THE SOUTH FLORIDA BUILDING CODE

CHANGE OF ADDRESS

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N°

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Board of Rules and Appeals
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PREFACE

The "South Florida Building Code" is dedicated to the development of better building construction and greater safety to the public through uniformity of building laws, to the granting of full justice of all building materials on the fair bases of true merit of each material, and to the development of a sound economic basis for the future growth of the area through unbiased and equitable structural design, inspection and the protection of human life and property from fire and other hazards.

For the purpose of clarity of reference the Code is divided and, as far as practicable, all detailed information or requirements relating to specific subjects has been grouped together and cross-referenced. The nomenclature of division and grouping is as follows:

Parts are designed by Roman numerals.

Chapters are designated by Arabic numbers and are added to Chapter numbers; thus 2704 is Chapter 27, the fourth section thereof.

Sub-sectionsare decimals added to Section numbers; thus 2704.2 is the second Sub-section in Section 2704.

Paragraphs are small-case letters in parenthesis; thus 2704.2 (c) is the third Paragraph in Sub-section 2704.2.

Sub-paragraphs are Arabic numbers in parenthesis; thus 2704.2 (c) (2) is the second Sub-paragraph in Paragraph 2704.2 (c).

Sub-sub-paragraphs, used as infrequently as possible, are doubled small-case letters in parentheses; thus 2704.2 (c) (2) (dd) is the fourth Sub-paragraph in Sub-paragraph 2704.2 (c) (2).

Two indexes have been provided. At the front of the book is a chronological title index. At the back of the book is an index by subject.

Certain appendices containing related descriptive material have been included. These appendices are not a part of the Code and have not been adopted as such by the legislative authority.

NOTES

This Special Act was incorporated in the Broward County Charter by public referendum as of March 9, 1976.

CHAPTER 71-575

AN ACT relating to Broward County repealing Chapter 69-917 and Chapter 70-616 Laws of Florida; adopting the Dade County 1970 edition of the South Florida Building Code as amended as the standard for Broward County; enforcement and inspection shall be the responsibility of elected or appointed officials in each municipality in the county; providing a penalty; removal from office for nonfeasance, misfeasance or malfeasance; provided that all laws, ordinances or resolutions in existence in any municipality or unincorporated area of Broward County in conflict herewith are repealed; the Board of County Commissioners, nor any municipality, may pass a law in conflict herewith; amending Section 203 of the South Florida Building Code relating to secretary to the Board of Rules and Appeals; amending Section 203 of the South Florida Building Code relating to secretary to the Board, office space, equipment and additional personnel by adding a new Sub-section (a); amending Sub-section (a) of Section 203.1 of the South Florida Building Code relating to membership of the Board of Rules and Appeals; amending Sub-section (b) of Section 204.1 of the South Florida Building Code relating to the term of Board membership, providing that all Board members appointed under Chapter 70-616 Laws of Florida are held over and reaffirmed to complete the terms appointed for; amending Section 203.2 relating to compensation for Board members, amending Sub-section (b) of Section 203.3 of the South Florida Building Code relating to officers and procedure; amending Sub-section (e) of Section 203.3 of the South Florida Building Code as it relates to a quorum; amending Sub-section (d) (2) of Section 203.4 of the South Florida Building Code as it relates to revisions to the Code; repealing Sub-section (d) (3) of Section 203.4 of the South Florida Building Code by adding new Sub-section (e) and a new Sub-section (f) relating to costs of appeal and procedure of appeal; amending Sub-section (a) (2) of Section 203.5 relating to the powers of the Board of Rules and Appeals; repealing Sub-section (c) of Section 203.6 of the South Florida Building Code; providing an effective date.

Be It Enacted by the Legislative of the State of Florida:

Section 1. Chapter 69-917 and Chapter 70-616 of the Special Acts, Laws of Florida are hereby repealed.

Section 2. The South Florida Building Code, Dade County 1970 edition, as amended, hereafter referred to as the South Florida Building Code, shall apply to all municipalities and unincorporated areas of Broward County, Florida.

(a) The South Florida Building Code as applicable to Broward County shall apply countywide in both incorporated and unincorporated areas to all new buildings and structures, both private and public and to all operations, additions and repairs in any new or existing building or structure, both private and public, including but not limited to all public or private school facilities, notwithstanding the provisions of Section 8 of the Florida Education Finance Act of 1973; county buildings or

structures; municipal and state buildings or structures; hospitals and any other building or structure of any governmental authority.

(b) The South Florida Building Code shall take precedence over and supersede the Southern Standard Building code in Broward County regardless of whether the Southern Standard Building Code may be more or less stringent that the South Florida Building Code.

Section 3.

(a) Inspection and enforcement of the South Florida Building Code (as amended for Broward County) by competent and qualified building inspectors shall be the responsibility of elected or appointed city commissioners, city councilmen and mayor of each municipality; and the responsibility of elected and appointed members of the Board of County Commissioners in all unincorporated areas within Broward County.

(b) Inspection of all school facilities shall be based on the minimum standards of the South Florida Building Code as applicable to Broward County, notwithstanding the provisions of Section 8, Sub-section 4, of the Florida Education Finance Act of 1973.

(c) The Board of Rules and Appeals shall certify each and every Building Department after it has determined to its satisfaction that the Building Inspectors which include the Building Official, Chief Plumbing Inspector and Chief Electrical Inspector are properly competent and qualified by the provisions of the South Florida Building Code as amended from time to time by the Broward County Board of Rules and Appeals. Those building departments not certified by the Board must utilize architects or engineers or professional architectural or consulting engineering firms meeting the requirements for a Building Official as prescribed in Section 201 of the South Florida Building Code or other certified building departments for inspections until they are capable of being certified by the Board. Violation of this Section by any appointed or elected official or officials shall constitute a misdemeanor of the second degree, punishable as provided in Florida Statutes, Sections 775.082 or 775.083.

Section 4.

(a) For the purpose of inspection, competent and qualified building inspectors shall be employed by these elected or appointed officials charged with the responsibility of enforcing this act. If any of the elected or appointed officials named in Section 3 of this act knowingly allow or permit any new buildings or structures, both private and public or any alterations, additions and repairs in any new or existing building or structure, both private and public, including but not limited to

public schools, county buildings or structures, municipal and state buildings or structures, hospitals, and any other building or structure of any governmental authority, to be erected within Broward County in violation of the South Florida Building Code, or if any of the elected or appointed officials prohibit, by any means, directly or indirectly, the use of any materials, types of construction and methods of design authorized by the Code or alternate materials, types of construction and methods of design approved by the provisions of the Code, then the elected or appointed official or officials may be removed from office for nonfeasance, misfeasance or malfeasance in office. Violation of this Section by an appointed or elected official shall constitute a misdemeanor of the second degree, punishable as provided in Florida Statutes Section 775.082 or 775.083.

(b) Any inspector (such as and including but not limited to structural, engineering, plumbing, mechanical or electrical) or other building official charged with enforcing or otherwise supervising or inspecting any work covered under any section of the South Florida Building Code as applicable to Broward County pursuant to Chapter 71-575, Laws of Florida, and who is required to hold or who otherwise holds a Certificate of Competency in any area of construction shall not use that Certificate of Competency to engage in free enterprise thereby competing against persons or firms whose work he may also inspect, nor may he allow his Certificate of Competency to be used by another person or firm.

Section 5. Any laws, ordinances of resolutions now in existence in the unincorporated areas in Broward County, or in any municipality in conflict herewith are hereby repealed.

Section 6. Neither the Board of County Commissioners nor any municipality may pass any law in conflict with this act, specifically but not limited to raising or lowering any standards in the South Florida Building Code.

History: Chapters 69-917, 70-616, 72-482, 72-485, 73-427, 74-435, 74-437, 74-448, and Referendum 11/6/84.

(See Sec. 203 for legislative enactment concerning the Broward County Board of Rules and Appeals).

1996
SOUTH FLORIDA BUILDING CODE
TITLE INDEX

PART I _ ADMINISTRATIVE **Page**

CHAPTER 1: TITLE AND SCOPE **1-1**
Sec. 101 Title
Sec. 102 Purpose
Sec. 103 Scope
Sec. 104 Application to Existing Buildings
Sec. 105 Maintenance of Buildings and Property

CHAPTER 2: ORGANIZATION AND ENFORCEMENT **2-1**
Sec. 201 Building Official and Inspectors
Sec. 202 Unsafe Buildings
Sec. 203 Board of Rules and Appeals
Sec. 204 Alternate Materials and Types of Construction
Sec. 205 Violations and Penalties
Sec. 206 Amendments to Code

CHAPTER 3: PERMITS AND INSPECTIONS **3-1**
Sec. 301 Permits Required
Sec. 302 Application
Sec. 303 Permit Fees
Sec. 304 Conditions of Permit
Sec. 305 Inspection
Sec. 306 Clean-up of Site
Sec. 307 Certificate of Occupancy
Sec. 308 Statements of the Structural Responsibility of Architects and Professional Engineers

PART II _ DEFINITIONS AND STANDARDS
CHAPTER 4: DEFINITIONS AND STANDARDS **4-1**
Sec. 401 Definitions
Sec. 402 Standards

PART III _ REQUIREMENTS BASED ON OCCUPANCY
CHAPTER 5: CLASSIFICATION AND GENERAL REQUIREMENTS **5-1**
Sec. 501 General Requirements
Sec. 502 Occupancy Classified
Sec. 503 Change in Use
Sec. 504 Occupant Content
Sec. 505 Adjoining Occupancy
Sec. 506 Fire Divisions
Sec. 507 Party Walls

Sec. 508 Occupancy Separations
Sec. 509 Hazardous Utilities
Sec. 510 Egress Facilities for Mixed Occupancies
Sec. 511 Location of the Property
Sec. 512 Sanitation
Sec. 513 Ceiling Heights
Sec. 514 Allowable Areas
Sec. 515 Accessibility for Physically Disabled and/or Handicapped
Sec. 516 Safeguards

CHAPTER 6: REQUIREMENTS OF GROUP A OCCUPANCIES 6-1
Sec. 601 Group A Occupancy Defined
Sec. 602 Construction Height and Area Allowable
Sec. 603 Location on Property
Sec. 604 Egress Facilities
Sec. 605 Light and Ventilation
Sec. 606 Enclosure of Vertical Openings
Sec. 607 Stages and Platforms
Sec. 608 Projection Rooms
Sec. 609 Special Hazards
Sec. 610 Plumbing and Sanitation
Sec. 611 Exceptions and Deviations
Sec. 612 Mixed Occupancy

CHAPTER 7: REQUIREMENTS OF GROUP B OCCUPANCIES 7-1
Sec. 701 Group B Occupancy Defined
Sec. 702 Construction Height and Area Allowable
Sec. 703 Location on Property
Sec. 704 Egress Facilities
Sec. 705 Light and Ventilation
Sec. 706 Enclosure of Vertical Openings
Sec. 707 Stages and Platforms
Sec. 708 Projection Room
Sec. 709 Special Hazards
Sec. 710 Plumbing and Sanitation
Sec. 711 Mixed Occupancy

CHAPTER 8: REQUIREMENTS OF GROUP C OCCUPANCIES 8-1
Sec. 801 Group C Occupancy Defined
Sec. 802 Construction, Height and Area Allowable
Sec. 803 Location on Property
Sec. 804 Egress Facilities
Sec. 805 Light and Ventilation
Sec. 806 Enclosure of Vertical Openings
Sec. 807 Stages and Platforms

Sec. 808 Projection Rooms
Sec. 809 Special Hazard
Sec. 810 Plumbing and Sanitation
Sec. 811 Exceptions and Deviations
Sec. 812 Mixed Occupancy

CHAPTER 9: REQUIREMENTS OF GROUP D OCCUPANCIES 9-1
Sec. 901 Group D Occupancy Defined
Sec. 902 Construction, Height and Area Allowable
Sec. 903 Location on Property
Sec. 904 Egress Facilities
Sec. 905 Light and Ventilation
Sec. 906 Enclosure of Vertical Openings
Sec. 907 Projection Rooms
Sec. 908 Special Hazards
Sec. 909 Plumbing and Sanitation
Sec. 910 Mixed Occupancy

CHAPTER 10: REQUIREMENTS OF GROUP E OCCUPANCIES 10-1
Sec. 1001 Group E Occupancy Defined
Sec. 1002 Construction, Height and Area Allowable
Sec. 1003 Location on Property
Sec. 1004 Egress Facilities
Sec. 1005 Light and Ventilation
Sec. 1006 Enclosure of Vertical Openings
Sec. 1007 Special Hazards
Sec. 1008 Plumbing and Sanitation
Sec. 1009 Mixed Occupancy

CHAPTER 11: REQUIREMENTS OF GROUP F OCCUPANCIES 11-1
Sec. 1101 Group F Occupancy Defined
Sec. 1102 Construction, Height and Area Allowable
Sec. 1103 Location on Property
Sec. 1104 Egress Facilities
Sec. 1105 Light and Ventilation
Sec. 1106 Enclosure of Vertical Openings
Sec. 1107 Special Hazards
Sec. 1108 Plumbing and Sanitation
Sec. 1109 Mixed Occupancy

CHAPTER 12: REQUIREMENTS OF GROUP G OCCUPANCIES 12-1
Sec. 1201 Group G Occupancy Defined
Sec. 1202 Construction, Height and Area Allowable
Sec. 1203 Location on Property
Sec. 1204 Egress Facilities

Sec. 1205 Light and Ventilation
Sec. 1206 Enclosure of Vertical Openings
Sec. 1207 Special Hazards
Sec. 1208 Plumbing and Sanitation
Sec. 1209 Mixed Occupancy

CHAPTER 13: REQUIREMENTS OF GROUP H OCCUPANCIES 13-1
Sec. 1301 Group H Occupancy Defined
Sec. 1302 Construction, Height and Area Allowable
Sec. 1303 Location on Property
Sec. 1304 Egress Facilities
Sec. 1305 Light and Ventilation
Sec. 1306 Enclosure of Vertical Openings
Sec. 1307 Special Hazards
Sec. 1308 Plumbing and Sanitation
Sec. 1309 Mixed Occupancy

CHAPTER 14: REQUIREMENTS OF GROUP I OCCUPANCIES 14-1
Sec. 1401 Group I Occupancy Defined
Sec. 1402 Construction, Height and Area Allowable
Sec. 1403 Location on Property
Sec. 1404 Egress Facilities
Sec. 1405 Light and Ventilation
Sec. 1406 Enclosure of Vertical Openings
Sec. 1407 Special Hazards
Sec. 1408 Plumbing and Sanitation
Sec. 1409 Mixed Occupancy

CHAPTER 15: REQUIREMENTS OF GROUP J OCCUPANCIES 15-1
Sec. 1501 Group J Occupancy Defined
Sec. 1502 Construction, Height and Area Allowable
Sec. 1503 Location on Property
Sec. 1504 Egress Facilities
Sec. 1505 Light and Ventilation
Sec. 1506 Enclosure of Vertical Openings
Sec. 1507 Special Hazards
Sec. 1508 Plumbing and Sanitation
Sec. 1509 Exceptions and Deviations
Sec. 1510 Mixed Occupancy

PART IV _ REQUIREMENTS BASED ON LOCATION IN FIRE ZONES
CHAPTER 16: FIRE ZONES 16-1
Sec. 1601 General
Sec. 1602 Restrictions in Fire Zone 1
Sec. 1603 Restrictions in Fire Zone 2

Sec. 1604 Restrictions in Fire Zone 3

PART V _ TYPES OF CONSTRUCTION
CHAPTER 17: CLASSIFICATION BY TYPES OF CONSTRUCTION 17-1
Sec. 1701 Classification
Sec. 1702 Existing Buildings

CHAPTER 18: TYPE I BUILDINGS (FIRE-RESISTIVE) 18-1
Sec. 1801 Definition
Sec. 1802 General
Sec. 1803 Structural Framework
Sec. 1804 Walls and Partitions
Sec. 1805 Floors
Sec. 1806 Roofs
Sec. 1807 Vertical Openings
Sec. 1808 Stairways
Sec. 1809 Doors and Windows
Sec. 1810 Projections from the Building
Sec. 1811 Roof Structures and Skylights
Sec. 1812 Combustible Materials Regulated

CHAPTER 19: TYPE II BUILDINGS (SEMI-FIRE-RESISTIVE) 19-1
Sec. 1901 Definition
Sec. 1902 General
Sec. 1903 Structural Framework
Sec. 1904 Walls and Partitions
Sec. 1905 Floors
Sec. 1906 Roofs
Sec. 1907 Vertical Openings
Sec. 1908 Stairways
Sec. 1909 Doors and Windows
Sec. 1910 Projections from the Building
Sec. 1911 Roof Structures and Skylights
Sec. 1912 Combustible Materials Regulated

CHAPTER 20: TYPE III BUILDINGS (ORDINARY MASONRY) 20-1
Sec. 2001 Definition
Sec. 2002 General
Sec. 2003 Structural Framework
Sec. 2004 Walls and Partitions
Sec. 2005 Floors
Sec. 2006 Roofs
Sec. 2007 Vertical Openings
Sec. 2008 Stairways
Sec. 2009 Doors and Windows

Sec. 2010 Projections from the Building
Sec. 2011 Roof Structures and Skylights
Sec. 2012 Combustible Materials Regulated

CHAPTER 21: TYPE IV BUILDINGS (INCOMBUSTIBLE) 21-1
Sec. 2101 Definition
Sec. 2102 General
Sec. 2103 Structural Framework
Sec. 2104 Walls and Partitions
Sec. 2105 Floors
Sec. 2106 Roofs
Sec. 2107 Doors and Windows
Sec. 2108 Projections from the Building
Sec. 2109 Roof Structures and Skylights
Sec. 2110 Combustible Material Regulated

CHAPTER 22: TYPE V BUILDINGS (WOOD FRAME) 22-1
Sec. 2201 Definition
Sec. 2202 General
Sec. 2203 Walls and Partitions
Sec. 2204 Floors
Sec. 2205 Roofs
Sec. 2206 Fireproofing
Sec. 2207 Stairways
Sec. 2208 Doors and Windows
Sec. 2209 Projections from the Building
Sec. 2210 Combustible Materials Regulated

PART VI _ ENGINEERING AND CONSTRUCTION REGULATIONS
CHAPTER 23: LIVE AND DEAD LOADS 23-1
Sec. 2301 Scope
Sec. 2302 Definitions and Standards
Sec. 2303 Design
Sec. 2304 Minimum Loads
Sec. 2305 Special Load Considerations
Sec. 2306 Load Combinations
Sec. 2307 Roof Live Loads
Sec. 2308 Live Load Reductions
Sec. 2309 Wind Loads
Sec. 2310 Live Loads Posted
Sec. 2311 Occupancy Permits
Sec. 2312 Foundation Design
Sec. 2313 Wave Force Design
Sec. 2314 Load Tests
Sec. 2315 Impact Tests for Windborne Debris

Sec. 2316 Impact Test Procedures

CHAPTER 24: EXCAVATIONS, FOOTINGS AND FOUNDATIONS 24-1
Sec. 2401 Excavations
Sec. 2402 Bearing Capacity of Soils
Sec. 2403 Soil Bearing Foundations
Sec. 2404 Pile Foundations
Sec. 2405 Foundation Walls and Grade Beams
Sec. 2406 Grades Under Buildings
Sec. 2407 Retaining Walls
Sec. 2408 Seawalls and Bulkheads

CHAPTER 25: REINFORCED CONCRETE 25-1
Sec. 2501 General
Sec. 2502 Standards
Sec. 2503 Definitions
Sec. 2504 Materials and Tests
Sec. 2505 Quality of Concrete
Sec. 2506 Mixing and Placing
Sec. 2507 Formwork, Embedded Pipes, and Construction Joints
Sec. 2508 Details of Reinforcement
Sec. 2509 Precast Concrete
Sec. 2510 Prestressed Concrete
Sec. 2511 Pneumatically-placed Concrete (Shotcrete)

CHAPTER 26: REINFORCED GYPSUM CONCRETE 26-1
Sec. 2601 General
Sec. 2602 Definitions and Standards
Sec. 2603 Design of Reinforced Gypsum Concrete
Sec. 2604 Construction Details of Reinforced Gypsum Concrete
Sec. 2605 Design of Insulating Concrete
Sec. 2606 Tests of Insulating Concrete
Sec. 2607 Construction Details of Insulating Concrete

CHAPTER 27: MASONRY 27-1
Sec. 2701 Design
Sec. 2702 Quality, Tests and Approvals
Sec. 2703 Allowable Unit Stresses in Masonry
Sec. 2704 Construction Details
Sec. 2705 Engineered Unit Masonry

CHAPTER 28: STEEL AND IRON 28-1
Sec. 2801 General
Sec. 2802 Material
Sec. 2803 Design Loads
Sec. 2804 Minimum Thickness of Material

Sec. 2805 Connections
Sec. 2806 Tubular Columns
Sec. 2807 Protection of Metal
Sec. 2808 Open Web Steel Joists
Sec. 2809 Cold-Formed Steel Construction
Sec. 2810 Metal Systems Building

CHAPTER 29: WOOD 29-1
Sec. 2901 General
Sec. 2902 Quality
Sec. 2903 Sizes
Sec. 2904 Unit Stresses
Sec. 2905 Vertical Framing
Sec. 2906 Horizontal Framing
Sec. 2907 Firestops
Sec. 2908 Anchorage
Sec. 2909 Sheathing
Sec. 2910 Furring
Sec. 2911 Connectors
Sec. 2912 Wood Supporting Masonry
Sec. 2913 Protection of Wood
Sec. 2914 Fire Retardant Wood
Sec. 2915 Fire Retardant Treated Shakes and Shingles

CHAPTER 30: ALUMINUM 30-1
Sec. 3001 General
Sec. 3002 Allowable Unit Stresses
Sec. 3003 Design
Sec. 3004 Fabrication and Construction Details

PART VII _ DETAILED REGULATIONS
CHAPTER 31: MEANS OF EGRESS 31-1
Sec. 3101 General
Sec. 3102 Required Means of Egress
Sec. 3103 Doors
Sec. 3104 Corridors and Exterior Balconies
Sec. 3105 Stairways
Sec. 3106 Ramps
Sec. 3107 Horizontal Exit
Sec. 3108 Exit Enclosures
Sec. 3109 Smokeproof Enclosures
Sec. 3110 Exit Discharge
Sec. 3111 Exit Courts, Exit Passageways, and Yard Areas
Sec. 3112 Illumination of Means of Egress, Emergency Lighting and Signs
Sec. 3113 Aisles

Sec. 3114 Seats
Sec. 3115 Group A Occupancies
Sec. 3116 Group B Occupancies
Sec. 3117 Group C Occupancies
Sec. 3118 Group D Occupancies
Sec. 3119 Group E Occupancies
Sec. 3120 Group F Occupancies
Sec. 3121 Group G Occupancies
Sec. 3122 Group H & I Occupancies
Sec. 3123 Group J Occupancies
Sec. 3124 Covered Malls, Walkways and Passageways
Sec. 3125 Special Hazards
Sec. 3126 Fire Alarms

CHAPTER 32: ELEVATOR AND ESCALATORS 32-1
Sec. 3201 Standards
Sec. 3202 Definitions
Sec. 3203 General
Sec. 3204 Elevators
Sec. 3205 Escalators, Dumbwaiters and Moving Stairways
Sec. 3206 Transporting Assemblies

CHAPTER 33: PRECAUTIONS DURING BUILDING OPERATIONS 33-1
Sec. 3301 General
Sec. 3302 Demolition
Sec. 3303 Excavation
Sec. 3304 Sidewalk Sheds and Fences
Sec. 3305 Storage of Material
Sec. 3306 Hoisting Machinery
Sec. 3307 Derricks and Cranes
Sec. 3308 Cables, Ropes, Chains and Blocks
Sec. 3309 Platforms Hoists
Sec. 3310 Hoist Towers
Sec. 3311 Temporary Flooring
Sec. 3312 Floor Openings
Sec. 3313 Runways and Ramps
Sec. 3314 Temporary Stairs
Sec. 3315 Ladders
Sec. 3316 Scaffolds
Sec. 3317 Safeguards
Sec. 3318 Temporary Light and Power
Sec. 3319 First Aid
Sec. 3320 Sanitation
Sec. 3321 Welding and Cutting

Sec. 3322 Open Fires
Sec. 3323 Fire Protection
Sec. 3324 Special Hurricane Precautions

CHAPTER 34: ROOF COVERINGS AND APPLICATION 34-1
Sec. 3401 Roof Coverings
Sec. 3402 Built-up and Prepared Roof Covering Application
Sec. 3403 Cement and Clay Tile
Sec. 3404 Metal Shingles
Sec. 3405 Wood Shingles and Shakes
Sec. 3406 Roof Insulation
Sec. 3407 Roofing Accessories
Sec. 3408 Other Roof Covering Materials
Sec. 3409 Roof Mounted Equipment

CHAPTER 35: CLADDING AND GLAZING 35-1
Sec. 3501 General
Sec. 3502 Lathing
Sec. 3503 Plaster
Sec. 3504 Stucco
Sec. 3505 Plastics
Sec. 3506 Reserved For Future Use
Sec. 3507 Tile
Sec. 3508 Windows, Doors, Glass and Glazing
Sec. 3509 Glass Veneer
Sec. 3510 Gypsum Board Products and Accessory Items
Sec. 3511 Suspended and Furred Ceiling
Sec. 3512 Other Materials
Sec. 3513 Storm Shutters

CHAPTER 36: OCCUPANCY OF PUBLIC AND RESTRICTED PROPERTY ... 36-1
Sec. 3601 General
Sec. 3602 Temporary Occupancy
Sec. 3603 Permanent Occupancy
Sec. 3604 Restricted Areas

PART VIII _ FIRE-RESISTIVE STANDARDS AND PROTECTION
CHAPTER 37: FIRE-RESISTIVE STANDARDS 37-1
Sec. 3701 General
Sec. 3702 Fire-Resistive Materials
Sec. 3703 Protection for Structural Members
Sec. 3704 Walls and Partitions
Sec. 3705 Floors and Ceilings
Tables No. 37-A, 37-B, 37-C Fire Rated Assemblies
Sec. 3706 Fire-Resistive Assemblies for the Protection of Openings

Sec. 3707 Fire-Retardant Roof Coverings
Sec. 3708 Interior Finishes
Sec. 3709 Insulating Materials
Sec. 3710 Calculated Fire Resistance

CHAPTER 38: FIRE-EXTINGUISHING APPARATUS 38-1
Sec. 3801 Automatic-Sprinkler Systems
Sec. 3802 Carbon Dioxide Fire-Extinguishing Systems
Sec. 3803 Standpipes and Hose Stations
Sec. 3804 Water Supply
Sec. 3805 Fire-Department Connections
Sec. 3806 Yard Hydrants
Sec. 3807 Portable Fire Extinguishers
Sec. 3808 Inspections and Tests

CHAPTER 39: CHIMNEYS, FLUES, VENTS AND FIREPLACES 39-1
Sec. 3901 General
Sec. 3902 Type A Flues or Vents
Sec. 3903 Type B Flues or Vents
Sec. 3904 Type BW Flues or Vents
Sec. 3905 Smokepipes
Sec. 3906 Fireplaces

CHAPTER 40: HEAT-PRODUCING APPARATUS 40-1
Sec. 4001 General
Sec. 4002 Gas-burning Appliances
Sec. 4003 Electric Appliances
Sec. 4004 Oil-Burning Appliances
Sec. 4005 Solid-Fuel-Burning Appliances
Sec. 4006 Boilers
Sec. 4007 Incinerators
Sec. 4008 Solar Heaters
Sec. 4009 Combustion Engines

CHAPTER 41: SPECIAL HAZARDS 41-1
Sec. 4101 Transformer Vaults
Sec. 4102 Flammable Liquids
Sec. 4103 Film
Sec. 4104 Explosives
Sec. 4105 Radiation Protection
Sec. 4106 Paint Spray Booths and Dip Tanks
Sec. 4107 Boat Storage Facilities

PART IX _ SIGNS
CHAPTER 42: SIGNS 42-1
Sec. 4201 General

Sec. 4202 Definitions
Sec. 4203 Erection Permits
Sec. 4204 Inspection
Sec. 4205 Design
Sec. 4206 Limitations on Roof Signs
Sec. 4207 Limitations on Ground Signs
Sec. 4208 Limitations on Projecting Signs
Sec. 4209 Limitations on Wall or Flat Signs
Sec. 4210 Limitations on Marquee Signs
Sec. 4211 Use of Plastic Materials
Sec. 4212 Detailed Requirements
Sec. 4213 Lighting

PART X _ FABRIC AWNINGS, CANOPIES AND TENTS AND MEMBRANE STRUCTURES
CHAPTER 43: FABRIC AWNINGS, CANOPIES AND TENTS AND MEMBRANE STRUCTURES 43-1
Sec. 4301 General
Sec. 4302 Definitions
Sec. 4303 Permits and Inspections
Sec. 4304 Location and Use of Fabric Awnings and Canopies
Sec. 4305 Construction of Fabric Awnings and Canopies
Sec. 4306 Tents
Sec. 4307 Membrane Structures

CHAPTER 44: RIGID AWNINGS, RIGID SUN SHADES, CANOPIES, SCREEN ENCLOSURES AND UTILITY SHEDS 44-1
Sec. 4401 General
Sec. 4402 Permits and Inspections
Sec. 4403 Design
Sec. 4404 Location

PART XI _ ELECTRICAL
CHAPTER 45: ELECTRICAL 45-1
Sec. 4501 Administration
Sec. 4502 Definitions
Sec. 4503 Standards
Sec. 4504 Electrical Materials and Types of Construction
Sec. 4505 Permits and Inspections
Sec. 4506 Services, Meter Rooms and Electrical Equipment Rooms
Sec. 4507 Wiring Methods and Materials
Sec. 4508 Branch Circuits
Sec. 4509 Feeders
Sec. 4510 Conductors for Wiring
Sec. 4511 Temporary Wiring

Sec. 4512 Low Voltage Wiring
Sec. 4513 Special Requirements
Sec. 4514 Sign Installations

PART XII _ PLUMBING AND GAS
CHAPTER 46: PLUMBING 46-1
Sec. 4601 Administrative
Sec. 4602 Definitions
Sec. 4603 General
Sec. 4604 Materials
Sec. 4605 Drainage System and Disposal
Sec. 4606 Indirect Waste Piping and Special Wastes
Sec. 4607 Joints and Connections
Sec. 4608 Traps and Cleanouts
Sec. 4609 Hangers and Supports
Sec. 4610 Vents and Venting Systems
Sec. 4611 Storm Drainage System
Sec. 4612 Interceptors and Separators
Sec. 4613 Plumbing Fixtures
Sec. 4614 Water Supply and Distribution
Sec. 4615 Septic Tanks and Drainfields
Sec. 4616 Supply and Disposal Wells
Sec. 4617 Fire-Extinguishing Apparatus
Sec. 4618 Swimming Pools
Sec. 4619 Trailer Coaches and Trailer Parks
Sec. 4620 Cross Connection, Backflow and Backsiphonage

CHAPTER 47: GAS 47-1
Sec. 4701 General
Sec. 4702 Standards
Sec. 4703 Permits
Sec. 4704 Inspection

PART XIII _ MECHANICAL VENTILATION
CHAPTER 48: MECHANICAL SYSTEMS 48-1
Sec. 4801 General Administrative
Sec. 4802 Definitions
Sec. 4803 Mechanical Ventilation
Sec. 4804 Air Conditioning and Refrigeration
Sec. 4805 Equipment
Sec. 4806 Ducts and Duct Systems
Sec. 4807 Piping
Sec. 4808 Weatherproofing and Insulation
Sec. 4809 Maintenance

CHAPTER 49: FLORIDA ENERGY CODE **49-1**
PART XIV _ SPECIAL SUBJECTS
CHAPTER 50: SWIMMING POOLS **50-1**
Sec. 5001 General
Sec. 5002 Design
Sec. 5003 Construction Details
Sec. 5004 Water Supply and Disposal
Sec. 5005 Equipment
Sec. 5006 Inspection

CHAPTER 51: FIRE SUPPRESSION _ LIFE SAFETY SYSTEM **51-1**
Sec. 5101 Scope
Sec. 5102 Fire Sprinkler System
Sec. 5103 Fire Alarm System
Sec. 5104 Fire Detection System
Sec. 5105 Central Control Station
Sec. 5106 Voice Communication System
Sec. 5107 Smoke Control
Sec. 5108 Elevators
Sec. 5109 Emergency Systems
Sec. 5110 Exits
Sec. 5111 Buildings Over 50 Feet to 75 Feet in Height

CHAPTER 52: FIRE PREVENTION CODE **52-1**

APPENDICES (Pink pages)
Schedule of Piping System Materials A-1
Minimum Fixture Clearances A-2
Boat Size Classifications A-3

INDEX (Yellow pages) **I-1**

PART I
ADMINISTRATIVE

CHAPTER 1
TITLE AND SCOPE

101 TITLE
102 PURPOSE
103 SCOPE
104 APPLICATION TO EXISTING BUILDINGS
105 MAINTENANCE OF BUILDINGS AND PROPERTY

101 TITLE

This compilation of rules shall be known as "The South Florida Building Code," may be cited as such, or as the "Building Code" (prefixing the name of the legislative body adopting it by ordinance) and will be referred to hereinafter as "this Code."

102 PURPOSE

The purpose of this Code is to provide certain minimum standards, provisions and requirements for safe and stable design, methods of construction and uses of materials in buildings and/or structures hereafter erected, constructed, enlarged, altered, repaired, moved, converted to other uses or demolished, to provide for the safety of workers and others during these operations and to regulate the equipment, materials, use and occupancy of all buildings and/or structures. The provisions of this Code shall be deemed to supplement any and all State laws of the State of Florida relating to building.

103 SCOPE

103.1 New buildings and structures hereafter erected in any jurisdiction in which this Code has been adopted and structures moved into or within jurisdiction shall conform to the requirements of this Code.

103.2 Additions, alterations, repairs and changes of use or occupancy in all buildings and structures shall comply with the provisions for new buildings and structures except as otherwise provided in Sections 104 and 503 of this Code.

103.3 A previously issued lawful permit shall be valid on the terms of the Code under which it was issued, provided, however, that such permit shall be subject to the limitations as specified in Section 304.

103.4 The provisions of this Code shall not be applicable to the fabrication, utilization, operation, construction, repair, maintenance, alteration, assembly or disassembly of any temporary sets, assemblies or structures used in commercial motion picture or television production, or any sound recording equipment used in such production, on or off the producer's premises; provided however, that all temporary plumbing installations shall be installed so as not to create a sanitary nuisance as defined by Section 386.01, Florida Statutes, and the Building Official may at reasonable times inspect such plumbing installations to determine that such installations are not a threat to the health, welfare and safety of the public; and provided further, the producer shall comply with the provisions of Article 530 of the National Electrical Code, adopted by Sub-section 4502.1 of Chapter 45 of this Code, but need not comply with other provisions of Chapter 45 of this Code; however, in lieu thereof, a permit shall be required and issued to the producer, upon the filing of an application by the producer, for one electrical permit to cover each complete motion picture production or television series, which need not be accompanied by plans or specifications but such application shall be accompanied by a shooting schedule listing the different locations and sets and times when the electrical

equipment will be installed or reinstalled at such locations and sets for the purpose of providing opportunity for inspections of such installations or reinstallations by the Building Official and the producer shall advise the Building Official of any changes in such schedule for the same purpose. The permit fee shall be based upon the number of such installations and reinstallations and shall be calculated upon the established fee for generator installations.

104 APPLICATION TO EXISTING BUILDINGS

104.1 GENERAL:

(a) Existing buildings or structures to which additions, alterations, repair or changes of Group of Occupancy are proposed or intended shall be made to comply with all the requirements for new buildings or structures of like area, height, type of construction or Group of Occupancy, except as provided in this Section.

(b) The requirements of this Section shall not supersede specific requirements of Chapter 16 herein.

For construction in Fire Zones, see Chapter 16.

104.2 ADDITIONS:

(a) When additions, or alterations increasing floor area, are made to an existing building, and the addition and existing buildings are separated by a fire division wall, the addition shall conform to all the requirements of this Code applicable to a building of the area of the addition.

(b) Where the existing building and the addition are not separated by a fire division wall and the area of the addition is 25 percent or more of the area of the existing building, the existing building and the addition shall be made to comply with all requirements of this Code for a building of area equal to the combined area of the addition and existing building.

EXCEPTION: Existing buildings shall not be required to be upgraded to the structural requirements of the Code in effect on the date of application of the permit for the addition.

(c) Where the existing building and the addition are not separated by a fire division wall and the area of the addition is less than 25 percent of the area of the existing building, the addition shall conform to all requirements of this Code applicable to the building of the combined area of the existing building and the addition; and the existing building shall conform to the requirements of this Code applicable to facilities for means of egress and automatic fire-extinguishing systems for a building of the combined area of the addition and existing building.

104.3 REPAIRS AND ALTERATIONS:

(a) Repairs and alterations not increasing the area of the building, made within any 12 month period, shall be as set forth in this Sub-section.

(b) Structural repairs and alterations, the cost of which does not exceed 25 percent of the value of the existing building or structure, shall comply with the requirements for new buildings or structures except that minor structural alterations, with the approval of the Building Official, may be made of the same material and degree of fire-resistivity of which the building or structure is constructed.

(c) (1) Non-structural repairs and alterations exclusive of fixtures and furniture, the cost of which does not exceed 25 percent of the value of the existing building or structure and which does not effect egress or fire-resistivity, may be made of the same material of which the building or structure is constructed.

(2) The replacement of garage doors, exterior doors, skylights, operative and inoperative windows, where the total cost of the alteration or repair does not exceed 25 percent of the value of the existing structure/building and which does not effect egress and fire-resistivity, shall be designed and constructed in accordance with Chapter 23 of this Code.

EXCEPTION: Buildings and structures located outside the coastal construction zone and westward

of the coastal construction line with a permit application date preceding September 1, 1994 shall be designed and constructed in accordance with Table 35-H of this Code, however, need not comply with Section 2315.

Buildings and structures located within the coastal construction zone and eastward of the coastal construction line with a permit application date preceding September 1, 1994 shall be designed and constructed in accordance with Chapter 23 of this Code, however, need not comply with Section 2315.

(d) Repairs and alterations amounting to over 25 percent but not exceeding 50 percent of the value of the existing building may be made during any 12 month period without making the entire existing building comply provided such repairs and alterations comply with the requirements of this Code for a building of like area, height and Occupancy.

(e) When repairs and alterations amounting to more than 50 percent of the value of the existing building are made during any 12 month period, the building or structure shall be made to conform to the requirements for a new building or structure or be entirely demolished.

EXCEPTION: Provided there is no change in occupancy. Foundation, slabs, tie beams, tie columns, reinforced masonry and masonry walls erected in compliance with the Code under which the building was constructed.

(f) EXCEPTION: Those property improvements involuntarily altered by right of eminent domain need only to meet the requirements of the Code in force at the time of original construction.

104.4 ROOFING: Not more than 25 percent of the roof covering of any building or structure shall be replaced in any 12 month period unless the entire roof covering is made to conform to the requirements of this Code.

104.5 VALUE DETERMINATION: For the purpose of this Section, the value of a building or structure shall be the estimated cost of constructing a new building of like size, design and materials at the site of the original structure, assuming such site to be clear and deducting therefrom an amount for depreciation, deterioration and damage before such proposed new construction is started. For the purpose of this Section, cost of additions, and repairs shall be construed as the total cost of labor, materials and services, based on current prices for new materials.

104.6 STRUCTURAL DETERMINATION: For purposes of this Section, structural shall mean any part, material or assembly of a building or structure which affects the safety of such building or structure and/or which supports any dead or designed live load and the removal of which part, material or assembly could cause, or be expected to cause, all or any portion to collapse or to fail.

104.7 CHANGE OF OCCUPANCY:

(a) Any existing building for which the Group of Occupancy is changed from its former or existing Group of Occupancy shall be required to have stairways, egress and fire-extinguishing apparatus as set forth herein for buildings, hereafter erected for similar Groups of Occupancy, whether or not such building complies with other requirements of this Code for new structures.

(b) Any existing building for which the Group of Occupancy is changed shall comply with all the requirements for a new building of like Group of Occupancy and Type of Construction except as follows:

(1) Where each existing building fails to comply in only the single respect that it is of Type III construction and exceeds two stories in height, this height limitation for Type III construction may be extended to four stories provided the building is equipped with an approved automatic fire-extinguishing system.

(2) Where, in the opinion of the Building Official and/or Chief Fire Official, based on life and fire risk, the proposed Group of Occupancy is not more hazardous than the existing use, he may approve such change of Group or Occupancy and require compliance with the requirement of this Code for buildings of like Group of Occupancy to the extent of all, none or only those requirements which, in his opinion, are specifically

pertinent to safeguard the life, health and welfare of persons.

(3) Where each existing building fails to comply in only the single respect that under the new Group of Occupancy the building is required to be of Type III construction and the existing building is Type V construction and does not exceed two stories in height, the Group of Occupancy may be changed if the building is equipped with an approved automatic fire extinguishing system provided the distance separation is a minimum of 20 feet.

(c) Change of Group of Occupancy shall not be construed to be a change of tenants or ownership where the Group of Occupancy remains the same, and the fact that a building is vacant or has not been tenanted does not change its Group of Occupancy from its most recent Group of Occupancy.

104.8 EXISTING BUILDINGS:

(a) "Any existing building, which complied with the Code in effect at the date of issuance of the permit or at the time of establishment of its present Group of Occupancy, may continue in its approved Group of Occupancy but such continued approval may not be construed to prohibit the inspection authority from at any time requiring that the minimum standards of safety such as, but not limited to, strength, egress, fire-resistance, openings in walls, or electrical, or plumbing, mechanical or elevator equipment or fire extinguishing apparatus be maintained during the period of use of the building in accordance with The South Florida Building Code in effect on the date of issuance of the permit."

(b) (1) "Any existing building which complied with the Code in effect on the date of issuance of the permit or at the time of establishment of its present Group of Occupancy, may be continued to be used in its present Group of Occupancy."

(2)"Approval for such continued use may not be construed to prohibit the inspection authority from, at any time, requiring compliance with minimum standards of safety, strength, egress, fire-resistance, openings in walls, electrical or plumbing equipment or fire extinguishing apparatus which was required by the South Florida Building Code in effect at the time the building permit was issued."

(3)"Minimum standards of safety shall be in accordance with this Code, regularly adopted fire codes, or minimum housing codes, whichever code affords the greatest degree of life safety except the requirements set forth herein in Chapter 51."

(c)"Existing Building Code violations that are discovered by an inspection authority (City and/or County building and/or fire department and/or Board of Rules and Appeals), an owner and/or an owner's representatives(s) and/or any interested party shall be cited by the Building Official and/or Chief Fire Official for such violations. All such violations shall be repaired and corrected in accordance with the South Florida Building Code in effect on the date the structure received a building permit. Existing buildings shall comply with Life Safety Code 101 as referenced in this Code."

104.9 HISTORICAL BUILDINGS: The provisions of this Code, including Chapter 16, shall not apply to existing buildings and structures within Broward County which are of historical significance, or are within a historical area, as determined or designated by ordinance duly passed by a governmental entity in accordance with law. Buildings so designed or located may be restored or rehabilitated in accordance with plans approved by the Building and Zoning Department of said governmental entity, provided that the health, safety and welfare of the public shall not be endangered thereby.

105 MAINTENANCE OF BUILDINGS AND PROPERTY

105.1 BUILDINGS:

(a) The requirements contained in this Code, covering the maintenance of buildings, shall apply to all buildings and/or structures now existing or hereafter erected. All buildings and/or structures and all parts thereof shall be maintained in a safe condition, and all devices or safeguards which are required by this Code shall be maintained in good working order.

(b) This Sub-section shall not be construed as permitting the removal or non-maintenance of any existing devices or safeguards unless authorized by the Building Official and/or Chief Fire Official.

105.2 PROPERTY: No debris of any kind shall remain on any lot or on a sidewalk or street contiguous thereto, resulting from a fire, windstorm or from demolition or partial demolition of any building; nor shall any equipment, excess building materials, storage sheds or debris remain upon any such lot, sidewalk or street, upon completion of any new building upon such lot; nor shall any equipment, materials, tool shed or debris be stored on any vacant or partially vacant lot, except as provided for in the Zoning Ordinances. It is hereby made the duty of the owner or his agent to remove or cause to be removed from such sidewalk street and/or lot all such equipment, materials, tool sheds and debris within five days after written notice by the Building Official. For failure to comply with such notice after such period of five days, the owner and/or permit holder is subject to the penalties specified herein, the Certificate of Occupancy for the structure or structures may be revoked and the Building Official shall have the work done and public property restored and shall notify the legal authority, who shall institute the necessary action to have the costs placed as a lien against the property.

105.3 HURRICANE PRECAUTIONS: During such periods of time as are designated by the United States Weather Bureau as being a hurricane warning or alert, the owner, occupant or user of a property shall take precaution for the securing of buildings and equipment. Canvas awnings and swing signs shall be lashed to rigid construction, tents shall be taken down and stored or lashed to the ground, and such other precautions shall be taken for the securing of buildings or structures or material or equipment as may be reasonably required.

CHAPTER 2
ORGANIZATION AND ENFORCEMENT

201 BUILDING OFFICIAL AND INSPECTORS
202 UNSAFE BUILDINGS
203 BOARD OF RULES AND APPEALS
204 ALTERNATE MATERIALS AND TYPES OF CONSTRUCTION
205 VIOLATION AND PENALTIES

201 BUILDING OFFICIAL AND INSPECTORS

201.1 (A) BUILDING OFFICIAL:

(1) APPOINTMENT, POWERS AND DUTIES OF A BUILDING OFFICIAL: There shall be appointed by the appointing authority a person qualified as set forth in Sec. 201 to serve as Building Official. The Building Official shall be the principal enforcing officer of this Code and it shall be his duty and responsibility to coordinate the work of all subordinate inspectors. In the event that the Building Official is not available to perform his duties, the appointing authority shall appoint an Interim Building Official provided such person is qualified as set forth in Sec 201.1 (A) (7) of this Code, and further provided that the Board of Rules and Appeals is notified in writing by the Building Official of the starting date and period of time that the Interim Building Official will assume the Building Official's duties. The name of the Interim Building Official will be recorded by the Board of Rules and Appeals, but he will not be issued a certification card as a Building Official. If there is one Inspector hired by an inspection authority, that Inspector shall be a Building Official. It shall be his duty and responsibility to coordinate the work of all subordinate Inspectors.

(2) POWERS OF BUILDING OFFICIAL: The Building Official shall be subject to the powers vested in the Board of Rules and Appeals as set forth in Sec. 203 of this Code. The Building Official shall delegate powers, duties and assignments to certified Chief Inspectors to interpret the provisions of this Code in categories in which the Building Official is not certified.

(3) RIGHT OF ENTRY: Upon presentation of proper credentials, the Building Official or his duly authorized representative may enter, at any reasonable time, any building, structure or premises for the purpose of inspection or to prevent violation of this Code.

(4) STOP-WORK ORDERS: Whenever any building work is being done contrary to the provisions of this Code or is being done in an unsafe or dangerous manner, the Building Official or his duly authorized representative may order such work stopped, or may order the person or persons engaged in the doing or causing of such work to be done and such persons shall immediately stop such work until arrangements, in compliance with the provisions of this Code and satisfactory to the Building Official or his duly authorized representatives have been made, at which time he may authorize the work to proceed.

(5) CONCEALED WORK: The Building Official or his duly authorized representative may order portions of the structural frame of a building and/or structure to be exposed for inspection when in his opinion there are good reasons to believe that a building or portion thereof is in an unsafe or dangerous condition or that there is willful or negligent concealment of a violation of this Code.

(6) OCCUPANCY: Whenever any building or portion thereof is being used or occupied contrary to the provisions of this Code, the Building Official or his duly authorized representative shall order such use or occupancy discontinued and the building or portion thereof vacated. Such order shall be by notice, in writing, served on the person or persons using or causing to be used such building or portion thereof. Within a reasonable period of time after receipt of such notice or order, such building or portion thereof shall be made to comply with

the requirements of this Code; however, in the event of an emergency, Sub-section 202.5 shall apply.

(7) CERTIFICATION OF BUILDING OFFICIAL: To be eligible for appointment as a Building Official, such person shall be certified by the Board of Rules and Appeals and shall meet one or more of the following qualifications.

(a) A Florida Registered Professional Engineer and having practiced within the area of jurisdiction of this Code for

at least three years.

(b)A Florida Registered Architect and having practiced within the area of jurisdiction of this Code for at least three years.

(c) Ten years experience as a General Contractor (Unlimited), Electrical Contractor, Plumbing Contractor or Mechanical Contractor, 5 years of which shall have been within the jurisdiction of this Code; or 5 years experience as a Building Official, Building Inspector, Chief Electrical Inspector, Chief Plumbing Inspector or Chief Mechanical Inspector, 3 years of which shall have been within the jurisdiction of this Code. Each of the aforementioned must possess a current Certificate of Competency issued by one of the following:

(1) Florida Construction Industry Licensing Board.

(2) Broward County Central Examining Board Certificate of Competency.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored examination graded by an independent testing agency approved by the Board of Rules

and Appeals.

(8) (a) ASSISTANT BUILDING OFFICIAL: To be eligible for appointment as an Assistant Building Official, such person shall be certified by the Board of Rules and Appeals and shall meet the qualifications equal to the requirement for Building Official.

(b) DUTIES AND POWERS OF ASSISTANT BUILDING OFFICIAL: The Assistant Building Official shall be responsible for duties as assigned by the Building Official. The Assistant Building Official shall fulfill the duties of the Building Official during the absence of the Building Official with full responsibilities of the position.

201.2 (A) CHIEF BUILDING INSPECTOR OR BUILDING PLANS EXAMINER:

(1) APPOINTMENT AND DUTIES OF A CHIEF BUILDING INSPECTOR: There shall be appointed by the appointing authority a person qualified as set forth in Sec. 201 to serve as Chief Building Inspector. If there is one Building Inspector hired by an inspection authority, that Inspector shall be a Chief Building Inspector. It shall be his duty and responsibility to coordinate the work of all subordinate Inspectors.

(2) POWERS OF CHIEF BUILDING INSPECTOR: The Chief Building Inspector shall be subject to the powers vested in the Board of Rules and Appeals as set forth in Sec. 203 of this Code. The Chief Building Inspector shall have the power to delegate powers, duties and assignments to subordinate regular employees working under his authority, but only to those employees certified by the Board of Rules and Appeals as qualified to perform such powers, duties and assignments. The Chief Building Inspector may not delegate authority to subordinate employees to interpret the provisions of this Code (except certified Chief Inspectors).

(3) CERTIFICATION OF CHIEF BUILDING INSPECTOR OR BUILDING PLANS EXAMINER: To be eligible for appointment as a Chief Building Inspector or Building Plans Examiner, such person shall be certified by the Board of Rules and Appeals and shall meet one or more of the following qualifications:

(a) A Florida Registered Professional Engineer and having practiced within the area of jurisdiction of this Code for at least 3 years, and 2 years as a Building Inspector under the jurisdiction of this Code.

(b)A Florida Registered Professional Architect and having practiced within the area of jurisdiction of this Code for at least 3 years, and 2 years as a Building Inspector under the jurisdiction of this Code.

(c) Ten years experience as a licensed General Contractor, 5 years of which shall have been within the jurisdiction of this Code, and include 2 years as a Building Inspector; or 5 years experience as a Building Official or Building Inspector, 3 years of which shall have been within the jurisdiction of this Code. If a presently certified Building Inspector attains an Associate of Science Degree in Building Code Enforcement for the completion of a course of education approved by the Board of Rules and Appeals, then the above requirements are changed to five years experience as a licensed General Contractor, two years of which shall have been within the jurisdiction of this Code, and include two years as a Building Inspector; or three years experience as a Building Official or Building Inspector which have been within the jurisdiction of this Code. Each of the aforementioned must possess a current Certificate of Competency as a General Contractor issued by:

(1) Florida Construction Industry Licensing Board.

(2) Broward County Central Examining Board Certificate of Competency as Class "A" Unlimited General Contractor.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored examination graded by an independent testing agency approved by the Board of Rules and Appeals.

(d)(FOR PLANS EXAMINER ONLY) Five years experience as a licensed General Contractor and include two years within the jurisdiction of this Code, two years experience as a Building Inspector. A presently certified Building Inspector may submit evidence in the form of official transcripts, indicating satisfactory performance and relevant courses, from a State approved institute of formal education in Architecture, Engineering or Building Construction for equivalent experience up to but not over ½ of the two years experience required as a Building Inspector, including attendance at the formal education course on building codes approved by the Board of Rules and Appeals.

(B) BUILDING INSPECTOR: (STRUCTURAL)

(1) A Building Inspector, if properly qualified, may be certified and assigned duties in more than one category.

(2) Such employee shall have the duties and powers as delegated by the Chief Building Inspector except that the Chief or Head of the Division or Department of Building Inspectors may not delegate authority to subordinates to interpret provisions of this Code.

(3) To be certified, a Building Inspector shall meet one or more of the following requirements:

(a) A Florida Registered Professional Engineer and having practiced within the area of jurisdiction of this Code for at least three years.

(b)A Florida Registered Architect and having practiced within the area of jurisdiction of this Code for at least three years.

(c) Five years construction experience in a supervisory capacity of which at least 2 years shall have been within the jurisdiction of this Code and possessing a current Certificate of Competency as a General Contractor issued by:

(1) Florida Construction Industry Licensing Board.

(2) Broward County Central Examining Board Certificate of Competency as Class "A" Unlimited General Contractor.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored examination graded by an independent testing agency approved by the

Board of Rules and Appeals.

(5) Two years construction experience and possessing an Associate of Science Degree in Building Code Enforcement awarded for completion of an educational course approved by the Board of Rules & Appeals and possess a current Certificate of Competency as a General Contractor, etc.

(C) ROOFING INSPECTOR:

(1) A Roofing Inspector, if properly certified, may be assigned only to perform Roofing Inspectors.

(2) Roofing Inspectors, shall have the powers and duties as may be assigned by the Chief Building Inspector or Building Official.

(3) Presently Certified Building Inspectors may be assigned duties as a Roofing Inspector.

(4) To be certified, A Roofing Inspector shall meet one or more of the following requirements:

(a)A Florida Registered Professional Engineer having roofing expertise and having practiced within the area of jurisdiction of this Code for at least three years.

(b)A Florida Registered Architect having roofing expertise and having practiced within the area of jurisdiction of this Code for at least three years.

(c)A Licensed General Contractor with roofing experience and expertise in the area of jurisdiction of this Code for at least five years.

(d)A Licensed Roofing Contractor with experience in the area of jurisdiction of this Code for at least five years.

201.3 (A) CHIEF ELECTRICAL INSPECTOR OR ELECTRICAL PLANS EXAMINER:

(1) APPOINTMENT AND DUTIES OF A CHIEF ELECTRICAL INSPECTOR: There shall be appointed by the appointing authority a person qualified to serve as a full time Chief Electrical Inspector. A full time Chief Electrical Inspector shall be mandatory and his subordinates are supervised at all times. If there is one Electrical Inspector hired by an inspection authority, that Inspector shall be a Chief Electrical Inspector. It shall be his duty and responsibility to coordinate the work of all subordinate Inspectors.

(2) POWERS OF CHIEF ELECTRICAL INSPECTOR: The Chief Electrical Inspector shall be subject to the power vested in the Board of Rules and Appeals as set forth in Sec. 203 of this Code. The Chief Electrical Inspector shall have the power to delegate powers, duties and assignments to subordinate regular employees working under his authority, but only to those employees certified by the Board of Rules and Appeals as qualified to perform such powers, duties and assignments. The Chief Electrical Inspector may not delegate authority to subordinate employees to interpret the provisions of this Code.

(3) CERTIFICATION OF CHIEF ELECTRICAL INSPECTOR OR ELECTRICAL PLANS EXAMINER: To be eligible for appointment as a Chief Electrical Inspector or Electrical Plans Examiner, such person shall be certified by the Board of Rules and Appeals and shall meet one or more of the following qualifications:

(a) A Florida Registered Professional Engineer and having practiced within the area of jurisdiction of this Code for at least 3 years and 2 years as an Electrical Inspector under the jurisdiction of this Code.

(b) Ten years experience as a Master or Journeyman Electrician, 5 years of which shall have been in the field within the jurisdiction of this Code including 2 years as an Electrical Inspector and having completed the course of formal education in Plan Review offered by Broward Community College under Board of Rules and Appeals sponsorship or 2 years of training in the Plan Review department of a municipality under the jurisdiction of this Code; or 5 years experience as Chief Electrical Inspector, 3 years of which shall have been within the jurisdiction of this Code. Each of the aforementioned must possess a current Certificate of Competency as a Master Electrician issued by:

(1) Florida Electrical Contractors Licensing Board.

(2) Broward County Central Examining Board of Electricians.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored examination graded by an independent testing agency approved by the Board of Rules and Appeals.

(B) ELECTRICAL INSPECTOR:

(1) An Electrical Inspector, if properly qualified, may be certified and assigned duties in more than one category.

(2) Such employee shall have the duties and powers as delegated by the Chief Electrical Inspector except that the Chief or Head of the Division or Department of Electrical Inspectors may not delegate authority to subordinates to interpret provisions of this Code.

(3) To be certified, an Electrical Inspector shall meet one or more of the following requirements.

(a) Five years construction experience in the electrical field in a supervisory capacity of which at least 2 years shall have been within the jurisdiction of this Code and possessing a current Certification of Competency as a Master Electrician issued by:

(1) Florida Electrical Contractors Licensing Board.

(2) Broward County Central Examining Board of Electricians.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored examination graded by an independent testing agency approved by the Board of Rules and Appeals.

201.4 (A) CHIEF PLUMBING INSPECTOR OR PLUMBING PLANS EXAMINER:

(1) APPOINTMENT AND DUTIES OF A CHIEF PLUMBING INSPECTOR: There shall be appointed by the appointing authority a person qualified to serve as Chief Plumbing Inspector. If there is one Plumbing Inspector hired by an inspection authority, that Inspector shall be a Chief Plumbing Inspector. It shall be his duty and responsibility to coordinate the work of all subordinate Inspectors.

(2) POWERS OF CHIEF PLUMBING INSPECTOR: The Chief Plumbing Inspector shall be subject to the power vested in the Board of Rules and Appeals as set forth in Sec. 203 of this Code. The Chief Plumbing Inspector shall have the power to delegate powers, duties and assignments to subordinate regular employees working under his authority, but only to those employees certified by the Board of Rules and Appeals as qualified to perform such powers, duties and assignments. The Chief Plumbing Inspector may not delegate authority to subordinate employees to interpret the provisions of this Code.

(3) CERTIFICATION OF CHIEF PLUMBING INSPECTOR OR PLUMBING PLANS EXAMINER: To be eligible for appointment as a Chief Plumbing Inspector or Plumbing Plans Examiner, such person shall be certified by the Board of Rules and Appeals and shall meet one or more of the following qualifications.

(a) A Florida Registered Professional Engineer and having practiced within the area of jurisdiction of this Code for at least 3 years and 2 years as a Plumbing Inspector under the jurisdiction of this Code.

(b) Ten years experience as a Master or Journeyman Plumber, 5 years of which shall have been in the field within the jurisdiction of this Code and include 2 years as a Plumbing Inspector, or 5 years experience as Chief Plumbing Inspector or Plumbing Inspector, 3 years of which shall have been within the jurisdiction of this Code. Each of the aforementioned must possess a current Certificate of Competency as a Master Plumber issued by:

(1) Florida Construction Industry Licensing Board.

(2) Broward County Central Examining Board of Plumbers.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored examination graded by an independent testing agency approved by the Board of Rules and Appeals.

(B) PLUMBING INSPECTOR:

(1) A Plumbing Inspector, if properly qualified, may be certified and assigned duties in more than one category.

(2) Such employee shall have the duties and powers as delegated by the Chief Plumbing Inspector except that the Chief or Head of the Division or Department of Plumbing Inspectors may not delegate authority to subordinates to interpret provisions of this Code.

(3) To be certified, a Plumbing Inspector shall meet one or more of the following requirements.

(a) Five years construction experience in the plumbing field in a supervisory capacity of which at least 2 years shall have been within the jurisdiction of this Code and possessing a current Certificate of Competency as a Master Plumber issued by:

(1) Florida Construction Industry Licensing Board.

(2) Broward County Central Examining Board of Plumbers.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored examination graded by an independent testing agency approved by the Board of Rules and Appeals.

(b) Florida Registered Professional Engineer with 2 years experience under the jurisdiction of this Code.

201.5 (A) CHIEF MECHANICAL INSPECTOR OR MECHANICAL PLANS EXAMINER:

(1) APPOINTMENT AND DUTIES OF A CHIEF MECHANICAL INSPECTOR: There shall be appointed by the appointing authority a person qualified as set forth in Sec. 201 to serve as Chief Mechanical Inspector. If there is one Mechanical Inspector hired by an inspection authority, that Inspector shall be a Chief Mechanical Inspector. It shall be his duty and responsibility to coordinate the work of all subordinate Inspectors.

(2) POWERS OF CHIEF MECHANICAL INSPECTOR: The Chief Mechanical Inspector shall be subject to the powers vested in the Board of Rules and Appeals as set forth in Sec. 203 of this Code. The Chief Mechanical Inspector shall have the power to delegate powers, duties and assignments to subordinate regular employees working under his authority, but only to those employees certified by the Board of Rules and Appeals as qualified to perform such powers, duties and assignments. The Chief Mechanical Inspector may not delegate authority to subordinate employees to interpret the provisions of this Code.

(3) CERTIFICATION OF CHIEF MECHANICAL INSPECTOR OR MECHANICAL PLANS EXAMINER: To be eligible for appointment as a Chief Mechanical Inspector or Mechanical Plans Examiner, such person shall be certified by the Board of Rules and Appeals and shall meet one or more of the following qualifications:

(a) A Florida registered Professional Engineer and having practiced within the area of jurisdiction of this Code for at least 3 years and 2 years as a Mechanical Inspector under the jurisdiction of this Code.

(b) Ten years experience as a Mechanical Contractor or Class A Air Conditioning Contractor or Journeyman, 5 years of which shall have been in the field within the jurisdiction of this Code and include 2 years as a Mechanical Inspector, or 5 years experience as a Chief Mechanical Inspector or Mechanical Inspector, 3

years of which shall have been within the jurisdiction of this Code. Each of the aforementioned must possess a current Certificate of Competency as a Mechanical Contractor or Class A Air Conditioning Contractor issued by:

(1) Florida Construction Industry Licensing Board.

(2) Broward County Central Examining Board of Mechanical Contractors and Specialty Mechanical Contractors.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored

examination graded by an independent testing agency approved by the Board of Rules and Appeals.

(B) MECHANICAL INSPECTOR:

(1) A Mechanical Inspector, if properly qualified, may be certified and assigned duties in more than one category.

(2) Such employee shall have the duties and powers as delegated by the Chief Mechanical Inspector except that the Chief or Head of the Division or Department of Mechanical Inspectors may not delegate authority to subordinates to interpret provisions of this Code.

(3) To be certified, a Mechanical Inspector shall meet one or more of the following requirements:

(a) Five years construction experience in the mechanical field in a supervisory capacity of which at least two years shall have been within the jurisdiction of this Code and possessing a current Certificate of Competency as a Mechanical Contractor or Class A Air Conditioning Contractor issued by:

(1) Florida Construction Industry Licensing Board.

(2) Broward County Central Examining Board of Mechanical Contractors and Specialty Mechanical Contractors.

(3) Dade County, Block proctored, issued on or after January 1, 1968.

(4) Any other proctored examination graded by an independent testing agency approved by the Board of Rules and Appeals.

(b)A Florida registered Professional Engineer and having practiced within the area of jurisdiction of this Code for at least 3 years.

201.6 (A) CERTIFICATION:

(1) Only such persons as are examined and certified by the Board of Rules and Appeals may be appointed or have the powers and duties of a Building Official, Chief Inspector or Inspector.

(2) The Board of Rules and Appeals, upon receiving notice from any source of abnormal Code violations and upon verification of same, shall immediately notify the Building Official and the Inspector involved shall appear before the Board to explain why his certification should not be revoked.

(3) When Building Departments fail to meet certification criteria, they will immediately be notified to cease activities until such time as requirements as per Code are met.

(4) Application for certification shall contain such pertinent information as is considered relevant to the Board of Rules and Appeals.

(5) Certification shall be for the calendar year of approval and shall be renewed on January 1st of each calendar year. When an Inspector resigns from his position, he will be kept on the "inactive" list until he again returns to work for a building department, at which time he will be issued a new certification card, at a renewal fee in the amount appropriate for each discipline according to The Board of Rules and Appeals Fee Schedule for

Certification."

(6) Applications for certification will not be considered unless accompanied by a written request from a specific building department.

(7) Certification fee: each application shall be accompanied by a check in the amount appropriate for each discipline according to The Board of Rules and Appeals Fee Schedule for Certification, payable to "Broward County Commissioners."

(8) After application and review, the Board of Rules and Appeals may certify the applicant; deny certification; or limit certification to a particular field.

(9) Certification may be withdrawn, rescinded or suspended if, upon investigation, it is found that the certified person has failed to enforce the Code, abused the powers of office, or withheld or concealed information on application which, if known to the Board of Rules and Appeals, may have been cause for denying certification.

(10) Any person whose certification has been denied, withdrawn or rescinded, may appeal to the Board of Rules and Appeals in open meeting and may produce witnesses and be represented by counsel in support of his claim.

(B) RECERTIFICATION:

(1) To be recertified, all Building Officials, Chief Inspectors and Inspectors who are presently certified by the Board of Rules and Appeals, must meet the following criteria and comply with the current requirements for initial employment.

(aa) Be currently certified by the Broward County Board of Rules and Appeals.

(bb) Be presently employed by a governmental building department within Broward County.

(cc) All Chief Inspectors, Plans Examiners, and Inspectors, to be recertified must obtain 24 contact hours within a 2 consecutive calendar year period by attending formal education courses, workshops, and seminars, any of which must be approved by the Broward County Board of Rules and Appeals, and be related to the individual's discipline.

(dd) A previously employed Inspector may be recertified bi-ennially upon the presentation of 24 contact hours of education accumulated during the previous two consecutive calendar years.

(2) If certification is not renewed and allowed to lapse, application for recertification must be accompanied with proof acceptable to the Certification Committee, that the 24 contact hour requirement of continued education has been met.

(3) By December 15 of every year, each Building Official shall submit to the Certification Department of the Board of Rules and Appeals a list of currently employed personnel (including himself) who are to be recertified for the ensuing new year, accompanied by a check in the amount appropriate for each discipline according to The Board of Rules and Appeals Fee Schedule for Certification for each certification, payable to the "Broward County Commissioners." Recertification to be effective on January 1st of each year.

201.7 FIRE INSPECTOR:

(A) APPOINTMENT, POWERS AND DUTIES OF A FIRE MARSHAL OR FIRE CODE OFFICIAL:

(1) There shall be appointed by the Chief Fire Official a person qualified as set forth in Sec. 201.7 (A) to serve as Fire Marshal or Fire Code Official. The Fire Marshal/Fire Code Official shall be the principal enforcing officer of the Fire Codes and it shall be his duty and responsibility to coordinate the work of all subordinate Inspectors. The Fire Marshal/Fire Code Official may delegate authority to subordinate employees to enforce the provisions of the Fire Codes. In the event that the Fire Marshal/Fire Code Official is not available to perform his duties, the Chief Fire Official may appoint an interim Fire Marshal/Fire Code Official provided such person is

qualified as set forth in Sec. 201.7 (A) of this Code. The name of any interim Fire Marshal/Fire Code Official will be recorded by the Board of Rules and Appeals, but he will not be issued a certification card as a Fire Marshal/Fire Code Official. The Fire Marshal/Fire Code Official shall be subject to the powers vested in the Board of Rules and Appeals as set forth in Sec. 203 and Chapter 52 of this Code. If there is one Fire Inspector hired by an inspection authority, that Inspector shall be a Fire Code Official. It shall be his duty and responsibility to coordinate the work of all subordinate Inspectors.

(2) CERTIFICATION OF FIRE MARSHAL/FIRE CODE OFFICIAL: To be eligible for appointment as a Fire Marshal/Fire Code Official, such person shall be certified by the Board of Rules and Appeals and shall meet one or more of the following qualifications:

(a) A Florida Registered Professional Engineer and/or a Degree in Fire Science and/or a Degree in Fire Prevention and must have been certified as County Fire Inspector for three (3) years: or

(b)A County Certified Fire Plans Examiner with at least five (5) years of experience which shall have been within the jurisdiction of this Code; or

(c) Ten (10) years experience as a Fire Inspector, five (5) years of which shall have been within the jurisdiction of this Code; or

(d) Have been fulfilling the duties of a Fire Marshal/Fire Code Official with five years continuous service as such, prior to July 1, 1988.

(e) Fire Marshal/Fire Code Official shall comply with Sec. 201.7(C)(2) and (3). Certification may be revoked for cause, by the Board of Rules and Appeals.

(B) APPOINTMENT AND DUTIES OF A FIRE PLANS EXAMINER:

(1) There shall be appointed by the Chief Fire Official a person qualified to serve as Fire Plans Examiner.

(2) Certification of Fire Plans Examiner: To be eligible for appointment as Fire Plans Examiner, such person shall be certified by the Board of Rules and Appeals and shall meet one or more of the following qualifications:

(a) A Florida Registered Professional Engineer and/or a Degree in Fire Science, and/or a Degree in Fire Prevention and having practiced within the area of jurisdiction of this Code for a minimum of three (3) years.

(b) Five (5) years of experience as a Fire Inspector, two (2) years of which shall have been in the jurisdiction of this Code and shall be a County Certified Fire Inspector. In addition, they shall meet one or more of the following:

(1) Two (2) or more of the educational requirements as outlined in this Section.

(2) Five (5) years experience as a Fire Plans examiner; or,

(c) Ten (10) years of experience as a firefighter, three (3) years of which shall have been in the jurisdiction of this Code and shall be a County Certified Fire Inspector and two (2) or more of the educational requirements as outlined in this Section.

(d) Education requirements aforementioned are as follows:

(1) FFP 2300-Plans

(2) 2327-Fire Inspection

(3) FFP 1203-N.F.P.A. 101 Life Safety Code

(4) FFP 1320-Fire Protection through Building Construction

(5) Plans Review for Fire Inspectors-National Fire Academy or other equivalent courses as approved by the Board of Rules and Appeal..

(e) Have been fulfilling the duties of a Fire Plans Examiner with five years continuous service as such,

prior to July 1, 1988.

(f) Fire Plans Examiner shall comply with Sec. 201.7(C)(2) and (3). Certification may be revoked for cause, by the Board of Rules and Appeals.

(C) CERTIFICATION:

(1) The Chief Fire Official of each governmental jurisdiction shall designate certain fire prevention personnel to be certified Fire Inspectors. The Chief Fire Official shall delegate powers and duties to the Fire Inspectors, certified by the Board of Rules and Appeals as they pertain to fire and life safety items in this Code.

(2) Application for certification shall be on a form containing such pertinent information as is considered relevant to the Board of Rules and Appeals, and shall be sent to the chairman of the Fire Certification Committee for committee's approval/disapproval. Each application shall be accompanied by a check in the amount appropriate for each discipline according to The Board of Rules and Appeals Fee Schedule for Certification payable to "Broward County Commissioners."

(3) Certification shall be for the calendar year of approval and shall be renewed on January 1st of each year.

(4) The certification of a Fire Inspector may be revoked, for cause, by the Board of Rules and Appeals.

(5) To be certified a Fire Inspector shall meet the following criteria:

(aa) Be a certified Firefighter as defined by the Florida Firefighters Standards Council.

(bb) Pass a written competency examination approved by the Broward County Board of Rules and Appeals, to be given in May and November of each year, or the test may be given when requested by at least six (6) applicants.

(cc) Additional requirements refer to Sec. 5202.5.

(D) RECERTIFICATION:

(1) To be recertified all Fire Marshal(s)/Fire Code Officials, Fire Plans Examiner(s), Fire Inspector(s) or a combination thereof shall meet the following criteria:

(aa) Be currently certified by the Broward County Board of Rules and Appeals, as per Sec. 201.7(A), (B) or (C).

(bb) Be presently employed by a governmental fire entity within Broward County.

(cc) Broward County Certification is valid for a period of three (3) years. Recertification shall have the same anniversary date as provided in Florida Statutes 633.081, with the completion of 55 contact hours in continuing education every three (3) consecutive years on Fire Protection and Fire Safety, sponsored and/or approved by the Board of Rules and Appeals.

(dd) Additional requirements refer to Sec. 5202.5.

(ee) If certification is not renewed and allowed to lapse, application for recertification must be accompanied with proof that 18.33 contact hours per year in continuing education has been met, and as per Sec. 201.7(C)(2).

202 UNSAFE BUILDINGS

202.1 GENERAL:

(a) Buildings or structures that are, or hereafter shall become unsafe, unsanitary or deficient in adequate facilities for means of egress, or which constitute a fire or windstorm hazard, or illegal or improper use, occupancy or maintenance, or which do not comply with the provisions of the applicable Minimum Housing Code, or which have been substantially damaged by the elements, acts of God, fire, explosion or otherwise, shall be deemed unsafe buildings and a permit shall be obtained to demolish the structure or bring the building to

comply with the applicable Codes.

(b) Incomplete buildings or structures commenced without a permit or the permit for which has expired, or completed buildings or structures commenced without a permit or the permit for which expired prior to completion and no Certificate of Occupancy has been issued, shall be presumed and deemed unsafe.

(c) Unsafe buildings or structures shall be demolished and removed from the premises concerned, or made safe, sanitary and secure in a manner required by the Building Official and as provided in this Chapter, provided that where replacement, repair, alteration or demolition is required on buildings or structures within the purview of the applicable Minimum Housing Code, the provisions of such Code shall be complied with and shall control.

(d) A permit shall be issued for the demolition of any unsafe building or structure in accordance with Sections 304.3(i)(1) and (2).

202.2 CRITERIA:

(a) PHYSICAL CRITERIA:

(1) A building shall be deemed a fire hazard and/or unsafe when:

(aa) It is vacant, unguarded and open at doors or windows.

(bb) There is an unwarranted accumulation of dust, debris or other combustible material therein.

(cc) The building condition creates hazards with respect to means of egress and fire protection as provided herein for the particular occupancy.

(2) A building shall be deemed unsafe when:

(aa) There is a failure, hanging loose or loosening of any siding, block, brick, or other building material.

(bb) There is a deterioration of the structure or structural parts.

(cc) The building is partially destroyed.

(dd) There is an unusual sagging or leaning out of plumb of the building or any parts of the building and such effect is caused by deterioration or over-stressing.

(ee) The electrical or mechanical installations or systems create a hazardous condition contrary to the Standards of this Code.

(ff) An unsanitary condition exists by reason of inadequate or malfunctioning sanitary facilities or waste disposal systems.

(gg) By reason of use or Occupancy the area, height, type of construction, fire-resistivity, means of egress, electrical equipment, plumbing, air conditioning or other features regulated by this Code do not comply with this Code for the use and Group of Occupancy.

(3) A building, or part thereof, shall be presumed to be unsafe if:

(aa) The construction, installation of electrical, plumbing or other equipment therein or thereon, or the partial construction or installation of equipment has been commenced or completed without a permit therefore having been obtained or the permit therefore expired prior to completion and a Certificate of Occupancy issued.

(bb) By reason of illegal or improper use, occupancy, or maintenance does not comply with this Code, or the Code in effect at the time of construction or the applicable Minimum Housing Code.

(b) VALUATION CRITERIA:

(1) If the cost of alteration, repair and/or replacement of an unsafe building or structure or part thereof exceeds 50% of its value, such building shall be demolished and removed from the premises. If the cost of alteration, repair and/or replacement of an unsafe building or structure or part thereof does not exceed 50% of

such replacement cost, such building or structure may be repaired and made safe, as provided in Section 104 and in the applicable Minimum Housing Code; or

(2) If the cost of structural repair or structural replacement of an unsafe building or structure or part thereof exceeds 33% of the structural value such building or structure or part thereof shall be demolished and removed from the premises; and if the cost of such structural repairs does not exceed 33% of such replacement cost, such building or structure or part thereof may be structurally repaired and made safe, as provided in Section 104.

(3) In order to determine the value of a building or structure and the cost of alterations, repairs and replacement, the guides and standards provided in Section 104 shall apply.

(4) An exception to the above percentages may be recognized provided:

(aa) The owner of property has the ways and means to complete the work.

(bb) All imminent danger has been removed from the site.

(cc) All applicable Zoning regulations are met.

(dd) All applicable requirements of other departments and agencies are met.

(ee) Criteria noted in Sec. 104.3 is followed.

(ff) Any remaining portion of the structure to be used in rebuilding is certified as safe by an engineer or architect.

202.3 INSPECTION OF UNSAFE BUILDINGS AND STRUCTURES: The Building Official, on his own initiative or as a result of reports by others, shall examine or cause to be examined every building or structure appearing or reported to be unsafe, and if such is found to be an unsafe building or structure as defined in this Section, the Building Official shall post the property concerned and shall furnish the owner of such building or structure with written notice, the manner of posting and furnishing of written notice is provided hereinafter.

202.4 POSTING: The Building Official shall post, but not before 14 days after the notice of violation hereinafter provided has been served, a signed notice in a conspicuous location on the building or structure which has been determined to be unsafe. The posted notice shall read substantially as follows: "UNSAFE BUILDING." This building or structure is, in the opinion of the Building Official, unsafe, as defined in Section 202 of the South Florida Building Code.

This building SHALL BE VACATED — SHALL NOT BE OCCUPIED. Action shall be taken by the owner as further prescribed by written notice previously served. THIS NOTICE SHALL NOT BE REMOVED EXCEPT BY THE BUILDING OFFICIAL. DATE _____

202.5 EMERGENCY ACTION:

(a) When in the opinion of the Building Official, there is actual or immediate danger of the failure or the collapse of a building or structure, or there is a health, windstorm or fire hazard, he may order the occupants to vacate, temporarily close for use or occupancy the rights of way thereto, sidewalks, streets or adjacent buildings or nearby area and institute such other temporary safeguards, including securing posting and demolition of the building or structure, as he may deem necessary under the circumstances, and may employ the necessary labor and materials to perform the required work as expeditiously as possible.

(b) Costs incurred in the performance of such emergency work shall be paid by the appropriate governmental authority and upon the recording in the public records of this county a certificate executed by the Building Official, certifying the amount so expended and why expended, the same shall become a lien against the property involved.

202.6 NOTICE OF VIOLATION: The Building Official shall, at least 14 days prior to posting an unsafe building, give the owner of record of the premises concerned written notice by certified or registered mail,

addressed to such person's last known address. If proof of service by registered or certified mail is not completed by signed return receipt, then a copy of the written notice shall be affixed to the structure concerned and such procedure shall be deemed proper service, and the time for compliance, stipulated in the notice, shall be deemed to commence with the date such notice is so affixed. This written notice shall state the defects which constitute a violation of this Section and shall prescribe the action to be taken to comply and the time within which compliance must be accomplished, such time to be 15 days, subject to reasonable extension when requested in writing, for reasons which the Building Official considers justifying an extension of time. All such extensions of time shall be by written approval of the Building Official. In addition, this written notice will explain the right of appeal of the decision of the Building Official to the Unsafe Structures and Housing Appeals Board, and also advise that unless there is compliance with the instructions in the Notice of Violation or an appeal is filed that a public hearing before the Unsafe Structures and Housing Appeals Board will be initiated by the Building Official after time for compliance has expired.

202.7 RECORDING OF NOTICE OF VIOLATION:

(a) If the owner of the property concerned has not complied with the requirements as stated in the Notice of Violation within the time stipulated or has not appealed the action of the Building Official as stated in the Notice of Violation within the time specified, the Building Official may file an appropriate instrument in the office of the Clerk of the Circuit Court, to be recorded in the public records of this county, indicating that violations of the South Florida Building Code, and of Section 202 thereof, exist upon the property involved.

(b) The recording of such notice shall constitute constructive notice to all concerned, as well as to any subsequent purchasers, transferees, grantees, mortgages, lessees and all persons claiming or acquiring interest in said property.

(c) When the violation specified in the Notice of Violation has been corrected, the Building Official shall file for record a certificate certifying that the violation has been corrected, upon being paid for the filing fees incurred.

202.8 APPEAL AND REVIEW: The owner or anyone having an interest in a building or structure which has been determined to be unsafe, and concerning which a Notice of Violation has been served by the Building Official, may appeal the decision of the Building Official as stated in the Notice of Violation, to the Unsafe Structures and Housing Appeals Board, if such appeal is filed prior to the expiration of the time allowed for compliance specified in such notice; provided, in no event shall appeal period be less than fifteen (15) days. Such appeal shall be in writing, addressed to the Secretary of the Unsafe Structures and Housing Appeals Board, and shall be in the form of a certified statement, stating the reasons for such an appeal and stating wherein they consider the Building Official to be in error. Upon receipt of the appeal, the Secretary of the Board will proceed to notify all parties in interest as to the time and place the Unsafe Structures and Housing Appeals Board shall conduct a public hearing on the matter. The procedure for the serving of, and the form of notice is provided hereinafter.

202.9 NOTICE OF PUBLIC HEARING: If the owner, or other parties having an interest do not comply with the terms of the Notice of Violation and do not file an appeal within the time stipulated, the Building Official shall then apply for a public hearing to be conducted by the Unsafe Structures and Housing Appeals Board, and the Secretary of the Unsafe Structures and Housing Appeals Board shall notify all parties in interest of the time and place of such public hearing on the matter. The procedure for the serving, and the form of notice shall be the same as in the case where an appeal has been filed by the owner or other parties in interest and such procedure and form of notice shall be as set forth hereinafter.

(a) When an appeal has been properly filed, or when the public hearing is initiated by the Building Official, as provided herein, the Secretary of the Unsafe Structures and Housing Appeals Board shall issue a notice in the Board's name, requiring the owner of record and all parties having an interest to appear before the Board in person or by an attorney at the time set forth in such notice, but not earlier than ten days after service thereof, and show cause why the decision of the Building Official should not be carried out.

(b) As many alias and pluries notices may be issued as may be necessary.

(c) Service of such notices shall be certified or registered mail to the last known address of the party being served, if known; however, failure to receive such notice shall not invalidate the same as such notice shall also be perfected by posting such notice on the property and by publishing a copy thereof in a newspaper published in this county, such publication to be for two times one week apart.

(d) The time for appearing and showing cause as aforesaid, and a description of the property shall be as set forth in such published notice; provided, such time shall not be less than ten days after the last publication thereof.

(e) Any person or party who shall not appear and show cause as aforesaid shall be as fully bound by proceedings taken as if he had appeared and shown cause.

202.10 PUBLIC HEARING:

(a) On the day established in the notice of public hearing the Board shall review all pertinent evidence and hear all testimony from the Building Official, the owner and other parties in interest and their respective witnesses.

(b) The Board may modify, rescind, or uphold the decision of the Building Official as recited in the Notice of Violation and may order the owner or persons responsible for the building or structure to vacate, or cause to be vacated forthwith, to make repairs and to take necessary action to secure the building, or to demolish the building or structure and remove the salvage, contents debris and abandoned property from the premises, all within the time stipulated in the order by the Board.

(c) Such order shall be entered in the minute book of the Board within three (3) days after such public hearing and a copy of such order shall be forwarded to the owner and all parties in interest by registered or certified mail, and a copy thereof posted on the premises.

(d) If the owner or those responsible shall fail to comply with the order of the Board within the time stipulated therein, and such order is to repair, or secure the building to make safe, then the Building Official shall cause such building to be vacated, if occupied, and shall through his employees or through a contractor making the lowest responsible bid, secure the building or structure.

(e) If the order is to demolish the building or structure and to remove the salvage, contents, debris and abandoned property from the premises, and the owner or those responsible shall have failed to comply with such order, then the Building Official may do so thereafter through his employees or through a contractor making the lowest responsible bid.

(f) The Building Official may sell to the highest bidder or bidders for cash the salvage and the contents of such building or other structure so demolished which have not been removed by the owner of the land.

(g) If no bids are received for such salvage or contents the Building Official may destroy that for which no bids are received.

(h) Advertisement calling for bids shall be published by the Building Official one time in a newspaper published in the County.

202.11 RECOVERY OF COST:

(a) The entire costs incurred pursuant to Sub-section 202.5 to Sub-section 202.10 shall be paid by the owner of occupant of the premises or by the person who caused or maintained the violation.

(b) The Building Official shall file among his records an affidavit stating with fairness and accuracy the items of expense and the date of execution of actions authorized by Sub-section 202.5 or Sub-section 202.10.

(c) The enforcing agency may institute a suit to recover such expenses against any liable person or may cause such expenses to be charged against the property as a lien or as a special assessment collectable according to

established procedures.

(d) Except with respect to a lien imposed for expenses incurred in demolition, nothing herein shall be construed as placing a lien upon property which supersedes the lien of any mortgage on such property executed and recorded prior to the existence of a lien authorized herein.

(e) Any lien imposed for demolition shall be a lien prior in dignity to all liens, excepting county tax liens and liens of equal dignity with county tax liens.

202.12 JUDICIAL REVIEW: Any person aggrieved by a decision of the Unsafe Structure Board may seek judicial review of that decision in accordance with the Florida Appellate Rules.

202.13 UNSAFE STRUCTURES BOARD: The Unsafe Structures Board is hereby created, consisting of nine members who shall be appointed by the Appointing Authority. All professional members of the Unsafe Structures Board should be registered and licensed in the State of Florida. In the event the Appointing Authority cannot find a properly qualified resident of the area under its jurisdiction, it may by majority vote of its membership, appoint a qualified non-resident of the specific categories or professions required.

(a) QUALIFICATION OF MEMBERS: Members of the Board shall be permanent residents of the area under the jurisdiction of the Appointing Authority, who possess outstanding reputations for civic activity, interest, integrity, responsibility, and business or professional ability. The composition and representative membership of the Board shall be as follows: a Registered Engineer, a Registered Architect, a General Building Contractor, an Electrical Contractor, an Attorney at Law, a Plumbing Contractor, a Real Estate Appraiser, a Real Estate Property Manager and Citizen with experience and background in the field of social problems.

(b) TERMS OF OFFICE: In order that the terms of office of all members of the Board shall not expire at the same time, the initial appointments to the Board shall be as follows: Three members for the term of two years, three members for the term of three years, and three members for the term of four years. Thereafter, all appointments shall be for the term of three years, provided that the term in all instances, shall continue until a successor is appointed and qualified. Appointments to fill any vacancy on the Board shall be for the remainder of the unexpired term, but failure to fill a vacancy shall not invalidate any action or decision of the Board.

(c) ORGANIZATION OF THE BOARD:

(1) The members of the board shall elect a Chairman and a Vice Chairman and such other officers as may be deemed necessary or desirable, who shall serve at the will of the Board. Election of officers shall be held at the first meeting after February First, and such officers shall hold office for one year.

(2) Five members of the Board shall constitute a quorum necessary to hold a meeting or take any action.

(3) A majority vote of the Board membership present and voting at a duly constituted meeting shall be sufficient to overrule, modify or affirm any action or decision of the Building Official or to take any other action within the scope of the power and duties of the Board.

(4) Members shall serve without compensation but shall be entitled to reimbursement for necessary expenses incurred in the performance of their official duties, upon approval by the legislative body adopting this Code.

(5) No member of the Board shall sit as a voting member in any hearing on a matter in which he has a personal or financial interest.

(6) The Building Official, or his designee, shall be the Secretary of the Board but shall have no vote.

(7) The Chairman or the Secretary may call meetings of the Board, and meetings may be called by written notice signed by three members of the Board.

(8) Minutes and records shall be kept of all meetings of the Board and all meetings shall be public.

(9) All hearings shall be open to the public, and any person whose interest may be affected by the matter

on appeal shall be given an opportunity to be heard in person, or through his attorney.

(10) Witnesses may be sworn and subpoenaed by the Board in a like manner as they are subpoenaed by the court or courts in the County in which this Code is adopted.

(11) The hearings shall be informal and need not be conducted according to technical rules relating to evidence and witnesses. Any relevant evidence shall be admitted if it is the type of evidence on which responsible persons are accustomed to rely in the conduct of serious affairs regardless of the existence of any common law or statutory rules which might make improper the admission of such evidence over objection in civil actions.

(12) Hearsay evidence may be used for the purpose of supplementing or explaining any direct evidence but shall not be sufficient itself to support a finding unless it would be admissible over objection in civil actions.

(13) The rules of privilege shall be effective to the same extent that they are now, or hereafter may be, recognized in civil actions; and irrelevant and unduly repetitious evidence shall be excluded.

(14) The Board may establish rules and regulations for its own procedure.

(15) The Building Official shall provide adequate and competent clerical and administrative personnel and such technical or scientific personnel as may be reasonably required by the Board for the proper performance of its duties, and shall maintain a record of all proceedings in the office of the Building Official, and shall make available for copying any and all portions of the record of the proceeding and may certify the same as a true copy and make a reasonable charge therefore.

(16) The Building Official shall provide a regular meeting place for the Board.

(d) DUTIES AND POWERS OF THE BOARD: The board shall have the following duties, functions, powers and responsibilities:

(1) Hear and determine appeals from actions and decisions of the Building Official pursuant to the provisions thereof.

(2) Hear and review the application of the Building Official for review of his action where his decision as indicated in a Notice of Violations has not been complied with.

(3) Affirm, modify or reverse the decision of the Building Official upon appeal or on application for review.

(4) The Board, through its Secretary, shall transmit the record with all exhibits, instruments, papers, and transcripts of its proceedings to the appointing authority in the event that authority shall consider the matter pursuant to applicable law in that regard made and provided.

(5) Hear and determine appeals from actions and decisions of the enforcing agency pursuant to the provisions of the applicable Minimum Housing Code.

202.14 DUTIES OF LEGAL COUNSEL: It shall be the duty of the attorney for the appointing authority, when so requested, to appear at all hearings before the Unsafe Structures Board and to represent and advise the Board.

202.15 CONFLICT OF INTEREST: No official, board member or employee charged with the enforcement of this law shall have any financial interest, directly or indirectly, in any repairs, corrections, construction or demolition which may be required, nor shall any official, board member or employee give to anyone the location of any property or the names of owners thereof on which repairs, corrections or demolition have been ordered, except as otherwise directed hereinafter, until after the owners have been formally advised at which time such shall become a matter of public record.

203 BOARD OF RULES APPEALS

In order to determine the suitability of alternate materials and types of construction to provide for reasonable interpretation of the provisions of this Code and to assist in the control of the construction of buildings and

structures, there is hereby created a Board of Rules and Appeals, appointed by the appointing authority, consisting of twenty-one (21) members who are qualified by training and experience to pass on matters pertaining to building construction.

(a) Secretary to the Board and employees. The Board of Rules and Appeals is authorized to hire a full-time secretary. Office space, office equipment and such other material, equipment and services required to operate such office shall be furnished by the Broward County Commissioners. The Board may hire other personnel as they are deemed necessary by said Board with permission from the Broward County Commissioners. All moneys collected by the Board as fees shall be retained by the Broward County Commission to offset operating costs of such office.

(b) The Broward County Board of Rules and Appeals shall maintain a staff to coordinate the enforcement of the South Florida Building Code, and shall be called the Code Compliance Department. The Department shall consist of the Administrative Director, Assistant Director, Structural Code Compliance Officer, Mechanical Code Compliance Officer, Electrical Code Compliance Officer, Plumbing Code Compliance Officer and Fire Code Compliance Officer. Code Compliance Officers shall be certified as Chiefs, in their respective disciplines, and the Fire Code Compliance Officer shall be certified as Fire Code Official. The Code Compliance Officers shall have the authority to make inspections in their disciplines, and shall be responsible to see that the South Florida Building Code is being uniformly enforced by all Building and Fire Departments in all cities in Broward County and the unincorporated areas. The Code Compliance staff shall work directly under the Administrative Director, who will be directed by the full Board of Rules and Appeals.

203.1 MEMBERSHIP:

(a) Memberships of the Board of Rules and Appeals shall be as follows:

Nine (9) members appointed by the Broward County Commissions consisting of one (1) Architect, one (1) General Contractor, one (1) Air Conditioning Contractor, one (1) Mechanical Engineer, one (1) Electrical Engineer, one (1) Master Electrician, and one (1) Consumer Advocate; one (1) Fire Service Professional, and one (1) Handicapped person.

Twelve members appointed by the Broward County League of Cities, consisting of one (1) Architect, one (1) General Contractor, two (2) Structural Engineers, one (1) Mechanical Engineer, one (1) Electrical Engineer, one (1) Master Electrician, two (2) Master Plumbers, one (1) Fire Service Professional, one (1) Swimming Pool Contractor, and one (1) Consumer Advocate.

Except for the Consumer Advocates, all members appointed by the Broward County Commission and the Broward County League of Cities shall be qualified by being registered as a professional or by having been licensed as a contractor, and by having been active in their respective profession or trade for not less than ten (10) years. Members shall be residents of Broward County and shall have served in their professional capacity in the State of Florida for a period of two (2) years.

(b) On January 1, 1977:

The Board of County Commissioners shall appoint: one (1) Architect and one (1) General Contractor for the term of one (1) year; and one (1) Air Conditioning Contractor, one (1) Mechanical Engineer and one (1) Electrical Engineer for a term of two (2) years; and one (1) Master Electrician and one Consumer Advocate for a term of three (3) years.

(c) The Broward County League of Cities shall appoint: one (1) Master Electrician for a term of one (1) year, one (1) Consumer Advocate for a term of one (1) year, one (1) Master Plumber for a term of one (1) year, and one (1) Structural Engineer for a term of one (1) year; one (1) Master Plumber for a term of two (2) years, one (1) Fireman for a term of two (2) years, one (1) Structural Engineer for a term of two (2) years, and one (1) Swimming Pool Contractor for a term of two (2) years; and one (1) Architect for a term of three (3) years; one (1) General Contractor for a term of three (3) years, one (1) Electrical Engineer for a term of three (3) years, and

one (1) Mechanical Engineer for a term of three (3) years.

(d) All appointments made on or after January 1, 1978, shall be for a term of three (3) years, except in filling a vacancy for which appointments shall be made for the remainder of the former members' term of office.

(e) All existing members of the Board shall continue in office until their successors are duly appointed.

(f) The Broward County Commission or Broward County League of Cities, whichever is the appointing authority, may remove, either by its own action or upon recommendation of the majority of the Board of Rules and Appeals, any members for misconduct, incompetency, or neglect of duty. However, any member so removed may, within ten days, request a public hearing before the public body who attempts to remove the member, and the member shall receive such hearing before such removal shall be final.

(g) Any vacancies occurring on the Board of Rules and Appeals shall be filled for the remainder of the former member's term of office by appointment of the County Commission when the former member was an appointee of the Commission, or by the League of Cities when the former member was an appointee of the League.

(h) It shall be the function of the Broward County Board of Rules and Appeals, created by this Charter, to exercise the powers, duties, responsibilities, and obligations as set forth and established in Chapter 71-575, Laws of Florida, Special Acts of 1971, as amended by Chapters 72-482 and 72-485, Laws of Florida, Special Acts of 1972; Chapter 73-437, and 74-448, Laws of Florida, Special Acts of 1974; and the South Florida Building Code as enacted and amended by Chapter 71-575, as amended.

203.2 COMPENSATION: Members shall serve without compensation but shall be entitled to reimbursement for necessary expenses in performance of their official duties upon approval of the appointing authority.

203.3 MEETINGS:

(a) Meetings of the Board of Rules and Appeals shall be held at the call of the Chairman and at such other times as the Board may determine.

(b) The Board shall select one (1) of its members to serve as Chairman and one (1) to serve as Vice-Chairman, to act in the absence of the Chairman. A detailed record of all proceedings shall be kept on file in the office of the Secretary. The Board shall establish rules and regulations for its own procedure.

(c) (1) All hearings shall be open to the public, and any person whose interest may be affected by the matter on appeal shall be given an opportunity to be heard.

(2) The hearing shall be informal and need not be conducted according to technical rules relating to evidence and witnesses.

(3) Any relevant evidence shall be admitted if it is the sort of evidence on which responsible persons are accustomed to rely in the conduct of serious affairs, regardless of the existence of any common law or statutory rules which might make improper the admission of such evidence over objection in civil actions.

(4) Hearsay evidence may be used for the purpose of supplementing or explaining any direct evidence but shall not be sufficient in itself to support a finding unless it would be admissible over objection in civil actions.

(5) The rules of privilege shall be effective to the same extent that they are now, or hereafter may be, recognized in civil actions, and irrevelant and unduly repetitious evidence shall be excluded.

(d) No member of the Board shall sit as a voting member in any hearing involving any question in which he has personal or financial interest.

(e) Quorum: Eleven (11) members of the Board shall constitute a quorum. Decisions shall be reached by the majority of those present.

(f) Written notice of Board decision shall be furnished the appellant when requested.

(g) When an appeal of a decision of a Building Official/Fire Code Official or his subordinate has been filed with the Board of Rules and Appeals, that Building Official/Fire Code Official or his designated representative

shall be responsible to (1, 2, 3, or all):

(1) Respond to the Board of Rules and Appeals in writing defending his decision and/or interpretation, within 5 (working) days.

(2) Attend the Board meeting when the appeal is on the agenda.

(3) Take immediate action in accordance with decision of Broward County Board of Rules and Appeals.

(aa) Immediate action shall be that a Certificate of Completion, Temporary Occupancy, or a Certificate of Occupancy shall not be issued until compliance with the decision of the Board has been completed.

203.4 DUTIES:

(a) APPEAL FROM DECISION OF BUILDING OFFICIAL: The Board shall hear all appeals from the decisions of the Building Official wherein such decision is on matters regulated by this Code from any person, aggrieved thereby, and specifically as set forth in Section 204. "Alternate Materials and Types of Construction." Application for Appeal shall be in writing and addressed to the Secretary of the Board.

(b) INTERPRET CODE AT REQUEST OF BUILDING OFFICIAL: The Board shall pass on all matters pertaining to this Code and referred to the Board by the Building Official for interpretation or clarification.

(c) INVESTIGATE ENFORCEMENT: The Board of Rules and Appeals, upon the request of any person charged with the responsibility of enforcing the Code, or upon its own initiative, shall conduct investigation into enforcement of this Code, and shall have the power to suspend or revoke any permits issued thereunder, after a hearing at which interested persons may appear and be heard and evidence indicates that the best interests of the public are served by such action except in regard to the qualifications of the applicant for permit.

(d) REPORT AND RECOMMENDATIONS:

(1) The Board of Rules and Appeals may recommend to the elected officials of the jurisdictions adopting this Code ordinances prescribing the fee for examinations, permits, inspections of boilers and elevators, the testing of materials, and all other such work required by the Building Code.

(2) The Board of Rules and Appeals shall make any desired amendments or revisions to the Code.

(e) Cost of appealing to Board: Any person who appeals to the Board of Rules and Appeals for a decision on any matter within its jurisdiction is required to pay a fee of fifty dollars ($50) to the Secretary of the Board of Rules and Appeals, and said person shall further guarantee payment of all expenses for necessary tests made or ordered by said Board to ascertain whether the request of the applicant has any merit.

(f) Procedure for Appeals: Any person aggrieved by anyone enforcing the South Florida Building Code who desires to appeal to this Board shall first contact the Secretary of the Board for a date for his Appeal to be heard. A notice of Appeal shall be sent to the governing body of the jurisdiction wherein the dispute arose and said notice shall contain the following:

(1) The time and date of the hearing.

(2) A clear and concise statement of the subject to be decided on appeal sufficient to put the said governing body on notice so that they may defend their interpretation of the South Florida Building Code.

The notice shall be sent by registered or certified mail at least fifteen (15) days prior to the hearing but not more than thirty (30) days. The Board in its discretion may require a specific form for this notice.

The appellant shall also file a copy of his notice of Appeal with the Secretary of the Board at the same time that he notifies the governing body and said Secretary shall deliver to each member of the Board a copy of the notice with sufficient time before the hearing for the Board members to study the dispute. Procedure for Appeals may be changed from time to time by the Board if they deem it necessary for the benefit of the public.

(g) Notwithstanding, and in addition to, the jurisdiction of the Board of Rules and Appeals created by

Chapter 71-575, Laws of Florida, Building Code as applicable to Broward County may be enforced by injunctive proceedings, or other appropriate legal proceedings, in the appropriate court having jurisdiction thereof, upon petition or complaint filed by the Board of Rules and Appeals, which is hereby granted the power to sue and be sued, or by any aggrieved person, any interested citizen, citizen's association, corporation or other business entity if any elected or appointed officials named in Sec. 3 of Chapter 71-575 or any Building Official fails or refuses to comply with said Code.

(h) CERTIFICATION OF BUILDING OFFICIAL, BUILDING INSPECTOR, ELECTRICAL INSPECTOR, MECHANICAL INSPECTOR, PLUMBING INSPECTOR, FIRE MARSHAL/FIRE CODE OFFICIAL, FIRE PLANS EXAMINER AND FIRE INSPECTOR: The Board of Rules and Appeals shall have the duty to accept and review applications and to certify or refuse to certify applicants for Building Official, Building Inspector, Electrical Inspector, Mechanical Inspector, Plumbing Inspector, Fire Marshal/Fire Code Official, Fire Plans Examiner, and Fire Inspector to be employed by any inspection authority regulated by this Code.

203.5 POWERS:

(a) (1) The Board of Rules and Appeals may interpret the provisions of the Code to cover a special case if it appears that the provisions of the Code do not definitely cover the point raised or that the intent of the Code is not clear or that ambiguity exists in the wording: but it shall have no authority to grant variances where the Code is clear and specific.

(2) The use of alternate materials or types of construction not clearly comparable with the materials and types of construction specified in the Code may not be granted by the Board of Rules and Appeals; but the Board, if favorable to such use, may amend this Code to make such use lawful.

(b) The Board shall have the power to affirm, modify or reverse the decision of the Building Official wherein such decision is on matters regulated by this Code.

(c) The Board shall have the powers as specified in Section 202, "Unsafe Buildings."

(d) The Board of Rules and Appeals shall have the power to suspend or revoke permits, as specified in Paragraph 203.4(c).

(e) When it is deemed necessary by the Board, it may request experienced and technical advice on any specific subject or subjects from any qualified person or persons, and such request may be for attendance at Board Meetings or for written analysis of the specific problem. The Board may establish Panels of Industry, either standing or temporary, for technical analysis of specific subjects.

203.6 RECIPROCITY:

(a) The Board of Rules and Appeals shall have the authority to meet with similarly constituted and authorized boards for the purposes of discussion, decision and similar matters of area-wide industry concern.

(b) Decisions of the majority of all members at joint meetings as referred to herein, shall not be binding on the Board of Rules and Appeals. The decisions of joint meetings with other boards may be accepted or rejected or accepted with modifications.

203.7 COURT REVIEW:

(a) Any person aggrieved by a decision of the

Board of Rules and Appeals, whether or not a previous party to the decision, may apply to the appropriate court for a writ of certiorari to correct errors of law of such decision.

(b) Application for review shall be made to the proper court of jurisdiction within five days after the decision of the Board.

204 ALTERNATE MATERIALS AND TYPES OF CONSTRUCTION

The provisions of this Code are not intended to prevent the use of types of construction or materials or methods of designs as an alternate to the standards herein set forth, but such alternates may be offered for approval, and their consideration shall be as specified in this Section and Chapter.

204.1 STANDARDS: The types of construction or materials or methods of design referred to in this Code shall be considered as standards of quality and strength. New types of construction or materials or methods of design shall be at least equal to these standards for the corresponding use intended.

204.2 APPLICATION:

(a) Any person desiring to use types of construction or materials or methods of design not specifically mentioned in this Code shall file with the Building Official authentic proof in support of claims that may be made regarding the sufficiency of such types of construction or materials or methods of design and request approval and permission for their use.

(b) The Building Official shall approve such alternate types of construction or materials or methods of design if it is clear that the standards of this Code are at least equaled. If, in the opinion of the Building Official, the standards of this Code will not be satisfied by the requested alternate, he shall refuse approval.

204.3 APPEAL: Any person, whose request for alternate types of construction and materials or methods of design has been refused by the Building Official, may appeal to the Board of Rules and Appeals by written request to the Secretary of the Board, and such written request shall be transmitted to the Board at once.

204.4 APPEAL BY OTHERS: Any person, in whose considered opinion an action by the Building Official in approving or disapproving construction under this Code does not satisfy the standards of the Code for reasons of safety, quality or strength, may appeal to the Board of Rules and Appeals by written request to the Secretary of the Board, and such written request shall be transmitted to the Board at once.

205 VIOLATIONS AND PENALTIES

Any person, firm or corporation who shall violate a provision of this Code or fail to comply therewith, or with any of the requirements thereof, shall be guilty of a misdemeanor. Each such person shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of any of the provisions of this Code is committed or continued, and upon conviction of any such violation, such person shall be punishable by a fine of not less than fifty ($50) nor more than five hundred ($500) dollars, or by imprisonment not exceeding sixty days, or by both such fine and imprisonment.

206 AMENDMENTS TO CODE

The provisions of the South Florida Building Code shall be amended only by Board of Rules and Appeals and only to the extent and in the manner specified in the Code. Neither the Board of County Commissioners nor any municipality within Broward County may enact any ordinance in conflict with Chapter 71-575, as amended, or the South Florida Building Code.

CHAPTER 3

301 PERMITS AND INSPECTIONS
302 APPLICATIONS
303 PERMIT FEES
304 CONDITIONS OF PERMIT
305 INSPECTIONS
306 CLEAN-UP OF SITE
307 CERTIFICATE OF OCCUPANCY
308 STATEMENTS OF THE STRUCTURAL RESPONSIBILITY OF ARCHITECTS AND PROFESSIONAL ENGINEERS

301 PERMITS REQUIRED

(a) It shall be unlawful to construct, enlarge, alter, repair, move, remove or demolish any building, structure, or any part thereof; or any equipment, device or facility therein or thereon; or to change the Occupancy of a building from one use Group to another requiring greater strength, means of egress, fire and sanitary provisions; or to change to an unauthorized or prohibited use; or to install or alter any equipment for which provision is made or the installation of which is regulated by this Code; without first having filed application and obtained a permit therefore from the Building Official. A permit shall be deemed issued when signed by the Building Official and impressed with the seal of the governmental agency issuing said permit.

(b) EXCEPTIONS:

(1) All work where exempt from permit shall still be required to comply with the Code.

(2) No permit shall be required, in this or any of the following Sections, for general maintenance or repairs which do not change the Occupancy and the value of which does not exceed eight hundred dollars ($800.00) in labor and material as determined by the Building Official.

(3) No permit shall be required for installations by telephone communication utilities in single family Occupancies, whether detached or townhouse.

(4) No permit shall be required for installations or companies certified pursuant to Chapter 364, Florida Statutes (1993), for unregulated inside telephone wiring on new construction involving five (5) or less tenants, leasees, licensors, or owners, on new construction where any occupancy in a building or structure requires less than six (6) lines; and in either event, where the wiring is entirely in conduit.

(5) No permit shall be required for installations or companies certified pursuant to Chapter 364, Florida Statutes (1993), for unregulated inside telephone wiring on new construction for all other commercial occupancies not listed in subparagraph 301(b)(4) above and where the value of which is less than six hundred and fifty ($650.00) dollars in labor and material based on invoice value.

301.1 Permits, to be issued by the Building Official, shall be required for the following operations:

(a) The erection or construction of any building or structure, the adding to, enlarging, repairing, improving, altering, covering or extending of any building or structure.

(b) The moving of any building or structure within, into, through or out of the area of jurisdiction, or the moving of a building or structure on the same lot.

(c) The demolition of any building or structure. (Refer to 202.1(d) and 304.3(i)(1) & (2).

(d) The installation, alteration or repair of any sanitary plumbing, water supply, or gas supply system, as provided in Part XII.

(e) The installation, alteration or repair of any electrical wiring or equipment, as provided in Part XI.

(f) The installation, alteration or major repair of any boiler, pressure vessel, furnace, steam-actuated machinery, or heat producing apparatus, including the piping and appurtenances thereto as provided in Parts VIII and XII.

(g) The erection, remodeling, relocating, repair, altering, or removal of any sign, as provided in Chapter 42.

(h) The erection, alteration or repair of any awning or similar appurtenance, as provided in Chapters 43 and 44.

(i) The storage and use of all volatile flammable liquids, gases and materials, but such permits shall not be issued without the endorsement of the Fire Chief, as provided in Chapter 40.

(j) The application, construction, or repair of any roof covering, as provided in Chapter 34, for work exceeding two roofing squares.

(k) The installation, alteration or repair of any air conditioning or refrigeration apparatus, as provided in Chapter 48.

(l) The installation, alteration, or repair of any apparatus producing air contaminants.

(m) The installation, alteration, or repair of a swimming pool, as provided in Chapter 50.

(n) The installation, alteration, or repair of any structure or facility on private property defined by this or any other regulation as being within the scope of work of an engineering contractor.

(o) The installation of exterior windows and exterior glass doors in new buildings or additions exceeding two stories in height and the installation, alteration or repair of such windows and doors in existing buildings of any height.

(p) The installation, alteration or repair of any curtain wall.

(q) The installation, alteration or repair of any garage door in any existing building.

301.2 In addition, the Building Official shall require that the laws, rules and regulations of any other regulatory authority having jurisdiction, and where such laws, rules and regulations are applicable and are known to the Building Official, shall be satisfied before a permit shall be issued. The Building Official shall require such evidence, as in his opinion is reasonable, to show such other approvals. The Building Official shall not thereby be held responsible for enforcement of such other regulations as he is not specifically authorized to enforce. Following are some, but not necessarily all, other agencies having jurisdiction:

(a) The Engineering Department, Fire Department and/or Police Department for the moving of buildings, structures and heavy equipment over, temporary construction over, storage of material on, construction operations over or temporary blocking of streets or other public spaces; and for land clearing adjacent to existing sidewalks; as well as for the discharge of rainwater or other water runoff on streets or other public spaces into the public sewers.

(b) The Fire Department for the burning of construction or demolition waste or the use or storage of explosives.

(c) The City and/or County Tax assessor and Collector for the moving or demolition of any building or structure.

(d) Broward County Office of Natural Resource Protection and/or Florida Department of Environmental Regulation for (but not limited to):

(1) The adequacy of waste treatment plants receiving waste from industrial, commercial, public or dwelling units.

(2) Waste treatment and disposal systems.

(3) Waste disposal wells.

(4) Waste water collection systems.

(5) Air pollution.

(e) Broward County Health Department, Florida Department of Health and Rehabilitation Services for (but limited to):

(1) Septic tank disposal systems.

(2) Places where food or drink is prepared or served to the public.

(3) Public water supply and supply wells.

(4) Public swimming pools.

(5) Chemical toilets as set forth in Sec. 4603.21.

(6) Trailer park as set forth in Sec. 4619.

(f) The State Hotel Commission for the construction, alteration or addition to multiple-residential rental units or places where food and/or drink is prepared or served to the public.

(g) The U.S. Engineer Corps. for construction of bulkheads or docks adjacent to or extending into navigable waters.

(h) Federal regulations limiting construction during periods of national emergency.

(i) The rules of the State Board of Education of Florida and the regulations of the Florida State Department of Education, School Plant section, pertaining to the public schools. Where such rules and regulations are in conflict with this Code and cannot be satisfied if this Code is applied the Board of Rules and Appeals, upon request, shall consider such specific conflicts and may waive or vary the requirements of this Code to permit public school, or other approved schools, design and construction to be in accordance with the rules and the regulations of these agencies.

(j) The Public Works Department for bulkheads, docks, similar construction or fill along water front property.

(k) The Rules and Regulations of the State Fire Marshal.

(l) The State of Florida Bureau of Elevator Inspection.

301.3

(a) An annual premise permit may be issued for any premise. Such permit shall be in lieu of any other permit required by the South Florida Building Code for maintenance of existing facilities, buildings and structures. The word "premise" shall be defined as the buildings, structures and facilities located on one parcel of land all of which are under one ownership or under the control of the same lessee.

(b) Such annual premise permit, if application is made therefore, may be issued where the Building Official finds that the person, firm or corporation having control over or occupying such premises has assigned responsibility for such maintenance work in each trade to maintenance personnel employed by such person, firm or corporation on regular salary basis; and such maintenance personnel are assigned to work directly under the supervision of certified personnel certified in the type of work being performed, such certified maintenance man to be in actual, direct and continuous supervision of all members of any work crew in the trade concerned.

(c) The holders of an annual premise permit shall maintain a log listing all work performed on forms provided by the Building Official under such permit and shall make that log available to the Building Official or his

authorized employees upon demand, in order that the work may be inspected as deemed necessary. The holder of the annual premise permit shall be responsible for insuring that all work performed under such permit conforms to the South Florida Building Code and if inspection reveals that such work does not so conform, the work will be corrected or removed. The annual premise permit shall be subject to cancellation for violation of the provisions of applicable regulations.

301.4 ANNUAL BLANKET PERMIT:

(a) Each permit shall encompass work of a similar nature and be of a minor impact such as cable T.V. or telephone wiring.

(b) A blanket permit shall be in lieu of any other permit required by the South Florida Building Code for the particular work.

(c) The permit would be for a geographic area such as a municipality.

(d) The Building Official shall require an annual application for blanket permit or renewal with appropriate information such as name of responsible person, address and access phone number.

(e) A periodic notification such as a list or computer printout of names, addresses, dates and description of work shall be required; weekly; bi-weekly or monthly.

(f) Formal inspection requests can be waived, however, the permit holder shall be responsible for conformance to South Florida Building Code.

(g) Blanket permit is subject to cancellation for violation of provisions of application.

(h) Annual blanket permits shall be amended to include all applicable revisions approved and included in interim and/or Code amendments.

302 APPLICATION

302.1 GENERAL:

(a) APPLICATION REQUIRED: Any qualified applicant desiring a permit to be issued by the Building Official as required, shall file an application therefor in writing on a form furnished by the Building Official for that purpose and application for permit will be accepted from only qualified applicants as set forth in Paragraph 302.1 (b).

(b) QUALIFICATION OF APPLICANT: Application for permit will be accepted from only qualified persons or firms. Qualification of persons or firms shall be in accordance with the rules of the Broward County Central Examining Board, Ordinance 78-9 and Chapter 9 of the Broward County Codes; the State of Florida, Department of Professional Regulation by authority of Chapter 489, Part One of the Florida Statutes; or other Examining Boards as specifically approved by the Broward County Board of Rules and Appeals.

(c) APPLICATION FORM: Each application shall describe the land on which the proposed work is to be done, by legal description and address; shall show the use or occupancy of the building or structure; shall be accompanied by plans and specifications as required hereafter; shall state the value of the proposed work; shall give such other information as reasonably may be required by the Building Official to describe the proposed work; and shall be attested by the qualified applicant. Application form shall be inscribed with the application date and the date of the Code in effect.

(d) ATTESTING OF APPLICATION: The permit application shall be signed in a space provided, before an officer duly qualified to administer oaths, by the qualified applicant. The qualified applicant shall be the permit holder and shall be held responsible for the proper supervision and conduct, including all work accomplished by tradesmen as required by the Broward County Central Examining Board by authority of Ordinance 78-9 and Chapter 9 of the Broward County Codes. The attested application or an amended application is required as set

forth in Paragraph 302.1 (e) shall serve as the basis for determination for issuing the building permit and shall be factual evidence on which the Building Official, other public officials and the public can rely during the entire progress of the work. If the Building Official will not permit application forms to be removed from his department and/or jurisdiction, it is the intent of this Code that he shall accept, in lieu of his official form, an application by letter, signed by the applicant before an officer duly qualified to administer oaths. Such letter shall also contain the name and legal signature of the qualifier's authorized agent who is designated to sign the permit application. A separate letter of application shall be required for each permit to be issued. Wherever permit applications or applications for permit changes or permit amendments are required in other sections of this Code, the interpretation of this Section shall apply to signature requirements.

(e) CHANGES TO APPLICATION: In the event of a change in any material fact given in the attested application which served as a basis for issuing the permit, the permit holder shall immediately file an amended attested application detailing such changed conditions. In the event the change in the attested application is a change in the person responsible for the work, the owner shall immediately stop the work and notify the Building Official in writing detailing such changed conditions and any other information required by the Building Official or in lieu thereof a new attested permit application shall be filed immediately by a new qualified applicant. If such changed conditions are determined to be in compliance with the Code and other applicable regulations, an amended building permit will be issued, without additional fee if the changed condition shall not be greater than those permitted in the original permit.

(f) (1) Within 15 working days after plans are submitted and accepted for a building permit, the Building Official shall notify the applicant in writing that a permit is ready for issuance or that additional information is required.

(2) 60 calendar days after the date of such notification, where such additional information has not been submitted or the permit has not been purchased, the application and/or the permit shall become null and void.

(3) Where an application and/or a permit has become null and void, an applicant may again apply, as set forth in Section 302 of this Code, and such applications shall be processed as though there had been no previous application.

302.2 PLANS AND SPECIFICATIONS:

(a) (1) Application for permit shall be accompanied by two sets of plans and current product approvals or rational analysis and/or test data and plans by a Professional Engineer or Architect for all components and cladding for the building envelope as described in A.S.C.E. 7 and as required for Condition I for enclosed buildings or Condition II for un-enclosed buildings in Table 9 of A.S.C.E. 7. The application for permit shall be inscribed with the application date and the date of the Code in effect as set forth herein. See Table 3-A for items requiring Product Approval.

(2) Where required by the Building Official, a third copy of the plan showing parking, landscaping and drainage shall be provided.

(3) The elevation above mean sea level **(MSL)** of the top of all first floors shall appear on all construction plans and the Building Official shall require that such elevations be transferred to the accompanying application for permit.

(4) At any time during the course of construction, the Building Official may require the submittal of a first-floor elevation survey, as built.

(b) (1) For buildings and/or structures, except single-family residences, alterations, repairs or improvements, replacements and additions, costing five-thousand ($5,000 dollars or over, as specified herein, the plans and specifications shall be prepared and approved by, and each sheet shall bear the impress seal of, an Architect or

Professional Engineer, either of whom must be duly registered in the State of Florida; provided that for any work involving structural design, the Building Official may require that plans be prepared by and bear the impress seal of a Professional Engineer, regardless of the cost of such works.

EXCEPTION: Roofing as set forth in Chapter 34.

(2) For single-family residence costing $10,000 or over, as specified herein, the plans and specifications shall be prepared and approved by, and each sheet shall bear the impress seal of, an Architect or Professional Engineer, either of whom must be duly registered in the State of Florida;

provided that for any work involving structural design, the Building Official may require that plans be prepared by and bear the impress seal of a Professional Engineer, regardless of the cost of such works.

(c) (1) Plans for work which is preponderantly of architectural nature shall be prepared by and bear the impress seal of a registered Architect, and such work which involves extensive computation based on structural stresses shall, in addition, bear the impress of seal of a Professional Engineer.

(2) Plans for work in which definite mechanical or electrical problems are involved shall, at the discretion of the Building Official, be prepared by and bear the impress seal of a Professional Engineer.

(3) Compliance with certain of the specific minimum requirements of this Code shall not be in itself deemed sufficient to assure that a building or structure complies with all of the requirements of this Code. It is the responsibility of the Architect and/or Engineer of Record for the building or structure to determine through rational analysis what design requirements are necessary to comply with this Code.

(d) Plans for work which are preponderantly of a structural nature shall be prepared by and bear the impress seal of a Professional Engineer.

(e) Plans shall be mechanically reproduced prints on substantial paper on cloth showing completely all foundation, wall sections, floor plans, roof plans and elevations at a convenient scale, and the main details at a scale not less than 3/4 inch equals one foot, together with use or occupancy of all parts of the building, a plot plan showing all occupied and unoccupied portions of the lot or lots, and complete structural, mechanical, plumbing and electrical plans, and such other reasonable information as may be required to clearly show the nature, character and location of the proposed work. Computations, stress diagrams, shop drawings, results of site tests, floor plans of existing buildings to which additions are proposed and other data necessary to show compliance with this Code, the correctness of the plans and the sufficiency of structural and mechanical design shall be included when required by the Building Official. Any specifications in which general expressions are used to the effect that "work shall be done in accordance with the Building Code" or "to the satisfaction of the Building Official" shall be deemed imperfect and incomplete, and every reference to this Code shall be by section or sub-section number applicable to the materials to be used, or to the methods of construction proposed. Plans shall be adequately identified. See Table 3-A for items requiring Product Approval.

(f) Application for permit for new construction and additions shall be accompanied by a registered land surveyor's certificate and plan in duplicate on which shall be clearly indicated the property-corner stakes, property-line dimensions, existing structures and their location, existing right-of-way, sidewalks, easements, street zoning and property zoning of record, critical elevations and building setbacks required by law, general block plan and other plan and other pertinent survey data which may be required. The Building Official may waive the requirements for such survey when property-line stakes are existing and known to be in place, and the work involved is minor and/or is clearly within building lines.

(g) (1) The Building Official may authorize the issuance of a permit without plans and specifications for small or unimportant work, but in no instance where the work is of a structural nature except as set forth in Sub-paragraph 302.2(g)(2).

(2) The Building Official will authorize the issuance of a permit for a single-family fall-out shelter without a professional seal on the plans where the cost of such work does not exceed $5,000.

302.3 APPLICATION FOR EXAMINATION OF PLANS:

(a) Plans for proposed construction, where such plans are required by this Code to be prepared by and bear the impress seal of a Registered Architect or Professional Engineer, shall be submitted by the Registered Architect or Professional Engineer or authorized representative.

(b) Application for permit will not be required for examination of plans prepared and submitted by a Registered Architect or Professional Engineer.

(c) Complete plans shall be submitted in duplicate and with a third copy of the plot plan showing parking, landscaping and drainage; or such plans may be submitted in single copy where it is evident that code interpretation is needed before final working drawings can be prepared.

(d) Plans for proposed construction, where such plans are not required to be prepared by and bear the impress seal of a Registered Architect or Professional Engineer shall be submitted by the designer with the application as set forth in Sub-section 302.1.

(e) CONSTRUCTION INSPECTION: The Professional Engineer of Record or the Architect of Record in responsible charge of the structural design shall include in the construction documents the following:

(1) Special inspections required by Sub-section 305.3.

(2) Other structural inspections required by the Professional Engineer of Record or the Architect of Record in responsible charge of the structural design.

302.4 EXAMINATION OF PLANS:

(a) The Building Official shall have certified plans examiners examine all plans and amendments thereto.

(b) If the plans conform to all pertinent laws the plans shall be marked "approved."

(c) If the plans do not conform to all pertinent laws the plans shall be rejected and the plan examiner shall state the reasons for rejection in writing.

(d) Plans for which only minor correction is necessary may be corrected by notation on the prints with the approval of the designer.

(e) Plans for which major correction is necessary shall be revised on the tracings by the designer and new corrected prints submitted.

(f) Plans corrected to comply with this Code and all pertinent laws shall be marked "approved."

(g) When plans are approved such plans shall become a part of the application prepared by and submitted by the qualified applicant for permit as set forth in Paragraph 302.1(b).

(h) Approval of the permit shall not be given until plans, as set forth herein, are approved.

302.5 PARTIAL APPROVAL: Pending the completion of detailed drawings and checking of plans and specifications, the Building Official, at his discretion, and upon payment of the total required fee, may authorize the issuance of a temporary permit for site preparation, excavation and construction below grade provided such drawings and specifications are presented in such detail as to show the design, extent and scope of the project, but the holder of such temporary permit shall proceed only at his own risk and without the assurance that a permit for the superstructure will be granted.

302.6 MOVING OF BUILDING AND STRUCTURES:

(a) Before a building permit for moving a builder or structure within or into the jurisdiction adopting this Code shall be approved or issued, such building or structures shall be inspected by the Building Official; upon

request of the owner or his agent, and the Building Official shall ascertain that this Code and all other laws or ordinances applicable thereto shall be satisfied.

(b) Application for permit shall be submitted in such form as the Building Official may prescribe and shall be accompanied by such plans or other data as, in the opinion of the Building Official, is necessary to show compliance with the Code or the zoning regulations.

302.7 DEMOLITION: Application for building permits for the work of demolition of buildings or structures, if such building or structure is over 12 feet in extreme height above grade or any wall of which is over 40 feet in horizontal length, shall be accepted from only qualified persons or firms. Qualifications of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradesmen.

303 PERMIT FEES

303.1 Any person desiring a permit to be issued shall, in addition to filling an application therefore and before such permit is issued, pay a permit fee as required.

303.2 BASIS OF PERMIT FEE:

(a) The Building Official may require an estimate of cost and/or other descriptive data as a basis for determining the permit fee.

(b) Permit fees for blanket permits shall be commensurate with the services provided.

303.3 DOUBLE FEE:

When work for which a permit is required is started or proceeded with prior to the obtaining of said permit, the fees as specified herein may be doubled. Preliminary work performed up to but not including the first mandatory inspection (see Sec. 305.2), shall not be considered as work started without a permit. The payment of such double fee shall not relieve any person, firm or corporation from fully complying with the requirements of this Code, nor from any penalties prescribed therein.

303.4 APPROVED PLANS:

(a) The Building Official shall retain one set of the approved plans, and the other set shall be given to the permit holder, who shall maintain and keep this set at the building site during the hours of work in progress and available for mandatory inspections. The Building Official may stop the work if such plans are not available at the building site.

(b) Approved plans and/or amendments thereto retained by the Building Official shall become a part of the public record; provided however, that they be considered instruments of service and confidential records of their author, that they shall be open to the public only for inspection, that the Building Official may permit bona fide owners or designers, employed by such owners, to inspect the plans when not available from their author or the Building Official may permit the plans to be copied by the owner in event of the author's death or inability of the author to supply copies.

304 CONDITIONS OF PERMIT

304.1 PERMIT CARD: Upon approval of plans, specifications and application for permit and the payment of the required fee, the Building Official shall issue a permit therefor. With each such permit, the Building Official shall issue a weatherproof permit card which shall bear the description of the property, the nature of the work being done, the name of the owner and contractor and other pertinent information; and such card shall be maintained in a conspicuous place on the front of the premises affected thereby during the hours of work in progress and available on demand for examination by the Building Official. The Building Official may, whenever there is a delay in approval of plans or other similar special circumstances, permit the placing, on the site, of tool sheds, materials, batterboards and construction equipment, preliminary to actual construction, or may permit

exploratory uncovering of concealed structural elements of existing buildings for design information, pending completion of plans for proposed alterations.

304.2 COMPLIANCE:

(a) The issuance or granting of a permit shall not be deemed or construed to be a permit for, or an approval of, any violation of this Code.

(b) The issuance of a permit upon plans or specifications, shall not prevent the Building Official from thereafter requiring the corrections of errors on such plans and specifications, or from preventing building operations being carried on thereunder, when in violation of this Code or of any other regulations applicable thereto.

(c) When during the work carried on under the permit, from issuance of permit to issuance of Certificate of Occupancy, approved plans are found to be in violation of this Code the Building Official shall notify the designer and the designer shall correct the drawings or otherwise satisfy the Building Official that the design and/or working drawings are in compliance with the Code.

(d) Compliance with the Code is the responsibility of the owner, except that the safety to persons and materials during actual construction operations, as set forth in Chapter 33, is the responsibility of the permit holder.

(e) The Building Official shall make written notice of violation of this Code and/or corrections ordered and such notice shall be served on or mailed or delivered to the permit holder or his job representative or may be posted at the site of the work. Refusal, failure or neglect to comply with such notice or order within ten days, except where an appeal has been filed with the Board of Rules and Appeals, shall be considered a violation of this Code, and shall be subject to the penalties as set forth. In event of failure to comply with this Section, no further permits shall be issued to such person, firm or corporation.

304.3 TIME LIMITATION:

(a) Permits shall expire and become null and void if work, as defined in Paragraph 304.3(f), authorized by such permit is not commenced within 180 days from the date of the permit or if such work when commenced is suspended or abandoned for a period of 180 days.

(b) If the work covered by the permit has not commenced, or has been commenced and been suspended or abandoned, the Building Official may extend such permit for a single period of 180 days from the date of expiration of the initial permit, if request for extension is made prior to the expiration date of the initial permit.

(c) If the work covered by the permit has commenced, is in progress, has not been completed and is being carried on progressively in a substantial manner in accordance with Paragraph 304.3(f), the permit shall be in effect until completion of the job.

(d) If work has commenced and the permit becomes null and void or expires because of lack of progress or abandonment, a new permit covering the proposed construction shall be obtained before proceeding with the work.

(e) If a new building permit is not obtained within 180 days from the date the initial permit became null and void, the Building Official shall require that any work which has been commenced or completed be removed from the building site; or he may issue a new permit, on application, providing the work in place and required to complete the structure meets all applicable regulations in effect at the time the initial permit became null and void and any regulations which may have become effective between the date of expiration and the date of issuance of the new permit.

(f) Work shall be considered to have commenced and be in active progress when, in the opinion of the Building Official, a full complement of workmen and equipment is present at the site to diligently incorporate

materials and equipment into the structure, weather permitting. This provision shall not be applicable in case of civil commotion or strike or when the building work is halted due directly to judicial injunction, order or similar process. The fact that the property or parties may be involved in litigation shall not be sufficient to constitute an exception to the time period set forth herein.

(g) The fee for renewal re-issuance and extension of a permit shall be set forth by the administrative authority.

(h) If the work covered by the permit is subordinate to the permit issued to the general (or prime) contractor, i.e. plumbing, electrical, pool, etc., the subordinate permit will be in effect for the full time of the contract permit.

(i) (1) A permit for the demolition of a building or structure for which an application is made voluntarily by the owner shall expire sixty (60) days from the date of issuance, and shall specifically require the completion of the work for which the permit is issued on or before the expiration date.

(2) A permit for the demolition of a building or structure issued pursuant to a judicial order or administrative board order having jurisdiction of the building or structure shall expire in accordance with the provisions of such order, and shall require completion of the work for which the permit is issued on or before the expiration date of the permit.

304.4 REVOCATION OF PERMIT:

(a) The Building Official may revoke a permit or approval issued under the provisions of this Code in case of any false statement or misrepresentation of fact in the application or on the plans on which the permit or approval was based.

(b) Whenever the work for which a permit has been issued is not being performed in conformity with plans, specifications or descriptions, or approved plans are not being kept at the site, it shall be the duty of the Building Official to notify the contractor or owner or their agent, in writing, that the permit is suspended. Written notice shall be mailed or given to the permit holder or his agent, and it shall be unlawful for any person or persons to perform any work in or about the building or structure except such work as may be required for the correction of the expressed violations. And if, in the judgment of the Building Official, there is imminent danger that requires immediate action, the permit may be revoked or suspended verbally and written notice served later.

(c) When a permit has been suspended, it shall not be reinstated until all existing violations have been corrected. Written notice of reinstatement shall be given the permit holder if requested.

(d) Upon request of the owner and/or permit holder and on investigation by the Building Official to determine that the work has been abandoned or that the contractor is unable or unwilling to complete the contract a second permit may be issued where there is a change of contractor without the initial permit being revoked or suspended. The foregoing will be permitted only when the following stated persons have filed with the Building Official a letter stating the reason for a second permit being required and holding the Building Official harmless from legal involvement. All interested parties shall be notified before action is taken.

(1) Where a prime contractor is the permit holder the owner shall file such hold-harmless letter.

(2) Where a sub-contractor or specialty contractor is the permit holder the owner and prime contractor shall both file such hold-harmless letters.

305 INSPECTION

305.1 GENERAL:

(a) When deemed necessary, the Building Official shall examine or cause to be examined all buildings and structures for which an application has been received for permit to enlarge, alter, repair, move, demolish or change the occupancy thereof. He shall inspect all buildings and structures from time to time during and upon completion of the work for which a permit was issued. He shall make a record of every such examination and

inspection and of all violations of this Code, and the correction or disposition of such violations.

(b) (1) When deemed necessary, the Building Official shall make inspection of construction products and assemblies at the point of manufacture or fabrication.

(2) The Building Official may require that only such construction products, materials and assemblies that are supplied, manufactured or fabricated by persons or firms having a current, valid Certificate of Competency may be incorporated into buildings or other structures.

(3) Any person or firm desiring to supply, furnish, manufacture or fabricate construction products or assemblies shall, when required so to do, make application on a form provided by the Building Official.

(4) Application shall set forth and describe plant methods, personnel, equipment, control procedure, and such other information as may be required to insure compliance of the product or assembly with this Code.

(5) The Building Official may approve such product and plant or manufacturing procedure and issue a Certificate of Competency where such product and manufacturing procedure is, in the opinion of the Building Official, in compliance with this Code, or he may refuse to approve such product or issue such Certificate of Competency when such product, plant, or procedure is determined, on consideration, to fail to comply with this Code.

(6) The Building Official may suspend or revoke approval of a product or assembly or Certificate of Competency when a product, plant or procedure is determined, on consideration, to fail to comply with this Code.

(7) The manufacturer's or fabricator's name or insignia shall be clearly indicated on each prefabricated structural assembly.

(8) Appeal from a decision of the Building Official to refuse to approve, suspend or revoke a product approval or Certificate of Competency shall be to the Board of Rules and Appeals as set forth in Section 203.

(c) The Building Official shall make the inspections called for by these requirements or he may accept reports of inspectors of recognized qualifications for special inspections, except that no certificate called for by any provisions of this Code shall be based on such reports unless the same are in writing and certified.

(d) Reserved For Future Use.

(e) No inspection shall be made until sanitary facilities have been provided, as required in Chapter 33 and set forth in Sub-section 4603.21.

(f) (1) When the services and reports of inspection and testing laboratories are required by this Code, only such services and reports shall be accepted as are submitted from impartial inspecting and testing laboratories having a Professional Engineer in active responsible charge of the work of sampling and testing.

(2) Testing laboratories engaged in the sampling and testing of concrete and steel products shall have complied with the Standard for "Inspection and Testing Agencies for Concrete and Steel as Used in Construction," ASTM E329, as set forth in Section 402.

(3) Testing laboratories located out of this State and under the supervision of a Registered Professional Engineer legally qualified in the State in which the laboratory is located, and where such testing laboratory has complied with the above Standard, may submit test reports as required by this Code.

(g) All equipment, material, power, and labor, necessary for inspection and test shall be supplied by the permit holder.

305.2 MANDATORY INSPECTIONS:

(a) The Building Official, upon notification from the permit holder or his agent, shall have the following inspections performed by Inspectors certified in the categories involved who shall either approve the portion of the work completed or shall notify the permit holder or his agent wherein the same fails to comply.

STRUCTURAL:

PILING: To be made during the driving of piles (Special Inspector).

FOUNDATION INSPECTION: (Include pile caps and grade beams) To be made after necessary excavation, form erection, and reinforcing steel placement, prior to pouring of concrete.

FLOOR SLAB (ON GRADE): To be made after necessary excavations, form erection as may be required, placement of reinforcing steel, mesh, and vapor barrier when specified, and prior to pouring concrete.

CONCRETE COLUMNS: To be made after the placement of reinforcing steel and prior to complete erection of forms and pouring of concrete.

CONCRETE UNIT MASONRY: To be made at each successive pour after placement of the reinforcement and prior to the pouring of grout (See Sec. 305.3).

CONCRETE BEAMS: To be made after the erection of forms, placement of reinforcing steel, hangers, bracing and shoring and prior to pouring of concrete.

ROOF TRUSSES: To be made after the erection of truss members, permanent and temporary bracing, roof sheathing and bottom chord furring members and anchors.

ROOF SHEATHING: To be made after placement of panels or planking and prior to application of base or anchor coat of roofing.

WALL SHEATHING: To be made after placement of panels or planking.

ROOFING: To be made in accordance with Sec. 3401.1(d).

FRAMING: To be made after the installation of all structural elements, including: furring, fire stops, nailers, anchors, and bracing, and prior to the installation of interior cladding, but after inspection of rough in electrical, plumbing and HVAC, which must be completed prior to request for framing inspection. (See mandatory inspections for electrical, plumbing, and HVAC.)

WINDOW AND DOOR INSPECTION: Two inspections to be made, one after door and window bucks have been installed, and the second, after window and door assemblies have been installed and before attachments and connections to the building frame are concealed.

WIRE LATH: To be made after installation of all metal lath and accessories prior to application of any coatings.

INSULATION: After installation in compliance with type and "R" values stipulated in energy calculations and prior to installation of rock lath and drywall.

ROCK LATH: To be made after installation of all rock lath, corner beads, strip reinforcement and nailers for molding and trim and prior to application of plaster basecoat.

DRYWALL: To be made after installation of drywall panels and prior to taping and spackling.

CURTAIN WALL INSPECTION: To be made at each floor level after curtain walls are installed and before curtain wall attachments are concealed.

STORE FRONT INSPECTION: To be made after store fronts are installed and before store front attachments are concealed.

WINDOW AND GLASS DOOR INSPECTION: For buildings over 2 stories, to be made after windows and glass doors are installed and before attachments and connections to building frame are concealed.

FINAL INSPECTION: To be made after installation and completion of all elements of construction and safeguards and protective devices, and after final plumbing, electrical, and HVAC. Approval of Fire Department accessibility and all tests of fire alarm detection and suppression systems, smoke evacuation systems and life safety systems shall be conducted prior to final inspection and issuance of Certificate of

Occupancy. This final inspection shall signify the completion of all work and that the structure is safe and for Occupancy. Final adjustments to mechanical devices can be made after this inspection and during Occupancy. (See Sec. 305.2 (d)).

SWIMMING POOL: First inspections to be made after excavation and installation of reinforcing steel, bonding and main drain and prior to placing of concrete. Second and Final inspection shall be made upon completion of all elements including pool piping, accessories, and finishes. The pool shall be filled with water and filtration system shall be in operation.

PLUMBING:

PLUMBING INSPECTION: To be made of the ground work and at each floor. All plumbing work shall be left uncovered and convenient for examination until inspected and approved. Floors shall be left open in all bathrooms and elsewhere above all sanitary plumbing, water-supply and gas-supply piping and other plumbing work until it shall have been examined, tested and approved. Final inspection shall be made prior to Final Structural Inspection.

MECHANICAL:

MECHANICAL INSPECTION: To be made for all underground work, and at each floor and roof level where mechanical work is installed. All mechanical work shall be left uncovered and convenient for examination until inspected and approved by the Mechanical Inspector. Final inspection shall be made prior to Final Structural Inspection.

ELECTRICAL:

ELECTRICAL INSPECTION: Shall be made on each of the following items:

Temporary Electrical Service Underground Installations

Temporary Electrical Service/Pole/Meter Can

UNDERGROUND ELECTRICAL INSTALLATIONS:

(1) Antenna/Satellite
(2) Cable Television /Television
(3) Feeders, (e.g.. Elevator)
(4) Lightning Protection System
(5) Service Lateral
(6) Site Lighting
(7) Sprinkler Pump System
(8) Telephone
(9) All other Underground Electrical Installations not Listed

SLAB ELECTRICAL INSTALLATIONS:

(1) Grounding Electrode Conductor to Foundation Steel
(2) Roof
(3) Tilt Wall
(4) All other Slab Electrical Installations not Listed

ROUGH ELECTRICAL INSTALLATIONS:

(1) Air Conditioning Roof/Heat Pump
(2) Burglary Alarm/Security System/Pre-Wire
(3) Cable Television/Television
(4) Ceiling/Soffit/House Lighting
(5) Central Vacuum
(6) Computers/POS
(7) Energy Management System
(8) Fire Alarm System/ Smoke Detectors

(9) Intercom/Music System/Speakers
(10) Lightning Protection System / Surge Arrester
(11) Load Management Pre-Wire
(12 Low Voltage Systems Miscellaneous
(13) Medical Gas Alarm/Nurses Call/Paging System
(14) Meter Rooms/Electrical Equipment Enclosures
(15) Security Systems
(16) Site Lighting
(17) Telephone
(18) Uninterrupted Power Supply
(19) Walls
(20) All other Rough Electrical Installations not Listed

ELECTRICAL SERVICE INSTALLATIONS:
(1) Electrical Service Changes
(2) Electrical Service Repairs
(3) Electrical Service Retaps
(4) Electrical Service Final Inspection

MISCELLANEOUS ELECTRICAL INSTALLATIONS:
Swimming Pool/Spa Electrical Installations:
(1) Swimming Pool/Spa Bonding
(2) Swimming Pool/Spa Deck Perimeter Bonding
(3) Swimming Pool/Spa Electrical Final Inspection

Temporary Electrical 30-Day Power for Testing

FINAL ELECTRICAL INSTALLATIONS:
(1) Air Conditioning Roof/Heat Pump
(2) Burglary Alarm/Security System
(3) Cable Television/Television
(4) Ceiling/Soffit/House Lighting
(5) Central Vacuum
(6) Computers/POS
(7) Energy Management System
(8) Fire Alarm System/ Smoke Detectors
(9) Intercom/Music System/Speakers
(10) Lightning Protection System / Surge Arrester
(11) Load Management Pre-Wire
(12 Low Voltage Systems Miscellaneous
(13) Medical Gas Alarm/Nurses Call/Paging System
(14) Meter Rooms/Electrical Equipment Enclosures
(15) Security Systems
(16) Site Lighting
(17) Telephone
(18) Uninterrupted Power Supply
(19) Walls
(20) All other Final Electrical Installations not Listed
(21) **Final**

ALL UNDERGROUND, SLAB, AND ROUGH ELECTRICAL INSTALLATIONS:

(1) **Shall Be** left uncovered and convenient for examination until Inspected and Approved by the Electrical Inspector.

Final Electrical Inspection shall be made Prior to Final Structural Inspection.

THRESHOLD BUILDINGS: Florida State Statute 553.71

OTHER INSPECTIONS:

The Building Official may require Special Structural Inspections Sec. 305.3.

(b) No work shall be done on any part of a building or structure or any plumbing, electrical or mechanical installation beyond the point indicated herein above for each successive inspection until such inspection has been made and the work approved and the Inspector has so indicated on the permit card or an inspection record pad at the job site which has been approved by the Building Official.

(c) No reinforcing steel or structural framework of any part of any building or structure shall be covered or concealed in any manner whatsoever without the approval of the Building Official.

(d) Inspection requests shall be made to the Building Department office and shall provide reasonable time for such inspections to be made. Inspections shall be made not later than the following work day after the day of the request for inspection when a request is made prior to 12:00 noon. Requests for inspections received after 12:00 noon, shall be made not later than the day after the following work day.

Construction inspected by the Building Department may be rejected or approval refused for reasons of incompleteness or code violation. The work shall be made to comply and the request for inspection repeated as outlined herein. It shall be assumed that the responsible individual or individuals in charge of the work shall have themselves inspected the work and found it to be in compliance with the Code requirements before the request for inspection is made.

(e) Reserved For Future Use.

(f) Examination of all structural, electrical, plumbing and mechanical items may be performed by Inspectors only when holding current certification in the respective disciplines issued by the Board of Rules and Appeals.

(g) Violations and/or correction notices must include specific reference to the Code section, in writing, upon which the notice is based.

(h) During such periods of time that an area or areas of Broward County is deemed a Federal or State declared Disaster Area, building owners and/or their designated representatives may institute temporary repairs to their property, in order to restore the impermeability to the building envelope and/or to secure the property. Such repairs shall be temporary in nature, so as to minimize further damage to the property, and may be undertaken without repair permits and inspections by the local building department, as long as the damaged building components and their respective attachments are not permanently concealed.

305.3 SPECIAL INSPECTOR:

(a) The Building Official may require the owner to employ a special structural inspector for the inspection of the structural framework, or any part thereof, as herein required:

(1) Building or structures or part thereof of unusual size, height, design or method of construction and critical structural connections.

(2) Pile driving.

(3) Windows, glass doors and curtain walls on buildings over two stories.

(4) Concrete unit masonry (Sec. 2705).

(b) Such special inspector approved by the Building Official shall be an Architect or Professional Engineer or a duly accredited employee representing either.

The special inspector shall be responsible for compliance with the approved structural plans and shall submit progress reports and inspection reports to the Building Official. Structural inspections performed by the special inspector shall satisfy the requirements for mandatory structural inspections by the municipality.

(c) At the completion of the structural work, the special inspector shall submit a Certificate of Compliance to the Building Official, stating that the work was done in accordance with the approved structural plan or plans.

305.4 OFFICIAL REPORTS: The Building Official shall keep records of inspections, Certificates of Compliance, results of tests, plans, surveys and Certificate of Occupancy for a period of not less than seven years. Such records shall become a part of the public records and open to public inspection, except as may be elsewhere specifically stipulated.

305.5 SPECIAL HURRICANE INSPECTIONS:

(a) During such periods of time as are designated by the United States Weather Bureau as being a hurricane watch, all furniture, display racks, material and similar loose objects in exposed outdoor locations, shall be lashed to rigid construction or stored in buildings. Orders shall be oral or written and shall be given to any person on the premises most logically responsible for maintenance and such orders shall be carried out before winds of hurricane velocity are anticipated.

(b) After winds of hurricane velocity are experienced and have subsided, the Building Official shall investigate to determine if damage has occurred to buildings or other structures. The Building Official will list each structure which has suffered damage in excess of 25%.

(c) No building or other structure or assembly or part thereof, which was damaged or collapsed or out of plumb or line shall be repaired or altered or otherwise returned to its original position without inspection and approval by the Building Official.

(d) Upon notification to the Building Official the owner shall retain the services of a licensed contractor who will be granted an emergency permit to secure, brace and perform any service required to make the structure safe. The contractor will be permitted to erect shoring and barricades as required to assure life safety. The Building Official will investigate to assure that the damaged structure is safe and that electrical service has been disconnected. The Building Official will then determine that the structure can be repaired or demolished (Sec. 202).

(e) Within 30 days of the Building Official's determination, either a drawing indicating the reconstruction shall be submitted for a permit (Sec. 302), or a permit for demolition will be issued to a licensed Demolition Contractor pursuant to Sec. 302.7 of the South Florida Building Code, Broward County Edition.

(f) Physical damage occurring to meter troughs, risers, weather heads and associated electrical equipment on the exterior portion of residential structures shall be repaired by a qualified electrical contractor. Upon completion of said repairs:

(1) Contractor shall tag the completed work with appropriate identification including Customer Name, Customer Address, brief description of repair, Contractor Name, Contractor CC# and Contractor phone number for F.P.L. and inspecting authorities. Tag and text shall be durable and weather resistant.

(2) Florida Power & Light Co. may, upon acknowledging tag, retap the electrical service without inspection by the inspecting authorities. Florida Power & Light Co. shall take due care to ensure safety before energizing the service.

(3) Contractor shall obtain permits after the fact within thirty days of the occurrence.

(4) Florida Power & Light Co. shall record and submit to individual inspecting authorities a list of retaps

and locations within 30 days after the emergency or crisis conditions have subsided.

SAMPLE TAG

Made of durable weather resistant material & capable of being tied on to service equipment.

STORM RESTORATION PROGRAM

BROWARD COUNTY BOARD OF RULES & APPEALS

SFBC - SECTION 305.5 (F)

This tag certifies that emergency residential service repairs have been made as follows:

ELECTRICIAN: COMPLETE BOTH TOP AND BOTTOM PORTIONS OF TAG.

CUSTOMER NAME .....

CUSTOMER ADDRESS .....

JURISDICTION .....

CONTRACTOR'S NAME .....

CONTRACTOR'S CC# .....

CONTRACTOR'S PH# .....

BRIEF DESCRIPTION .....

.....

.....

.....

_____ **DATE**

SIGNED BY CONTRACTOR

NOTE: Contractor will apply for follow up Permit within 30 days.

.....

UTILITY:

TEAR OFF COMPLETED LOWER PORTION AND RETURN TO LOCAL INSPECTING AUTHORITY.

CUSTOMER NAME .....

CUSTOMER ADDRESS .....

JURISDICTION .....

CONTRACTOR'S NAME .....

CONTRACTOR'S CC# .....

CONTRACTOR'S PH# .....

(g) During the emergency period the Building Official may accept inspection reports as outlined in Section 305.3 Special Inspector, for structural portions, including qualified engineers or architects for electrical, mechanical and plumbing inspections.

306 CLEANUP OF SITE

Upon completion of the proposed work, the permit holder shall leave the site cleared of rubbish, debris, construction sheds or materials of construction. In the event there has been damage to public property or that rubbish, debris, construction sheds or materials of construction have been left at the site, then the Building Official shall refuse to make final inspection and shall notify the permit holder to correct the condition of

violation within five days. For failure to comply with such notice after such period of five days, the permit holder is subject to the penalties specified herein, and the Building Official shall have the clean-up work done and public property restored and shall notify the legal authority, who shall institute the necessary action to have the costs placed as a lien against the property in relation to which the permit was issued.

307 CERTIFICATE OF OCCUPANCY

307.1 WHEN REQUIRED:

(a) No building hereafter erected, altered or enlarged, nor existing building involving a change of Occupancy shall be used or occupied in whole or in part until a Certificate of Occupancy or Temporary or Partial Certificate of Occupancy shall have been issued by the Building Official, certifying that the building and Occupancy are in accordance with the provisions of the Code and all other ordinances and laws applicable thereto: except that any use or occupancy which has not been discontinued during the work of alteration or enlargement shall be discontinued within 30 days after the completion of the work unless the required certificate is secured from the Building Official. If the building or part thereof complies with the provisions of all pertinent laws and regulations, the Building Official shall issue the Certificate of Occupancy or temporary or Partial Certificate of Occupancy. A Certificate of Occupancy for places of assembly shall indicate thereon and make record of the number of persons for which such certificate is issued.

(b) A Certificate of Completion shall be issued upon approval of a final inspection indicating that all work described in a permit not affecting occupancy or a change of occupancy, has been completed in accordance with the provisions of the code. A Certificate of Completion shall also be issued for completion of partial work of a project for which an individual permit was issued, such as piling, shell, or other segment of the work. A Certificate of Completion does not permit human occupancy.

(c) The Building Official may issue a Certificate of Completion for construction not for direct human occupancy such as but not limited to fences, walls, signs, paving, light posts, landscaping, etc.

307.2 EXISTING BUILDINGS: If an occupancy which does not comply with the requirements of this Code has existed prior to the adoption of this Code, the Building Official shall issue a Certificate for Occupancy therefor, unless the building and use, in his opinion, constitute a serious hazard to life, limb or property. If an application for a Certificate of Occupancy is not approved, such occupancy shall not be started or shall be discontinued.

307.3 REVOCATION: The Building Official shall have the authority to revoke a Certificate of Occupancy for any building which is occupied, in whole or in part, for any use not authorized or which is changed in Occupancy to a classification where such Occupancy does not comply with this Code, or for any building where the live loads imposed on any floor or the number of persons permitted to assemble therein or thereon exceed those authorized in said Certificate. The revoking of a Certificate of Occupancy shall have the effect of nullifying any occupational license issued in connection with such building or the affected part of such building.

307.4 TEMPORARY AND/OR PARTIAL CERTIFICATE OF OCCUPANCY/USE:

(a) A Temporary Certificate of Occupancy may be issued by the Building Official, for the use of a building for a period of up to ninety days, providing the building to be occupied has, to the satisfaction of the Building Official, met all the code provisions related to sanitary facilities, electric service, means of egress, fire resistive separation, structural adequacy, and life safety requirements.

The temporary Certificate of Occupancy may be extended for one period up to 90 days if a request is made in writing to the Building Official prior to the expiration of the initial Temporary Certificate of Occupancy.

In the event the Temporary Certificate of Occupancy has expired, or no extension has been granted by the Building Official, the electric service may be disconnected, upon written notice by Certified Mail or hand delivery to the owner or tenant and a copy forwarded to the Public Service Corporation or agency providing service to the building or structure, pursuant to (Section 307.5) of the South Florida Building Code.

(b) A Partial Certificate of Occupancy may be issued by the Building Official for portions of a building providing such portions comply with the requirements for a Certificate of Occupancy, and the portions of the building are isolated from the portions in which construction activities are continuous. Areas not included in the Partial Certificate of Occupancy shall not be occupied until such areas are completed satisfactorily for an issuance of a Certificate of Occupancy. Each area shall not be occupied until inspected and approved and additional Partial Certificates of Occupancy are issued. The final Certificate of Occupancy shall not be issued for the entire building until the requirements of Sec. 307.1 are complied with.

307.5 CONNECTION OF SERVICES: It shall be unlawful for any public-service corporation or agency to begin service to a building, except temporary service for use during building operations and for testing purposes, until a Certificate of Occupancy has been issued and/or notice posted on the premises.

308 STATEMENTS OF THE STRUCTURAL RESPONSIBILITY OF ARCHITECTS AND PROFESSIONAL ENGINEERS

308.1 DEFINITIONS:

Architect of Record: The Florida Registered Architect who develops the structural design criteria and framing concept for the structure performs the analysis and is responsible for the preparation of the Structural Construction Documents. The Architect of Record is cautioned that the delegation of design does not necessarily relieve the Architect of Record of any responsibility in the design of the structure. These procedures are a reminder to the Architects that, in affixing their seal to structural drawings of the structural entity they have accepted responsibility for the design of the structural entity.

Structural Engineer of Record: The Florida Registered Professional Engineer who develops the structural design criteria and structural framing concept for the structure, performs the analysis and is responsible for the preparation of the Structural construction Documents. The Structural Engineer of Record is cautioned that the delegation of design does not necessarily relieve the Structural Engineer of Record of any responsibility in the design of the structure. These procedures are a reminder to Professional Engineers that, in affixing their seal to structural drawings of the structural entity they have accepted responsibility for the design of the structural entity.

Specialty Engineer: A Florida Registered Professional Engineer, not the Structural Engineer of Record and not the Architect of Record, who undertakes the design of structural components or structural systems for a specific project. These procedures are a reminder to Professional Engineers that, in affixing their seal to structural drawings of the structural components or structural systems they have accepted responsibility for the design of the structural components or structural systems.

The Specialty Engineer will generally fall into one of these three categories:

(a) An employee or Officer of a fabricator.

(b) An employee or an Officer of an entity supplying components to a fabricator.

(c) An Independent Consultant.

Structural Component: An individual structural member designed to be part of a structural system.

Structural System: A portion of a structure comprising an assembly of structural components.

Structural Construction Documents: The structural drawings and specifications setting forth the overall design of the structure, prepared by and signed, sealed and dated by the Structural Engineer of Record and/or

the Architect of Record. The Structural Construction Documents shall identify the project and specify design criteria both for the overall structure and for structural components and structural systems. The drawings shall identify the nature, magnitude and location of all design loads to be imposed on the structure. The drawings shall bear the impressed seal, signature and date of the Structural Engineer of Record and/or the Architect of Record who prepared them.

Structural Submittal: The structural submittal shall include, but shall not be limited to, drawings, calculations, computer printouts, catalog information, etc. required by the Structural Documents.

(a) Drawings prepared solely to serve to as a guide for fabrication and installation and requiring no Engineering input such, but not limited to, as reinforcing steel shop drawings, structural steel erection drawings and etc., do not require the seal of a Professional Engineer and/or an Architect.

(b) Drawings introducing Engineering input such as defining the configuration or structural capacity of prefabricated structural components or their assembly into structural systems shall require the impressed seal, signature and date of the Specialty Engineer who prepared them.

(c) Calculations shall require the impressed seal, signature and date of the Specialty Engineer who prepared them.

(d) Computer printouts are an acceptable substitute for manual computations provided they are accompanied by sufficient design assumptions and identified input and output information to permit their proper evaluation. Such information shall bear the impressed seal, signature and date of the Specialty Engineer who prepared them as an indication that he or she has accepted responsibility for the results.

(e) Catalog information on standard products not fabricated for a specific project does not require the seal of a Professional Engineer and/or an Architect.

308.2 REVIEW OR STRUCTURAL SUBMITTAL: When the Structural Engineer of Record and/or the Architect of Record elects to delegate a portion of the responsibility to a Specialty Engineer, the Structural Engineer of Record and/or the Architect of Record shall review the structural submittal.

Table 3-A

Mission Statement: Product Approval is necessary for those component products which are pre-manufactured and are subject to wind and/or impact loading unless specifically exempted by code.

Structural Products Which Require A Product Approval For Permitting	For Building Permit	Prior to Installation
Coolers / Freezers (pre-manufactured / exterior)	✔	
Doors (Exterior)		✔
Garage Doors		✔
Roof Hatches		✔
Roof Covering (See SFBC Chapter 34)		
Shutters		✔
Skylights		✔
Storage Sheds (pre-manufactured)*	✔	
Windows		✔

* or State of Florida, Department of Community Affairs Seal

Product Approval for structural products shall be acceptable in any of the following forms:

1. Dade County Product Control Notice of Acceptance.
2. Certification through rational and / or comparative analysis by a registered professional engineer wherein compliance with the Broward County Edition of the South Florida Building Code's standards is identified and signed and sealed by a registered professional engineer on the appropriate Board approved Product Compliance Standards form.
3. Testing and certification by a testing agency recognized in SFBC Section 402, Table 4-A, or specifically approved by the Board and wherein compliance with the Broward County Edition of the South Florida Building Code's standards is signed and sealed by a registered professional engineer on the appropriate Board approved Product Compliance Standards form.

PART II
DEFINITIONS AND STANDARDS

CHAPTER 4
DEFINITIONS AND STANDARDS

401 DEFINITIONS

Unless otherwise expressly stated, all words other than herein defined shall have the meanings implied by their context in this Code or their ordinarily-accepted meanings in the construction industry; words used in the present tense shall include the future; words in the masculine gender shall include the feminine and neuter; the singular number shall include the plural; and the plural number shall include the singular.

ACCESSIBLE: Reasonable and adequate clearance on sides and above for inspection, service, repair and replacement, without removing permanent construction. Also see Section 515.

ACCESSIBLE, READILY: Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, chairs, etc. (See "Accessible.")

ACCESSORY USE: A building or structure, the use of which is incidental to the main building or structure, and is located on the same lot, or on a contiguous lot fronting on the same street as the lot or lots on which the main building is located and the use of which is manifestly incidental to that of the main building.

ADDITION: An extension or increase in floor area or height of a building.

AIR-PERMEABLE CLADDING: Roof or wall claddings that allow partial air pressure equalization between their exterior and interior surfaces.

ALLEY: Any public space, public park or thoroughfare 20 feet or less, but not less than ten feet, in width, which has been dedicated or deeded to public use.

ALTERATION: Any change or modification of construction, space arrangement and/or occupancy of a building, or decreasing or not increasing the area or cubic contents thereof.

APARTMENT: One or more rooms occupied as a home or residence for an individual or a family or a household. The existence of, or the installation of, sink accommodations and/or cooking facilities within a room or suite of rooms shall be deemed sufficient to classify such room or suite of rooms as an apartment. The floor area for an apartment shall be not less than required by applicable zoning regulations.

APARTMENT HOTEL: A building, usually under resident supervision, made up of three or more apartment units, arranged with common corridors and exits and maintaining an inner lobby or foyer, through which persons pass for access to the apartments.

APARTMENTHOUSE: A building made up of three or more apartment units so arranged that each unit has direct access, without common corridors, to a means of egress from the building, and which may or may not maintain an inner lobby for its tenants.

APPOINTING AUTHORITY: The constituted public body comprised of the elected or appointed city commissioners, city councilmen, and mayor of each municipality for incorporated areas, within their territorial jurisdiction; or the elected members of the board of county commission for all unincorporated areas within Broward County.

APPROVED: Approved by the Building Official or other authority given jurisdiction by this Code.

ARCADE: Is an avenue or passageway, roofed over and enclosed except at the ends and serving as a common entrance and egress for shops, stores and similar places of business located thereon.

ARCHITECT OR REGISTERED ARCHITECT: A person technically qualified and professionally licensed by the State of Florida to practice architecture.

AREA: As applied to the dimensions of a building means the horizontal projected area of the building at grade.

AREA WAY: In an open, subsurface space, adjacent to a building for access to, or for lighting or ventilating basements.

ASSEMBLY BUILDING: A building used in whole or in part, for the gathering together of persons for such purposes as deliberation, worship, entertainment, amusement or awaiting transportation.

ATRIUM: A floor opening or series of floor openings connecting two or more stories that is covered at the top of the series of openings and is used for purposes other than an enclosed stairway; elevator hoist way; escalator opening; or utility shaft used for plumbing, electrical, air conditioning, or communication facilities.

ATTIC: Shall be taken to mean any space immediately under the roof rafters and above the ceiling joists of the story nearest to the roof.

AUTOMATIC: Applied to a door, window, or other opening protective or protective device, means that such protective is so constructed and arranged that when actuated by a predetermined temperature or rate of rise in temperature, such operating protective will close if open, or such protective device will operate as intended. Not requiring manual operation.

AWNING: (See Chapter 43 and 44 herein).

BALCONY: That portion of a seating space of an assembly room, the lowest part of which is raised four feet or more above the level of the main floor.

BALCONY EXTERIOR: A landing or porch projecting from the wall of a building. Where serving as a required means of egress the long side shall be at least 50 percent open and the open area above the guard rail shall be so distributed as to prevent the accumulation of smoke or toxic gases.

BASEMENT: That portion of a building between floor and ceiling, which is so located that one-half or more of the clear height from floor to ceiling is below grade. (See **STORY**).

BAY WINDOW: Is a rectangular, curved or polygonal window supported on a foundation extending beyond the main walls of a building.

BRICK: A solid masonry unit not larger than 16 x 4 x 8 inches.

BUILDING: A structure which encloses space; a structure which gives protection or shelter for any occupancy. The term "building" shall be construed as if followed by the phrase "or part thereof." When separated by fire walls, each portion so separated shall be deemed a separate building.

BUILDING LINE: The line established by law, beyond which a building shall not extend, except as specifically provided herein.

BUILDING OFFICIAL: That official designated by the appointing authority, whatever his official title, to enforce the provisions of the South Florida Building Code and other applicable laws; provided, he may act with the aid of and through his authorized assistants.

BULKHEAD:

(a) That portion of the exterior walls of a building which is located immediately under show-windows.

(b) A structure above the roof of any building, enclosing a stairway, tank, elevator machinery or ventilating apparatus, or such part of a shaft as extends above a roof.

(c) A retaining type structure.

BUNGALOW COURTS: A group of three or more detached, one-story, single-family dwellings, arranged with common utilities and accessories under a common ownership.

CABANAS: Shall mean bath cabins, together with only such accessories as boardwalks, terraces, sun decks, rubbing rooms and toilet rooms.

CANOPY: (See Chapters 43 and 44 herein).

CARPORT: A covered area for sheltering a motor vehicle and which is not more than 75 percent enclosed by walls.

C.E.U. — CONTINUING EDUCATION UNIT: Continuing Education Units are nationally recognized units designed to provide a record of an individual's continuing education accomplishments. One C.E.U. is equal to ten (10) contact hours. One contact hour is at least 50 minutes long. One, eight (8) hour day of participation in an organized continuing education experience under responsible sponsorship, capable direction and qualified instruction is equal to .8 Continuing Education Units.

CHIEF FIRE OFFICIAL OR CHIEF OF THE FIRE DEPARTMENT: Is the Chief Officer and/or Administrator of the Fire Department or his authorized representative serving the jurisdiction.

COMBUSTIBLE: Capable of igniting and continuing to burn or glow with a flame at or below a temperature of 1200 degrees Fahrenheit.

COMPOSITE BUILDING: Any single structure composed of more than one type of construction. The total height and number of stories shall not exceed the allowable for either of the types of construction individually. Each portion shall comply with all of the requirements of the type of construction incorporated into that portion.

CONTACT HOUR: Contact Hours are awarded to individuals participating in an organized continuing education experience, under responsible sponsorship, capable direction and qualified instructors. One Contact Hour is at least 50 minutes long. One Contact Hour is equal to .1 Continuing Education Units. All recertification requirements are stated in Contact Hours. Continuing Education Units may be converted to Contact Hours by multiplying the earned C.E.U.'s by ten (10).

CORRIDOR: A path of egress connecting more than one room or occupied space on any one floor; a hallway.

COURT: Is an open, unoccupied space, bounded on two or more sides by the walls of the building. An inner court is a court entirely within the exterior walls of a building. All other courts are outer courts.

CURTAIN WALL: Any fabricated assembly of various components to enclose a building usually attached to and/or supported by the building frame other than a single door or window or frame therefor and as distinguished from masonry units, poured-in-place concrete and siding of single membrane metal, wood or plastic.

DEAD LOAD: The weight of the structure and all permanent parts incorporated into the construction thereof.

DEVELOPED DISTANCE: The shortest distance between two points that free air would travel as measured horizontally , vertically or diagonally in a straight line or around corners.

DINING ROOM: Any building or part thereof, or any room or part thereof, in which food is dispensed or served.

DISTANCE SEPARATION: Distance separation is the horizontal distance, measured at right angles, from a wall or opening in a wall to the building line of a contiguous lot or any building on the same lot. In calculating the building line of a contiguous lot, it shall be the minimum setback allowed from the property line but in no case shall more than five feet from the common lot line of the contiguous lot be included. Distance in excess of five feet may be utilized in calculating the distance separation provided a perpetual setback easement has been recorded in the Public Records of Broward County or by way of a restrictive covenant to run with the land.

DORMITORY: Shall mean a room having separate sleeping accommodations for more than four persons and used as an accessory to Group "D," "C," "H," and "I" occupancies.

DUPLEX: A single building structure consisting of two residential apartments either side by side or one over the other.

DWELLING: A building occupied exclusively for residential purposes and serving not more than two housekeeping units used for cooking, living, or sleeping purposes.

EGRESS: See MEANS OF EGRESS.

ELEVATOR: A device used for carrying persons or things upward or downward.

ESCALATOR: A moving, inclined stairway for passengers.

EXIT: See MEANS OF EGRESS.

EXIT ACCESS: See MEANS OF EGRESS.

EXIT COURT: A yard or court providing egress to a public way for one or more required exits.

EXIT DISCHARGE: See MEANS OF EGRESS.

EXIT PASSAGEWAY: An enclosed means of egress connecting a required exit or exit court with a public way.

FAMILY: Is any number of persons living together under one head as a single housekeeping unit, whether related to each other legally or not; and shall be deemed to include servants, but shall not include paying guests.

FAMILY DAY CARE HOME: An occupied residence in which child care is regularly provided for children and which receives a payment fee, or grant for any of the children receiving care, whether or not operated for profit. Family day care home shall not mean a private residence used for an informal cooperative arrangement among neighbors or relatives, or the occasional care of children with or without compensation thereof.

FIRE ASSEMBLY: The assembly of a fire door, fire window, or fire damper, including all required hardware, anchorage, frames and sills.

FIRE ASSEMBLY, AUTOMATIC CLOSING: A fire assembly which may remain in an open position and which will close automatically is subjected to either of the following:

1. An increase in temperature.
2. Products of combustion. Unless otherwise specified, the closing device shall be one that is rated at a maximum temperature of 165, F. If products of combustion are being detected to activate the closing device, the closing device, shall operate by the activation of an approved unit type smoke and heat activated detector or an approved detection device having an equivalent response to smoke and products of combustion.

Unit type smoke detection shall conform to the Standard for Essential Electrical Systems for Hospitals, NFPA 76A and Installation of Air Conditioning and Ventilating Systems (Non-Residential) NFPA 90A, as set forth in Section 402.

FIRE ASSEMBLY, SELF-CLOSING: A fire assembly which is kept in a normally closed position and is equipped with an approved device to insure closing and latching after having been opened for use.

FIRE DIVISION: A portion of a building so separated from the rest by fire-walls that it may be erected to the maximum height and area allowed for the governing Occupancy and the Type of Construction, independently of adjoining Occupancies or Types of Construction.

FIRE DOOR: A door and its assembly so constructed and placed as to give protection against the passage of fire.

FIRE ESCAPES: A single or series of steel framed balconies attached to the exterior wall at windows or doors and connected to each other and to the ground by flights of steel stairs.

FIRE-RESISTIVE: Ability to resist fire and prevent its spread as regulated in this Code.

FIRE-RESISTIVE RATING: The time in hours that a material or construction will withstand a standard fire exposure as defined in this Code and its adopted standards.

FIRE-RETARDANT TREATED WOOD: Wood that has been treated to comply with Section 2914 herein.

FLAMEPROOF: The property of a material, usually decorative fabric, whether treated or not treated to not burst into flames or support combustion when subjected to flames for a period of 30 seconds.

FLOOR AREA, GROSS: Gross area shall be the floor area within the perimeter of the outside walls of the building with no deduction for corridors, stairs, closets, thickness of wall, columns, or other features. Where the term area is used in this Code, it shall be understood to be gross area unless otherwise specified. In theaters, assembly halls and similar occupancies, balconies, galleries, and stages; and mezzanine floors which are not enclosed; shall be considered as adding to the floor area.

FLOOR AREA, NET: Net floor area shall be the actual occupied area, not including accessory unoccupied areas or thickness of walls.

FOYER: Is an area or space within a building and located between a lobby and main entrance and the main floor.

GALLERY: Is that portion of the seating capacity of a theater or assembly room having a seating capacity of more than ten persons and located above a balcony.

GARAGE: A building, shed or enclosure, or part thereof, in which a motor vehicle containing a flammable liquid in its fuel tank is housed or stored or repaired.

GRADE:

(a) The average elevation of the ground, paved or unpaved, adjoining a building or structure, at the center of each exterior wall line.

(b) When used in connection with lumber, means a division of sawn lumber into quality classes with respect to its physical and mechanical properties, as defined by the association under whose rules the lumber is controlled.

GROUNDFLOOR: Is a floor located not more than two feet below, nor more than six feet above "grade".

GUEST:

(a) In connection with multiple-family occupancies means a person hiring a room for living and/or sleeping purposes.

(b) In connection with single-family and two-family occupancies means a person sharing single-family accommodations without profit on those accommodations.

GUEST HOUSE:

(a) As a part of multiple-family occupancies means a detached single-family dwelling occupied or intended to be occupied for hire.

(b) As a part of a single-family and two-family occupancies means a detached portion which provides rooms and necessary appurtenances for the sleeping accommodation and/or entertainment of non-paying guests and their servants; but not provided with means for the general and regular serving of meals.

GUEST ROOM:

(a) In connection with multiple-family occupancies means a room in a building occupied or intended to be occupied for hire.

(b) In connection with single-family and two-family occupancies means a room in the main or an accessory building occupied or intended to be occupied by non-paying guests.

HABITABLE ROOM: A room in a residential unit used for living, sleeping, eating or cooking, but excluding baths, toilets, storage spaces or corridors.

HEIGHT, BUILDING: The vertical distance from grade to the highest finished roof surface of a flat roof or to the average level of a gable, or hip roof except with regard to the application of the requirements for Chapter 51, the term shall be defined as set forth in Sec. 5101.1(a).

HEIGHT, STORY: The vertical distance from top to top of two successive floors or floor and roof.

HEIGHT, STRUCTURE: The height of a structure erected on the ground shall be the vertical distance from grade to the highest point thereof, and for roof structures shall be the vertical distance from the mean level of the roof to the highest point of such structure. In general, the height of a structure shall be its overall height.

HIGH HAZARD: High hazard contents shall be classified as those which are liable to burn with extreme rapidity or from which poisonous flames or explosions are likely in the event of fire.

HORIZONTAL EXIT: A means of passage from one building into another building occupied by the same tenant, or from one section of a building into another section of the same building occupied by the same tenant through a separation wall having a minimum fire resistance of two hours.

HOTEL: Is any building containing ten or more rooms, intended or designed to be used or which are used, rented or hired out to be occupied, or which are occupied by persons for sleeping purposes by paying guests.

INCOMBUSTIBLE: Is a material which, in the form in which it is used meets the following requirements:

(a) Material of which no part will ignite and burn when subjected to fire. Any material conforming to the standard set forth in Paragraph 3701.2(k) shall be considered incombustible within the meaning of this section, or

(b) Material having a structural base of incombustible material as defined in Paragraph (a) above, with a surfacing not more than one-eighth inch thick having a flame spread rating not greater than 50 when tested in accordance with the standard set forth in Paragraph 3701.2(j).

(c) Incombustible does not apply to surface finish materials or to materials required to be incombustible for reduced clearances to flues, heating appliances or other materials, or

(d) No material shall be classed as incombustible which is subject to increase in combustibility or flame-spread raging beyond the limits herein established, through the effect of age, moisture or other atmospheric condition.

JOIST: Are secondary horizontal supporting members in floor, ceilings or roof construction.

JOURNEYMAN PLUMBER/ELECTRICIAN/MECHANICAL: A person holding a Certificate of Competency from an approved examining board as referred to in Sec. 302.1(b) and shall work under the supervision and responsibility of a licensed Master.

JURISDICTION: Shall mean the legally-constituted authority which has adopted this Code as law or ordinance.

LINTEL: The beam or girder placed over an opening in a wall which supports the construction above.

LIVELOAD: Any load imposed, or capable of being imposed, on a structure other than dead load or wind load.

LOBBY: Is an enclosed vestibule, directly accessible from the main entrance.

LODGING HOUSE: Is any building containing less than ten rooms, intended or designed to be used or which are used, rented or hired out, or which are occupied for sleeping purposes by two or more paying guests.

LOT: A portion or parcel of land considered as a unit.

LOT LINE: A line dividing one lot from another or from a street or other public space.

LOW HAZARD: Low Hazard contents shall be classified as those of such low combustibility that no self-propagating fire therein can occur and that consequently the only probably danger requiring the use of emergency exits will be from panic, fumes, or smoke, or fire from some external source.

MARQUEE: A cantilevered or otherwise supported projection from a major building constructed to be, or appear to be, an integral part thereof by being of similar material and intended for the weather protection of the main entrance and extending on each side of the opening a distance not greater than the protection from the

building. An appurtenance erected for the principal purpose of a display sign and constructed of light-gage metals is not classified as a marquee.

MASONRY: Brick, stone, plain concrete, hollow block, solid block or other similar materials or units bonded together with mortar. Reinforced concrete is not classified as masonry.

MASTER PLUMBER/ELECTRICIAN/MECHANICAL: A person holding a Certificate of Competency from an approved examining board as referred to in Sec. 302.1(b).

MEANS OF EGRESS: A means of egress is a continuous path of travel from any point in a building or structure to the open air outside at ground level and consists of three separate and distinct parts: (a) the way of exit access, (b) the exit, and (c) the means of discharge from the exit. A means of egress comprises the vertical and horizontal means of travel and may include the room space, doorway, corridor, hallway, passageway, stairs, ramps, lobby, escalator and other paths of travel.

(a) EXIT ACCESS is that portion of a means of egress which leads to an entrance to an exit.

(b) EXIT is that portion of a means of egress which is separated from the area of the building from which escape is to be made by walls, floors, doors or other means which provide the protected path necessary for the occupants to proceed with reasonable safety to the exterior of the building at the exit discharge.

NOTE: An interior aisle, corridor, hallway or other means of travel used to reach an exit door or doorway is not an exit, except where the maximum allowable distance of travel to an exit is exceeded, at which point the aisle or corridor shall be treated as part of an exit or is so located, arranged, and enclosed as to constitute an integral part of an exit facility.

(c) EXIT DISCHARGE: Is that portion of a means of egress between the termination of the exit at the exterior of the building and ground level.

MEANS OF ESCAPE: For the purposes of this Code a means of escape shall be defined as a way out of a building which does not conform to the strict definition of a means of egress but does provide an alternate way out.

MEZZANINE: Is an intermediate floor placed in any story or room. The entire area, including all communicating floor levels, shall be sufficiently open and unobstructed so that fire or other hazardous conditions in any part will be immediately apparent to the occupants of all such levels and area. Such mezzanines may have an open interior stairway as a required exit. When the total area of any such mezzanine floor exceeds 33-1/3 percent of the total floor area in that room or story in which the mezzanine floor occurs, it shall be considered as constituting an additional story. The clear height above or below a mezzanine-floor construction shall not be less than seven feet.

MULTIPLE-FAMILY: As in a building, meaning more than two families or households living independently of each other and doing cooking within their living quarters; includes apartments, tenements and flats.

NOMINAL DIMENSION: The dimension or size in which such material, part or unit is usually manufactured or supplied.

NON-COMBUSTIBLE: Non-combustible shall have the same meaning as incombustible.

(See **INCOMBUSTIBLE**)

NONCONFORMING: Shall apply to any building or structure which does not comply with the requirements set forth in this Code, or amendments thereto.

OCCUPANTLOAD: The total number of persons that may occupy a building or portion thereof at any one time.

OCCUPANCY: As used in this Code, pertains to and is the purpose for which a building is used or intended to be used. Occupancy is not intended to include tenancy or proprietorship.

OCCUPIED: Shall be construed as though followed by the words, "or intended, arranged, or designed to be occupied."

OPEN-AIR PARKING GARAGE: An open-air parking garage is a structure used exclusively for the parking of passenger motor vehicles where no servicing or repair is made and where 50 percent of the perimeter is 75 percent open or where 75 percent of each wall at opposite ends is open.

OPEN PLAN: Open Plan Buildings are Group C Occupancy buildings having rooms and corridors delineated by the use of tables, chairs, desks, bookcases, counters, low height (five foot) partitions, or similar furnishings. Group C Occupancy buildings without exit doors between rooms and corridors shall also be classified as Open Plan Buildings.

ORDINARY HAZARD: Ordinary Hazard contents shall be classified as those which are liable to burn with moderate rapidity and give off a considerable volume of smoke, but from which neither poisonous fumes nor explosion are likely in case of fire.

ORIEL WINDOW: Is one that projects from the main line of an enclosing wall of a building and is carried on brackets or corbels.

OWNER: The term shall include his duly authorized agent, a purchaser, devisee, fiduciary, property holder or any other person, firm or corporation having a vested or contingent interest, or in case of leased premises, the legal holder of the lease contract, or his legal representative, assign or successor.

PANIC HARDWARE: A bar or panel extending not less than 2/3 of the width of the door and placed at heights suitable for the service required not less than 30 nor more than 44 inches. Such bar or panel shall cause the door latch to release when pressure not to exceed 15 pounds is applied to the releasing device in the direction of exit travel.

PARAPET: That part of a wall entirely above the roof line.

PARKING GARAGE: Parking garages for passenger vehicles involving only the parking or storing of automobiles and not including automobile repair or service work or the sale of gasoline or oil.

PARTITION: A non-load bearing vertical separation between rooms or spaces. If such separating construction closes less than three-fourths of the area from wall to wall and floor to ceiling, it shall be considered a decorative separation and not a partition.

PATH OF EGRESS: The course taken by an occupant to effect egress to a public space. (See **PUBLIC SPACE**.)

PENTHOUSE: An enclosed one-story structure extending above the roof of a building not exceeding 25 percent of the area of the roof at the level on which such penthouse or penthouses are located.

PERMIT: A written authorization by the Building Official to proceed with construction, alteration, repair, installation or demolition.

PERSON: A natural person, his heirs, executors, administrators, or assigns, and also includes a firm, partnership, or corporation, its or their successors or assigns or the agent of any of the aforesaid.

PLATFORM: A portion of an assembly room which may be raised above the level of the assembly floor and which may be separated from the assembly space by a wall and proscenium opening provided the ceiling above the platform shall be not more than five feet above the proscenium opening.

PORTECOCHERE: Is a one-story porch under which vehicles may be driven for the purpose of providing shelter for either the vehicle or persons and which is open, full width, front and rear in the direction of vehicle travel, and open not less than 50 percent on the outer side.

PREFABRICATED: Fabricated prior to installation or erection.

PRIMARY MEMBER: A structural member, such as a column, beam, girder or truss, that carries dead, live and/or wind loads to the foundation. All principal members of a structure other than secondary or non-load bearing members.

PRIVATE BOAT DOCKING FACILITIES: Any facility for in-water docking four (4) or more boats which are over 16 feet in length (as defined in Appendix A-3) at a residential waterfront property, including but not limited to, condominium(s), hotel(s), motel(s), multifamily residence(s), duplex(e's) and single family residence(s) or at non-residential waterfront properties having temporary or permanent dockage, such as but not limited to, restaurant(s), lounge(s) and similar type occupancies. **See Appendix A-3**.

PRIVATE STAIRWAY: A stairway serving one tenant only and not for general public use.

PRODUCT APPROVAL: A report by an approved testing laboratory or Professional Engineer certifying that the product complies with the specifications of the manufacturer and compliance with the requirements of this code.

PROFESSIONAL ENGINEER: A person technically qualified and professionally licensed by the State of Florida to practice engineering.

PUBLIC SPACE: For the purpose of determining allowable floor areas and/or egress from buildings, such open spaces as public parks, right-of-ways, waterways, public beaches and other permanently unobstructed yards or courts having access to a street, and a width of not less than set forth herein for required units of exit width, may be considered a public space.

PUBLIC WAY: Any parcel of land more than 10 feet in width and 10 feet in height and open to the air and appropriated to the free passage of the general public.

RAFTERS: Are secondary inclined supporting members in roof construction.

RAILROAD RIGHTS-OF-WAY: For the purpose of determining allowable areas, fire-resistivity of walls, means of egress and openings in walls, a permanent railroad right-of-way or easement may be considered as an unobstructed yard, public street or public space.

RATIONAL ANALYSIS: Rational analysis shall mean the process of applying special knowledge of the mathematical, physical and engineering sciences to meet a desired need. It is a decision-making process (often interactive), in which the basic sciences, mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the rational analysis are the establishment of objectives and criteria, assumptions, synthesis, analysis, construction, testing and evaluation. Central to the process of rational analysis are the essential and complimentary roles of synthesis and analysis.

REINFORCED CONCRETE: As designated in ACI-318-'84 standard.

REMOTE: As applied to means of egress shall mean that persons shall have alternate paths of egress from any point or space in a building, and such paths of egress shall be separated by distance, construction, assemblies, or arrangement.

REQUIRED: A mandatory provision of this Code.

REPAIR: The replacement of existing work with the same kind of material for the purpose of its maintenance, but not including additional work that would affect structural, sanitary or fire-resistivity safety or facilities for means of egress.

RESTAURANT: Every building or part thereof and all outbuildings used in connection therewith, or any place or location, kept, used, maintained as, advertised as, or held out to the public to be a place where meals, lunches or sandwiches are prepared and/or served, either gratuitously or for pay.

ROOF JOISTS: Where roof members are nearly horizontal and are supported from bearing to bearing without an intermediate ridge, such members shall be termed roof joists.

ROOFING: The covering applied to the roof for weather protection, fire resistance or appearance.

ROOM: Every compartment in any building, including parlors, dining-rooms, sleeping rooms and porches, kitchens, offices, stores, sample-rooms, living-rooms, but not including halls, bathrooms, closets, pantries or storage or equipment spaces.

SEATING CAPACITY: Shall mean, where seats are fixed, the number of persons for whom seats are provided, and where seats are not fixed, or provided, shall be calculated on the basis of the areas given herein.

SECONDARY MEMBER: A structural member that carries dead, live and/or wind loads and collects or accumulates these forces into a primary member in the same plane, such as a deck or purlins carrying loads to a suspended beam or girder.

SELF-CLOSING: As applied to a fire door or other opening protector, means normally closed and equipped with an approved device which will insure closing after having been opened for use.

SERVANT'S QUARTERS:

(a) As accessory to multiple-family occupancies means accommodations for such number of servants and other employees as are required by the main occupancy and which accommodations may be detached and may or may not include separate cooking facilities.

(b) As accessory to single-family occupancies means accommodations for such number of servants in personal service and/or for the maintenance of the premises as could be reasonably required and which accommodations may be detached, but shall not have separate cooking facilities except in connection with properties which have a ground area of 10,000 or more square feet.

SERVICE STATIONS: A building or portion thereof where gasoline, oil and greases are supplied and dispensed to the motor vehicle trade, also where tire, battery, washing, polishing and lubrication services are rendered and minor adjustments are made.

SHALL: As used in this Code means mandatory.

SHAFT: A vertical opening or passage through two or more floors of a building or through floors and roof.

SLIDING GLASS DOORS: One or more panels of glass contained in a wood or metal frame where the area of the glass exceeds the area of the frame and which frame in turn is contained within an overall frame so that one or more of the panels is movable.

SMOKE DETECTORS:

(a) Smoke Detector Coverage, Full: Installation of smoke detectors in a building so that a fire in any habitable part of that building will be detected.

(b) Smoke Detection System: A system consisting of one or more supervised detectors that when activated sounds a general alarm for a building or a floor or floors in a building.

(c) Single Station Smoke Detector: A smoke detector that only sounds at the detector site and is not connected to a building alarm or smoke detection system.

SPECIFICATIONS: Specifications referenced in this Code shall pertain to the most recent issues and editions of Materials, Methods and Products prepared by the manufacturer, recognized trade associations who normally engage in testing and/or writing of Standards, and approved testing laboratories and product control agencies as listed in The South Florida Building Code.

SPIRAL STAIRWAY: A stairway built on a single center post.

SPRINKLED: Equipped with approved automatic sprinkler system properly maintained.

STADIUM: A structure providing seating for spectator events and which is not more than 50 percent enclosed by walls.

STAGE, GENERAL: A stage is a partially enclosed portion of an assembly room or building, cut off from the audience section by a proscenium wall, which is designed or used for the presentation of plays, demonstration, or other entertainment. Stages shall be classified as working stages or non-working stages.

STAGE, WORKING: A working stage is a partially enclosed portion of an assembly room or building, cut off from the audience section by a proscenium wall, and which is equipped with scenery loft, gridiron, fly-gallery, and lighting equipment, and the depth from the proscenium curtain to the back wall is 15 feet or more.

STAGE, NON-WORKING: A non-working stage is a partially enclosed portion of an assembly room or building, cut off from the audience section by a proscenium wall, and which is not equipped with the equipment common to the working stage (such as fly-gallery, gridiron, scenery loft or lighting equipment) and of such dimension that any such equipment cannot be installed (but flat scenery may be used on such stage). The depth of a non-working stage shall be not more than 15 feet from the proscenium wall to the back wall.

STAIRWAY: One or more flight of steps and the necessary landings connecting them to form a continuous and uninterrupted passage from one story to another in a building.

STORE FRONT: That portion of a building exterior wall facing on an open court or public street and having glass areas to permit pedestrians and/or vehicular passengers to view into the building and observe a large part of the room or space immediately therein.

STORY:

(a) That portion of a building included between the uppermost surface of any floor and the uppermost surface of the floor or roof next above.

(b) That portion of building between floor and ceiling which is so located that more than half of the clear height from floor to ceiling is above grade.(See **BASEMENT**).

(c) In a residential-type apartment occupied by a single tenant in which the area of the upper floor does not exceed two-thirds of the area of the main floor, such upper floor shall not be considered a story.

(d) The total number of stories allowable for various Occupancies, Chapters 6 through 15, shall be the number of stories from the ground floor to the roof. (See also **MEZZANINE**.)

(See also **PENTHOUSE**.)

STREET: Also public thoroughfare such as, but no limited to, street, avenue, lane, place, terrace, and road, and which is more than 20 feet in width and dedicated or deeded to the public for public use.

STRUCTURE: Is that which is built or constructed, or any piece of work artificially built up or composed of parts jointed together in some definite manner, the use of which requires more or less permanent location on the ground, or which is attached to something having a permanent location on the ground. The term shall be construed as followed by the words "or part thereof."

STRUCTURAL FRAME: All the members of a building or structure required to transmit loads to the ground.

STRUCTURAL (STOP LESS) GLAZING: A system in which panels are bonded to framing members of a curtain wall utilizing an elastometric silicone adhesive without the use of conventional glazing stops or retainers. Negative and positive structural loads are transferred from the panels to the perimeter framing. Structural glazing systems may have stops or retainers on one or more sides.

TENANCY: As used in Chapter 45, tenancy shall mean one or more occupants, i.e. tenants, lessees, owners, etc.

TENANT: A person or firm using a building, or part of a building, as a lessee or owner-occupant.

THEATER: Is a building or part thereof which contains an auditorium having a stage which may be equipped with curtains and/or permanent stage scenery or mechanical equipment adaptable to the showing of plays, operas, performances, spectacles, and similar forms of entertainment, or in such building or portion thereof

containing an auditorium having a platform, screen, and mechanical equipment adapted to the showing of motion pictures.

TOWNHOUSE: A single-family dwelling unit constructed in a series or group of attached units with property line separating such units. Each townhouse shall be considered a separate building and shall be separated from adjoining townhouses by the use of separate exterior walls or by a party walls.

VALLEYS: Intersection of two roofing planes shall be considered a valley although one surface is horizontal.

VALUE: Of a building shall be the estimated cost to replace the building in kind.

WALLS:

BEARING: A wall which supports any vertical load in addition to its own weight.

EXTERIOR: Shall include any wall not protected from fire or wind pressure by enclosure.

FACED WALL: Is a wall in which masonry facing and backing are so bonded as to exert a common action under load.

FIRE PARTITION: A partition for the purpose of restricting the spread of fire or to provide an area of refuge but not necessarily vertically continuous from floor to floor.

FIRE WALL: A wall for the purpose of sub-dividing a building or separating buildings to restrict the spread of fire and which starts at the foundation and extends continuously through all stories to and above the roof, or to the roof if such slab is of concrete.

FOUNDATION: Shall mean those exterior walls between the foundations and the first floor above grade, or any other wall below the first floor above grade which are in contact with or receive lateral earth pressure.

INTERIOR: Is a wall entirely surrounded by the exterior walls of the building.

NON-BEARING: Is a wall which supports no load other than its own weight.

PANEL: Is a non-bearing wall in skeleton construction built between columns and wholly supported at each story.

PARTY: A wall used or adapted for joint service between two buildings.

RETAINING: Is any walk used to resist lateral displacement of any material.

VENEERED: Is a wall in which the veneering of brick, stone, concrete or tile is provided for the purpose of ornamentation, protection or insulation, but which is not bonded to the backing in such matter as to be counted on as adding strength to the wall.

WATERWAY: A channel of water not less than 50 feet wide and navigable by small boats. For the purpose of determining allowable floor areas, but not required means of egress, of buildings, waterways will be considered as streets.

WINDERS: Are any stairway steps which have variations in the width of the treads of more than three-fourths inches per one foot of stair width.

WRITING: The term includes printing, typewriting, or other forms of reproduction of legible symbols.

YARDS: Mean the open spaces required adjacent to lot lines, under the Zoning Regulations, for the control of the density of building, and such yards shall be unobstructed from the ground to the sky except as provided herein.

ZONING: The reservation of certain specific areas within a community or city for buildings or structures for use of land for certain specified purposes with other limitations such as height, lot coverage and other stipulated requirements.

402 STANDARDS

402.1 This section catalogues by name and address those agencies, associations, institutes and others who are referred to in this Code by name, initials or symbols.

402.2 This section also list those agencies, associations, institutes and other whose technical services are available to owners, designers, builders and Building Officials.

402.3 This section sets forth the date of adoption or date of reference of the Standard applicable to the South Florida Building Code.

402.4 The standards set forth in this section are hereby adopted to supplement, but not supersede, the requirements otherwise set forth in the South Florida Building Code.

402.5 Only those provisions of the Standards stated as being mandatory shall be mandatory and recommendations, suggestions or preferences so stated in the Standards shall not be construed to be mandatory.

402.6 The provisions of the Standards shall be applicable to only the subject of references in that portion of the South Florida Building Code in which the Standard is referenced and where the Standard may appear to regulate other topics specifically covered by the South Florida Building Code such other regulations of the Standards shall not be mandatory.

402.7 Only that portion of the Standards directly applicable to the stated purpose of the Building Code shall be applicable and where portions of the referenced documents deal with prefatory or extraneous matter such as purchaser's rights, purchasing agreements, appearance of products, test reports and similar matters such prefatory and extraneous matter shall not be considered mandatory.

402.8 Where the method of installation of materials, assemblies or equipment is not specified in this Code or in the Products Approval, the installation shall be in accordance with the manufacturer's specifications or recommendations. **Note**: See Sec. 204 of this Code for method of approval.

402.9 The installation of materials or products exceeding the requirements of the Code shall be installed in full compliance with the Code and/or the manufacturer's specifications (recommendations).

TABLE 4-A

Name, Address and Standard Title	Symbol, Designation and Year
AIR CONDITIONING and REFRIGERATION INSTITUTE	**ARI**
1501 Wilson Blvd., 6th Floor, Arlington, VA 22209-2403	
Standard for Packaged Terminal Air Conditioners	ANSI/ARI 310-1982
Standard for Positive Displacement Refrigerant Compressors, Compressor Units and Condenser Units	ARI 520-1978
ALUMINUM ASSOCIATION, INC.	
818 Connecticut Avenue, N.W. Washington, D.C. 20006	
Aluminum Construction Manual Specifications for Aluminum Structures	1986
Aluminum Formed Sheet Building Sheathing Design Guide	1980
Commentary on Specifications for Aluminum Structures	1982
Engineering Data for Aluminum Structures	1986
AMERICAN CONCRETE INSTITUTE	**ACI**
P.O. Box 19150, Redford Station, Detroit, MI 48291	
Standards Tolerances for Concrete Construction and Materials	117-90
Guide for Determining the Fire Endurance of Concrete Elements	216 R-81
Specifications for Structural Concrete for Buildings	301-89
Manual of Standard Practice for Detailing Reinforced Concrete Structures	315-80
A.C.I. Detailing Manual — 1988 (SP-66)	315-88
Building Code Requirements for Reinforced Concrete	318-89
Recommended Practice for Concrete Form-work	347R-88
Recommended Practice for Shotcreting	506-83
Specification for Materials, Proportioning, and Application of Shotcrete	506.2-90
Building Code Requirements for Concrete Masonry Structures	530-92
Specification for Concrete Masonry Construction	530.1-92
AMERICAN FOREST AND PAPER ASSOCIATION AFPA	
1250 Connecticut Avenue, N.W. Washington, DC 20036	
National Design Specification for Wood Construction	1991
Design Values for Wood Construction, NDS Supplement	11-91
Wood Construction Data No. 6, Design of Wood Frame Structures for Permanence	1988
Span Tables for Joists and Rafters	1993
Design Values for Joists and Rafters	1992
Wood Structural Design Data	1986
AMERICAN GAS ASSOCIATION	**AGA**
1515 Wilson Boulevard, Arlington, VA 22209	
Directory of Certified Appliances and Accessories	1994
AMERICAN HARDBOARD ASSOCIATION	**AHA**
1210 W. Northwest Highway, Palatine, IL 60067-3609	
Basic Hardboard (Reaffirmed January 11, 1982)	ANSI/AHA A135.4-1982
Prefinished Hardboard Paneling	ANSI/AHA A135.5-1988
Hardboard Siding	ANSI/AHA A135.6-1990
Cellulosic Fiberboard	ANSI/AHA A194.1-1985
AMERICAN INSTITUTE OF STEEL CONSTRUCTION	**AISC**
Wrigley Building, 400 N. Michigan Ave., Chicago, IL 60611	
Steel Construction Manual	8th Edition-1980

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (Continued)	
Manual of Steel Construction, Allowable Stress Design	9th Edition-1989
Manual of Steel Construction, Load Resistance Factor Design	1st Edition-1986
Simple Shear Connection	1st Edition-1990
Simple Shear Connections	1st Edition-1990
Serviceability Design Considerations for Low-rise Buildings	1990
Plastic Design in Steel	1959
Engineering for Steel Construction	1984
Detailing for Steel Construction	1983
Iron and Steel Beams - 1873 to 1952	1985
Plastic Design of Braced Multistory Steel Frames	1969
Torsional Analysis of Steel Members	1983
AMERICAN INSTITUTE OF TIMBER CONSTRUCTION 333 West Hampden Avenue, Englewood, CO 80110	**AITC**
Typical Construction Details	AITC 104-83
Standard Appearance Grades for Structural Glued Laminated Timber	AITC 110-83
Standard for Tongue and Groove Heavy Timber Roof Decking	AITC 112-81
Standard for Dimensions of Glued Laminated Structural Members	AITC 113-83
Standard Specifications for Structural Glued Laminated Timber or Softwood Species	
Design	AITC 117-85
Manufacturing (with Addendum No. 6)	AITC 117-84
Standard Specifications for Hardwood Glued Laminated Timber	AITC 119-85
Technical Note No. 7	September 1984 Updated 10/9/85
AMERICAN INSURANCE 85 John Street, New York, NY 10038	**AIA**
Building Code, National 1976	CO-1
Building Code, Their Scope and Aims	CO-3
Fire Prevention Code, 1977	CO-6
AMERICAN IRON AND STEEL INSTITUTE 1000 16 Street, N.W., Washington, DC 200368	**AISI**
Specification for the Design of Cold-Formed Steel Structural Members	1980
Stainless Steel Cold-Formed Structural Design Manual	1974
Fire-Resistant Steel-Frame Construction	2nd Edition-1982
Fire-Safe Structural Steel — A Design Guide	1st Edition-1980
Designing Fire Protection for Steel Trusses	2nd Edition-1981
Cold-Formed Steel Design Manual	1986
Specifications for the Design of Light-Gage Cold-Formed Stainless Steel Structural Members	1989
Specification for the Criteria for Structural Application of Steel Cables for Buildings	1986
Designing Fire Protection for Steel Columns	3rd Edition-1980
Design Manual for Structural Tubing	1976
AMERICAN NATIONAL STANDARDS INSTITUTE, INC. 1430 Broadway, New York, NY 10018	**ANSI**
Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks	A17.1-1984
Structural Glue Laminated Timber	ANSI/AITC A190.1-1983

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (Continued)	
Voluntary Product Standard PS57-53 American National Standard	A194.1-1973
Water Pressure Reducing Valves for Domestic Water Supply Systems	A112.262-1975
Aluminum Prime Windows	A134.1 ANSI/AAMA 302.9-1977
Aluminum Sliding Glass Doors	A134.1 ANSI/AAMA 402.9-1977
Air Gaps in Plumbing Systems	A112.12-1973
Building Code Requirements for Masonry	A41.1-1953
Manlifts	A90.1-1976
Self-contained Mechanically Refrigerated Drinking Water Coolers	A101-1978
Making Buildings and Facilities Accessible to and Useable by the Physically Handicapped	A117.1-1986
Pipe Threads (Except Dryseal)	B120.1-1983
Malleable-Iron Screwed Fittings, 150 and 300 lb.	B16.3-1977
Cast-Iron Screwed Fittings, 125 and 260 lb.	BS16.4-1977
Cast-Iron Threaded Drainage Fittings	B16.12-1983
Cast-Bronze Screwed Fittings, 125 and 150 lb.	B16.15-1978
Cast-Bronze Solder-Joint Pressure Fittings	B16.18-1984
Wrought Copper and Bronze Solder-Joint Pressure Fittings	B16.22-1980
Cast-Bronze Solder-Joint Drainage Fittings-DWV	B16.23-1984
Bronze Flanges and Flanged Fittings, 150 and 300 lb.	B16.24-1979
Cast-Bronze Fittings for Flared Copper Tubes	B16.26-1983
Power Piping	B31.1-1983
Cement Mortar Lining for Cast-Iron Pipe and Fittings for Water	C104-1980
Automatic Storage Type Water Heaters with Input Less than 50,000 BTU per Hour	Z21.10.1-1981
Gas Water Heaters Volume III-Circulating Tank, Instantaneous and Large Automatic Storage Type Water Heaters	Z21.10.3-1981
Instantaneous and Large Automatic Storage Type Water Heaters Circulation Tank	Z21.10.3-1981
Transparent Safety Glazing Material Used in Buildings	Z97.1-1984
National Fuel Gas Code	Z223.1-1984
Specifications for the Design and Construction of Composite Slabs and Commentary on Specifications for the Design and Construction of Composite Slabs	ANSI/ASCE 3-1991
Specification for the Design of Cold-Formed Stainless Steel Structural Members	ANSI/ASCE 8-1990
Guideline for Structural Condition Assessment of Existing Buildings	ANSI/ASCE 11-1990
Manual of Safety Practices — A Code of Practices for the Use of Industrial and Commercial Steel Storage Racks	RMI/ANSI MH16.2-1984
Specification for the Design, Testing, Utilization and Application of Industrial Grade Steel Shelving	SMA/ANSI MH281
AMERICAN PLYWOOD ASSOCIATION P.O. Box 11700, Tacoma, WA 98411-0700	**APA**
Plywood Design Specification	Y510-1990
Plywood Design Specification-Design and Fabrication of Plywood Curved Panels-Supplement No. 1	S811.1990

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
AMERICAN PLYWOOD ASSOCIATION (Continued)	
Plywood Design Specification-Design and Fabrication of Plywood-Lumber Beams-Supplement No. 2	S812.1990
Plywood Design Specification-Design and Fabrication of Plywood Stressed-Skin Panels-Supplement No. 3	U813.1990
Plywood Design Specification-Design and Fabrication of Plywood Sandwich Panels-Supplement No. 4	U814-1990
Plywood Design Specification-Design and Fabrication of All-Plywood Beams-Supplement No. 5	H815-1989
Adhesives for Field-Glueing Plywood to Wood Framing	AFG-01-1984
Plywood Folded Plates-Laboratory Report 121	V910-1990
APA Design/Construction Guide-Diaphragms	L350-1990
U.S. Product Standard PSI-83 for Construction and Industrial Plywood	H850-1990
APA Design/Construction Guide-Residential and Commercial	E30-1990
Performance Standards and Policies for Structural-Use Panels	E445-1991
APA 303 Siding Manufacturing Specifications	B840-1991
AMERICAN SOCIETY OF CIVIL ENGINEERS 345 E. 47th Street, New York, NY 10017-2398	**ASCE**
ASCE 7 With Commentary shall be ASCE 7-88 With Commentary, American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures, except as otherwise noted in this Code.	
AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS, INC. 1791 Tullie Circle, NE, Atlanta, GA 30329	**ASHRAE**
ASHRAE Handbook-HVAC Applications	1991
ASHRAE Handbook-Refrigeration	1994
ASHRAE Handbook-Fundamentals	1993
ASHRAE Handbook-HVAC Systems & Equipment	1992
ASHRAE Safety Code for Mechanical Refrigeration	ANSI/ASHRAE 15-1994
Number Designation and Safety Classification of Refrigerants	ASHRAE Standard 34-92
Natural and Mechanical Ventilation	ASHRAE Standard 62-89
Thermal Environmental Conditions for Human Occupancy	ASHRAE Standard 55-92
AMERICAN SOCIETY OF MECHANICAL ENGINEERS 845 E. 47th Street, New York, NY	**ASME**
Boiler and Pressure Vessel Code	1992
AMERICAN SOCIETY OF SANITARY ENGINEERS P.O. Box 9712, Bay Village, OH 44140	**ASSE**
Water Pressure Reducing Valves for Domestic Water Supply Systems	ASSE-1003-1981
AMERICAN SOCIETY FOR TESTING AND MATERIALS 1916 Race Street, Philadelphia, PA 19103	**ASTM**
General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use	A6-83
General Requirements for Steel Bars, Carbon and Alloy, Hot Rolled and Cold Finished	A29-84
Cast-Iron Soil Pipe and Fittings	A74-82

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
AMERICAN SOCIETY FOR TESTING AND MATERIALS (Continued)	
Weight of Coating on Zinc-Coated (Galvanized) Iron or Street Articles	A90-81
Steel Pipe, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steep Pipe for Ordinary Uses	A120-84
Welded and Seamless Steel Pipe Piles	A252-82
High Strength Bolts for Structural Steel Joints, Including Suitable nuts and Plain Hardened Washers	A325-84
Malleable Iron Flanges, Pipe Fittings and Valve Parts for Railroad, Marine and Other Heavy Duty Service at Temperatures up to 650°F	A338-84
Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Roofing and Siding	A361-81
Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints	A490-83a
Welded Steel Wire Fabric for Concrete Reinforcement	A504-83
General Requirements for Zinc-Coated (Galvanized) Steel Sheets by the Hot-Dipped Process	A525-83
Hot, Rolled Carbon Steel Sheets and Strip Structural Quality	A570-79
Steel, Cold-Rolled Sheet Carbon Structural	A611-82
Deformed Billet-Steel Bars for Concrete Reinforcement	A615-84a
Carbon Steel Bars Subject to Mechanical Property Requirements	A663-79a & A675-82
Zinc Metal (Slab Zinc)	B6-83E-1
Solder Metal	B32-83
Brass Plate, Sheet, Strip and Rolled Bar	B36-83
Seamless Copper Pipe, Standard Sizes	B42-84
Seamless Red Brass Pipe, Standard Sizes	B43-84
Seamless Copper Tube	B75-83
Leaded Brass Plate, Sheet, Strip and Rolled Bar	B121-83
Seamless Brass Tube	B-135-83E-1
Nickel Rod and Bar	B160-81
General Requirements for Wrought Seamless Copper and Copper Alloy Tube	B251-84
Copper Drainage Tube (DWV)	B306-83
Clay Drain Tile	C4-81
Quicklime for Structural Purposes	C5-79
Concrete Sewer, Storm Drain and Culver Pipe	C14-82
Gypsum Plasters	C28-80
Making and Curing Concrete Compression and FlexureTest Specimen in the Field	C31-84
Concrete Aggregates	C33-84
Structural Clay Load-Bearing Wall Tile	C-34-75
Inorganic Aggregates for Use in Gypsum Plaster	C35-81
Gypsum Wallboard	C36-80
Gypsum Lath	C37-84
Compression Strength of Cylindrical Concrete Specimens	C39-83b
Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	C42-84a
Gypsum Partition Tile or Block	C52-77
Concrete Building Brick	C55-80

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
AMERICAN SOCIETY FOR TESTING AND MATERIALS (Continued)	
Structural Clay Non-Load-Bearing Tile	C56-81
Structural Clay Floor Tile	C57-83
Keene's Cement	C61-81
Building Brick (Solid Masonry Units Made from Clay or Shale)	C62-84
Refractories for Incinerators and Boilers	C64-77
Sampling and Testing Brick and Structural Clay	C67-83
Calcium Silicate Face Brick (Sand-Lime Brick)	C73-75
Reinforced Concrete Culvert, Storm Drain and Sewer Pipe	C76-83
Gypsum Sheathing Board	C79-84
Hollow Load-Bearing Concrete Masonry Units	C90-81
Masonry Cement	C91-83a
Ready-Mixed Concrete	C94-84
Aggregate for Masonry Mortar	C144-81
Portland Cement	C150-84
Finish Hydrated Lime	C206-84
Insulating Board (Cellulosic Fiber) Structural and Decorative	C208-82
Testing Insulating Board (Cellulosic Fiber) Structural and Decorative	C209-72
Mortar for Unit Masonry	C270-84
Asbestos Cement Pressure Pipe (Including Tentative Revisions)	C296-83
Clay Flue Linings	C315-83
Lightweight Aggregates for Structural Concrete	C330-82a
Concrete Drain Tile	C412-83
Compression Joints for Vitrified Clay Bell and Spigot Pipe	C425-77
Chemical Analysis of Testing Gypsum and Gypsum Products	C471-76
Physical Testing of Gypsum Plaster and Gypsum Concrete	C472-79-E-1
Physical Testing of Gypsum Board Products, Gypsum Lath, Gypsum Partition Tile and Block, and Precast Reinforced Gypsum Slabs	C473-84
Joint Treatment Materials for Gypsum Wallboard Construction	C475-81
Rubber Gaskets for Cast-Iron Soil Pipe and Fittings (Specs)	C564-82
Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board	C645-83
Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated	C700-83
Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation	C1077-87
Round Timber Piles	D25-79
Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber	D245-81
Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80	D1527-82-E-2
Test for Moisture Density Relations of Soils, Using 10 lb. (4.5 kg) Rammer and 18 in. (457 mm) Drop	D1557-78
Resistance in Plastic Flow of Bituminous Mixtures Using Marshall Apparatus	D1559-82
Homogeneous Bituminized-Fiber Drain and Sewer Pipe	D1861-81
Laminated Wall Bituminized-Fiber Drain and Sewer Pipe	D1862-81
Mineral Aggregate Used on Built-Up Roofs	D1863-86

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
AMERICAN SOCIETY FOR TESTING AND MATERIALS (Continued)	
Ignition Properties of Plastics	D1929-77
Polyethylene (PE) Plastic Pipe Schedule	D2104-82-E-1
Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings	D2235-81
Polyethylene (PE) Plastic Pipe (SDR-PR)	D2239-83
Poly (Vinyl Chloride) PVC Plastic Pipe (SIDR-PR)	D2241-83-E-1
Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)	D2282-82-E-1
Recommended Practice for Underground Installation of Thermoplastic Sewer Pipe	D2321-83a
Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings Schedule 80	D2467-76a
Solvent Cement for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings	D2564-80
Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe	D2609-74
Acrylonitrile-Butadiene Styrene (ABS) Plastic Drain, Waste Vent Pipe Fittings	D2661-84-E-1
Polybutylene (PB) Plastic Pipe (SDR-PR)	D2662-83
Triaxial Compression Strength of Undrained Rock Core Specimen Without Pour Pressure Measurements	D2664-80
Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste and Vent Pipe and Fittings	D2665-82
Polybutylene (PB) Plastic Tubing	D2666-83
Density of Smoke from the Burning or Decomposition of Plastics	D2843-77
Chlorinated Polyvinyl Chloride (CPVC) Plastic Hot Water Distribution System	D2846-82
Styrene Rubber Plastic Drain, and Building Sewer Pipes, and Fittings	D2852-81
Accelerated Weathering on Fire-Retardant Treated Wood, for Fire Testing	D2898-81
Established Design Stresses for Round Timber Piles	D2899-74
Type PSM, Polyvinyl Chloride (PVC) Sewer Pipe and Fittings	D3034-83
Test Methods for Hygroscopicity of Fire Retardant Wood and Wood Base Products	D3201-79
Surface Burning Characteristics of Building Materials	E84-84
Fire Tests of Roof Coverings	E108-83
Fire Tests of Building Construction and Materials	E119-83-E-1
Non-Combustibility of Elementary Materials	E136-82
Fire Tests of Door Assemblies	E152-81aE-1
Fire Tests of Window Assemblies	E163-80-E-1
Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors	E283-84
Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction	E329-77
Standard Method of Fire Tests of Through Penetration Fire Stops	ASTM E-814-83
AMERICAN WATER WORKS ASSOCIATION 6666 West Quincy Avenue, Denver, CO 80235	**AWWA**
Standards for Cast-Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids	C151/A21.51-81
Standards for Coal-Tar Enamel Protective for Steel Water Pipe	C203-78
Standards for Chlorinated Rubber-Alkyd Paint System for the	C204-75

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
AMERICAN WATERWORKS ASSOCIATION (Continued)	
Exterior of Aboveground Steel Water Piping	
Standard for Resilient Seated Gate Valves for Water and Sewage Systems	C509-87
AMERICAN WELDING SOCIETY	**AWS**
2501 NW 7th Street, Miami, FL 33125	
Standard Qualification Procedure	B3.0-77
Structural Welding Code — Steel	D1.1-94
Structural Welding Code — Sheet Steel	D1.3-89
Structural Welding Code — Reinforcing Steel	D1.4-92
Standard Welding Procedure and Performance Qualification	B2.1-84
Recommended Practice for Stud Welding	C5.4-93
Specification for Welding of Sheet Metal	D9.1-90
AMERICAN WOOD PRESERVERS ASSOCIATION	**AWPA**
P.O. Box 849, Stevensville, MD 21666	
Note: (C) must be used in conjunction with C1	
All Timbers Products — Pressure Treatment (General Requirements)	C1-88
Lumber, Timbers, Bridge Ties & B Mine Ties — Pressure Treatment	C2-88(c)
Piles — Pressure Treatment	C3-88(c)
Poles — Pressure Treatment	C4-88(c)
Posts — Pressure Treatment	C5-84(c)
Cross Ties and Switch Ties — Pressure Treatment	C6-83(c)
Incised (Red, White & B Alaska Yellow Cedar) Poles Butts Thermal Treatment	C7-73
Poles (Western Red & Alaska Yellow Cedar) Full Length Thermal Treatment	C8-73
Plywood — Pressure Treatment	C9-85(c)
Poles (Lodgepole Pine) Full Length Thermal Treatment	C10-73
Wood Blocks for Floors & Platforms — Pressure Treatment	C11-80(c)
Wood for Highway Construction — Pressure Treatment	C14-88(c)
Wood Used on Farms — Pressure Treatment	C16-88(c)
Material in Marine Construction — Pressure Treatment	C18-88(c)
Structural Lumber — Fire Retardant — Pressure Treatment	C20-84(c)
Lumber & Plywood for Permanent Wood Foundation Permanent Treatment for Pressure Processes	C22-88(c)
Pole Building Construction — Pressure Treatment	C23-84(c)
Sawn Timber Piles Used for Residential and Commercial Commercial Building-Preservative Treatment by Pressure Process	C24-86
Crossarms — Pressure Treatment	C25-84(c)
Crossarms Non-Pressure Treatment	C26-57
Plywood — Fire-retardant Pressure Treatment	C27-84(c)
Structural Glued Laminated Members & Lamination Before Gluing _ Pressure Treatment	C28-88(c)
Lumber to be used for the Harvesting, Storage and Care of Pressure-Treated Wood Products	C29-82 M4-84

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
APPLIED RESEARCH LABORATORIES	**ARL**
5371 NW 161st Street, Miami, FL 33014 — Current Edition	
ARCHITECTURAL ALUMINUM MANUFACTURER'S ASSOCIATION	**AAMA**
2700 River Road, Suite 118, Des Plaines, IL 60018	
Aluminum Prime Windows	ANSI/AAMA 302.9-1977
Aluminum Sliding Glass Doors	ANSI/AAMA 402.9-1977
CANADIAN STANDARDS ASSOCIATION	**CSA**
178 Rexdale Blvd., Rexdale (Toronto), Ontario, Canada M9W 1R3 1994	
CAST IRON SOIL PIPE INSTITUTE	**CISPI**
5959 Shallowford Road, Ste. 419, Chattanooga, TN 37421	
Hubless Cast-Iron Sanitary System With No Hub Pipe and Fittings	301-95
Neoprene Rubber Gaskets for Hub and Spigot Cast-Iron Soil Pipe and Fittings	HSN-85
Installation Suggestions for No-Hub Pipe and Fittings	310-82
Specifications for Rubber Gaskets for Cast-Iron Soil Pipe and Fittings	ASTM M564-82
Standard Specifications for Cast-Iron Soil Pipe and Fittings	ASTM A-74-82
COASTAL CONSTRUCTION BUILDING FOR FLORIDA	CH. 161, F.S. 1985
CONSUMER PRODUCT SAFETY COMMISSION	**CPSC**
800 Peachtree St., NW, Suite 210, Atlanta, GA 30208	
Safety Standard for Architectural Glazing Materials (rev. Aug. 81)	Part 1201
CONCRETE REINFORCING STEEL INSTITUTE	**CRSI**
180 North LaSalle Street, Chicago, IL 60601	
Reinforced Concrete Fire Resistance	1984
DASH, STRAUS & GOODHUE, INC.	**DS&G**
593 Massachusetts Avenue, Boxborough, MA 01719	
DEPARTMENT OF NAVY	
Navy Facilities Engineering Command, Washington, D.C.	
Naval Facilities Engineering Command Design Manual, NAV-FAC DM-26, U.S. Department of the Navy	
ETL TESTING LABORATORIES, INC. (Inchscape Testing Services NA Inc.)	
3933 US Route 11, Industrial Park, Cortland, NY 13045 — Current Edition	**ETL**
FACTORY MUTUAL ENGINEERING CORPORATION	**FMEC**
1151 Boston-Providence Turnpike, Norwood, MA 02062	
Factory Mutual Systems Approval Guide	1984
FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS CODES AND STANDARDS SECTION	
2740 Centerview Drive, Tallahassee, FL 32399-2100	
Accessibility for the Physically Disabled and/or Handicapped	1990
Florida Model Energy Efficiency Code for Building Construction	
Title 44 Code of Federal Regulations (C.F.R.) parts 59 and 60 National Flood Insurance Regulations.	
FEDERAL EMERGENCY MANAGEMENT AGENCY	**FEMA**
500 C. Street, SW, Washington, D.C. 20472	
Coastal Construction Manual, Federal Emergency Management Agency (FEMA).	

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
FLORIDA STATE DEPARTMENT OF LABOR AND EMPLOYMENT SECURITY BUREAU OF INDUSTRIAL SAFETY & HEALTH 2551 Executive Center Circle, West Lafayette Building, Suite 204, Tallahassee, FL 32301	**FIC**
OSHA-CFR General Industry 1900-1910	1984
OSHA-CFR Construction 1920 to end	1984
OSHA-CFR Agriculture 1920 to end	1984
FLORIDA DEPARTMENT OF NATURAL RESOURCES Tallahassee, FL	
Technical Design Memoranda of the Division of Beaches and Shores, Florida Department of Natural Resources. Chapter 161, Beach and Shore Reservation parts I, II, and III, Florida Statute 1989.	
FLORIDA DEPARTMENT OF HEALTH AND REHABILITATION SERVICES, DIVISION OF HEALTH P.O. Box 210, Jacksonville, FL 33201	**FDHRS**
Division of Health Rules	1977
Swimming Pools and Bathing Places	10D-5
Hospital Licensure	10D-28
Nursing Homes and Related Facilities Licensure	10D-29
Minimum Fire Safety Standards for Adult Congregate Living Facilities	A4-40
GENERAL SERVICES ADMINISTRATION	**GSA**
Federal Supply Services, Specifications Management Branch Washington, DC 20406	FCMM
Glass, Flat and Corrugated, for Glazing Mirrors and Other Uses	DD-G-451D (1977)
Compound Plumbing Fixture-Setting	TT-P-001536A (1975)
Pipe and Fittings, Plastic (Polyvinyl Chloride, PVC, Drain, Waste and Vent DWV)	L-P-00320D (1975)
Brass, Leaded and Non-Leaded, Plate, Rolled Bar Sheet and Strip	QQ B 613D (1973)
Brass, Leaded and Non-Leaded, Rods, Shapes, Forgings and Flat Products with Finished Edges (Bars, Flat Wire and Strips)	QQ B 626D (1973)
Copper Plates, Rolled Bars, Sheets and Strips	QQ C 5768 (1964)
Caulking Lead: Type 1	QQ C 40(2) (1970)
Lead Sheet	QQ L 201F(2) (1970)
Solder; Lead Alloy, Tin Lead Alloy and Tin Alloy; Flux Cored Ribbon and Wire, and Solid Form	QQ S 571E (1975)
Soft Solder; Galvanized Iron and Steel Sheets	QQ S 775E (1978)
Pipe; Concrete, Non-Reinforced, Sewer	SS-P-37E (1968)
Pipe; Bituminized-Fiber, Sewer, and Fittings for same	SS-P-1504B (1973)
Water Heater, Circulating Tank	W-H-196J (1973)
Pipe; Bends and Traps; Lead (For) Plumbing and Water-Distribution	WW-P-325A(1976)
Pipe; Red Brass (Copper Alloy No. 2300, Seamless Standard Pipe Size, Regular and Extra Strong)	WW-P-351A (1975)
Pipe; Copper, Seamless, Standard Sizes	WW-P-377D (1) (1976)
Pipe and Pipe Fittings, Cast-Iron, Soil	WW-P-401E (1974)
Pipe; Cast-Iron, Pressure (For Water and Other Liquids)	WW-P-421D (1976)
Pipe-Fittings; Brass or Bronze, (Screwed) 125 and 250 pound	WW-P-460B (1977)

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
GENERAL SERVICES ADMINISTRATION (Continued)	
Pipe-Fittings; Cast-Iron, Screwed, 125 and 250 Pound	WW-P-501E (1974)
Pipe-Fittings; Flange Fittings and Flanges, Ferrous and Steel, (Screwed and Butt-Welded) 150 Pound	WW-P-521F (1977)
Plumbing Fixtures, Land Use	WW-P-541E/Gen (1980)
Tubing; Brass Seamless	WW-T-791A (1971)
Tube; Copper, Seamless (For Use with Solder-Type Flared Tube Fittings)	WW-T-799F (1979)
Valves, Cast-Iron Gate; 125 and 150 Pound, Screwed and Flanged	WW-V-58B(1971)
GYPSUM ASSOCIATION 1603 Orrington Avenue, Evanston, IL 60201	
Design Data — Fire Resistance — Twelfth Edition	GA-600-84
Recommended specifications for the application and finishing of gypsum board	GA-216-85
MET LABORATORIES, INC. 914 West Patapsco Avenue, Baltimore MD 21230-3432	
Directory of Listed and Labeled Products	
NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS 1033 South Boulevard, Oak Park, IL 60302	**NAAMM**
Metal Bar Grating Manual	1974
NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTIONS 1055 Crupper Avenue, Columbus, OH 43229	**NBBPVI**
Boiler Blow-Off Equipment	1973
NATIONAL CONCRETE MASONRY ASSOCIATION P.O. Box 781, Herndon, VA 22070	**NCRP**
Specification for the Design and Construction of Load-Bearing Concrete Masonry	TR 75-B-1970
NATIONAL COUNCIL OF RADIATION PROTECTION AND MEASUREMENTS 7910 Woodmont Avenue, Suite 1016, Bethesda, MD 20814	**NCRP**
Control and Removal of Radio-active Contamination in Laboratories — Handbook	8-1951
Recommendation for Waste Disposal of Phosphorous-32 and Iodine-131 for Medical Users	9-1951
Recommendations for the Disposal of Carbon-14 Wastes	12-1953
Radioactive Waste Disposal in the Ocean	16-1954
Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionucleides in Air and in Water for Occupational Exposure	22-1959
Medical X-Ray and Gamma Ray Protection for Energies Up to Me V-Equipment Design and Use	33-1968
Dental X-Ray Protection	35-1970
Radiation Protection in Veterinary Medicine	36-1970
Precautions in Management of Patients Who Have Received Therapeutic Amounts of Radionucleides	37-1970
Permissible Dose of External Sources of Ionizing Radiation	39-1971
Protection Against Radiations from Brachy Therapy Sources	40-1972
Protection Against Betatron-Synchatron Radiations up to 100 Million Electron Volts	51-1977

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
NATIONAL FIRE PROTECTION ASSOCIATION	**NFPA**
Batterymarch Park, Quincy, MA 02269	
Installation of Portable Fire Extinguishers	10-1990
Carbon Dioxide Extinguishing Systems	12-1993
Halogenated Fire Extinguishing Agent Systems Halon 1301	12A-1992
Halogenated Extinguishing Agent Systems Halon 1211	12B-1990
Installation of Sprinkler Systems (with all appendixes)	13-1994
Installation of Standpipe and Hose Systems (with all appendixes)	14-1993
Installation of Centrifugal Fire Pumps	20-1993
Water Tanks for Private Fire Protection	22-1993
Standard for the Installation of Private Fire Service Mains and Their Appurtenances	24-1992
Flammable and Combustible Liquids Code	30-1993
Installation of Oil Burning Equipment	31-1992
Spray Finishing Using Flammable and Combustible Materials	33-1989
Dip Tanks Containing Flammable and Combustible Materials	34-1989
Installation and Use of Stationary Combustion Engines and Gas Turbines	37-1994
Storage and Handling of Cellulose Nitrate Motion Picture Film	40-1988
Installation of Gas Appliances and Gas Piping in Buildings	54-1992
Storage and Handling of Liquefied Petroleum Gases	58-Rev. 1995
National Electric Code	70-1993
Electrical Safety Requirements for Employee Workplaces	70E-1995
National Fire Alarm Code	72-1993
Electrical Standard for Industrial Machinery	79-1994
Fire Doors and Windows	80-1992
Installation of Air Conditioning and Ventilating Systems	90A-1993
Installation of Residential Warm Air Type Heating and Air Conditioning Systems	90B-1993
Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying.	91-Rev. 1995
Guide for Smoke Management Systems in Malls, Atria and Large Areas	92B-Rev. 1995
Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment (Except Chapter 10)	96-1994
Standard for Health Care Facilities (Includes NFPA 99C)	99-1996
Gas and Vacuum Systems (Excerpted from NFPA 99, 1996 Edition)	99C-1996
Code for Safety to Life from Fire in Existing Buildings and Structures	101-1985
Code for Safety to Life from Fire in New Buildings and Structures	101-1994
Tents and Grandstands Used for Places of Assembly	102-1992
Standard for Emergency and Standby Power Systems	110-1996
Stored Energy Emergency and Standby Power Systems	111-1996
Smoke and Heat Venting Guide	204M-1991
Chimneys, Fireplaces, Vent and Solid Fuel Burning Appliances	211-1992
Water Cooling Towers	214-1992
Fire Protection for Marinas and Boat Yards	303-1990
Construction and Fire Protection for Marine Terminals, Piers and Wharves	307-1990
Standard on Aircraft Hangers	409-1995
Classification of Class I Hazardous Locations for	497A-1991

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
NATIONAL FIRE PROTECTION ASSOCIATION (Continued)	
Electrical Installations in Chemical Process Areas	
Recommended Practice for the Classification of Class II Hazardous (Classified)	497B-1991
Classification of Gases, Vapors and Dusts for Electrical Equipment in Hazardous (Classified) Locations	497M-1991
Fire Safety Criteria for Manufactured Home Installations, Sites and Communities	501A-1992
Recreational Vehicle Parks and Campgrounds	501D-1996
Prevention of Fires and Explosions in Woodworking Facilities	664-1993
Installation of Lightning Protection Systems	780-1993
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY Gaithersburg, Maryland 20899	**NIST**
Performance Standard for Wood-Based Structural-Use Panels	PS2-92
American Softwood Lumber Standard Amended 1986	PS 20-70
Standards Development Service Station, Standards Application and Analysis Division, Washington DC 20234	
Construction and Industrial Plywood	PS-1-83
NATIONAL SANITATION FOUNDATION NSF Building, Ann Arbor, MI 48106	**NSF**
Thermoplastic Materials, Pipe Fittings, Valves, Traps and Jointing Materials	14-11/83
Thermoplastic Plastic Pipe, Fittings, Valves, Tanks Appurtenances, Jointing Materials and Thermoset Plastic Coatings for use in Potable Water Supply Systems	14-11/83
Filtration Devices Relating to Supplementary Treatment of Potable Water	42-6/82
Chemical Feeding and Processing Equipment Relating to Supplementary Treatment of Potable Water	43-2/84
NATIONAL SPA AND POOL INSTITUTE 2000 K Street, NW, Washington, DC 20006	**NSPI**
Suggested Minimum Standards for Residential Swimming Pools	Section 2, January 1974
NATIONAL WOOD WINDOW AND DOOR MANUFACTURERS ASSOCIATION 1400 E. Touhy Avenue, Suite G54, Des Plaines, IL 60018-3305	**NWWDA**
Industry Standard for Wood Window Units	ANSI/NWMA NWWDA I.S.2.87
Industry Standard for Wood Sliding Patio Doors	NWMA NWWDA-1.S.3-88
Industry Standard for Water Repellant Preservative Treatment for Millwork	NWMA NWWDA-I.S.4.81
NORTH AMERICAN INSULATION MANUFACTURER'S ASSOCIATION 44 Canal Center Plaza, Suite 310, Alexandria, VA 22314	**NAIMA**
Fibrous Glass Duct Construction Standards	2nd Edition-1993
Fibrous Glass Duct Construction with 1½" Duct Board	2nd Edition-1993
Fibrous Glass Residential Duct Construction Standards	1993
PARALYZED VETERANS ASSOCIATION OF FLORIDA 6200 N. Andrews Avenue, Fort Lauderdale, FL 33309	
Barrier-Free Design-The-Law	1986

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
PROFESSIONAL SERVICE INDUSTRIES, INC.	**P.S.I.**
Pittsburgh Testing Laboratory Division, 545 Conger Street, Eugene, Oregon 97402	
RACK MANUFACTURERS INSTITUTE	**RMI**
A PRODUCTS SECTION OF THE MATERIAL HANDLING INSTITUTE (MHI)/AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)	
8720 Red Oak Boulevard, Suite 201, Charlottee, NC 28217-3992	
Industrial Steel Storage Racks Manual	RMI-1990
Manual of Safety Practices — A Code of Practices for the Use of Industrial and Commercial Steel Storage Racks	RMI/ANSI MH16.2-1984
SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.	**SMACNA**
8224 Old Courthouse Road, Tysons Corner, Vienna, VA 22180	
Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems	Fourth Edition 1992
Duct Construction Standards — Metal and Flexible	SMACNA/HVAC-1985
Fibrous Glass Duct Construction Standards 5th Edition-1979 (Contains Pressure Sensitive Tape Standards)	
SHELVING MANUFACTURERS ASSOCIATION (SMA),	**SMA**
A PRODUCTS SECTION OF THE MATERIAL HANDLING INSTITUTE (MHI)/AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)	
8720 Red Oak Boulevard, Suite 201, Charlotte, NC 28217-3992	
Specification for the Design, Testing, Utilization and Application of Industrial Grade Steel Shelving	SMA/ANSI MH 281
SOUTHWEST RESEARCH INSTITUTE	**SRI**
6220 Culebra Road, San Antonio, Texas 78284	
STEEL DECK INSTITUTE, INC.	**SDI**
P.O. Box 9506, Canton, OH 44711	
Diaphram Design Manual, 2nd Edition	1987
Steel Deck Institute Design Manual, Publication No. 6	1987
Standard Practice Details for Composite Floor Deck Non-composite Formwork Steel Roof Deck	1992
SDI Manual of Construction with Steel Deck	1992
Deck Damage and Penetrations	1987
Steel Deck Institute Design Manual	1989
LRFD Design Manual for Composite Beams and Girders with Steel Deck	1989
STEEL JOIST INSTITUTE	**SJI**
1205 48th Ave. North, Myrtle Beach, S.C. 29577	
Standard Specification for Joist Girders	1984
Standard Specifications, Load Tables, and Weight Tables for Steel Joists and Joist Girders	1993
Structural Design of Steel Joist Roofs to Resist Ponding Loads	Tecnhical Digest No. 3-1971
Vibration of Steel Joist-Concrete Slab Floors	Technical Digest No. 5-1988
Structural Design of Steel Joist Roofs to Resist Uplift Loads	Technical Digest No. 6
Welding of Open Web Steel Joist	Technical Digest No. 8-1993
Handling and Erection of Steel Joists and Joist Girders	Technical Digest No. 9-1987
60 — Year Steel Joist Manual	19

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
STEEL STRUCTURES PAINTING COUNCIL 4400 Fifth Avenue, Pittsburgh, PA 15213-2683	**SSPC**
Red Lead Iron Oxide, Raw Linseed Oil Alkyd Primer, SSPC - Paint 2	1991
Steel Joist Shop Paint, SSPC - Paint 15	1991
A Guide to the Shop Painting of Structural Steel, SSPC/AISC	1972
TIMBERCO, INC. d/b/a/ TECO 2402 Daniels Street, Madison, WI 53704	**TECO**
TRUSS PLATE INSTITUTE, INC. 583 D'Onofrio Drive, Suite 200, Madison, WI 53719	**TPI**
Design Specification for Metal Plate Connected Parallel Cord Wood Trusses	PCT-80
Design Specification for Metal Plate Connected Wood Trusses	TPI-85
Commentary and Recommendations for Handling Installing and Bracing Metal Plate Connected Wood Trusses	HIB-91
UNDERWRITERS LABORATORIES, INC. 207 E. Ohio Street, Chicago, IL 60611	**UL**
UL Automotive, Burglary Protection, Mechanical Equipment	1996
UL Building Fire Resistive Directory	1996
UL Building Materials Directory	1996
UL Electrical Appliance and Utilization Equipment Directory	1996
UL Electrical Construction Materials Directory	1996
UL Fire Protection Equipment Directory	1996
UL Gas and Oil Equipment Directory	1996
UL General Information for Electrical Consrtuction, Hazardous Locations, and Electric Heating and Air Conditioning Equipment Directory	1996
UL Hazardous Location Equipment Directory	1996
UL Marine Products Directory	1996
Standards for Tin-Clad Fire Doors and Shutters	10A-1980
Standards for Safety, Electric Signs	48-Rev.-1988
Materials for Built-Up Roof Coverings	55A-Rev.-1983
Class C Asphalt Organic-Felt Sheetroofing and Shingles	55B-Rev.-1983
Standard for Safety, Installation Requirements for Lightning Protection Systems	96A-1994
Standards for Safety, Portable Electric Lamps	153-Rev.-1995
Standards for Safety, Household, Electric Storage Tank Water Heaters	174-Rev.-1996
Factory Made Air Ducts and Air Connectors	181-Rev. 1995
Closure Systems for Use with Rigid Air Ducts & Connectors	181A-Rev. 1995
Standard for Safety, Manufactured Wiring Systems	183-Rev. 1994
Standards for Safety Single and Multiple Station Smoke Detectors	217-Rev. 1995
Standards for Smoke Detectors, Photoelectric Type for Fire Protective Signaling Systems	268-Rev. 1994
Standard for Safety, Smoke Detectors for Duct Application	268A-1993
Standard for Safety, Grounding and Bonding Equipment	467-1993
Standard for Safety, Single and Multiple Station Heat Detectors	539-1995
Standards for Safety, Fire Dampers	555-1995 5th Edition

TABLE 4-A (Continued)

Name, Address and Standard Title	Symbol, Designation and Year
UNDERWRITERS LABORATORIES, INC. (Continued)	
Standards for Safety, Ceiling Dampers	555C-1992
Leakage Rated Dampers for Use in Smoke Control Systems	555S-Rev. 1995
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Kingman Building, Ft. Belvoir, VA 22060	
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U.S. CONSUMER PRODUCT SAFETY COMMISSION	**CPSC**
1330 West Peachtree Street, N.W. Atlanta, GA 30309	
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P.O. Box 4970, Jacksonville, FL 32232-0019	
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Occupational Safety and Health Administration	
200 Constitution Avenue, Washington, DC 20210	
Part 1910 as Applied to Permanent Structures, Publication No. 2206	1996
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WARNOCK HERSEY INTERNATIONAL, INC.	**WHI**
Headquarters, 1165 E. San Antonio Drive, Suite B, Long Beach, CA 90807	
WELDED STEEL TUBE INSTITUTE, INC.	**WSTI**
522 Westgate Tower, Cleveland, OH 44116	
Manual of Cold-Formed Welded Structural Steel Tubing	1974
WYLE LABORATORIES	
7800 Highway 20 West, Huntsville, Alabama 35807-7777	

PART III
REQUIREMENTS BASED ON OCCUPANCY

CHAPTER 5
CLASSIFICATION AND GENERAL REQUIREMENTS

501 GENERAL REQUIREMENTS
502 OCCUPANCY CLASSIFIED
503 CHANGE IN USE
504 OCCUPANCY CONTENT
505 ADJOINING OCCUPANCY
506 FIRE DIVISION
507 PARTY WALLS
508 OCCUPANCY SEPARATIONS
509 HAZARDOUS UTILITIES
510 EGRESS FACILITIES FOR MIXED OCCUPANCIES
511 LOCATIONS ON THE PROPERTY
512 SANITATION
513 CEILING HEIGHTS
514 ALLOWABLE AREA
515 FACILITIES FOR PHYSICALLY DISABLED AND/OR HANDICAPPED
516 SAFEGUARDS

501 GENERAL REQUIREMENTS

501.1 The intent of this Code is that buildings shall be of the Type of Construction required for the occupancies contained therein.

501.2 No building or structure shall be erected nor shall any lot or portion of a lot be subdivided or sold nor any lot line moved by sale of land or otherwise in such a manner as to eliminate, nullify or reduce any required spaces for light, ventilation, means of egress, distance separation or in any way to create violations of any provisions of this Code.

502 OCCUPANCY CLASSIFIED

502.1

(a) Every building or portion thereof, whether existing or hereafter erected, shall be classified by the Building Official according to its use or the character of its Occupancy, as a building of Group A, B, C, D, E, F, G, H, I or J Occupancy, as defined in Chapters 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 respectively.

(b) (1) Where the minor accessory uses do not occupy more than 10 percent of the area of any floor of a building, nor more than 10 percent of the basic area permitted by Occupancy, the major use of the building shall determine the Occupancy classification.

(2) In buildings of Group G Division 1 Occupancy, rooms for storing, sorting and unpacking goods held for retail sales shall be considered and classified the same as retail sales display areas.

(c) Minor accessory buildings not exceeding 10 percent of the area of the ground floor of the primary building, nor 1500 square feet, whichever is larger, and constructed of unprotected incombustible materials may, where complying with Sub-section 1701.6 herein, be constructed without changing the limiting areas based on Group of Occupancy classification.

502.2 Any occupancy not specifically mentioned shall be classified by the Building Official in the Group it most

nearly resembles.

502.3 Unless otherwise classified, accessory buildings shall conform to the requirements of the Occupancy Group to which the building is accessory.

503 CHANGE IN USE

503.1 No change in the character of Occupancy of a building shall be made except as set forth inSub-section 104.7.

503.2 No change in the character of occupancy of a building shall be made without a Certificate of Occupancy, as required in Section 307 of this Code.

503.3 Buildings in existence at the time of the passage of this Code shall comply with Sub-section 104.8 herein.

504 OCCUPANCY CONTENT

504.1 The occupant content shall be computed as set forth in Sub-section 3101.4.

505 ADJOINING OCCUPANCY

505.1 Adjoining units of different Occupancies within a fire division shall be separated by a separation at least as fire-resistive as set forth in Section 508.

505.2 Two or more units of different Occupancy may be contained within a fire division, but all such units shall conform to the provisions of Chapters 6 through 15 for the most restricted of the Occupancies so contained except as otherwise set forth in Sub-section 502.1.

506 FIRE DIVISIONS

506.1 Where in this Code and particularly in Chapters 6 through 15, specific maximum allowable areas are set forth, the building may be separated into fire divisions and each such fire division shall be considered a separate building and be of the maximum allowable area provided the fire division separation walls are as set forth in this Section.

(a) Horizontal fire division separations shall not be permitted.

(b) Horizontal separations shall not be used for separating the height of structure, or to eliminate any required Fire Suppression/Life Safety Systems for the total building.

506.2

(a) Fire division separation walls shall be not less than four-hour fire-resistive construction in buildings of Type I, three-hour fire-resistive construction in buildings of Type II, and two-hour fire-resistive construction in buildings of Types III, IV, and V construction.

(b) The total width of all openings in such walls shall not exceed 25 percent of the length of the wall in each story.

(c) Opening shall be protected, as set forth in TABLE 31-C, by a fire assembly having a three-hour fire-rating in four-hour and three-hour fire-resistive walls and one and one-half hour fire-resistive rating in two-hour fire-resistive walls.

506.3 Fire division separation walls need not extend to the outer edge of horizontal projecting elements such as balconies, roof overhangs, canopies, marquees, or ornamental projections provided that the exterior wall at the termination of the fire division separation wall and the projecting elements are not less than one-hour fire-resistive construction for a width equal to the depth of the projecting elements. Wall openings within such widths shall be protected by not less than three-fourths-hour fire-resistive assemblies.

506.4 Fire division separation walls shall extend from the foundation to a point at least 30 inches above the roof.

EXCEPTIONS:

(a) Four-hour, three-hour, and two-hour five division separation walls may terminate at the bottom of the roof deck providing the roof deck is of incombustible construction for the area within 40 feet of each side of the wall.

(b) Two-hour fire division separation walls may terminate at the underside of a wooden deck provided that the roof assembly is of at least one-hour fire-resistive construction on each side of the fire division separation wall termination.

506.5 When a fire division separation wall separates portions of a building having different heights, such wall may terminate at a point 30 inches above the lower roof level provided the exterior wall for a height of 10 feet above the lower roof is one-hour fire-resistive construction with openings protected by three-fourths-hour fire-resistive assemblies.

EXCEPTION: The fire division separation wall may terminate at the deck of the lower roof provided the lower roof is of at least one-hour fire-resistive construction for the width of 10 feet without openings measured from the wall.

506.6 Fire dampers in ducts passing through fire division separation walls shall be required as set forth in Section 4806.10.

507 PARTY WALLS

507.1 EXTERIOR WALLS: Subject to the applicable legal provisions of common ownership, a wall may be used as a PARTY WALL when conforming to the following requirements.

(a) Where the Type or Types of Construction used and/or combined floor areas of an existing and a proposed building are such that a separation into fire divisions is required, such walls shall meet the requirements for fire walls under this Code.

(b) Where not required as a fire wall but used to separate Occupancies, such wall shall conform with the requirements for separations of Occupancies under this Code.

(c) Such wall in all its parts shall conform to the engineering regulations of this Code or shall be made to conform therewith.

(d) Party walls used as common walls between separately owned buildings shall be incombustible and rated a minimum of two hours and shall meet the provisions of Sub-section 506.4.

(e)EXCEPTION: Screen enclosures or screen porches shall not be considered as interior space, and do not require fire-rated separation walls.

507.2 SEPARATION BETWEEN TENANTS:

(a) (1) In any building where rooms or spaces are occupied by separate tenants, not less than one-hour fire-resistive construction shall be provided between tenants and between tenants and common areas except as provided below:

(2) EXCEPTION: Fire separation will not be required between tenants or between tenants and common areas of Group A, B, F, G, Division 1, H and J Occupancies where walls or partitions are omitted or where visual intercommunication through separation walls or partitions is provided for 50 percent or more of the area of the wall or Partition.

(3) EXCEPTION: Where all tenancies within a Fire Division are of Group G, Division 2 Occupancy, such spaces shall be exempt from the provisions of this Sub-section if one-story in height and of Type III unprotected, IV, V unprotected.

(4) EXCEPTION: Fire resistive separation between a tenant and a mall area will not be required by this sub-paragraph where the space on both sides of such wall or partition is protected by an automatic sprinkler system or by a water curtain provided at the line of separation.

(5) EXCEPTION: Group F, Division 1 tenancies, 200 square feet and less in area shall not be required to meet the provision of this subsection when one-story in height, and Type I or II construction not exceeding three stories in height, providing fire division walls are constructed for each 9,000 square feet of building area, provided areas are used for dead storage only.

(6) EXCEPTION: Group G, Division 2, clusters of offices less than 200 square feet served by a common reception area and internal corridor within the cluster area shall not require fire separation between offices and corridors common to the cluster.

(b) Fire resistive separation between tenants and between tenants and common areas shall be from floor to the deck above such space and shall include any eaves or overhang. There shall be no penetration of combustible framing materials through any fire-resistive wall, other than to exterior balconies.

(c) Openings in fire-resistive separations between tenants and between tenants and common areas shall be protected by doors or windows complying with Sec. 3706 and air movement openings shall be provided with fire dampers as required in Sec. 4806.10, 4806.11, and 4806.12.

(d) Walls or partitions required by this Code to be fire-resistive (based on Group of Occupancy, Type of Construction, Occupancy Separation in Section 508, draft stopping as set forth under Types of Construction, or protection of means of egress in Chapter 31) may serve as separation between tenants and between tenants and common areas where such walls and partitions also comply with this Sub-section.

508 OCCUPANCY SEPARATIONS

508.1 Occupancy separations shall be provided between the various Groups and Divisions of Occupancies as specified herein and in Table No. 5A, but shall be not less fire-resistive than required by the Type of Construction.

TABLE 5-A REQUIRED OCCUPANCY SEPARATIONS IN HOURS, IN BUILDINGS OF MIXED OCCUPANCY

GROUP	A	B-1	B-2	C	D-1	D-2	E	F-1	F-2	G-1	G-2	H	I	J-1	J-3	J-4
A	a	a	a	a	3	3	4	4	3	3	3	1	1	2	a	2
B-1		a	a	a	3	3	4	3	1	1	1	1	1	1	a	1
B-2			a	a	3	3	4	3	1	1	1	1	1	1	a	1
C				a	1	1	4	4	1	1	1	1	1	1	a	1
D-1					a	a	4	4	4	4	4	1	1	2	3	a
D-2						a	4	4	4	4	4	1	1	2	3	a
E							a	2	2	2	2	4	4	2	4	1
F-1								a	a	b	1	3	1	a	4	a
F-2									a	b	1	3	1	1	3	a
G-1										a	a	1	a	1	3	a
G-2											a	1	a	1	3	a
H												a	a	1	1	a
I													a	1	1	a
J-1														a	2	a
J-3															a	a

(a) No general requirement for fire-resistive separation by Group of Occupancy. See walls and partitions required for Type of Construction.

(b) Rooms for storing and unpacking goods held for retail sales shall not be required to have fire-resistive separation between such rooms and the retail sales area.

508.2 FORM OF OCCUPANCY SEPARATION: Separations, as specified in this Chapter, may be vertical, horizontal, or inclined, depending upon the relative position of the portions to be separated, and shall consist of a system of walls, partitions, floors or other construction of such materials and construction, so arranged as to provide a complete, secure and continuous fire break of the required fire-resistive rating between the portions of the building so separated.

508.3 CLASSIFICATIONS OF OCCUPANCY SEPARATION:

(a) Separations between occupancies within a fire division and between fire divisions shall be classified, each classification designated by the number of hours of fire-rating as set forth herein.

(b) A four-hour fire-resistive separation shall be of not less than four-hour fire-resistive construction and openings thereon shall comply with Paragraph 506.2(c) herein.

(c) (1) A three-hour fire-resistive separation shall be of not less than three-hour fire-resistive construction.

(2) All openings in walls of three-hour fire-resistive separations shall be protected by a fire assembly having a three-hour fire-resistive rating.

(3) The total width of all openings in any three-hour fire-resistive separation wall in any one story shall not exceed 25 percent of the length of the wall in that story and no single opening shall have an area greater than 120 square feet.

(4) All openings in floors forming a three-hour fire-resistive separation shall be protected by vertical enclosures extending above and below such openings. The walls of such vertical enclosures shall be of not less than two-hour fire-resistive construction and all openings thereto shall be protected by a fire assembly having a one and one-half hour fire-resistive rating.

(d) A two-hour fire-resistive separation shall be of not less than two-hour fire-resistive construction. All openings in such separation shall be protected by a fire assembly having a one and one-half-hour fire-resistive rating.

(e) A one-hour fire-resistive separation shall be of not less than one-hour fire-resistive construction. All openings in such separation shall be protected by a fire assembly having a three-fourths-hour fire-resistive rating.

508.4 DESIGN AND MATERIALS OF OCCUPANCY SEPARATION: Walls which form separations between Occupancies or between fire divisions shall also conform with the provision of PART VI as they pertain to design and materials.

509 HAZARDOUS UTILITIES

509.1 GENERAL: Individual feeders and shut-offs shall be provided for every separate fire division in every building.

509.2 ELECTRIC: Where electricity is served to multiple tenants (more than two), the provisions of Paragraph 4506.1(b) and (c) shall be satisfied.

509.3 GAS: Where gas is served to separated fire divisions or occupancies, there shall be individual valves, and valves and meters shall be located on the exterior of the building in a conspicuous and accessible place. Installation shall be as set forth herein.

509.4 OTHER: Other utilities which may constitute hazards shall, in general, be governed by the provisions of this Section and shall be subject to such additional requirements as the Building Official may prescribe.

510 EGRESS FACILITIES FOR MIXED OCCUPANCIES

510.1 Where two or more Occupancies, having exit width based on different occupant content, occur on the same floor and have common means of egress, the number of units of width required for each such occupancy shall be calculated separately, and the units of width combined and proportioned in two or more means of egress as required by travel distance limitations of the most restricted Occupancy.

510.2 Where two or more Occupancies, having units of exit width based on different occupant content, occur in different floors of the same building, the combined width of means of egress at any floor, other than the first or ground floor, shall not be less than required for the occupant content of that floor.

511 LOCATION ON PROPERTY

511.1 The location of all building and/or structures shall conform to the provisions of the Zoning Ordinance.

511.2 The location of all buildings and the protection of certain openings shall conform to the requirements of the Group of Occupancy in which such building is classified in this Code, according to the use or the character of the occupancy.

512 SANITATION

512.1 WASTE STORAGE: Adequate permanent enclosures shall be provided for the storage of waste within the lines of the lot or lots occupied.

512.2 TOILET ROOMS:

(a) Toilet facilities shall be provided on each floor for each sex using that floor and shall be located to be readily accessible except that in a building where the two lower levels, such as a first floor and mezzanine or the first floor and second floor where there is no mezzanine, are occupied by a single tenant and the toilet facilities are not for public use, the combined total toilet facilities required for these two levels may be located on either the first or second level.

EXCEPTION: Toilet facilities for public use in Group A or B Occupancies restaurants, bars, transportation terminals and similar locations shall be provided on each floor for each sex.

(b) Minimum toilet facilities shall be a toilet room having one water closet and one lavatory, which may serve both sexes but not more than nine persons.

(c) Water closets for public use, except within the residence or apartment of a single family, shall be of an elongated type and shall be equipped with open front seats, and shall be separated from the rest of the room, and from each other, by stalls of impervious materials. Such stalls shall be equipped with self-closing doors and shall be open at the top and at least 12 inches from the floor for ventilation.

EXCEPTION: For pre-schools and private schools (age limit, 4 years), separation stalls and

doors between water closets may be eliminated.

(d) The floors and walls of public toilet rooms, to a height of five feet, shall be tile or similar impervious materials.

(e) Toilet rooms connected to rooms where food is prepared, stored, or served to the public shall be separated therefrom by a vestibule with close-fitting doors.

(f) Toilet rooms connected to public rooms or passageways shall have a vestibule or shall otherwise be arranged or screened to ensure decency and privacy.

(g) Public toilets shall bear signs plainly indicating for which sex and/or group such room is intended.

(h) Required facilities in public buildings shall be available to employees and the public without charge.

(i) Warehouses or storage building renting or leasing bays or stalls of not more than 500 square feet and that do not have separate electric service for each bay or stall need not provide separate toilet facilities for each tenant. For the purpose of determining the required toilet facilities only, such buildings shall be considered as a single tenant. Toilet facilities shall be provided with a travel distance not to exceed 250 feet.

512.3 SCREENING:

(a) Food-storage and preparation rooms shall have outside openings screened with 18-mesh-wire screening. Screen doors shall be equipped with self-closing devices.

(b) Public dining rooms, restaurants, tearooms and similar places for serving food to the public shall be completely screened with 18-mesh wire screening; or such places may be equipped with a system of fans, so arranged as to effectively prevent the entrance of insects. This requirement for screening or installation of fans in public dining rooms shall not be construed to prevent the serving of food to the public in outdoor areas.

513 CEILING HEIGHTS

513.1 GENERAL:

(a) Except as otherwise set forth herein, the minimum ceiling height taken as the vertical clear height from floor to ceiling or other overhead obstruction, including pipes, mechanical appurtenances, etc., shall be not less than seven feet.

(b) Small storage closets, slop-sink closets, storage space under a stair and similar small areas where persons do not generally walk into shall not be limited by height.

(c) Doors connecting spaces where minimum ceiling heights are herein regulated shall be of not less than 6'8".

(d) The minimum height of entrances for pedestrian or vehicular traffic and for parking spaces under or within a building shall be 6'8".

(e) The ceiling height of a limited storage mezzanine or area where persons may infrequently be and only for the purpose of placing or removing stored materials shall not be limited.

513.2 CEILING HEIGHTS BY SPECIFIC USE:

(a) Ceiling heights of residential units shall comply with Sections 1305 and 1405 herein as applicable.

(b) Stairways and landings shall have headroom as set forth in Sub-section 3105.14.

(c) Maximum headroom for parking garages where the design is based on a reduced live load

shall not exceed that set forth in Section 2302.

(d) Headroom under roof signs shall comply with Sub-section 4206.4.

514 ALLOWABLE AREA

514.1 BASIC FLOOR AREA:

(a) (1) The area of one-story building in Fire Zones 1 and 2 shall not exceed the limits set forth in Chapters 6 through 15 except as provided in Sub-section 514.2 herein.

(2) Building in Fire Zone 3 may have basic areas of one-third more than the limits set forth in Chapters 6 through 15 and the basic areas so computed may be further increased as provided in Sub-section 514.2 herein.

(b) Basements and cellars need not be included in the total allowable area provided they do not qualify as a story or exceed the area permitted for a one-story building.

(c) The total area of all floors of a multi-story building shall not exceed twice the area allowed for one-story buildings.

(d) No single floor area shall exceed that permitted for one-story buildings.

514.2

(a) BASIC AREA INCREASES: The basic areas provided in Sub-section 514.1 may be increased by the percentages set forth in one of the following:

(1) Where public space, streets, or yards more than 20 feet in width extend along and adjoin two sides of a building, the basic floor area may be increased at a rate of one and one fourth percent for each foot by which such space, street, or yard exceeds 20 feet, but such increase shall not exceed 50 percent.

(2) Where public space, streets, or yards more than 20 feet in width extend along and adjoin three sides of a building, the basic floor area may be increased at a rate of two and one-half percent for each foot by which such space, street, or yard exceeds 20 feet, but such increase shall not exceed 100 percent.

(3) (aa) Where public space, streets, or yards more than 20 feet in width extend on all sides of a building and adjoin the entire perimeter, the basic floor area may be increased at a rate of five percent for each foot by which such space, street, or yard exceeds 20 feet.

(bb) Such increases shall not exceed 100 percent, except as provided in Paragraph 514.2(b) herein.

(4) Floor areas so computed are the maximum allowable except where unlimited as provided in Paragraph 514.2(b) or except in buildings provided with automatic fire-extinguishing systems as set forth in Paragraph 514.2(c) herein.

(b) UNLIMITED AREA:

(1) The areas of buildings of Groups F and G occupancy shall not be limited where such buildings do not exceed two stories in height, are entirely surrounded by public space, streets, or yards not less than 60 feet in width, and are provided with an approved automatic fire-extinguishing system throughout as set forth in Chapter 38 of this Code.

(2) The areas of one-story buildings of Groups F and G occupancy of Type II, Type III (Protected), or Type IV construction shall not be limited where such buildings are entirely surrounded and adjoined by public space, streets, or yards not less than 60 feet in width.

(c) AUTOMATIC FIRE-EXTINGUISHING SYSTEMS:

(1) The basic areas provided in Sub-section 514.1 may be tripled in one-story buildings and doubled in buildings more than one-story where such buildings are provided with approved automatic fire-extinguishing systems throughout, as set forth in Chapter 38 of this Code.

(2) In buildings of Group A, B, and E Occupancy, the area increases permitted in Sub-paragraph 514.2(c) (1) shall not apply where automatic fire-extinguishing systems are required.

(3) The area increases permitted in Sub-paragraph 514.2(c) (1) may be regarded as revised basic areas and may be further increased by the percentage provided in one of the Sub-paragraphs of Paragraph 514.2(a) applied to the revised basic area.

(d) PUBLIC SPACE, STREETS, OR YARDS: Where the width of public space, streets, or yards is used to increase floor area, such space, street or yards shall remain unobstructed to provide permanent access not less than 20 feet in width for fire-fighting equipment to serve each building.

515 ACCESSIBILITY FOR THE PHYSICALLY DISABLED AND/OR HANDICAPPED

As of January 1, 1990 All Florida Statutes in reference to Accessibility Requirements for the physically disabled and/or handicapped will be a part of the Broward County Edition of the South Florida Building Code, but by reference only and will remain Section 515. Information will be obtained from:

Florida Department of Community Affairs
Codes and Standards Section
2740 Centerview Drive
Tallahassee, FL 32399-2100 Phone: (904) 487-1824

516 SAFEGUARDS

516.1 GENERAL:

(a) Safeguards in and around buildings and structures shall be covers, railings, stair-railings, handrails, or other safeguards as defined and provided in the Standard of the Federal Occupational Safety and Health Administration (OSHA) Part 1910 as applied to permanent structures, set forth in Section 402 of this Code, and as provided herein.

(b) Such safeguards shall also be designed to comply with Section 515 and to resist the loads set forth in Sub-section 2303.3 of this Code.

(c) Safeguards at the open or glazed sides of vehicular ramps and parking areas shall be designed and constructed and shall be so supported so as to resist a horizontal force of not less than 1000 pounds per lineal foot or a concentrated load of not less than 10,000 pounds applied outwardly at not less than 27 inches above such ramp or parking surface, whichever condition(s) produces maximum stress(e's). The reaction and stresses due to the above referenced uniform and concentrated loads shall be considered not to be acting simultaneously.

516.2 WALL AND FLOOR OPENINGS:

(a) Wall openings; Open sides of balconies, landings and other walking surfaces; unenclosed floor and roof openings; roofs used for other than services for the building or structure and, except in Groups E and F Occupancies, any other abrupt differences in level exceeding 24",

including yard areas, shall be provided with safeguards not less than 42" in height. Glazed openings shall be protected as required in Sec. 3508.2(c) and 3508.3(c).

(b) Such differences in level exceeding 48 inches in and around Groups E and F Occupancies shall be provided with safeguards not less than 42 inches in height.

(c) Safeguards may be omitted at loading docks, truck wells and similar locations where it is apparent that the edge of the higher level is for loading, and on docks and sea walls where the lower level is the water surface. Safeguards are not required on theatrical stages and auditorium platforms.

(d) Safeguards in and around buildings shall be provided with additional rails, vertical pickets or an ornamental filler below the top rail which will reject a four-inch diameter object.

EXCEPTION: The triangle openings formed by the riser, tread and bottom element of a guardrail at the open side of the stair shall be of such a size that will reject a six-inch diameter object.

(e) Safeguards in buildings of Groups A and B Occupancies may be provided in specific areas as follows:

(1) The fasciae of boxes, balconies, and galleries shall not be less than 26 in. (66 cm) high above the adjacent floor or have substantial railings not less than 26 in. (66 cm) high above the adjacent floor.

(2) The height of the rail above footrests on the adjacent floor immediately in front of a row of seats shall be not less than 26 in. (66 cm). Railings at the ends of aisles shall not be less than 36 in. (91 cm) high for the full width of the aisle and shall be not less than 42 in. (107 cm) high for the width of the aisle where steps occur.

(3) Cross aisles shall be provided with railings not less than 26 in. (66 cm) high above the adjacent floor.

EXCEPTION: Cross aisles need not be provided with railings where the backs of seats on the front of the aisle project 24 in. (60 cm) or more above the adjacent floor of the aisle.

(f) Areas in all occupancies (except H and I) from which the public is excluded and which require such protection may be provided with vertical barriers having a single rail midway between a top rail and the walking surface provided the design meets the requirements of Sub-section 2303.3 of this Code.

(g) The bottom rail of any balcony shall not be more than 2 inches above the slab.

(h) A single horizontal rail of handrail strength at 42 inches height with a tempered glass fixed panel below may be installed as a safeguard in all Occupancies including Hotels and Motels, but not in other H Occupancies or in any I Occupancies, except where minimum ½" fully tempered glass is utilized.

CHAPTER 6
REQUIREMENTS OF GROUP A OCCUPANCIES

601 GROUP A OCCUPANCY DEFINED
602 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
603 LOCATION ON PROPERTY
604 EGRESS FACILITIES
605 LIGHT AND VENTILATION
606 ENCLOSURE OF VERTICAL OPENINGS
607 STAGES AND PLATFORMS
608 PROJECTION ROOMS
609 SPECIAL HAZARDS
610 PLUMBING AND SANITATION
611 EXCEPTIONS AND DEVIATIONS
612 MIXED OCCUPANCY

601 GROUP A OCCUPANCY DEFINED

601.1 Group A Occupancy shall include assembly uses such as theaters, auditoriums, motion-picture houses, exhibition halls, skating rinks, gymnasiums, bowling alleys, pool rooms, armories, restaurants, churches, dance halls, club rooms, night clubs, meeting rooms, passenger rooms, recreation piers, and similar uses having an occupant content of more than 1,000 persons.

602 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

602.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group A because of use and occupancy shall be limited in height and area as follows:

Type		Allowable Height	Basic Area
I		Not Limited	Not Limited
II		60 Feet (4 stories)	22,500
* III	(Protected) (with sprinkler system)	50 ft. (1 story)	9,000

*See Sec. 607.1(a)(1) for Stage Construction.

(b) See Section 514 for allowable area increases.

602.2 SPECIAL PROVISIONS:

(a) In the assembly space of churches and gymnasiums in one-story buildings, the roof structure may be of unprotected incombustible materials where every part of the structural framework is 18 feet or more above any floor, or any balcony or gallery seating over 50 persons. Roof structure less than 18 feet above any balcony or gallery seating 50 or less persons, may be of unprotected incombustible materials.

(b) Assembly rooms having an occupant load of 100 or more shall not be located in a basement.

(c) In gymnasiums, dance halls and similar occupancies, floors and running tracks may be of wood.

(d) Basements shall be of Type I Construction.

603 LOCATION ON PROPERTY

603.1 Buildings with Group A Occupancy shall front directly upon a public street or on a clear and permanently unobstructed yard or court not less than 30 feet in width and connected to such public street.

603.2 The main floor shall be located at or near grade.

603.3 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

604 EGRESS FACILITIES

604.1 Stairs, means of egress and smoke proof enclosures shall be provided as set forth in Chapter 31. (See Section 3115 for specific requirements for Group A Occupancies).

605 LIGHT AND VENTILATION

605.1 GENERAL: All portions of Group A Occupancies customarily used by human beings and all dressing room shall be provided with light and ventilation by means of windows, skylights or doors with an area not less than one-tenth of the total floor area, one-half of which shall be operable, or shall be provided with electric light and with a mechanically operated ventilating system as set forth in Chapter 48. Ducts for mechanical ventilation system shall serve no other Group of Occupancy.

605.2 ARTIFICIAL LIGHTING: Auditorium light shall be as set forth in Chapter 45 and emergency lighting shall be provided in all paths of egress as set forth in Section 3112.

605.3 HAZARDS: Registers or vents supplying air back stage, supplying a projection booth or passing through a fire wall shall be equipped with automatic closing devices with fusible links and supply-air fans shall be controlled with a temperature sensing device.

606 ENCLOSURE OF VERTICAL OPENINGS

606.1

(a) Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

(b) Elevators which serve dressing rooms, gridiron and fly galleries need not be enclosed above the stage level.

606.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

607 STAGES AND PLATFORMS

Stages, platforms and accessory features thereof shall be designed and constructed as follows:

607.1 STAGES:

(a) STAGE CONSTRUCTION:

(1) All parts of the stage shall be designed to support not less than 125 pounds per square foot and shall be of Type I construction.

(2) The room directly under the stage shall not be used for any purpose other than the working of traps and mechanical apparatus necessary for a performance on the stage.

(3) Openings through stage floors shall be equipped with tight-fitting trap doors of incombustible material or of wood not less than two inches thick.

(b) GRIDIRONS: Gridirons, fly galleries and pin rails shall be constructed of incombustible materials, but fireproofing of metal shall not be required.

(c) ACCESSORY ROOMS: Dressing rooms, workshops, and storerooms shall be located on the stage side of the proscenium walls and shall be separated from each other and from the stage by two-hour fire-resistive construction.

(d) PROSCENIUM WALLS:

(1) The proscenium wall separating a working stage from the audience shall be of not less than two-hour fire-resistive construction and shall extend not less than four feet above the roof. The proscenium wall shall not

be finished or covered with combustible materials.

(2) The proscenium wall separating a non-working stage from the audience shall be constructed of non-combustible materials of not less than one-hour resistive construction.

(3) There shall be no openings in the wall separating the stage from the audience except the proscenium opening, one doorway at each side of the proscenium opening at the stage floor level, at the level of the musician's pit, and where necessary to the organ. Each such doorway shall be not larger than 21 square feet in area and shall be protected by a self-closing door on the audience side of the wall and, for working stages, also an automatic closing fusion-linked fire door on the stage side of the wall. Door openings from the stage to the exterior of the building shall be equipped with approved self-closing fire doors.

(e) PROSCENIUM CURTAINS:

(1) The proscenium opening of every working stage shall be provided with a curtain of metal or other non-combustible materials, so designed and constructed that for at least 30 minutes it will prevent all passage of flame and withstand without failure a temperature of 1100 degrees F. and an air pressure normal to the surface of not less than 10 pounds per square foot.

(2) When closed, proscenium curtains shall be reasonably tight against the passage of smoke.

(3) The Building Official may require a fire test or other satisfactory evidence of sufficiency of the curtain in these requirements.

(4) The proscenium curtain shall be subjected to operating tests and be approved by the Building Official before initial performance. The proscenium curtain shall be lowered after every performance.

(5) The proscenium curtain shall overlap the proscenium openings by at least two feet at the top and 18 inches at each side and shall slide vertically at each side in iron or steel grooves which shall have a minimum overlap of 12 inches.

(6) The proscenium curtain shall be so arranged and maintained that, in case of fire, it would release automatically and instantly by an approved heat-actuated device, and will descend slowly and safely, by its own weight, to completely close the proscenium opening within 30 seconds, taking not over 5 seconds for the bottom 5 feet.

(7) The proscenium curtain shall be equipped with effective devices to permit prompt and immediate closing of the proscenium opening by manual means.

(8) No part of a proscenium curtain shall be supported by or fastened to combustible material.

(f) STAGE VENTILATORS: There shall be one or more ventilators constructed of metal or other incombustible materials near the center and above the highest point of any permanent stage, raised above the roof and having a total ventilating area equal to at least five percent of the floor area within the stage walls. Doors or covers for ventilators shall open by gravity or other approved mechanical means, i.e. spring, magnetic, etc., and shall be held closed and manually operated by means of cords extending to each side of the stage. These cords shall be equipped with three fusible links, one of which shall be placed in the ventilator above the main roof level and the other two at approved points, not affected by sprinkler heads. Such links shall fuse and separate at 160 degrees Fahrenheit. Each ventilator shall be opened and closed at least once before each performance. Glass, if used in such ventilators, shall be wire glass.

(g) FLAME-RETARDING REQUIREMENTS: No combustible scenery, drops, decorations or other combustible effects shall be placed on any stage of enclosed platform unless it is treated with an effective fire-retardant solution and maintained in a non-flammable condition as approved by the Fire Department, and scenery shall be inspected before the opening of each new production, or annually if the productions continue for more than one year.

(h) STAGE EXITS:

(1) At least one exit two feet six inches wide shall be provided from each side of the stage opening, directly or by means of passageway not less than three feet in width, to a street or exit court. An exit stair not less than two feet six inches wide shall be provided for egress from each fly gallery.

(2) Each tier of dressing rooms shall be provided with two remote paths of egress, each not less than two feet six inches wide, and where dressing rooms are provided more than one tier above the stage floor, stairways to all tiers shall be enclosed.

(3) Stage exits shall be as set forth in Chapter 31 except as otherwise required in this Sub-section.

(i) OTHER REQUIREMENTS: There shall be no enclosed structure for human occupancy located above a stage.

607.2 PLATFORMS:

(a) PLATFORM CONSTRUCTION: The platform shall be constructed entirely of incombustible materials, except that where the floor extends under the full area of such platform, construction may be of Type II, omitting the fireproofing on the beams and girders.

(b) SIZE OF PLATFORM: The platform shall not extend from the rear wall a distance greater than 18 feet, measured to the greatest projection of the platform, nor shall the ceiling over any platform be more than five feet above the screen except that in Group C Occupancies the platform may extend from the rear wall a distance not greater than 25 feet.

(c) ACCESSORY ROOMS: No dressing or other rooms for human occupancy shall be located on, under or above such platform unless such rooms shall be completely separated therefrom by not less than two-hour fire-resistive construction.

(d) SCREEN: The screen shall be rigidly attached to the platform and to the rear wall, and a clear passageway, not less than 20 inches wide, shall be provided between the screen or the sound equipment and the rear wall.

(e) COMBUSTIBLE MATERIALS REGULATED: No combustible scenery, drapes, decorations or other combustible effects shall be placed on any platform.

608 PROJECTION ROOMS AND BOOTHS

608.1 Projection rooms and booths shall be provided in all buildings where the principal use is the showing of motion pictures, and such projections rooms and booths shall be separated and protected as required by Chapter 8 of NFPA 101 and provided with fire-extinguishing apparatus as provided in Chapter 38 of this Code.

609 SPECIAL HAZARDS

609.1 Automatic sprinkler systems, fire extinguishers, fire-alarm systems and standpipes shall be as set forth in Chapter 38.

609.2 Chimneys, flues and vents shall be as set forth in Chapter 39.

609.3 Heat-producing apparatus shall be as set forth in Chapter 40.

609.4 The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto. Any gas service to the stage portion of the building, and every gas service shall be provided with a shut-off valve at a convenient and conspicuous place outside the building, and adequately marked.

609.5 Electrical installations shall be as required herein and as specified in Part XI.

609.6 Transformer vaults shall be as set forth in Section 4101.

609.7 The storage of flammable materials shall be as set forth in Chapter 41.

609.8 Buildings shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

610 PLUMBING AND SANITATION

610.1 Plumbing shall be installed as set forth in Part XII.

610.2

(a) Sanitation shall be as set forth in Section 512.

(b) For Group A Occupancies having a stage, separate toilet facilities shall be provided back-stage for personnel.

611 EXCEPTIONS AND DEVIATIONS

611.1 Existing buildings not fully complying with the requirements of this Chapter may be used for Group A Occupancies, if the requirements of Section 602, 604, 609 and 610 are fully complied with and providing there is not less than a two-hour fire separation between such buildings and any other occupancies.

612 MIXED OCCUPANCIES

612.1 Separation of Group A Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

612.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 7
REQUIREMENTS OF GROUP B OCCUPANCIES

701 GROUP B OCCUPANCY DEFINED
702 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
703 LOCATION ON PROPERTY
704 EGRESS FACILITIES
705 LIGHT AND VENTILATION
706 ENCLOSURE OF VERTICAL OPENINGS
707 STAGES AND PLATFORMS
708 PROJECTION ROOMS
709 SPECIAL HAZARDS
710 PLUMBING AND SANITATION
711 MIXED OCCUPANCY

701 GROUP B OCCUPANCY DEFINED

701.1 GROUP B OCCUPANCY DEFINED: Group B Occupancy shall include assembly uses such as:

DIVISION 1: Assembly set forth in Section 601 having an occupant content of 300 to 1,000 persons.

DIVISION 2: Assembly uses as set forth in Section 601 having an occupancy content of less than 300 persons except that the occupancy of any room or space for assembly purposes of less than 100 persons in a building of other occupancy and incidental to such other occupancy shall be classified as part of the other occupancy and subject to the provisions applicable thereto.

702 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

702.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group B because of use and occupancy shall be limited in height and area as follows:

Division	Type	Allowable Height	Basic Area	
1	I	Not Limited	Not Limited	
1	II	60 feet (4 stories)	22,500	
1	III (Protected)	30 feet (2 stories)	10,100	
1	III (Protected)	50 feet (1 story)	10,100	
1	V (Protected)	20 feet (1 story)	3,300	(with sprinkler system)
2	I	Not Limited	Not Limited	
2	II	75 feet (5 stories)	22,500	
2	III (Protected)	30 feet (2 stories)	10,100	
2	III (Protected)	50 feet (1 story)	10,100	
2	III (Unprotected)	30 feet (1 story)	6,800	
2	V (Protected)	20 feet (1 story)	3,300	(with sprinkler system)

(b) See Section 514 for allowable area increases.

702.2 SPECIAL PROVISIONS:

(a) In the assembly space of churches and gymnasiums in one-story buildings, the roof structure may be of unprotected incombustible materials where every part of the structural framework is 18 feet or more above any floor, or any balcony or gallery seating over 50 persons. Roof structure less than 18 feet above any balcony or gallery seating 50 or less persons, may be of unprotected incombustible materials.

(b) Group B assembly rooms having an occupant content of 100 or more shall not be located in a basement.

(c) In gymnasiums, dance halls and similar occupancies, floors and running tracks may be of wood.

(d) Balconies, and the means of egress therefrom, shall be a minimum of Type II construction.

(e) Basements shall be of Type I Construction.

703 LOCATION ON PROPERTY

703.1 Buildings with Group B Occupancy shall front directly upon a public street or on a clear and permanently unobstructed yard or court not less than 30 feet in width and connected to such public street.

703.2 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

704 EGRESS FACILITIES

704.1 GENERAL: Stairs, means of egress and smoke proof enclosures shall be provided as set forth in Chapter 31. (See Section 3116 for specific requirements for Group B Occupancies).

704.2 AMUSEMENT STRUCTURES:

(a) Stairs and means of egress for amusement structures shall be provided as set forth in Chapter 31, subject to the approval of the Building Official.

(b) Exit signs shall be installed as set forth in Section 3112 and where required by the Building Official.

705 LIGHT AND VENTILATION

705.1 All portions of Group B Occupancies customarily used by human beings shall have light and ventilation as set forth in Section 605.

706 ENCLOSURE OF VERTICAL OPENINGS

706.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

706.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

707 STAGES AND PLATFORMS

707.1 Stages and platforms shall be as set forth in Sec. 607, except that where the floor is incombustible and extends under the full area of a platform and the platform does not exceed three feet above the floor, the platform may be of Type III construction omitting the fireproofing.

708 PROJECTION ROOMS AND BOOTHS

708.1 Projection rooms and booths shall comply with Section 608 herein.

709 SPECIAL HAZARDS

709.1 Automatic sprinkler systems, fire extinguishers, fire-alarm systems and standpipes shall be as set forth in Chapter 38.

709.2 Chimneys, flues and vents shall be as set forth in Chapter 39.

709.3 Heat-producing apparatus shall be as set forth in Chapter 40.

709.4 The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto. Any gas service to the stage portion of the building shall be separated from any other service to the building, and every gas service shall be provided with a shut-off valve at a convenient and conspicuous place outside the building, and adequately marked.

709.5 Electrical installations shall be as required herein and as specified in Part XI.

709.6 Transformer vaults shall be as set forth in Section 4101.

709.7 The storage of flammable materials shall be as set forth in Chapter 41.

709.8 Buildings shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

710 PLUMBING AND SANITATION

710.1 Plumbing shall be installed as set forth in Part XII.

710.2 Sanitation shall be as set forth in Section 512 and where persons are engaged in physical athletic activities, bathing facilities shall be provided.

711 MIXED OCCUPANCIES

711.1 Separation of Group B Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

711.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 8
REQUIREMENTS OF GROUP C OCCUPANCIES

801 GROUP C OCCUPANCY DEFINED
802 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
803 LOCATION ON PROPERTY
804 EGRESS FACILITIES
805 LIGHT AND VENTILATION
806 ENCLOSURE OF VERTICAL OPENINGS
807 STAGES AND PLATFORMS
808 PROJECTION ROOMS
809 SPECIAL HAZARDS
810 PLUMBING AND SANITATION
811 EXCEPTIONS AND DEVIATIONS
812 MIXED OCCUPANCY

801 GROUP C OCCUPANCY DEFINED

801.1 Group C Occupancy shall include all schools having classes more than four hours each week and providing facilities for more than ten students or preschool children. Private Adult Schools providing educational facilities for students above 12th grade shall comply with the requirements for G-2 occupancy.

801.2 Accessory uses to schools not exceeding the following maximum may conform to the requirements of this Chapter:

Assembly Halls . . . . . 2,100 square feet
Dining rooms . . . . . 3,000 square feet
Gymnasiums . . . . . 3,000 square feet
Shops having portable or fixed power equipment or tools not exceeding a combined total of 20 H.P.

801.3 Such accessory uses exceeding the above maximums shall conform to the requirements of the Occupancy group which includes such use.

801.4 STANDARDS: The following standard as set forth in Sec. 402 is hereby adopted to supplement, but not supersede the requirement set forth in this Chapter.

(a) Florida State Board of Education 1975 Chapter 6A-2 Educational Facilities Part III-State Uniform Building Code Section A-New Construction.

802 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

802.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group C because of use or occupancy, shall be limited in height and area as follows:

Type	Allowable Height	Basic Area	
I	Not Limited	Not Limited	
II	60 feet (4 stories)	34,000	
III (Protected)	30 feet (2 stories)	15,200	
III (Unprotected)	30 feet (1 story)	10,100	
VI	30 feet (1 story)	10,100	
V (Unprotected)	30 feet (1 story)	6,800	
V (Protected)	30 ft. (2 stories)	9,000	(with sprinkler system)

(b) See Section 514 for allowable area increases.

802.2 SPECIAL PROVISIONS:

(a) Rooms having an occupant content of more than 100 persons and rooms used for kindergarten, first, and second grade pupils, shall not be located above the first story above grade except in buildings of Type I Construction.

(b) Where there is usable space under the first floor of two-story Type III buildings, basements, including the first floor, shall be of Type I construction.

803 LOCATION ON PROPERTY

803.1 Buildings with Group C Occupancy shall front directly upon a public street or on a clear and permanently unobstructed yard or court not less than 30 feet in width and connected to such public street.

803.2 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

804 EGRESS FACILITIES

804.1 Stairs, means of egress and smoke proof enclosures shall be provided as set forth in Chapter 31. (See Section 3117 for specific requirements for Group C Occupancies).

805 LIGHT AND VENTILATION

805.1 All portions of Group C Occupancies customarily used by human beings shall have light and ventilation as set forth in Section 605.

806 ENCLOSURE OF VERTICAL OPENINGS

806.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

806.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

807 STAGES AND PLATFORMS

807.1 Stages and platforms shall be as set forth in Sec. 607, except that platforms or rostrums constructed as part of classrooms and not occupying more than 15 percent of the area of the floor may be constructed of combustible materials. Platforms in assembly halls on the ground may comply with the requirements of Sec. 707.1 for 8 Occupancies.

808 PROJECTION ROOMS

808.1 Where motion pictures, using flammable film or film larger than 16 mm, or using carbon-arc or mercury-arc projectors, are to be shown, such building shall be equipped with a projection room as set forth in Section 608.

809 SPECIAL HAZARDS

809.1 Automatic sprinkler systems, fire extinguishers and standpipes shall be as set forth in Chapter 38 and fire alarms shall be as set forth in Chapter 31.

809.2 Chimneys, flues and vents shall be as set forth in Chapter 39.

809.3 Heat-producing apparatus shall be as set forth in Chapter 40.

809.4 The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto.

809.5 Electrical installations shall be as required herein and as specified in Part XI.

809.6 Transformer vaults shall be as set forth in Section 4101.

809.7 The storage of flammable materials shall be as set forth in Chapter 41.

809.8 Exhaust and dust collecting systems shall be provided on all equipment or power tools capable of producing or generating combustible fibers, chips, shavings, and dust. Exhaust and collecting systems shall comply with the Standards set forth in Sub-section 4801.6.

809.9 Buildings shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

810 PLUMBING AND SANITATION

810.1 Plumbing shall be installed as set forth in Part XII.

810.2 Sanitation shall be as set forth in Section 512 and as follows:

(1) In classrooms with grades below the fourth grade, where facilities and arrangements provide one lavatory under teacher supervision in each classroom and one water closet for each sex, for each two 30-student classrooms, such facilities may be computed as part of the general requirements.

(2) In schools having more than 100 students, separate facilities shall be provided for teachers and janitors.

811 EXCEPTIONS AND DEVIATIONS

811.1 Except in buildings of Type I construction, school classrooms used for kindergarten, first or second-grade pupils shall be located on the ground floor.

812 MIXED OCCUPANCIES

812.1 Separation of Group C Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

812.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 9
REQUIREMENTS OF GROUP D OCCUPANCIES

901 GROUP D OCCUPANCY DEFINED
902 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
903 LOCATION ON PROPERTY
904 EGRESS FACILITIES
905 LIGHT AND VENTILATION
906 ENCLOSURE OF VERTICAL OPENINGS
907 PROJECTION ROOMS
908 SPECIAL HAZARDS
909 PLUMBING AND SANITATION
910 MIXED OCCUPANCY

901 GROUP D OCCUPANCY DEFINED

Group D Occupancy shall include all institutional uses as follows:

DIVISION 1: Occupancy where inmates' liberties are restricted, such as jails, prisons, reformatories and asylums.

DIVISION 2: Occupancies where persons are under physical limitations such as hospitals, sanitariums, homes for the aged and orphanages and where accommodations are provided for four or more people.

DIVISION 3: Occupancies where the individuals residing are not under severe physical limitations, and which undertakes through its ownership or management to provide, for a period exceeding 24 hours, one or more personal services.

(a) Personal services, in addition to housing and food service, include but are not limited to: personal assistance with bathing, dressing, ambulation, housekeeping, supervision, emotional security, and any other related services, notwithstanding that such services do not include medical services.

(b) Division 3 Occupancies shall not be required to meet the provisions of this Chapter, but shall meet those specified in Sub-paragraph 902.3, Special Provisions.

902 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

902.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group D because of use or occupancy, shall be limited in height and area as follows:

Division	Type	Allowable Height	Basic Area
1	I	Not Limited	Not Limited
1	II	30 Feet (2 stories)	11,300
2	I	Not Limited	Not Limited
2	II	45 feet (3 stories)	11,300
2	III (Protected)	20 ft. (1 story)	5,100

(b) See Section 514 for allowable area increases.

902.2 SPECIAL PROVISIONS FOR DIVISION 1 and 2 OCCUPANCIES:

(a) Cell blocks and confinement cells in jails, prisons or similar buildings may be constructed of unprotected steel or iron, provided, that the entire cell block shall be constructed of incombustible materials.

(b) Basements shall be of Type I construction.

902.3 SPECIAL PROVISIONS FOR DIVISION 3 OCCUPANCIES:

(a) Division 3 Occupancies provided for six or less individuals shall be considered Group I Occupancies for all requirements.

(b) Division 3 Occupancies provided for more than six individuals shall be considered Group H Occupancies for all requirements.

EXCEPTION: The approved automatic sprinkler system requirements of subparagraph 3801.3(c) for Group D Occupancies shall also apply to Division 3 Occupancies.

(c) Fire alarms shall comply to the Broward County Edition of the South Florida Building Code or requirements of State Fire Marshal Rules of the Department of Insurance, Chapter 4A-40, whichever is more stringent.

(d) Smoke detectors shall comply to the Broward County Edition of the South Florida Building Code or requirements of State Fire Marshal Rules of the Department of Insurance, Chapter 4A-40, whichever is more stringent.

903 LOCATION ON PROPERTY

903.1 Buildings with Group D Occupancy shall front directly upon a public street or on a clear and permanently unobstructed yard or court not less than 30 feet in width and connected to such public street.

903.2 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

904 EGRESS FACILITIES

904.1 Stairs, means of egress and smoke proof enclosures shall be provided as set forth in Chapter 31. (See Section 3118 for specific requirements for Group D Occupancies).

905 LIGHT AND VENTILATION

905.1 All portions of Group D Occupancies customarily used by human beings shall be provided with light and ventilation by means of windows, skylight or doors with an area not less than one-tenth of the total floor area, one-half of which shall be openable, or shall be provided with electric lights as set forth in Chapter 45 and with a mechanically operated ventilation system as set forth in Chapter 48.

905.2 Ducts for mechanical ventilation system shall serve no other Group of Occupancy.

905.3 Emergency lighting shall be provided in all paths of egress and shall be as set forth in Section 3112.

906 ENCLOSURE OF VERTICAL OPENINGS

906.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

906.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

907 PROJECTION ROOMS

907.1 Where motion pictures are to be shown regularly, the building shall be equipped with a projection room as set forth in Section 608.

908 SPECIAL HAZARDS

908.1 Automatic sprinkler systems, fire extinguishers and standpipes shall be as set forth in Chapter 38 and fire alarms shall be as set forth in Chapter 31.

908.2 Chimneys, flues and vents shall be as set forth in Chapter 39.

908.3 Heat-producing apparatus shall be as set forth in Chapter 40.

908.4 The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto.

908.5 Electrical installations shall be as required herein and as specified in Part XI.

908.6 Transformer vaults shall be as set forth in Section 4101.

908.7 The storage of flammable materials shall be as set forth in Chapter 41.

908.8 Buildings shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

908.9 For Smoke Detector requirements, see Sec. 3122.9.

909 PLUMBING AND SANITATION

909.1 Plumbing shall be installed as set forth in Part XII.

909.2 Sanitation shall be as set forth in Section 512.

910 MIXED OCCUPANCY

910.1 Separation of Group D Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

910.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 10
REQUIREMENTS OF GROUP E OCCUPANCIES

1001 GROUP E OCCUPANCY DEFINED
1002 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1003 LOCATION ON PROPERTY
1004 EGRESS FACILITIES
1005 LIGHT AND VENTILATION
1006 ENCLOSURE OF VERTICAL OPENINGS
1007 SPECIAL HAZARDS
1008 PLUMBING AND SANITATION
1009 MIXED OCCUPANCY

1001 GROUP E OCCUPANCY DEFINED

Group E Occupancy shall include such hazardous uses as the storage and use of materials that are easily ignited and burn with extreme rapidity as follows:

DIVISION 1: Storage and handling of explosives and highly combustible materials such as, but not limited to: explosive manufacture, sales and storage; aluminum powder factories; cellulose-nitrate plastic factories, warehouses and sales rooms; cereal mills; flour and feed mills; grain elevators; mattress factories; rubber factories; waste paper plants; and polyester storage and processing plants.

DIVISION 2: Storage and handling of Class I, II and III flammable liquids, as set forth in Section 4102, and shall include such uses as, but not limited to, distilleries, gasoline bulk plants, lacquer factories, liquefied petroleum gas charging or bulk storage plants, plant manufacturing, spray painting, storage and handling of paint thinners and solvents, and storage and handling of styrene compounds.

1002 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

1002.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group E because of use or occupancy, shall be limited in height and area as follows:

Division	Type	Allowable Height	Basic Area
1	I	Not Limited	11,250
1	II	30 Feet (2 stories)	9,300
2	I	Not Limited	11,250
2	II	75 feet (5 stories)	9,300

(b) See Section 514 for allowable area increases.

1002.2 SPECIAL PROVISIONS:

(a) Basements shall be of Type I Construction.

(b) Floors shall be incombustible materials protected against saturation.

(c) Where a special explosion hazard is inherent to a high-hazard occupancy, no occupancy which is not directly related to the high-hazard occupancy shall be permitted in the same building.

(d) A distance separation of not less than 50 feet from a contiguous building line shall be provided.

1003 LOCATION ON PROPERTY

Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

1004 EGRESS FACILITIES

1004.1 Stairs, means of egress and smoke proof enclosures shall be provided as set forth in Chapter 31. (See Section 3119 for specific requirements for Group E Occupancies).

1005 LIGHT AND VENTILATION

1005.1

(a) All portions of Group E Occupancies customarily used by human beings shall have light and ventilation as set forth in Section 905.

(b) All portions of buildings where flammable liquids are used or stored shall be provided with mechanical ventilation as set forth in Chapter 48.

1005.2

(a) In all buildings where flammable liquids are used or stored, mechanical exhaust ventilation shall be provided, sufficient to produce one complete change of air every 10 minutes.

(b) Such exhaust ventilation shall be taken from a point at or near floor level and shall be in operation when the building is occupied by human beings.

1006 ENCLOSURE OF VERTICAL OPENINGS

1006.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

1006.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

1007 SPECIAL HAZARDS

1007.1 Automatic sprinkler systems, fire extinguishers and standpipes shall be as set forth in Chapter 38.

1007.2 Chimneys, flues and vents shall be as set forth in Chapter 39.

1007.3 Heat-producing apparatus shall be as set forth in Chapter 40.

1007.4 The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto.

1007.5 Electrical installations shall be as required herein and as specified in Part XI.

1007.6 Transformer vaults shall be as set forth in Section 4101.

1007.7 The storage or use of flammable materials shall be as set forth in Chapter 41.

1007.8 No combustion heater shall be installed in Group E Occupancies.

1007.9 Each machine in dry-cleaning plants which uses a flammable liquid shall have an adequate steam line connected to it so arranged as to automatically fill the machine with steam in case of fire.

1007.10 Paint spraying and dipping shall comply with Section 4106 herein.

1007.11 Mechanical ventilation shall comply with Section 4801.

1007.12 Exhaust systems and dust collecting equipment shall be provided on all equipment and power tools producing or generating highly combustible fibers, chips, shavings, dusts, etc. Exhaust and collecting systems shall comply with the standards set forth in Sub-section 4103.5.

1008 PLUMBING AND SANITATION

1008.1 Plumbing shall be installed as set forth in Part XII.

1008.2 Sanitation shall be as set forth in Section 512.

1009 MIXED OCCUPANCY

1009.1 Separation of Group E Occupancies or Divisions thereof from all other Occupancies or Division of

Occupancies shall be as set forth in Chapter 5.

1009.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 11
REQUIREMENTS OF GROUP F OCCUPANCIES

1101 GROUP F OCCUPANCY DEFINED
1102 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1103 LOCATION ON PROPERTY
1104 EGRESS FACILITIES
1105 LIGHT AND VENTILATION
1106 ENCLOSURE OF VERTICAL OPENINGS
1107 SPECIAL HAZARDS
1108 PLUMBING AND SANITATION
1109 MIXED OCCUPANCY

1101 GROUP F OCCUPANCY DEFINED

Group F Occupancy shall include storage and industrial uses as follows:

DIVISION 1: Storage Occupancy shall include warehouses, storage buildings, freight depots, public garages of any size where repair work is done, parking garages for more than four cars, gasoline service stations, aircraft hangars or similar uses.

DIVISION 2: Industrial Occupancy shall include factories, assembly and manufacturing plants, processing mills, laboratories, loft buildings, creameries, laundries, ice plants, sawmills, planning mills, box factories, woodworking shops with fixed or portable power equipment or tools exceeding a combined total of 20 H.P. and other similar uses.

1102 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

1102.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group F, Division 1 and Division 2, because of use or occupancy, except parking garages, shall be limited in height and area as follows:

Type	Allowable Height	Basic Area
I	Not Limited	Not Limited
II	75 feet (5 stories)	30,000
III (Protected)	60 feet (4 stories)	13,500
III (Unprotected)	20 feet (1 story)	10,000
IV	(1 story)	12,000
V (Unprotected)	20 feet (1 story)	10,000

(b) See Section 514 for allowable area increases.

1102.2 SPECIAL PROVISIONS:

(a) Motor Vehicle service stations in Fire Zones 1A and 2A (including canopies over pumps) shall be of Type I, II or III (Protected) Construction. Motor vehicle service stations shall not be Type V Construction in any Fire Zones.

(b) Aircraft hangars shall be of Type I, II, III (Protected), or IV Construction, and shall have exterior walls of not less than two-hour fire-resistive construction or be surrounded by an area open to free unobstructed passage not less than 60 feet in width.

(c) (1) Parking garages used exclusively for the parking and storing of passenger motor vehicles shall be of Type I, Type II or Type IV Construction with no combustible materials other than paint or other similarly approved finish and shall be limited in height and area as follows:

Parking Garages

Type	Allowable Height	Basic Area
I	Not Limited	Not Limited
II	Not Limited	Not Limited
IV	1 story	Not Limited

(2) Parking garages may be located in any Fire Zone, without reduction in allowable area.

(3) Parking on the roof is not construed to be an additional story.

(4) The horizontal distance from any point on each level to an exterior wall opening facing on a street, or to other permanently maintained open space accessible to a street, or to a wall opening on an interior court at least 10 feet in minimum dimension shall not exceed 200 feet.

(5) Openings in interior court walls shall conform to the requirements for exterior wall openings.

(6)EXCEPTION: Open-air parking garages in buildings in excess of one-story and all enclosed parking garges shall have no combustible materials of construction, except when fully sprinkled may have exposed pipes and conduits of PVC, CPVC and polybutylene materials. Fire sprinkler piping shall comply with NFPA 13.standards. The piping material shall be fire stopped in accordance with applicable sections of this Code. One story open-air parking garages may have exposed pipes and conduits of the above materials without being sprinkled unless located under another occupancy.

(d) Floors in motor service stations, garages and aircraft hangars shall be incombustible materials protected against saturation.

(e) Ramps used for the transfer of vehicles shall comply with Paragraph 3120.3(c) herein.

(f) Boat storage facilities shall be as set forth in Section 3801.3(e)(4).

1102.3 SPECIAL PURPOSE OCCUPANCY:

(a) (1) Special purpose occupancy is defined as any Group F, Division 2 Occupancy, except High Hazard, designed for and suitable only for particular types of operations characterized by a relatively low density of employee population with much of the area occupied by machinery and equipment.

(2) Vertical openings in special purpose occupancies may be unenclosed where such openings are necessary to manufacturing operations, provided every floor level has direct access to one or more enclosed stairways protected from obstruction by fire or smoke in the open areas connected by such openings.

1103 LOCATION ON PROPERTY

1103.1 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

1104 EGRESS FACILITIES

1104.1 Stairs, means of egress and smoke proof enclosures shall be provided as set forth in Chapter 31. (See Section 3120 for specific requirements for Group F Occupancies).

1105 LIGHT AND VENTILATION

1105.1 All portions of Group F Occupancies customarily used by human beings shall have light and ventilation as set forth in Section 905.

1105.2 All portions of buildings where flammable liquids are used or stored or where automobiles are stored or handled shall be provided with mechanical ventilation as set forth in Chapter 48, except that the Chief Mechanical Inspector may waive this requirement when the building is provided with unobstructed openings and/or cross ventilation.

1106 ENCLOSURE OF VERTICAL OPENINGS

1106.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

1106.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

1107 SPECIAL HAZARDS

1107.1 Automatic sprinkler systems, fire extinguishers and standpipes shall be as set forth in Chapter 38 and fire alarms shall be as set forth in Chapter 31.

1107.2 Chimneys, flues and vents shall be as set forth in Chapter 39.

1107.3 Heat-producing apparatus shall be as set forth in Chapter 40.

1107.4 The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto.

1107.5 Electrical installations shall be as required herein and as specified in Part XI.

1107.6 Transformer vaults shall be as set forth in Section 4101.

1107.7 The storage of flammable materials shall be as set forth in Chapter 41.

1107.8 Exhaust and dust collecting systems shall be provided on any single piece of equipment or power tool producing or generating combustible fibers, chips, shavings, and dusts and exceeding 2 H.P. or any quantity of equipment or power tools exceeding 5 H.P. Exhaust and collecting systems shall comply with the standards set forth in N.F.P.A. 91.

1107.9 Buildings shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

1107.10 Refer to Chapter 41 for Fire Protection for Marinas and Boat Yards, N.F.P.A. 303.

1108 PLUMBING AND SANITATION

1108.1 Plumbing shall be installed as set forth in Part XII.

1108.2 Sanitation shall be as set forth in Section 512 except that the requirements for facilities on upper storage floors of buildings of warehouse occupancy may be proportionately readjusted.

1109 MIXED OCCUPANCY

1109.1 Separation of Group F Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

1109.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 12
REQUIREMENTS OF GROUP G OCCUPANCIES

1201 GROUP G OCCUPANCY DEFINED
1202 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1203 LOCATION ON PROPERTY
1204 EGRESS FACILITIES
1205 LIGHT AND VENTILATION
1206 ENCLOSURE OF VERTICAL OPENINGS
1207 SPECIAL HAZARDS
1208 PLUMBING AND SANITATION
1209 MIXED OCCUPANCY

1201 GROUP G OCCUPANCY DEFINED

Group G Occupancy shall include mercantile and business uses as follows:

DIVISION 1: Mercantile occupancy shall include retail stores, shops, sales rooms, markets and similar uses.

DIVISION 2: Business occupancy, shall include office buildings, banks, civic-administration buildings, telephone exchanges, museums, art galleries, libraries and similar uses.

1202 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

1202.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group G, Division 1 and Division 2, because of use or occupancy, shall be limited in height and area as follows:

Type	Allowable Height	Basic Area
I	Not Limited	Not Limited
II	75 feet (5 stories)	45,000
III (Protected)	60 feet (4 stories)	20,300
III (Unprotected)	20 feet (1 story)	18,000
IV	(1 story)	13.500
V (Unprotected)	20 feet (1 story)	12,000

(b) See Section 514 for allowable area increases.

1202.2 SPECIAL PROVISIONS:

(a) Basements shall be of Type I Construction.

(b) Buildings on open lots, if used for the dispensing of gasoline, shall be as set forth in Paragraph 1102.2(a).

1203 LOCATION ON PROPERTY

1203.1 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

1204 EGRESS FACILITIES

1204.1 Stairs, means of egress and smoke proof enclosures shall be provided as set forth in Chapter 31. (See Section 3121 for specific requirements for Group G Occupancies).

1205 LIGHT AND VENTILATION

1205.1 All portions of Group G Occupancies customarily used by human beings shall have light and ventilation as set forth in Section 905.

1206 ENCLOSURE OF VERTICAL OPENINGS

1206.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

1206.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

1206.3 Atriums are permitted provided they comply with the requirements of Sec. 6-2 of NFPA-101 Code for Safety to Life from Fire in Buildings and Structures, and designed according to A6-2 of NFPA-101.

1207 SPECIAL HAZARDS

1207.1 Automatic sprinkler systems, fire extinguishers and standpipes shall be as set forth in Chapter 38 and fire alarms shall be as set forth in Chapter 31.

1207.2 Chimneys, flues and vents shall be as set forth in Chapter 39.

1207.3 Heat-producing apparatus shall be as set forth in Chapter 40.

1207.4 The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto.

1207.5 Electrical installations shall be as required herein and as specified in Part XI.

1207.6 Transformer vaults shall be as set forth in Section 4101.

1207.7 The storage of flammable materials shall be as set forth in Chapter 41.

1207.8 Buildings shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

1208 PLUMBING AND SANITATION

1208.1 Plumbing shall be installed as set forth in Part XII.

1208.2 Sanitation shall be as set forth in Section 512.

1209 MIXED OCCUPANCY

1209.1 Separation of Group G Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

1209.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 13
REQUIREMENTS OF GROUP H OCCUPANCIES

1301 GROUP H OCCUPANCY DEFINED
1302 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1303 LOCATION ON PROPERTY
1304 EGRESS FACILITIES
1305 LIGHT AND VENTILATION
1306 ENCLOSURE OF VERTICAL OPENINGS
1307 SPECIAL HAZARDS
1308 PLUMBING AND SANITATION
1309 MIXED OCCUPANCY

1301 GROUP H OCCUPANCY DEFINED

1301.1 Group H Occupancy shall include multiple-residential uses such as hotels, motels, apartment-hotels, apartment houses, bungalow courts, rooming houses, dormitories, fraternity houses, monasteries, and similar uses which provide accommodations for more than six persons, including group D, Division 3 occupancies.

1301.2 EXCEPTION: Single-family residence containing no more than three bedrooms where no more than two bedrooms are rented, said rooms used to house not more than two persons per bedroom, shall be included in Group I Occupancy.

1302 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

1302.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group H because of occupancy, shall be limited in height and area as follows:

Type	Allowable Height	Basic Area
I	Not Limited	Not Limited
II	75 feet (5 stories)	22,500
III (Protected)	60 feet (4 stories)	10,100
III (Unprotected)	20 feet (1 story)	9,000
V (Unprotected)	30 feet (2 stories)	7,875

(b) See Section 514 for allowable area increases.

(c) TOWNHOUSES: Multifamily structures in which all units are attached utilizing a common party wall between units shall comply with the requirements of I Occupancy, (Chapter 14) with a two-hour incombustible party wall conforming to Sec. 507.1(d) and having individual utility services for electrical, plumbing and mechanical systems connections made on the exterior of walls of each unit.

1302.2 Basements shall be of Type I Construction.

1302.3 In any new building of Group H Occupancy, every corridor shall be separated from guest rooms or separate apartments by a wall or partition having a minimum one-hour fire-resistive rating.

1303 LOCATION ON PROPERTY

1303.1 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

1304 EGRESS FACILITIES

1304.1 Stairs, means of egress and smoke proof enclosures shall be as set forth in Chapter 31. (See Section 3122 for specific requirements for Group H Occupancies).

1305 LIGHT AND VENTILATION

1305.1 GENERAL:

(a) (1) Rooms used for sleeping or living purposes shall be provided with light and ventilation by means of windows, transparent panels or doors, in exterior walls or roof with an area not less than 1/10 of the floor area of such rooms and ventilation by means of openings in exterior walls with a total area of not less than 1/20 of the floor area. Area of openings providing light shall be the square footage of the manufacturers window dimensions. Area of openings providing ventilation shall be the area of the screened openings.

(2) Other spaces for human occupancy such as lobbies, locker rooms, dining rooms, kitchens and toilet rooms shall be provided with light by means of windows as herein set forth or shall be provided with electric light as set forth in Chapter 45 and a mechanically operated ventilating system as set forth in Chapter 48.

(3) Hotels and motels shall comply with the light requirements in subparagraph (a)(1) above, but may have an HVAC unit capable of one complete change of air every 30 minutes as a substitute for the natural ventilation.

(b) Rooms used for sleeping and living purposes, where located as the first-occupied space below a roof, shall be protected from extreme temperatures.

(c) The floor area for an apartment shall be not less than required for applicable zoning regulations.

1305.2 MINIMUM DIMENSIONS:

(a) SLEEPING ROOMS:

(1) Rooms used for sleeping shall have a minimum width of eight feet and a minimum floor area within the immediate enclosing walls, exclusive of closets and toilets, of 100 square feet.

(2) Rooms, the floors of which are more than three feet below grade and which depend on natural ventilation, shall not be used for sleeping purposes.

(b) TOILET ROOMS: Toilet rooms shall have a minimum width of three feet and a minimum area of 15 square feet.

(c) CEILING HEIGHT:

(1) Habitable rooms, storage rooms and laundry rooms shall have a ceiling height of not less than 7'6" and no projection from the ceiling shall be less than 6'8" from the floor unless it is protected to prevent anyone walking into it.

(2) Hallways, toilet rooms, walk-in closets and kitchens shall have a ceiling height of not less than 7'-0" and no projection from the ceiling shall be less than 6'-8" from the floor.

(3) If any room in a building has a sloping ceiling, the minimum ceiling height is required in only one-half the area thereof but no portions of the room measuring less than five feet from the finished floor to the finished ceiling shall be included in the computation of the minimum area thereof.

(4) If any room has a furred ceiling, the minimum ceiling height is required in two-thirds the area thereof, but in no case shall the height of the furred ceiling be less than seven feet.

(5) All portions of a garage shall have an unobstructed headroom clearance of not less than six feet eight inches above the finish floor to any ceiling, beam, pipe, or similar construction except for wall-mounted shelves, storage surfaces, racks, or cabinets.

1306 ENCLOSURE OF VERTICAL OPENINGS

1306.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

1306.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded

as set forth in Section 516 of this Code.

1306.3 Atriums are permitted provided they comply with the requirements of Sec. 6-2 of NFPA-101-Code for Safety to Life from Fire in Buildings and Structures.

1307 SPECIAL HAZARDS

1307.1 Automatic sprinkler systems, fire extinguishers and standpipes shall be as set forth in Chapter 38 and fire alarms shall be as set forth in Chapter 31.

1307.2 Chimneys, flues and vents shall be as set forth in Chapter 39.

1307.3 Heat-producing apparatus shall be as set forth in Chapter 40.

1307.4 The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto.

1307.5 Electrical installations shall be as required herein and as specified in Part XI.

1307.6 Transformer vaults shall be as set forth in Section 4101.

1307.7 The storage of flammable materials shall be as set forth in Chapter 41.

1307.8 Buildings shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

1307.9 For Smoke Detector requirements see Sec. 3122.9.

1307.10 All shelving over domestic ranges and other fixed heating elements shall for gas burning ranges comply with NFPA 54-6.14, and for solid fuels, liquid fuels, and electric ranges shall be not less than 30" above or within 4" horizontally of the heating element.

1308 PLUMBING AND SANITATION

1308.1 Plumbing shall be installed as set forth in Part XII.

1308.2 Sanitation shall be as set forth in Section 512 except as follows:

(a) Toilet room floors and base shall be impervious materials.

(b) Toilet rooms serving a one-family-unit shall have outside openings screened with 18-mesh-wire screening, or comply Section 1305.1(a)(2).

(c) For occupancies with an occupant content of ten or more persons, separate facilities shall be provided for employees.

(d) Separate facilities consisting of a water closet, a lavatory, and a bath or shower shall be contiguous thereto and directly accessible from each hotel room.

(e) Lavatories may be relocated in rooms, provided there is no conflict with minimum requirements otherwise set forth herein.

1309 MIXED OCCUPANCY

1309.1 Separation of Group H Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

1309.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 14
REQUIREMENTS OF GROUP I OCCUPANCIES

1401 GROUP I OCCUPANCY DEFINED
1402 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1403 LOCATION ON PROPERTY
1404 EGRESS FACILITIES
1405 LIGHT AND VENTILATION
1406 ENCLOSURE OF VERTICAL OPENINGS
1407 SPECIAL HAZARDS
1408 PLUMBING AND SANITATION
1409 MIXED OCCUPANCY

1401 GROUP I OCCUPANCY DEFINED

1401.1 Group I Occupancy shall include:

(a) All single-family, duplex and townhouse uses.

(b) Dormitory, fraternity house and monastery uses when such buildings are used to house not more than six persons.

(c) Buildings classed as Group C Occupancy used to house not more than six students and the required supervisory personnel.

(d) Buildings classed as Group D, Division 2 Occupancy used to house not more than three inmates and the required supervisory personnel.

(e) Rooming houses operated in a single-family residence containing not more than three bedrooms only two of which are rented to not more than two persons per bedroom.

(f) Buildings classed as Group D, Division 3 Occupancy, used to house not more than six individuals and the required supervisory personnel.

(g) Family Day Care Homes providing children day care for not more than 10 children, including children legally residing therein.

1402 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

1402.1 GENERAL:

(a) Buildings, or parts of buildings, classed in Group I because of use or occupancy, shall be limited in height and area as follows:

Type	Allowable Height	Basic Area
I	Not Limited	Not Limited
II	45 feet (3 stories)	Not Limited
III (Protected)	45 feet (3 stories)	Not Limited
III (Unprotected) & IV	20 feet (1 story)	Not Limited
V (Unprotected)	20 feet (1 story)	Not Limited

(b) EXCEPTION: Type III (Unprotected) and Type V (Unprotected) may be three stories with maximum height of building not exceeding 30 feet in height without a fire-resistive floor system provided it is a single family residence, as defined in Section 401.

1403 LOCATION ON PROPERTY

1403.1 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as

set forth for the Type of Construction in Part V.

1404 EGRESS FACILITIES

1404.1 Stairs and means of egress shall be as set forth in Chapter 31. (See Section 3122 for specific requirements for Group I Occupancies).

1405 LIGHT AND VENTILATION

1405.1 GENERAL: Rooms used for sleeping and living purposes shall be provided with light and ventilation as set forth in Sub-section 1305.1.

1405.2 MINIMUM DIMENSIONS:

(a) SLEEPING ROOMS:

(1) Rooms used for sleeping shall have a minimum width of eight feet, and shall have a minimum floor area within the immediate enclosing walls, exclusive of closets and toilets, of 100 square feet.

(2) Where more than one sleeping room is provided in any one-family unit, additional sleeping rooms need be no larger than 80 square feet in area.

(b) TOILET ROOMS: Toilet rooms shall have a minimum width of three feet and a minimum area of 15 square feet.

(c) CEILING HEIGHT:

(1) Habitable rooms, storage rooms and laundry rooms shall have a ceiling height of not less than 7'6" and no projection from the ceiling shall be less than 6'8" from the floor unless it is protected to prevent anyone walking into it.

(2) Hallways, toilet rooms, walk-in closets and kitchens shall have a ceiling height of not less than 7'-0" and no projection from the ceiling shall be less than 6'-8" from the floor.

(3) If any room in a building has a sloping ceiling, the minimum ceiling height is required in only one-half the area thereof but no portions of the room measuring less than five feet from the finished floor to the finished ceiling shall be included in the computation of the minimum area thereof.

(4) If any room has a furred ceiling, the minimum ceiling height is required in two-thirds the area thereof, but in no case shall the height of the furred ceiling be less than seven feet.

(5) All portions of a garage shall have an unobstructed headroom clearance of not less than six feet eight inches above the finish floor to any ceiling, beam, pipe, or similar construction except for wall-mounted shelves, storage surfaces, racks, or cabinets.

1406 ENCLOSURE OF VERTICAL OPENINGS

1406.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

1406.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

1407 SPECIAL HAZARDS

1407.1 Chimneys, flues and vents shall be as set forth in Chapter 39.

1407.2 Heat-producing apparatus shall be as set forth in Chapter 40.

1407.3 Electrical installations shall be as required herein and as specified in Part XI.

1407.4 The storage of flammable materials shall be as set forth in Chapter 41.

1407.5 For Smoke Detector requirements see Sec. 3122.9.

1407.6 All shelving over domestic ranges and other fixed heating elements shall for gas burning ranges comply with NFPA 54-6.14, and for solid fuels, liquid fuels, and electric ranges shall not be less than 30" above or within 4" horizontally of the heating element.

1407.7 Buildings shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

1408 PLUMBING AND SANITATION

1408.1 Plumbing shall be installed as set forth in Part XII.

1408.2

(a) Sanitation shall be as set forth in Section 512.

(b) Toilet room floors and base shall be impervious materials.

(c) Toilet rooms shall have outside openings screened with 18-mesh-wire screen.

(d) Ample provision shall be made for the storage of waste within the lines of the lot or lots occupied.

1409 MIXED OCCUPANCY

1409.1 Separation of Group I Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

1409.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

CHAPTER 15
REQUIREMENTS OF GROUP J OCCUPANCIES

1501 GROUP J OCCUPANCY DEFINED
1502 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1503 LOCATION ON PROPERTY
1504 EGRESS FACILITIES
1505 LIGHT AND VENTILATION
1506 ENCLOSURE OF VERTICAL OPENINGS
1507 SPECIAL HAZARDS
1508 PLUMBING AND SANITATION
1509 EXCEPTIONS AND DEVIATIONS
1510 MIXED OCCUPANCY

1501 GROUP J OCCUPANCY DEFINED

Group J Occupancy shall be designed and constructed as set forth in Part VI of this Code, except as provided for elsewhere, and shall include:

DIVISION 1: Garages for four or less motor vehicles, porte-cocheres, and carports.

DIVISION 2: Tanks, towers and similar structures and fences.

DIVISION 3: Stadiums, reviewing stands, grandstands, enclosed grandstands, arenas and enclosed domed structures.

DIVISION 4: Cabanas and bath houses and similar structures.

DIVISION 5: Public and private swimming pools and buildings accessory thereto.

DIVISION 6: Solariums, sun decks and similar roofless structures.

DIVISION 7: Free-standing greenhouses, agricultural buildings and farm service buildings not for human habitation including those used for housing live stock, poultry, farm machinery, seed, feed and fertilizer.

DIVISION 8: Open storage yards including lumber yards and contractors' storage yards.

1502 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

GENERAL: Buildings and structures herein provided for under Divisions 3, 4, 5, 6 and 7, may be excluded from the requirements for impact resistibility, as required by Section 2315 of this Code, as long as the main wind force resisting system, and the components and cladding are designed and constructed in accordance with condition II, Table 9 of the ASCE 7-88.

1502.1 DIVISION 1:

Buildings, or parts of buildings, classed in Group J-1 because of use or occupancy, shall be limited to one story in height and 1000 square feet in area.

1502.2 DIVISION 2:

(a) Tanks and tower shall be designed and constructed as set forth in Part VI.

(b) Fences of wood shall be of decay and termite-resistive materials and shall be designed and constructed in accordance with Section 2915 of this Code. Fences may be of steel posts and wire. Fences may be of reinforced concrete or of masonry units or rock, but fences more than two feet high and of loose or casual masonry or rock shall not be permitted. Fences of masonry units shall be as set forth in Sub-section 2704.8.

(c) EXCEPTION: Fences for the enclosure of land used for agricultural purposes shall be exempt from the

requirements of this Sub-section.

1502.3 DIVISION 3:

(a) OPEN STRUCTURES AND PLACES OF OUTDOOR ASSEMBLY:

(1) Open stadiums, reviewing stands, grandstands, arenas and other places of outdoor assembly shall be as set forth herein and shall also comply with the Standard for Tents, Grandstands and Air-Supported Structures Used for Places of Assembly, NFPA 102, as set forth in Section 402, excepting that portion of the Standard referring to tents.

(2) Roofs shall be of incombustible construction or of heavy timber construction where the seating capacity exceeds 1000 persons.

(3) Where rooms or spaces within or above the roof structure are designed to be used by more than 10 persons essential to the operation of the facility or event for which persons are assembled, then the so occupied spaces and means of egress shall be of protected, incombustible construction and shall be of the Type of Construction set forth herein for the Occupancy they most nearly resemble.

(4) (aa) Spaces under grandstands and similar structures shall be kept free of extraneous, flammable material and shall not be occupied for other than protective or means of egress purposes, except that such space as is enclosed with construction surfaced with non-combustible materials and having not less than three-fourths-hour fire-resistance may be used for other purposes as approved by the Building Official.

(bb) A fully enclosed portable ticket booth, or similar portable structure of unprotected, incombustible construction, or heavy timber construction throughout, and not over 1000 square feet in area may be located under a grandstand where approved by the Building Official.

(5) Enclosed rooms or spaces under grandstands, or similar structures, shall be of the Type of Construction required for the Occupancy thereof but not less than one-hour fire-resistivity.

(b) ENCLOSED STRUCTURES:

(1) Sub-paragraphs 1502.3(a)(1) and (3) shall apply to enclosed structures, also.

(2) Grandstands or other structures which are fully enclosed, shall be of Type I, II or IV Construction except that seats may be of wood and roofs may be of unprotected, incombustible materials where such roofs are more than 10 feet above the topmost seats or 18 feet above the topmost floor.

(3) The main columns and beams supporting tiers and floors shall be protected by not less than one-hour fire-resistive construction.

1502.4 DIVISION 4: Buildings, or parts of buildings, classed in Division 4 of Group J Occupancy shall conform to the requirements based on location in the Fire Zone and shall be limited in height and area as set forth in Sub-section 1302.1.

(a) Gate-houses/Guard-houses intended, arranged, or designed to be occupied, shall be designed and constructed in accordance with Chapter 12, Requirements for Group G Occupancies, Division 2. Gate-houses/Guardhouses NOT intended, arranged, or designed to be occupied, shall be designed and constructed in accordance with Division 4 of the Chapter.

1502.5 DIVISION 5:

(a) Above-grade structures, accessory to pools, shall be limited in height and areas as the Group of Occupancy to which they are accessory.

(b) Swimming pools shall comply with the detailed requirements set forth in Chapter 50.

1502.6 DIVISION 6: Structures classed in Division 6 of Group J may be located on the roof of a building classed as Group D, F, G, H, or I occupancy. Framework and bracing shall be of incombustible materials. Horizontal canvas shall be limited to a total of 20 percent of the area for the roof of the building.

1502.7 DIVISION 7:

(a) Buildings or parts of buildings, classed in Division 7 of Group J Occupancy shall be limited to one story in height and may be of any Type of Construction.

(b) Ordinary glass may be used in the roofs and stalls of greenhouses provided the height at the ridge is less than 20 feet above grade. Greenhouses located in Fire Zone 1, or where the height at the ridge is 20 feet above grade, or where such building exceeds 5000 square feet in area, shall be of incombustible materials, including the frames of windows and skylights. Metal supporting members, including glass frames and sash bars, where less than 3/16 inch in thickness, shall be corrosion resistant.

(c) Buildings classed in Division 7 of Group J Occupancy where having a separation of 100 feet or more from all property lines and where located in an area zoned for agricultural use, may comply with the following requirements which are exceptions to requirements of this Code applicable to buildings of other uses:

(1) Deflection of any structural member or panel shall not exceed the limits set forth in Sub-section 2303.3.

(2) Sheet-metal roofing and siding shall have a minimum thickness of 29 U.S. Standard gauge.

(3) Aluminum roofing and siding shall be of not less thickness than 0.019 inches.

(4) Nonmetallic-sheathed cable may be used for lighting and receptacle circuits. Minimum number of outlets and maximum spacing requirements of Chapter 45 will not apply. Wiring shall be provided to meet specified loads.

(5) The specific requirements for water supply and sanitary waste disposal of Chapter 46 will not apply. Where plumbing is installed, it shall comply with Chapter 46.

1502.8 DIVISION 8:

(a) Lots classed in Division 8 of Group J shall be enclosed in a masonry wall, unpierced where abutting private property, and shall be not less than five feet in height, except that where combustible materials are stored, the height of such wall shall be not less than five feet nor less than the height of the material minus one-fifth of the distance from such wall to such stored combustible materials.

(b) EXCEPTION: The requirements of this Sub-section shall not supersede applicable zoning regulations.

1503 LOCATION ON PROPERTY

1503.1 Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

1504 EGRESS FACILITIES

1504.1 Stairs and means of egress shall be as set forth in Chapter 31. (See Section 3123 for specific requirements for Group J Occupancies).

1505 LIGHT AND VENTILATION

1505.1 DIVISION 1: Closed garages shall be provided with fixed louvers or screened openings through the exterior walls or doors at or near the floor level, the clear area of which shall be not less than 60 square inches per motor vehicle accommodated.

1505.2 DIVISIONS 3 and 4:

(a) All portions customarily used for human occupancy, shall have light and ventilation as provided in the Occupancy most suitably applicable.

(b) Lighting for means of egress and emergency lighting may be omitted when such occupancies are used only during daylight hours and where no artificial lighting is provided for the purpose of general use and occupancy.

1506 ENCLOSURE OF VERTICAL OPENINGS

1506.1 Vertical openings shall be enclosed as set forth in Part V, Types of Construction, and in Chapter 31.

1506.2 Vertical openings not required to be enclosed and abrupt differences in floor level shall be safeguarded as set forth in Section 516 of this Code.

1507 SPECIAL HAZARDS

1507.1 GENERAL:

(a) Automatic-sprinkler systems, fire extinguishers and standpipes shall be as set forth in Chapter 38.

(b) Chimneys, flues and vents shall be as set forth in Chapter 39.

(c) Heat-producing apparatus shall be as set forth in Chapter 40.

(d) The service of hazardous utilities shall be as set forth in Section 509 and other portions of this Code applicable thereto.

(e) Electrical installations shall be as required herein and as specified in Part XI.

(f) Transformer vaults shall be as set forth in Section 4101.

(g) The storage of flammable materials shall be as set forth in Chapter 41.

(h) Buildings and structures shall comply, where required, with Section 515, Facilities for the Physically Disabled and/or Handicapped.

1507.2 REQUIREMENTS BY DIVISION:

(a) DIVISION 1:

(1) Where more than three motor vehicles are stored in an enclosed garage, such building shall be equipped with an extinguisher or extinguishers providing not less than one unit of fire protection.

(2) Floors of porte-cocheres and carports attached to buildings of other than Group I Occupancies and floors of enclosed garages shall be of non-absorbent and incombustible material. Asphalt paving shall be permitted in porte-cocheres and carports of Group I Occupancy. When a porte-cochere or carport is enclosed for any purpose the floor shall conform to the requirements of the proposed use.

(3) A garage attached to a residence, shall be separated therefrom by one-hour fire-resistive construction. The only openings in such fire separations shall be: personnel doors not entering directly into bedrooms, air conditioning ducts and trap doors to attic spaces. Personnel doors shall be tight-fitting one and three-quarter inch (1 : ") thick solid wood core door in solid one and one-quarter inch (13") by four inch (4") rabbeted wood frame, or C-label metal door and jamb and such doors shall be equipped with automatic closers. Trap doors to attic spaces shall be fire-resistive. The floor of the main occupancy shall be not less than seven inches above the garage floor.

(4) Where any garage, porte-cochere or carport is located under another occupancy, the fire-resistive occupancy separation shall be as required in Table 5-A.

(b) DIVISION 3: The space under temporary structures of Division 3 of Group J Occupancy shall not be used for any purpose whatsoever.

(c) DIVISION 8: Where combustible materials are stored, yard hydrants shall be provided as set forth in Section 3806.

1508 PLUMBING AND SANITATION

1508.1 Plumbing shall be installed as set forth in Part XII.

1508.2 Sanitation shall be as set forth in Section 512 except that the requirements for sanitary fixtures may be proportionately adjusted for relatively small occupant loads, where Section 512 is not specific and where sanitary standards are suitably maintained.

1509 EXCEPTIONS AND DEVIATIONS

1509.1 DIVISION 2: Isolated tanks for the storage of liquids or gases, radio towers, flag poles and similar structures may be constructed of unprotected steel or iron, and tanks for the storage of water on the roofs of buildings may be of wood or unprotected steel, enclosed with walls and roof as required for the building.

1510 MIXED OCCUPANCY

1510.1 Separation of Group J Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

1510.2 Tenant separation shall be provided as set forth in Sub-section 507.2.

PART IV
REQUIREMENTS BASED ON LOCATION IN FIRE ZONES

CHAPTER 16
FIRE ZONES

1601 GENERAL
1602 FIRE ZONE 1
1603 FIRE ZONE 2
1604 FIRE ZONE 3

1601 GENERAL

1601.1 (a) FIRE ZONES DEFINED: For the purpose of this Code, the entire territory of jurisdiction is hereby declared to be, and is hereby established, a Fire District. Said Fire District shall consist of Fire Zones 1, 2, and 3. Any legally constituted governing authority within the area of jurisdiction of this Code may allocate and/or reallocate by legal procedure, all areas within its constituted limits as one or more of the above Fire Zones which, unless otherwise designated, shall be assumed to be Fire Zone 3.

(b) Areas may be designated as Fire Zones 1 or 2 only because of a hazard higher than normal to life safety, such as lack of fire lines, reasonable availability of fire apparatus, inability of fire apparatus to properly service area, or similar factors. Group of Occupancies shall not be designated as Fire Zones, thus circumventing Sec. 6 of Chapter 71-575, the Enabling Act of the South Florida Building Code.

1601.2 BUILDINGS LOCATED IN MORE THAN ONE FIRE ZONE: A building or structure which is located partly in one Fire Zone and partly in another shall be considered to be in the more highly restricted Fire Zone, when more than one-third of its total floor area is located in such Zone.

1601.3 MOVED BUILDINGS: Any building or structure moved within or into any Fire Zone shall be made to comply with all the requirements for new buildings in that Fire Zone.

1601.4 TEMPORARY BUILDINGS: Temporary buildings such as reviewing stands and other miscellaneous structures conforming to the requirements of this Code, and sheds, canopies, or fences used for the protection of the public around and in conjunction with construction work, constructed of any suitable materials, may be erected by special permit from the Building Official for a limited period of time, and such buildings or structures shall be completely removed upon the expiration of the time limit stated in such permits.

1601.5 ROOF COVERINGS: Roof coverings shall be required to be fire-retardant as set forth in Section 3401.

1601.6 ZONING REGULATIONS: Nothing in this Chapter shall be construed to nullify applicable zoning regulations governing materials or types of construction based on land use or location.

1602 FIRE ZONE 1

1602.1 Any existing building or structure in Fire Zone 1 that does not comply with the requirements for a new building erected therein, shall not hereafter be enlarged, altered, remodeled, repaired or moved except as follows:

(a) Such building may be entirely demolished.

(b) Such building may be moved outside the limits of Fire Zone 1.

(c) Changes, alterations and repairs may be made provided that in any 12-month period the value of the work does not exceed 20 percent of the value of the existing building, and provided that such changes do not add additional combustible material, and do not, in the opinion of the Building Official, increase the fire hazard.

(d) Additions thereto shall be separated from the existing building by fire walls, as set forth in Section 506.

1602.2 Fences and signs in Fire Zone 1 shall be constructed of incombustible materials except as follows:

(a) Non-electric flat wall signs in full contact with the wall may be as set forth in Sub-section 1812.5.

(b) Ground signs having a distance separation of 10 feet from any building.

(c) Property line fences with not less than 10 feet distance separation from all building lines unless otherwise required herein.

(d) Solar or privacy fences for court area use having distance separation of not less than 10 feet from the property line and which do not obstruct a required means of egress.

1602.3 Every building hereafter erected in Fire Zone 1 shall be of Type I, Type II or Type III construction and of not less than one-hour fire-resistive protection; except that open sheds attached to, and located outside of, the main exterior walls of a building otherwise complying with this Sub-section may be erected of exposed incombustible materials, provided such shed does not exceed 10 percent of the area of the building and provided that the omission of exterior walls of such open shed complied with Sub-section 1804.1.

1602.4 No incinerators shall be constructed or used in Fire Zone 1.

1603 FIRE ZONE 2

1603.1 Any existing building or structure in Fire Zone 2 that does not comply with the requirements for a new building erected herein shall not hereafter be enlarged, altered, remodeled, repaired or moved except as follows:

(a) Such building may be entirely demolished.

(b) Such building may be moved outside limits of Fire Zone 2.

(c) Changes, alterations and repairs may be made provided that in any 12-month period the value of the work does not exceed 20 percent of the value of the existing building, and provided that such changes do not add additional combustible materials, and do not, in the opinion of the Building Official, increase the fire hazard.

(d) Additions thereto shall be separated from the existing building by a fire wall as set forth in Section 506.

1603.2 Fences and signs in Fire Zone 2 shall be constructed of incombustible materials except as follows:

(a) Non-electric flat wall signs in full contact with the wall may be as set forth in Sub-section 1812.5.

(b) Ground signs having a distance separation of 10 feet from any building.

(c) Property line fences with not less than 10 feet distance separation from all building lines unless otherwise required therein.

(d) Solar or privacy fences for court area use having a distance separation of not less than 10 feet from the property line and which do not obstruct a means of egress.

1603.3 Every building hereafter erected in Fire Zone 2 shall be of Type I, Type II or Type III (protected) construction, except as follows:

(a) A building of Group H or I occupancy, or of Group F occupancy having a distance separation of not less than 30 feet may be of Type III (Unprotected) construction provided such building does not exceed 1500 square feet in area, or may be of Type IV or Type V construction provided such building does not exceed 1000 square feet in area.

(b) A building for Group J Occupancy may be of any type of construction permitted by this Code.

(c) Open sheds attached to and located outside of the main exterior walls of a building of exposed incombustible construction otherwise complying with this Sub-section may be erected of exposed incombustible construction provided such shed does not exceed 10 percent of the area of the building to which it is attached and further provided that the omission of exterior walls of such open shed complied with that set forth for the Type of Construction of the main building to which the open shed is attached.

1604 FIRE ZONE 3

1604.1 Any building complying with the requirements of this Code may be erected, constructed or moved into Fire Zone 3.

PART V
TYPES OF CONSTRUCTION

CHAPTER 17
CLASSIFICATION BY TYPES OF CONSTRUCTION

1701 CLASSIFICATION
1702 EXISTING BUILDINGS

1701 CLASSIFICATION

1701.1 The requirements of Part V are minimum for the various Types of Construction and are intended to represent varying degrees of public safety and resistance to fire. For the purpose of this Code, Type I shall be deemed to be the most fire-resistive and Type V the least fire-resistive Type of Construction.

1701.2 All buildings and structures shall be classified by the Building Official into one of the Types of Construction set forth in Chapters 18, 19, 20, 21, and 22. In order that a building or structure may be classified in any specific Type of Construction, it is necessary that all the requirements for that Type shall be at least equaled.

1701.3 No building or portion thereof shall be required to conform to the details of a Type of Construction higher than that Type which meets the minimum requirements based on "Location of Fire Zones" (Part IV) or "Occupancy" (Part III) even though certain features of such building actually conform to a higher Type of Construction.

1701.4 Where specific materials, types of construction or fire-resistive protection are required, such requirements shall be the minimum requirements, and any materials, types of construction or fire-resistive protection which will afford equal or greater public safety or resistance to fire as specified in this Code may be used, subject to the provisions of Section 204.

1701.5 Where two or more Types of Construction occur in the same building and are separated as required in Chapter 5, each portion so separated may be classified as of the Type of Construction to which it conforms; otherwise, the whole building shall be classified as of the least fire-resistive Type of Construction used and shall be subject to the restrictions imposed upon that Type.

EXCEPTION: Occupancies with basements of Type I construction need not meet the provisions of Sub-section 1701.5 when separated from the first floor by a floor or a floor/ceiling assembly and those structural members supporting and including the floor/ceiling assembly shall be a minimum of three (3) hour fire resistive construction.

1701.6 Minor accessory buildings of unprotected incombustible materials not exceeding 10 percent of the ground floor of the primary building, nor 1500 square feet, whichever is larger, may, where separated from the primary building as required in Chapter 5, be constructed without changing the fire-resistive classification of the primary building based on Type of Construction.

1702 EXISTING BUILDINGS

1702.1 An existing building which by its construction cannot be definitely classed as of Type I, II, III, IV, or V as defined in this Part shall be deemed, for the purpose of this Code, to belong to the least fire-resistive of the two Types to which it most nearly conforms.

CHAPTER 18
TYPE I BUILDINGS (Fire-Resistive)

1801 DEFINITION
1802 GENERAL
1803 STRUCTURAL FRAMEWORK
1804 WALLS AND PARTITIONS
1805 FLOORS
1806 ROOFS
1807 VERTICAL OPENINGS
1808 STAIRWAYS
1809 DOORS AND WINDOWS
1810 PROJECTIONS FROM THE BUILDING
1811 ROOF STRUCTURES AND SKYLIGHTS
1812 COMBUSTIBLE MATERIALS REGULATED

1801 DEFINITION

1801.1 Type I buildings and structures shall have a structural frame of steel, reinforced concrete, or masonry.

1801.2 Bearing walls, permanent non-bearing partitions, floors and roofs shall be of incombustible, fire-resistive construction except as otherwise set forth herein.

1802 GENERAL

1802.1 Allowable height and area shall be as set forth in Part III.

1802.2 Loads and material stresses shall be as set forth in Part VI.

1802.3 Buildings exceeding 50 feet in height shall also comply with Chapter 51 of this Code.

1803 STRUCTURAL FRAMEWORK

1803.1 The primary structural framework shall be of not less than the following fire-resistive construction.

(a) For buildings more than eight stories or 100 feet in height: exterior frame four hours, interior frame three hours.

(b) For buildings eight stories or 100 feet or less in height: exterior frame three hours, interior frame two hours.

(c) EXCEPTION: For buildings eight stories or 100 feet or less in height, exterior frame may have the fire-resistance as set forth for exterior walls in Sub-section 1804.1 but not less than two hours for buildings which exceed four stories or 50 feet nor less than one hour for buildings not exceeding four stories or 50 feet.

1803.2

(a) Unless specifically designed as a structural frame, the walls shall be considered as load-bearing and shall be constructed of masonry or reinforced concrete.

(b) Bearing walls shall be of fire-resistive construction as set forth in Section 1804 but not less fire-resistive than as set forth for the structural frame in Paragraph 1803.1(b).

(c) Bearing walls shall be designed as set forth in Section 2701.

1804 WALLS AND PARTITIONS

1804.1 EXTERIOR WALLS:

(a) MATERIALS: Exterior walls shall be of incombustible materials.

(b) DISTANCE SEPARATION: Distance separation as used in this Section shall be as defined in Section

401 of this Code.

(c) FIRE RESISTIVITY:

(1) Fire resistivity of exterior walls shall be determined by distance separation.

(2) Exterior walls of buildings, other than buildings of Group E Occupancy and parking garages, having a distance separation of not more than five feet shall be of four-hour fire-resistive construction; of more than five feet but not more than 10 feet, three-hour fire-resistive construction; of more than 10 feet but not more than 20 feet, two-hour fire-resistive construction; of more than 20 feet but not more than 30 feet, one-hour fire-resistive construction and where separated by more than 30 feet such walls shall be of incombustible materials or may be omitted, except that exterior bearing walls shall be not less fire-resistive than required for the structural frame.

(3) Exterior walls for buildings of Group E Occupancy shall be of four-hour fire-resistive construction.

(4) Exterior walls of buildings used for parking garages having a distance separation of from zero to 15 feet shall be of two-hour fire-resistive construction and where of 15 feet or more shall be of incombustible construction or may be omitted.

(5) Combustible materials may be used outside of the main exterior walls provided such materials comply with Section 1812.

(d) OPENINGS IN EXTERIOR WALLS:

(1) Openings in exterior walls shall be protected where required herein and protection shall comply with Section 3706.

(2) Exterior walls having a distance separation of five feet or less shall have no openings therein.

(3) Openings in exterior walls of buildings, other than Group E Occupancy or parking garages, having a distance separation of more than five feet but not more than 10 feet shall be limited in area to 30 percent of the wall area at any story with no single opening more than 10 percent of the wall area at any story and shall be protected by a fire assembly having a three-fourths-hour fire-resistive rating.

(4) Openings in exterior walls of buildings, other than Group E Occupancy or parking garages, having a distance separation of more than 10 feet but not more than 30 feet shall be limited in area to 50 percent of the wall area at any story.

(5) Openings in exterior walls of buildings of Group E Occupancy having a distance separation of from five to 30 feet shall be protected by a fire assembly having a three-fourths-hour fire-resistive rating and the total area of openings at any story shall be limited to 20 percent of the wall area at any story.

(6) Openings in exterior walls of parking garages having a distance separation of from five to 15 feet shall be protected by a fire assembly having a three-fourths-hour fire-resistive rating and the total area of openings at any story shall be limited to 50 percent of the wall area at any story.

(7) Openings in exterior walls of parking garages having a distance separation of more than 15 feet may be unprotected provided that where, in the opinion of the Building Official, a fire hazard or noise or light nuisance is thereby created and in such cases the Building Official may waive or vary the opening requirements.

(e) EXTERIOR WALLS WITHOUT OPENINGS: Buildings having exterior walls without openings shall be provided with access panels along street fronts and walls accessible for fire-fighting entrance to the building as follows:

(1) In buildings not exceeding 50 feet in height, access panels shall be in every story.

(2) Not less than one panel shall be located in each accessible wall and additional panels shall be provided so there shall be not more than 250 feet horizontally between such panels.

(3) Access panels shall be identified and easily openable and shall be exempt from safeguard requirements Sec. 516.

(4) The bottom of access panel shall be not higher than 36" and not lower than 26" above the floor level and, with panels removed, the openings shall be not less than 36" wide and 58" high.

(5) Exterior walls shall be considered accessible where a side or rear yard is a minimum of 10 feet in width and is permanently unobstructed.

1804.2 INTERIOR BEARING WALLS: Interior bearing walls shall be of incombustible materials and three-hour fire-resistive construction.

1804.3 FIREWALLS: Fire division walls shall comply with section 506 herein.

1804.4 PARTITIONS

(a) FIXED PARTITIONS:

(1) Fixed and permanent partitions shall be a minimum of one-hour fire-resistive construction and of incombustible materials and shall also comply with the requirements set forth in this Code for Fire Division Walls, Occupancy Separation, Tenant Separation, Vertical Enclosure and Exit Enclosure where applicable.

(2) Partitions dividing portions of stores, offices, apartments, rooms, or similar spaces occupied by one tenant only, may be constructed of:

(aa) Incombustible materials.

(bb) Fire-retardant treated wood.

(cc) Combustible materials with a minimum of one-hour fire-resistive construction.

(dd) Wood panels or similar light construction not to exceed three-fourths of the height of the room in which placed except that glass or approved plastic may close off the space to the ceiling.

(b) FOLDING, PORTABLE, OR MOVABLE PARTITIONS: Approved folding, portable or movable partitions need not be of fire-rated construction provided:

(1) Such partitions do not block access to exits and do not establish a corridor serving as an exit and do not create a corridor serving as an access to an exit for more than 50 persons.

(2) Such partitions are restricted to location by means of permanent tracks, guides, or other approved methods.

(3) Areas divided by such partitions shall include swinging egress doors where the occupant content of the enclosed area exceeds 25 persons.

(4) Flammability shall be limited to materials having a flame-spread classification as set forth herein for interior finishes.

1805 FLOORS

1805.1 MATERIALS:

(a) Floor systems shall be of incombustible materials. Poured-in-place concrete slabs shall be not less than 22 inches thick where tile, metal decking or similar form-structural element is to remain as a permanent component of the structure.

1805.2 FIREPROOFING: Floors for buildings more than eight stories or 100 feet in height shall be of not less than three-hour fire-resistive construction, and for buildings eight stories or 100 feet or less in height shall be of not less than two-hour fire-resistive construction.

1805.3 CEILING PLENUMS:

(a) Plenums and other spaces above a ceiling shall be divided into horizontal areas not exceeding 10,000 square feet by draft stops from ceiling to deck above.

(b) Draft stops shall be of one-half inch thick gypsum wall board, 22 gage sheet metal or one-fourth inch transits and shall be tight-fitted.

(c) Where multiple plenums are used for air movements, openings between plenums shall be protected with smoke dampers, except where the plenums are used for an engineered smoke removal system, smoke dampers shall not be required.

(d) (1) Attic access openings shall be provided in the ceiling of the top floor of buildings with combustible ceiling or roof construction.

(2) Such openings shall be located in a corridor or hallway of buildings of three or more stories in height and readily accessible in buildings of any height.

(3) Access openings shall be not less than 20 inches wide and four square feet in area.

(4) 30-inch minimum clear head room shall be provided above access openings.

(5) Attics with a maximum vertical clear height of less than 30 inches need not be provided with access openings.

(e) When ceiling area is provided with an engineered smoke evacuation system, draft stops in the ceiling area are not required.

1806 ROOFS

1806.1 MATERIALS: Roof systems shall be incombustible materials. Poured-in-place, concrete slabs shall be not less than 22 inches thick where removable forms are used nor less than 2 inches thick where tile, metal decking or similar form-structural element is to remain as a permanent component of the structure.

1806.2 FIREPROOFING: Roofs for buildings more than eight stories or 100 feet in height shall be of not less than three-hour fire-resistive construction, and for buildings eight stories or 100 feet or less in height shall be of not less than two-hour fire-resistive construction, except:

(a) Roofs, where every part of the structural framework is 20 feet or more above any part of any floor, balcony, or gallery, need not be fireproofed.

(b) Roofs, where every part of the structural framework is more than 15 feet and less than 20 feet above any part of any floor, balcony or gallery, shall be not less than one-hour fire-resistive construction.

1806.3 ROOF COVERINGS: Roof coverings shall comply with Chapter 34 of this Code.

1806.4 ROOF DRAINAGE:

(a) Where parapets or curbs are constructed above the level of the roof, provisions shall be made to prevent rain water from accumulating on the roof in excess of that considered in the design in the event the rain water drains or leaders become clogged.

(b) Where roofs are not designed in accordance with Paragraph 1806.4(a), overflow drains or scuppers shall be placed to prevent an accumulation of more than four inches of water on any portion of the roof.

(c) Drains or scuppers installed to provide the overflow drainage shall be not less in aggregate area than three times the area of down spouts or leaders, but of not less dimension than two inches.

(d) All roofs shall be designed with a minimum slope at a maximum deflection plus 1/8" per foot to assure adequate drainage.

1806.5 CEILING PLENUMS: Plenums and other spaces above a ceiling shall be provided with draft stops and access where and as required by Sub-section 1805.3.

1807 VERTICAL OPENINGS

1807.1 GENERAL:

(a) ENCLOSURE REQUIRED: Every vertical opening within the enclosing wall of a building and communicating between floor levels is required to be enclosed or protected to prevent the spread of fire and smoke except as unenclosed openings are specifically permitted.

(1) Every light shaft, vent shaft, chute, pipe chase or other vertical opening not otherwise specifically herein defined shall be enclosed as set forth in Sub-section 1807.2.

(2) Stairways and ramps shall be enclosed where and as required in Section 3108.

(3) Elevators, escalators and transporting assemblies shall be enclosed as set forth in this Section and in Chapter 32.

(4)A Court, any part of which is used as a means of egress from a building, shall comply with Sub-section 3108.6.

(b) (1) UNENCLOSED OPENINGS PERMITTED: In any building with low hazard contents, or with ordinary hazard contents with complete automatic fire-sprinkler protection for the floors involved, provided that between areas of such buildings there are not more than three communicating floor levels, the lowest or next to lowest level is the street floor, or not more than two communicating floors with the stairways not a required means of egress or exit, and providing all of the following conditions are met:

(aa) The Occupancy is Group A; Group B; Group F, Division 2; Group G, or Group H.

(bb) The entire area, including all communicating floor levels, is sufficiently open and unobstructed so that fire or other hazardous condition in any part will be immediately apparent to the occupants of all such levels and areas.

EXCEPTION: Where fire or other hazardous conditions are not immediately apparent to the occupants in the entire area, an early warning smoke detector system shall be installed throughout the entire common area.

(cc) The exit capacity is sufficient to provide simultaneously for all the occupants of all communicating levels and areas; all communicating levels in the same fire area being considered as a single floor area for the purpose of determining the required exit capacity.

(dd) Each floor level, considered separately, has at least one-half of the individual required exit capacity provided by an exit or exits leading directly out of that area without traversing another communicating floor level or being exposed to the spread of fire or smoke therefrom.

(ee) All other requirements of this Code with respect to interior finish, protection from other hazards, construction and other provisions are fully observed.

(2) In Special Purpose Occupancies, as provided in Sub-section 1102.3 of this Code.

(c) SAFEGUARDS: Vertical barriers shall be provided as safeguards at abrupt differences in levels as set forth in Section 516 of this Code.

1807.2 SHAFT ENCLOSURES:

(a) Shafts, ducts, chutes and other vertical openings extending through less than four stories of a building shall be enclosed in walls of incombustible materials having a fire-resistive rating of not less than one hour except as otherwise set forth herein.

(b) Shafts, ducts, chutes and other vertical openings extending through four or more stories of a building shall be enclosed in walls of incombustible materials having a fire-resistive rating of not less than two hours except as otherwise set forth therein.

(c) Pipes of approved materials passing through floors, walls, or enclosed in wall cavities need not be in enclosed shafts provided the requirements of Sub-section 3705.2 are met and the area around such pipes is effectively sealed at each floor or wall penetration with material having a fire-resistive rating equivalent to the rating of the floor or wall to prevent the passage of fire and smoke.

(d) Heating and ventilating shafts need not be enclosed where such ducts extend through less than four stories of a buildings, where the ducts are of sheet metal of not less than No. 26 US Standard gauge, and where ducts are provided with fire dampers at each floor.

(e)A shaft that does not extend to the bottom of the building shall be enclosed at the lowest point with floor construction as required for the building but not less than one-hour fire-resistive.

(f) (1) Shaft enclosures which extend into the top story of a building shall be carried to at least the under side of the roof, except that linen chutes may terminate in a room or space enclosed with partitions. Trash chutes shall extend (full size) at least four feet above the roof of the building and be vented.

(2) Shaft enclosures extending above the roof shall have enclosing walls equivalent to that required for inner court walls of such a building and may open at the top or have skylights or windows as set forth in Paragraph 1807.3(b).

(3) A shaft that does not extend into the top story of a building shall have the top enclosed with a form of construction equal to that required for the enclosing walls of the shaft.

1807.3 SHAFT OPENINGS:

(a) Shaft enclosures shall have no openings other than those necessary for the purpose of the shaft.

(b) Openings in shaft enclosures shall be protected by a fire-assembly as set forth in Chapter 37.

1807.4 LAUNDRY CHUTES:

(a) Laundry chutes shall not have openings into any enclosed means of egress but may open into an enclosed area, room or closet separated from the enclosed means of egress by a self-closing fire assembly or may open onto an exterior balcony.

(1) EXCEPTION: This requirement shall not apply to Group 1 Occupancies (private dwellings).

(2) The self-closing fire-assembly shall not be required in Group H Occupancies if such separate room or closet is protected by automatic sprinklers.

(b) Laundry chutes shall be protected by automatic sprinklers as set forth in Sub-section 3801.1.

(c) Laundry chutes shall be enclosed as set forth in Sub-section 1807.2 with openings protected as set forth in Sub-section 1807.3.

1807.5 TRASH CHUTES:

(a) Trash chutes shall not have openings into any enclosed means of egress but may open into an enclosed area, room, or closet separated from the enclosed means of egress by a self-closing fire assembly.

(b) Trash chutes having openings to an enclosed space shall open into a room separated from other enclosed rooms by a self-closing fire-assembly.

(c) Trash chutes and rooms shall be protected by automatic sprinklers as set forth in Sub-section 3801.4.

Trash chute wastes shall be classified as follows:

Type of Waste	Nature of Waste	Flue Gas Production at 1400 F. in Cubic Ft. per Min. Per Lb. of Refuse
0	**Paper Trash**	**10.74**
1	**Mixed Trash & Refuse**	**8.40**
2	**Apt. House Refuse**	**5.94**
3	**Garbage-Restaurants, Hospitals, etc.**	**4.92**
4	**Human or Animal Remains**	**4.12**

(e) Metal trash chutes shall be made of stainless steel, galvanized steel, or aluminum-coated steel with no screws, rivets, or other projections on the interior surface and laps or joints shall be designed so that liquid will

drain to the interior of such chutes and as follows:

(1) Chutes handling Type 2 or Type 3 wastes, or a combination of both, shall be of not less thickness than 16 gage except the upper six stories may be of 18 gage.

(2) Chutes handling wastes other than Type 2 or Type 3 shall be of not less thickness than 14 gage.

(3) Such chutes shall be of not less thickness than as indicated herein.

(f) Metal chutes may be lined with firebrick (ASTM Type G, low duty or the equivalent) not less than 22 inches thick. Unlined steel chutes shall be equipped with automatic sprinklers and the outlet of the chute shall be equipped with a self-closing steel door held open by a fusible link.

(g) Trash chutes may be made of listed medium-heat chimney sections approved for this use.

(h) Trash chutes other than masonry chutes shall be enclosed in all stories above the storage or compacting room with walls of continuous incombustible construction having a fire-resistance rating as set forth in Sub-section 1807.2.

(i) All service openings into a rubbish chute shall be provided with a self-closing, self-latching, bottom-hinged, hopper-type door approved for Class B openings and having a rating of not less than 1 hour with "Temperature rise: 30 Min. -250 F. Max." The door frame shall be firmly built into the chute and the design and installation shall be such that no part of the frame or door will project into the chute.

(j) The daylight area of each service opening shall be not more than one-half of the cross-sectional area of the chute.

(k) The size of the chute shall be not less than 222" x 222" or 24 inches in diameter inside measurement.

1807.6 FLUE-FED OR DIRECT-FED INCINERATOR: Flue-fed or direct-fed incinerators and incinerator chutes within buildings are prohibited.

1807.7 ATRIUM: A vertical openings within a building that communicates between floors, is enclosed by a roof at its highest point and is bound by enclosing walls a minimum of 30 feet apart.

1808 STAIRWAYS

1808.1 Stairways shall be as required in Part III and Chapter 31.

1808.2 Stairs, stair platforms, treads and risers shall be constructed of incombustible materials. Unprotected steel or iron stairways may be used only when enclosed.

1809 DOORS AND WINDOWS

1809.1 Doors, windows and similar openings in exterior walls, fire walls and enclosure walls shall be protected or entirely prohibited as set forth in this Chapter, Chapter 31, or in Occupancy, Part III.

1809.2 Doors and windows shall not project over public property or restricted areas except as provided in Chapter 36.

1810 PROJECTIONS FROM THE BUILDING

1810.1

(a) Cantilevering projections outside of the main exterior walls of the building shall be of incombustible materials and of not less than one-hour fire-resistive construction except as otherwise set forth in Sub-section 1812.5.

(b) Canopies and marquees outside of the main exterior walls of the building but not cantilevered from the building, shall be constructed of incombustible materials, except as otherwise set forth in Sub-section **1812.5** but need not have fire-resistive protection.

1810.2 Artificial projections shall be limited as set forth in Sub-section 1812.5 and Chapter 36.

1811 ROOF STRUCTURES AND SKYLIGHTS

1811.1 Towers, pylons, masts, signs, and similar structures above a roof, when not enclosed, shall be of incombustible materials.

1811.2 Any enclosed roof surface having a floor area of more than 15 square feet shall be constructed as required for the main portion of the building.

1811.3 Minor roof structures having an area of 15 square feet or less, housing ventilating shafts or similar openings shall be constructed of incombustible materials.

1811.4 Water storage tanks and cooling towers may be of wood.

1811.5 Storage tanks, having a capacity of over 500 gallons shall not be located over stairways or elevators.

1811.6 Skylights shall be constructed of incombustible materials, and transparent or translucent materials shall be fire-resistive.

1811.7 Where required to control rain runoff, a curb not less than eight inches in height shall be provided.

1811.8 Where the public has access to roof areas, safeguards as set forth in Section 516 of this Code shall be provided.

1812 COMBUSTIBLE MATERIALS REGULATED

Combustible materials shall be permitted for the following uses unless otherwise specifically prohibited.

1812.1 Show-window bulkheads shall be of incombustible materials, but show cases and other movable appurtenances of stores or other buildings may be of wood.

1812.2 Trim, picture molds, furniture and permanent seats, chair rails, wainscoting, baseboards, furring strips and blocking, handrails, show window backing, temporary partitions as provided in Sub-section 1804.4, floor finishes and sleepers may be of combustible materials. Wood doors, windows, or frames, or other approved materials, may be used except where fire-resistive protection is required.

EXCEPTION: Wood doors complying with Table 31-C may be used where fire-resistive protection is required.

1812.3 Loading platforms, and roofs over loading platforms, for warehouses, freight depots and buildings of similar use may be of heavy timber construction provided such heavy timber construction does not penetrate the exterior walls.

1812.4 Interior finishes shall be as set forth in Section 3708.

1812.5

(a) (1) Decorative, non-structural materials of wood (including shakes and shingles) and metal, plastic or fiber-glass trim, tile or panels may be applied to the outside of exterior walls, to cornices, architectural appendages, eave overhangs and similar projections. Where an exterior wall is required to be fire-resistive, such materials shall be separated from the interior of the building by the vertical extension of the exterior wall as set forth in Paragraph 1812.5(b). Such materials shall have a distance separation of not less than 60 feet in Fire Zone No. 1 and not less than 20 feet in other Fire Zones.

(2) Distance separation shall be measured horizontally from the projection.

(3) Combustible materials shall be as set forth in Sub-paragraph 1812.5(b).

(b) Combustible exterior trim, cornices, architectural appendages, eave overhangs and similar projections, where an exterior wall is required to be fire-resistive, shall have the fire-resistive rating required for the exterior wall or shall be separated from the interior of the building by the vertical extension of the exterior wall to the bottom of the roof deck, or as a parapet where a parapet is otherwise required herein, with a fire-resistive rating as required for the exterior wall.

(c) Structural framework and supports shall be of incombustible materials where required by Type of Construction.

(d) An awning, a lean-to, a shed roof or similar roof in whole or in part, supported from the surface below may be of combustible materials as set forth in this Sub-section.

1812.6 Open-air parking garages in buildings in excess of one story shall have no combustible materials of construction, except when fully sprinkled may have exposed pipes and conduits of P.V.C. materials. Fire sprinkler piping must comply with N.F.P.A. 13. One story open-air parking garages may have exposed pipes and conduits of P.V.C. material without being sprinkled unless located under another occupancy.

1812.7 COMBUSTIBLE PIPE:

(a) Installed within shafts constructed according to Sub-section 1807.2.

(b) Installed within partitions according to Sub-section 3704.2 and Section 1804.4(2) (cc).

(c) CPVC materials for water distribution and wet fire sprinkler systems installed according to manufacturers' specifications.

CHAPTER 19
TYPE II BUILDINGS (Semi-Fire-Resistive)

1901 DEFINITION
1902 GENERAL
1903 STRUCTURAL FRAMEWORK
1904 WALLS AND PARTITIONS
1905 FLOORS
1906 ROOFS
1907 VERTICAL OPENINGS
1908 STAIRWAYS
1909 DOORS AND WINDOWS
1910 PROJECTIONS FROM THE BUILDING
1911 ROOF STRUCTURES AND SKYLIGHTS
1912 COMBUSTIBLE MATERIALS REGULATED

1901 DEFINITION

1901.1 Type II buildings and structures shall have a structural frame of steel, reinforced concrete, or masonry.

1901.2 Bearing walls, permanent non-bearing partitions, floors and roofs shall be of incombustible, fire-resistive construction except as otherwise set forth herein.

1902 GENERAL

1902.1 Allowable height and area shall be as set forth in Part III except as otherwise set forth herein.

1902.2 Loads and material stresses shall be as set forth in Part VI.

1902.3 Required fireproofing shall be as set forth in Chapter 37.

1902.4 Buildings exceeding 50 feet in height shall also comply with Chapter 51 of this Code.

1903 STRUCTURAL FRAMEWORK

1903.1 The primary structural framework shall be of not less than three-hour fire-resistive construction for members in exterior walls and of not less than one-hour fire-resistive construction for members of the interior frame except that members in the exterior walls may have the fire protection set forth in Sub-section 1904.1 but, where exceeding one-story in height, shall be of not less than one-hour fire-resistive construction.

1903.2

(a) Unless specifically designed as a structural frame, the walls shall be considered as load-bearing and shall be constructed of masonry or reinforced concrete.

(b) Bearing walls shall be of fire-resistive construction as set forth in Section 1904 but not less fire-resistive than as set forth for the structural frame in Sub-section 1903.1.

(c) Bearing walls shall be designed as set forth in Section 2701.

1904 WALLS AND PARTITIONS

1904.1 Exterior walls and openings therein shall be as set forth in Sub-section 1804.1.

1904.2 Fire Division walls shall comply with Section 506 herein.

1904.3 Interior bearing walls shall be of incombustible one-hour fire-resistive construction.

1904.4 Partitions shall be of not less than one-hour fire-resistive construction except as provided in Sub-section 1804.4.

1905 FLOORS

1905.1 MATERIALS:

(a) Floors shall be of incombustible materials.

1905.2 FIREPROOFING: Floors and all parts thereof shall be not less than one-hour fire-resistive construction, except that where the space under a ground floor has clearance of less than three feet, such fire protection for the ground floor may be omitted.

1905.3 CEILING PLENUMS: Plenums and other spaces above a ceiling shall be provided with draft stops and access where and as required by Sub-section 1805.3.

1906 ROOFS

1906.1 MATERIALS: Roofs shall be incombustible materials.

1906.2 FIREPROOFING: Roofs and all parts thereof shall be of not less than one-hour fire-resistive construction, except as follows:

(a) Roofs, where every part of the structural framework is 20 feet or more above any part of the floor, balcony, or gallery, may be of unprotected, incombustible material.

(b) Roofs of one-story open sheds not more than 75 percent enclosed by walls, not of Group E occupancy, and in which the travel distance to the nearest exit does not exceed 40 feet, may be of unprotected incombustible materials.

1906.3 ROOF COVERINGS: Roof coverings shall comply with Chapter 34 of this Code.

1906.4 ROOF DRAINAGE: Where parapets or curbs are constructed above the level of the roof, design and construction for roof drainage shall be as set forth in Sub-section 1806.4.

1906.5 CEILING PLENUMS: Plenums and other spaces above a ceiling shall be provided with draft stops and access where and as required by Sub-section 1805.3.

1907 VERTICAL OPENINGS

1907.1 Vertical openings shall be enclosed, protected and constructed as set forth in Section 1807.

1908 STAIRWAYS

1908.1 Stairways shall be as required in Part III and Chapter 31.

1908.2 Stairs, stair platforms, treads and risers shall be constructed of incombustible materials. Unprotected steel or iron stairways may be used only when enclosed.

1909 DOORS AND WINDOWS

1909.1 Doors, windows and similar openings in exterior walls, fire walls and enclosure walls shall be protected or entirely prohibited as set forth in this Chapter, Chapter 31, or in Occupancy, Part III.

1909.2 Doors and windows shall not project over public property or restricted areas except as provided in Chapter 36.

1910 PROJECTIONS FROM THE BUILDING

1910.1

(a) Cantilevering projections outside of the main exterior walls of the building shall be of incombustible materials or fire retardant wood complying with Section 2914 and shall be of not less than one-hour fire-resistive construction except as otherwise set forth in Sub-section 1912.5.

(b) Canopies and marquees outside of the main exterior walls of the building but not cantilevered from the building, shall be constructed of incombustible materials or fire retardant treated wood complying with Section 2914 but need not have fire-resistive protection.

1910.2 Artificial projections shall be limited as set forth in Sub-section 1912.5 and Chapter 36.

1911 ROOF STRUCTURES AND SKYLIGHTS

1911.1 Towers, pylons, masts, signs, and similar structures above a roof, when not enclosed, shall be of incombustible materials. Roof structures extending more than 25 feet above the roof or signs more than 100 square feet in area shall be supported to the ground by an incombustible frame.

1911.2 Roof structures shall extend not more than 20 feet above the roof, and any enclosed roof structure having a floor area of more than 15 square feet shall be constructed as required for the main portion of the building.

1911.3 Minor roof structures having an area of 15 square feet or less, housing ventilating shafts or similar openings shall be constructed of incombustible materials.

1911.4 Water storage tanks and cooling towers may be of wood.

1911.5 Storage tanks, having a capacity of over 500 gallons shall not be located over stairways or elevators.

1911.6 Skylights shall be constructed of incombustible materials, and transparent or translucent materials shall be fire-resistive.

1911.7 Where required to control rain runoff, a curb not less than eight inches in height shall be provided.

1911.8 Where the public has access to roof areas, safeguards as set forth in Section 516 of this Code shall be provided.

1912 COMBUSTIBLE MATERIALS REGULATED

1912.1 Combustible materials shall be permitted except where specifically prohibited in this Chapter or in Occupancy, Part III.

1912.2 Combustible materials may be used within concealed spaces in accordance with the provisions of Sections 3505 and 3709.

1912.3 Loading platforms for warehouses, freight depots and similar buildings may be of heavy timber construction, with wood floors not less than one and five-eighths inches thick.

Such wood construction shall not be carried through the exterior walls.

1912.4 Interior finishes shall be as set forth in Section 3708.

1912.5 Decorative, non-structural combustible materials may be applied to the outside of the exterior walls, to fascia and soffits as set forth in Sub-section 1812.5.

1912.6 Open-air parking garages in buildings in excess of one-story and all enclosed parking garages, regardless of number of stories shall have no combustible materials of construction, except when fully sprinklered may have exposed pipes and conduits of Pvc, CPVC and polybuthylene materials. Fire sprinkler piping shall comply with N.F.P.A. standards. The piping material will be fire stopped in accordance with the other applicable sections of this Code. One story open-air parking garages may have exposed pipes and conduits of the above materials without being sprinklered unless located under another occupancy.

1912.7 COMBUSTIBLE PIPE:

(a) Installed within shafts constructed according to Sub-section 1807.2.

(b) Installed within partitions according to Sub-section 3704.2 and Section 1804.4(2) (cc).

(c)CPVC materials for water distribution and wet fire sprinkler systems installed according to manufacturers' specifications.

CHAPTER 20
TYPE III BUILDINGS (Ordinary Masonry)

2001 DEFINITION
2002 GENERAL
2003 STRUCTURAL FRAMEWORK
2004 WALLS AND PARTITIONS
2005 FLOORS
2006 ROOFS
2007 VERTICAL OPENINGS
2008 STAIRWAYS
2009 DOORS AND WINDOWS
2010 PROJECTIONS FROM THE BUILDING
2011 ROOF STRUCTURES AND SKYLIGHTS
2012 COMBUSTIBLE MATERIALS REGULATED

2001 DEFINITION

2001.1

(a) Type III buildings or structures shall have an exterior structural frame of steel or reinforced concrete, or shall have exterior load-bearing walls of incombustible, fire-resistive construction; or shall be heavy timber construction if not exceeding two stories in height.

(b) Type III buildings or structures shall have an interior structural frame of steel, reinforced concrete, wood, or interior load-bearing walls of incombustible materials or wood.

(c) Partitions, floors and roof framing may be of wood.

2001.2

(a) Type III (Protected) buildings shall have all interior bearing walls, bearing partitions, ceilings, floors and columns of not less than one-hour fire-resistant construction, or shall be of heavy timber construction except that the fire protection of floors may be omitted as specified in Sub-section 2005.2, and interior non-bearing walls shall comply with sub-section 2004.3(b).

(b) Type III (Unprotected) buildings shall have columns of not less than one-hour fire-resistive construction and may have interior walls, ceilings and floors of unprotected steel and wood or concrete. Interior bearing walls shall be fire protected as specified in Sub-section 2004.3. Floors shall be fire protected as specified in Sub-section 2005.2.

2002 GENERAL

2002.1 Allowable height and area shall be as set forth in Part III.

2002.2 Loads and material stresses shall be as set forth in Part VI.

2002.3 Required fireproofing shall be as set forth in Chapter 37.

2003 STRUCTURAL FRAMEWORK

2003.1

(a) The primary structure shall be designed as a structural frame or the exterior walls shall be considered as load-bearing.

(b) Where designed as a structural frame, the materials shall be as set forth in Sub-section 2001.1.

(c) Where designed as load-bearing walls, the materials shall be as set forth in Sub-section 2001.1 and 2001.2.

(d) The interior structural support shall be of steel, reinforced concrete, wood or bearing walls of incombustible materials or wood studs.

(e) Bearing walls shall be designed as set forth in Section 2701.

2003.2 FIREPROOFING:

(a) Fireproofing shall be as required in Part III, Occupancy, or in this Chapter, or in Chapters 39 and 40, and where required or where otherwise referred to in this Code as being protected, the structural framework or supports shall be of not less than one-hour fire-resistive construction except that members in the exterior walls shall have the fire protection as set forth in Sub-section 2004.1.

(b) All steel members supporting masonry in buildings over one story in height shall be fire-protected with not less than one-hour fire-resistive construction.

(c) Heavy-timber structures, designed and constructed as set forth in Sub-section 2003.3 shall be considered the equivalent of one-hour fire-resistive protection.

2003.3 HEAVY TIMBER CONSTRUCTION:

(a) GENERAL: Heavy timber construction is that type in which fire resistance is attained by placing limitations on minimum sizes of wood structural members including the thicknesses and compositions of wood floors and roofs and by the use of approved fastenings and construction details.

(b) HEAVY TIMBER FRAMING:

(1) COLUMNS:

(aa) Wood columns may be sawn or glued laminated and shall be not less than 8-inch nominal in depth when supporting roof loads only.

(bb) Columns shall be continuous or directly superimposed, one above the other with no girders or bolsters between columns, throughout all stories by means of reinforced concrete or metal caps with brackets, or shall be connected by properly designed steel or iron caps, with pintles and base plates, or by timber splice plates affixed to the column by means of metal connectors housed within the contact faces, or other approved methods.

(2) FLOOR FRAMING: Beams, girders and joists may be sawn or glued laminated and shall be not less than 6-inch nominal in width and 8-inch nominal in depth. Framed or glued laminated arches which spring from the floor line and support floor loads shall be not less than 8-inch nominal in any dimension. Framed timber trusses supporting floor loads shall have members of not less than 8-inch nominal in any dimension.

(3) ROOF FRAMING: Beams, girders and joists may be sawn or glued laminated and shall be not less than 6-inch nominal in least dimension. Framed members or glued laminated arches which spring from the floor line and do not support floor loads shall have members of not less than 6-inch nominal in width and 6-inch nominal in depth for the lower half of the height and not less than 6-inch nominal in any dimension for the upper half of the height. Framed members or glued laminated arches which spring from the top of walls or wall abutments, framed timber trusses, and other roof framing which does not support floor loads, shall have members not less than 4-inch nominal in width and 6-inch nominal in depth. Spaced members may be composed of two or more pieces not less than 3-inch nominal in thickness when an automatic fire extinguisher system is installed in the building as set forth in Chapter 38 or when the space between parallel elements is solidly filled or is tightly closed for the full length on the underside thereof with a wood cover plate of 2-inch nominal thickness. Splice plates shall be of no less than 3-inch nominal in thickness.

(4) CONSTRUCTION DETAILS: Wall plate boxes of self-releasing type or approved hangers shall be provided where beams and girders enter masonry. An air space of 2-inch shall be provided at top, end and sides of members unless approved durable or treated wood is used. Girders and beams shall be cross-tied to each other, or inter-tied by caps, to transfer horizontal loads across the joint. Wood bolsters may be placed on top of

columns which support roof loads only. Intermediate beams used to support floors shall rest on top of girders or be supported on approved metal hangers which transmit the vertical load to the top of the girder. Columns, beams, girders, arches and trusses of material other than wood shall have a fire-resistive rating of not less than one hour. Wood beams and girders supported by masonry walls shall have not less than 4 inches of solid masonry between their ends and the outside face of the wall. Roof anchors shall be provided as set forth in Chapter 29 but not less than required to resist the loads set forth in Chapter 23. Where distance separation of 20 feet or more is provided wood columns and arches may be used in exterior walls.

(5) HEAVY TIMBER FLOORS: Floors shall be without concealed spaces. Floors may be of sawn or glued laminated plank, splined or tongue and grooved, of not less than 3-inch nominal thickness, or square edged plank not less than 4-inch nominal thickness well spiked together. Planks shall be laid so that a continuous line of joints will not occur except at points of support. Planks shall be covered with one-inch nominal tongue and grooved flooring laid crosswise, or diagonally. Planks and floor shall not extend closer than 2-inch to wall to provide an expansion joint and such expansion joint shall be covered at top and bottom.

(6) HEAVY TIMBER ROOF DECKS: Roofs shall be without concealed spaces and decks shall be sawn or glued laminated, splined or tongue and grooved plank, not less than 2-inch nominal in thickness or of square edge plank not less than 3-inch nominal thickness well spiked together or of a double thickness of one inch nominal tongue and groove boards with staggered joints or of 1 1/8-inch nominal tongue and grooved plywood bonded with exterior glue.

2003.4 COMBINED ROOF AND WALL:

(a) Where the roof and wall are an integral structural element such as, but not limited to, an arch, dome, mansard, gambrel, continuous slope or A-frame extending downward to grade or to the top of a vertical wall, all portions of such integral structural element, other than a vertical wall of separate construction arrangement, shall be considered a part of the roof and shall comply with the requirements set forth herein for roofs.

(b) Where the roof cantilevers over the exterior wall, where a separate fascia and soffit is attached to the exterior of the wall, or where a combination of such construction arrangement is provided, that construction outside of the exterior wall shall be regulated by and comply with Sub-section 1812.5 herein.

2004 WALLS AND PARTITIONS

2004.1 Exterior walls and openings therein shall be as set forth in Sub-section 1804.1 except that main exterior non-bearing walls of buildings other than Group E, having a distance separation of 30 feet may be of unprotected incombustible construction, fire-retardant treated wood or plastics as set forth in Section 3505 with no limit on the area of openings, or such walls may be omitted.

2004.2 Fire Division walls shall be of incombustible materials and shall also comply with Section 506 herein.

2004.3 INTERIOR WALLS AND PARTITIONS

(a) Interior bearing walls shall be of a minimum one-hour fire-resistive construction.

(b) Interior permanent partitions shall comply with paragraph 1804.4(a)(1), and partitions within spaces occupied by one tenant only shall comply with paragraph 1804.4(a)(2), except that in both sections studs may be of wood without fire-retardant treatment and in 1804.4(a)(2) may be wood partition without one-hour fire-rated construction.

2005 FLOORS

2005.1 MATERIALS:

(a) Floors shall be of incombustible materials or wood.

(b) Wood post and girder construction shall not be permitted for a ground floor and spaces under ground floors shall have the clearance and ventilation as set forth in Section 2913.

(c) Access openings shall be provided to all space under the building as set forth in Sub-section 2913.3.

2005.2 FIREPROOFING: Floors and all parts thereof of Type III buildings shall be of not less than one-hour fire-resistive construction, except that where a ground floor has clearance of less than three feet, or the second and third floor of any Group H and I Occupancy not exceeding three stories in height and occupied as a single family tenant, such fire protection may be omitted for floors.

2005.3 CEILING PLENUMS:

(a) Plenums and other spaces above a ceiling of incombustible material shall be divided into horizontal areas not exceeding 10,000 square feet by draft stops from ceiling to deck above. See Sec. 2006.5(b) for combustible materials.

(b) Draft stops shall be of one-half inch thick gypsum wall board, 22-gage sheet metal or one-fourth inch transite and shall be tight-fitted.

(c) Where multiple plenums are used for air movement, openings between plenums shall be protected.

(d) When ceiling area is provided with an engineered smoke evacuation system, draft stops in the ceiling area are not required.

2006 ROOFS

2006.1 MATERIALS: Roofs shall be incombustible materials or wood.

2006.2 FIREPROOFING: Roofs and all parts thereof of unprotected Type III buildings located in Fire Zones 1 and 2, and roofs and all parts thereof of protected Type III buildings shall be not less than one-hour fire-resistive construction except as follows:

(a) Roofs, where every part of the structural framework is 18 feet or more above any part of any floor, may be of unprotected incombustible materials or of heavy timber, as specified in Sub-section 2003.3.

(b) Roofs of one-story open sheds not more than 75 percent enclosed by walls, not of Group E Occupancy and in which the travel distance to the nearest exit does not exceed 40 feet, may be of unprotected combustible materials, except that in Fire Zones 1 and 2, such roof shall be of unprotected incombustible materials or protected combustible materials.

(c) Exterior soffits of wood trussed roofs need not have a fire resistance rating, provided:

(1) The soffits are without occupiable space above and are constructed of a minimum thickness of 5/8-inch Portland cement plaster over metal lath, applied in accordance with the requirements of Chapter 35, and

(2) Roofs vents openings in the soffits are located at the outboard edge, and, wherever possible, placed so as not to be directly in-line with window openings, and

(3) The soffit or portion thereof would not be required to have a fire rating based on the requirements of 3104.6 for construction of corridors and exterior balconies.

2006.3 ROOF COVERINGS: Roof coverings shall comply with Chapter 34 of this Code.

2006.4 ROOF DRAINAGE: Where parapets or curbs are constructed above the level of the roof, design and construction for roof drainage shall be as set forth in Sub-section 1806.4.

2006.5 ATTIC SPACES AND SPACES ABOVE A CEILING:

(a) Attic spaces shall not be required, but where attic spaces are provided, such spaces shall comply with Sec. 1805.3(d).

(b) Where unprotected, combustible material is exposed, the plenum or attic space shall be divided into horizontal areas not exceeding 3,000 square feet by draft stops from ceiling to deck above. Draft stops shall be tight-fitted and shall be of the materials set forth in Sub-section 2005.3, or shall be of one-half inch fire-retardant treated plywood. Where the plenum or attic space is fully sprinklered horizontal area may be increased to 10,000 square feet.

(c) Where only incombustible materials are exposed, the plenum or attic space shall be divided into horizontal areas not exceeding 10,000 square feet as set forth in Sub-section 2005.3.

(d) Tenant separation complying with Sub-section 507.2 may serve as a draft stop but the horizontal area shall be limited to the provisions of this Sub-section.

(e) Attic access shall comply with Sub-section 1805.3(d).

(f) When ceiling area is provided with an engineered smoke evacuation system, draft stops in the ceiling are not required.

2007 VERTICAL OPENINGS

2007.1 Vertical openings shall be enclosed, protected and constructed as set forth in Section 1807.

2008 STAIRWAYS

2008.1 Stairways shall be as required in Part III and Chapter 31.

2008.2 Stairways may be constructed of incombustible materials or wood except where combustible materials are specifically prohibited in Part III or Chapter 31.

2009 DOORS AND WINDOWS

2009.1 Doors, windows and similar openings in exterior walls, fire walls and enclosure walls shall be protected or entirely prohibited as set forth in this Chapter, Chapter 31, or in Occupancy, Part III, and such protection shall be as specified in Chapter 37.

2009.2 Doors and windows shall not project over public property or restricted areas except as provided in Chapter 36.

2010 PROJECTIONS FROM THE BUILDING

2010.1 Cantilevering projections outside of the main exterior walls of the building shall be of incombustible materials or fire-retardant wood complying with Section 2914 or fire-resistive as specified in this Chapter, with the following exceptions:

(a) Combustible materials shall be permitted as specified in Sub-section 2012.5.

(b) The projection of wood rafters of Group H and I Occupancies over private property shall be permitted.

2010.2 Architectural projections shall be limited as set forth in Sub-section 2012.5 and Chapter 36.

2011 ROOF STRUCTURES AND SKYLIGHTS

2011.1 Towers, pylons, masts, signs, and similar structures above a roof, when not enclosed, shall be of incombustible materials. Roof structures extending more than 25 feet above the roof or signs more than 100 square feet in area shall be supported to the ground by an incombustible frame.

2011.2 Roof structures, including bulkheaded areas, shall be limited in total combined area to 30 percent of the area of the roof, shall not extend more than 20 feet above the allowable height, and any enclosure having a floor area of more than 15 square feet shall be constructed as required for the main portion of the building.

2011.3 Minor roof structures having an area of 15 square feet or less, housing ventilating shafts or similar openings shall be constructed of incombustible materials.

2011.4 Water storage tanks and cooling towers may be of wood.

2011.5 Storage tanks, having a capacity of over 500 gallons shall not be located over stairways or elevators.

2011.6 Skylights shall be constructed of incombustible materials, and transparent or translucent materials shall be fire-resistive.

2011.7 PARAPETS

(a) Parapets shall be required on exterior walls except:

(1) Where the roof is of incombustible, fire-resistive construction.

(2) Where the walls of buildings for other than Group H and I Occupancy are 20 feet or more from the building line of a contiguous lot or any building on the same lot.

(3) Where the building is of Group H or I Occupancy.

(4) Where the structures are cabanas, open bars, locker rooms or small retail shops which are of accessory use.

(b) Parapets shall be not less than 20 inches above the roof immediately adjacent thereto and shall be constructed as set forth in Chapter 27 or Section 2004.

(c) Where required to control rain water runoff, a curb not less than eight inches in height shall be provided where parapets are not required.

2011.8 Where the public has access to roof areas, safeguards as set forth in Section 516 of this Code shall be provided.

2012 COMBUSTIBLE MATERIALS REGULATED

2012.1 Combustible materials shall be permitted except where specifically prohibited in this Chapter or in Occupancy, Part III.

2012.2 Combustible materials may be used within concealed spaces in accordance with the provisions of Sections 3505 and 3709.

2012.3 Loading platforms for warehouses, freight depots and similar buildings may be of heavy timber construction, with wood floors not less than one and five-eighths inches thick. Such wood construction shall not be carried through the exterior walls.

2012.4 Interior finishes shall be as set forth in Section 3708.

2012.5 Decorative structural and non-structural combustible materials may be applied to the outside of the exterior walls, fascia and soffits as set forth in Sub-section 1812.5.

CHAPTER 21
TYPE IV BUILDINGS (Incombustible)

2101 DEFINITION
2102 GENERAL
2103 STRUCTURAL FRAMEWORK
2104 WALLS AND PARTITIONS
2105 FLOORS
2106 ROOFS
2107 DOORS AND WINDOWS
2108 PROJECTIONS FROM THE BUILDING
2109 ROOF STRUCTURES AND SKYLIGHTS
2110 COMBUSTIBLE MATERIALS REGULATED

2101 DEFINITION

2101.1 All structural and other elements of Type IV buildings shall be of incombustible materials.

2101.2 All structural and other elements of Type IV buildings of open-air parking garage Occupancy shall be of concrete, steel or masonry.

2102 GENERAL

2102.1 Allowable height and area shall be as set forth in Part III.

2102.2 Loads and material stresses shall be as set forth in Part VI.

2102.3 Required fireproofing shall be as set forth in Chapter 37.

2103 STRUCTURAL FRAMEWORK

2103.1 The structural framework shall be of steel, aluminum, or reinforced concrete, and fireproofing of structural members shall be required only when such members are a part of an exterior wall as set forth in Sub-section 2104.1.

2104 WALLS AND PARTITIONS

2104.1

(a) Distance separations shall be measured at right angles from the wall or opening to the building line of a contiguous lot or any building on the same lot.

(b) Where a building line varies by the use of the land, the building line of a contiguous lot shall be taken as that for the use of which requires the least set back from the property line but in no case taken as more than five feet from the parallel to the common lot line.

2104.2 Main exterior walls shall be of incombustible materials and such walls shall be of fire-resistive construction with opening protection where located as follows:

(a) Main exterior walls having a distance separation of less than five feet, or walls except on street fronts which are less than five feet from the building line of a contiguous lot, shall be of not less than two-hour fire-resistive construction and have no openings therein.

(b) Main exterior walls having a distance separation of from five to ten feet shall be of not less than one-hour fire-resistive construction and openings therein shall be protected by fire assemblies having a three-fourths-hour fire-resistive rating and the total area of openings in any story shall be limited to 30 percent with no single

opening more than 10 percent of such wall area.

2104.3 Fire Division walls shall be of incombustible materials and shall also comply with Section 506 herein.

2104.4 Interior bearing walls and all partitions shall be of incombustible materials and shall be fire-resistive where required based on Fire Division Walls, Occupancy Separation, Tenant Separation, Vertical Enclosure and Exit Enclosure where applicable.

2105 FLOORS

2105.1 Floors shall be of incombustible materials, and a wood-wearing surface shall be permitted.

2106 ROOFS

2106.1 Roofs shall be of any incombustible material, and fireproofing shall not be required.

2106.2 Roof coverings shall be as set forth in Chapter 34.

2106.3 ROOF DRAINAGE: Where parapets or curbs are constructed above the level of the roof, design and construction for roof drainage shall be as set forth in Sub-section 1806.4.

2106.4 CEILING PLENUMS: Plenums and other spaces above a ceiling shall be provided with draft stops and access as required by Sub-section 1805.3.

2107 DOORS AND WINDOWS

2107.1 Doors, windows, and similar openings in exterior walls and fire walls shall be protected or entirely prohibited as set forth in this Chapter, Chapter 31, or in Occupancy, Part III.

2107.2 Doors and windows shall not project over public property or restricted areas except as provided in Chapter 36.

2108 PROJECTIONS FROM THE BUILDING

2108.1 Projections from the building shall be of incombustible materials and as set forth in Chapter 36.

2109 ROOF STRUCTURES AND SKYLIGHTS

2109.1 Roof structures may extend above the allowable height not to exceed 20 feet and shall be of incombustible materials.

2109.2 Skylights shall be constructed of incombustible materials, and transparent or translucent materials shall be fire-resistive.

2109.3 Where the public has access to roof areas, safeguards as set forth in Section 516 of this Code shall be provided.

2110 COMBUSTIBLE MATERIALS REGULATED

2110.1

(a) A loading platform may be constructed of heavy timber construction with wood floors not less than one and five-eighths inches thick.

(b) A Type IV building or structure erected over such platform shall be supported by incombustible materials to the foundation.

2110.2 Open-air parking garages in buildings in excess of one-story shall have no combustible materials of construction, except when fully sprinklered may have exposed pipes and conduits of P.V.C. materials. Fire sprinkler piping must comply with N.F.P.A. One story open-air parking garages may have exposed pipes and conduits of P.V.C. material without being sprinklered unless located under another occupancy.

CHAPTER 22
TYPE V BUILDINGS (Wood Frame)

2201 DEFINITION
2202 GENERAL
2203 WALLS AND PARTITIONS
2204 FLOORS
2205 ROOFS
2206 FIREPROOFING
2207 STAIRWAYS
2208 DOORS AND WINDOWS
2209 PROJECTIONS FROM THE BUILDING
2210 COMBUSTIBLE MATERIALS REGULATED

2201 DEFINITION

2201.1 Type V construction is construction in which the exterior bearing and non-bearing walls and partitions, floors and roofs and their supports are wholly or partly of wood or other approved materials.

2201.2

(a) Type V (Protected) buildings shall have the structural framework, exterior bearing walls, exterior non-bearing walls, interior bearing walls, floor, roof, and ceiling assemblies of not less than one-hour fire-resistive construction.

(b) Type V (Unprotected) buildings shall have interior and exterior bearing walls supporting floors, and the floors and columns of not less than one-hour fire-resistive construction.

2202 GENERAL

2202.1 Allowable height and area shall be as set forth in Part III.

2202.2 Loads and material stresses shall be as set forth in Part VI.

2202.3 Required fireproofing shall be as set forth in Chapter 37.

2203 WALLS AND PARTITIONS

2203.1 DISTANCE SEPARATION

(a) Distance separation shall be measured at right angles from the wall or opening to the building line of a contiguous lot or any building on the same lot.

(b) Where a building line varies by the use of the land, the building line of a contiguous lot shall be taken as that for the use which requires the least set back from the property line but in no case taken as more than five feet from the parallel to the common lot line.

2203.2 Main exterior walls shall be of incombustible materials or wood and such walls shall be of fire-resistive construction with opening protection where located as follows:

(a) Main exterior walls having a distance separation of less than five feet, or walls except on street fronts which are less than five feet from the building line of a contiguous lot, shall be of not less than two-hour fire-resistive construction and have no openings therein.

(b) Main exterior walls having a distance separation of from five to ten feet shall be of not less than one-hour fire-resistive construction and openings therein shall be protected by fire assemblies having a three-fourths-hour fire-resistive rating and the total area of openings in any story shall be limited to 30 percent with no single

opening more than 10 percent of such wall area.

2203.3 Fire Division walls shall be of incombustible materials and shall also comply with Section 506 herein.

2203.4 All interior bearing walls shall be a minimum of one-hour fire-resistive construction, and all partitions shall be fire-resistive where required based on Fire Division Walls, Occupancy Separation, Tenant Separation, Vertical Enclosure and Exit Enclosure where applicable.

2204 FLOORS

2204.1 Floors shall be of steel, concrete or wood.

2204.2 Wood posts shall not be permitted under a girder supporting a ground floor and spaces under ground floors shall have the clearance and ventilation as set forth in Section 2913.

2204.3 Access openings shall be provided to all space under the building as set forth in Sub-section 2913.3.

2205 ROOFS

2205.1

(a) Roofs of Type V Unprotected Construction shall be of noncombustible materials, wood or plastics in accordance with the provisions of Section 3505.

(b) Roofs of Type V Protected Construction shall be of not less than 1-hour fire resistive construction.

EXCEPTION: Exterior soffits of Type V Protected Construction need not have a fire resistance rating, provided:

(1) The soffits are without occupiable space above and are constructed of a minimum thickness of 5/8-inch Portland cement plaster over metal lath, applied in accordance with the requirements of Chapter 35, and

(2) Roof vents openings in the soffits are located at the outboard edge, and, whenever possible, placed so as not to be directly in-line with window openings, and

(3) The soffit or portion thereof would not be required to have a fire rating based on the requirements of 3104.6 for construction of corridors and exterior balconies.

2205.2 Roof coverings shall be as set forth in Chapter 34.

2205.3 ROOF DRAINAGE: Where parapets or curbs are constructed above the level of the roof, design and construction for roof drainage shall be as set forth in Sub-section 1806.4.

2205.4 ATTIC SPACES: Attic spaces shall comply with Sub-section 2006.5.

2205.5 Where the public has access to roof areas, safeguards as set forth in Section 516 of this Code shall be provided.

2206 FIREPROOFING

2206.1 Bearing walls supporting floors, and floors, shall not be less than one-hour fire-resistive construction, except that where a ground floor has clearance of less than three feet, or the second floor of any Group H and I Occupancy not exceeding two stories in height and occupied as a single family tenant, such fire protection may be omitted for floors.

2207 STAIRWAYS

2207.1 Stairways shall be as required in Part III and Chapter 31.

2207.2 Stairways may be of incombustible or combustible materials.

2208 DOORS AND WINDOWS

2208.1 Doors, windows, and similar openings in exterior walls and fire walls shall be protected or entirely prohibited as set forth in this Chapter, Chapter 31, or in Occupancy, Part III.

2208.2 Doors and windows shall not project over public property or restricted areas except as provided in Chapter 36.

2209 PROJECTIONS FROM THE BUILDING

2209.1 Projections from the building may be of wood.

2210 COMBUSTIBLE MATERIALS REGULATED

2210.1 No materials more combustible than wood shall be permitted in the construction of permanent portions of Type V buildings.

2210.2 Combustible materials may be used within concealed spaces in accordance with the provisions of Sections 3505 and 3709.

PART VI
ENGINEERING AND CONSTRUCTION REGULATIONS

CHAPTER 23
DESIGN LOADS

2301 SCOPE
2302 DEFINITIONS AND STANDARDS
2303 DESIGN
2304 MINIMUM LOADS
2305 SPECIAL LOAD CONSIDERATIONS
2306 LOAD COMBINATIONS
2307 ROOF LIVE LOADS
2308 LIVE LOAD REDUCTIONS
2309 WIND LOADS
2310 LIVE LOADS POSTED
2311 OCCUPANCY PERMITS
2312 FOUNDATION DESIGN
2313 WAVE FORCE DESIGN
2314 LOAD TESTS
2315 IMPACT TESTS FOR WINDBORNE DEBRIS
2316 IMPACT TEST PROCEDURES

2301 SCOPE

2301.1 This Chapter prescribes general engineering design requirements and design loads applicable to all construction regulated by this Code.

2301.2 APPLICATION: The design of all construction regulated by this Code shall be based upon not less than the minimum loads and design criteria set forth in this Chapter.

2302 DEFINITIONS AND STANDARDS

2302 DEFINITIONS: For the purpose of this Chapter, certain terms are defined as follows:

(a) BEACH: The zone of unconsolidated material that extends landward from the mean low water line to the place where there is a marked change in material or physiographic form, or to the line of permanent vegetation, usually the effective limit of storm waves. "BEACH" is alternately termed "SHORE".

(b) BREAK-AWAY OR FRANGIBLE WALL: A wall independent of supporting structural members that will withstand design wind forces, but will fail under hydrostatic wave, and run-up forces associated with the design storm surge. Under such conditions, the wall will fail in a manner such that it dissolves or breaks up into components that will minimize the potential for damage to life or adjacent property. Break-away wall collapse shall result from a water load less than that which would occur during the base flood.

(c) BUILDING SUPPORT STRUCTURE: Any structure which supports floor, wall, or column loads and transmits them to the foundation, including beams, grade beams or joists, and includes the lowest horizontal structural member exclusive of piles, columns, or footings.

(d) COASTAL BARRIER ISLANDS: Geological features which are completely surrounded by marine waters that front upon the open waters of the Atlantic Ocean or the Straits of Florida, and which are composed of quartz sands, clays, limestone, oolites, rock, coral, coquina, sediment, or other material, including spoil disposal, which features lie above the line of mean high water. Mainland areas which were separated from the mainland by artificial canalization for the purpose of assisting marine commerce shall not be considered coastal

barrier islands.

(e) COASTAL BUILDING ZONE:

(1) The land area from the seasonal high water line A to a line 1,500 feet landward of the coastal construction control line established pursuant to Section 161.053, Florida Statutes.

(2) For those locations for which no coastal construction control line has been established, the coastal building zone shall be defined as that land area seaward of the most landward velocity zone (V-Zone) line as established by the Federal Emergency Management Agency (F.E.M.A.) and shown on flood insurance maps.

(3) On coastal barrier islands, the Coastal Building Zone shall be defined as the land area from the seasonal high water line to a line 5,000 feet landward from the coastal construction control line, or the entire island, whichever is less.

(4) On coastal barrier islands for which no coastal construction control line has been established, the Coastal Building Zone shall be the land area seaward of the most landward velocity zone (V-Zone) boundary line fronting upon the Atlantic Ocean or the Straits of Florida.

(f) COASTAL CONSTRUCTION CONTROL LINE (C.C.C.L.): Defines that portion of the beach and dune system which is subject to severe fluctuations based on a one-hundred year storm surge.

(g) COASTAL OR SHORE PROTECTION STRUCTURE: Shore-hardening structures, such as seawalls, bulkheads, revetments, rubble, mound structures, groins, breakwaters and aggregates of materials other than beach sand used for shoreline protection; beach and dune restoration; and other structures which are intended to prevent erosion or protect other structures from wave and hydrodynamic forces.

(h) HABITABLE MAJOR STRUCTURE: Habitable major structures include houses, mobile homes, apartment buildings, condominiums, motels, hotels, restaurants, towers, other types of residential, commercial or public buildings, and other construction having the potential for substantial impact on coastal zones.

(i) MEAN HIGH WATER LINE: Shall mean the intersection of the tidal plane of mean high water with the shore. Mean high water is the average height of high waters over a 19 year period.

(j) MINOR STRUCTURE: Shall include, but shall not be limited to, dune and beach walkover structures; beach access ramps and walkways; stairways; elevated viewing platforms; and gazebos and boardwalks; driveways; parking areas; shuffleboard courts; tennis courts; handball courts; racquetball courts; and other uncovered paved areas; earth retaining walls and sand fences; privacy fences; ornamental walls; ornamental garden structures; aviaries and other ornamental construction. It shall be a characteristic of minor structures that they are considered to be expendable under design wave and storm surge forces.

(k) N.G.V.D.: Shall mean National Geodetic Vertical Datum, Geodetic Datum established by the National Ocean Service and frequently referred to as the 1929 Mean Sea Level Datum.

(l) NON-HABITABLE MAJOR STRUCTURE: Includes, but is not limited to, swimming pools, pipelines, docks and piers, canals, lakes, ditches, drainage structures and other water retention structures, water and sewage treatment plants, electrical power plants, transmission lines, distribution lines, transformer pads, vaults and substations, roads, bridges, streets and highways and underground storage tanks.

(m) SAFETY FACTOR: A factor that account for unavoidable deviations of the actual strength from the nominal value and the manner and consequences of failure. This definition is the same as resistance factor as defined in ASCE 7 With Commentary.

2302.2 (a) MANDATORY STANDARD: ASCE 7 With Commentary, American Society of Civil Engineers minimum design loads for buildings and other structures, except as otherwise noted in this Code.

(b) MANDATORY STANDARDS: For the coastal construction zone the following standards, adopted as set forth in Section 402 of this Code, shall be considered mandatory for buildings and structures located wholly or partially within the coastal construction zone, as defined in Sub-section 2302.1.

(1) Title 44 Code of Federal Regulations (C.F.R.) parts 59 and 60, National Flood Insurance Regulations.

(2)ASCE 7 With Commentary, American Society of Civil Engineers minimum design loads for buildings and other structures, except as otherwise noted in this Code.

(3) Chapter 161, Beach and Shore Preservation, parts, I, II, and III, Florida Statute, 1989.

(c) REFERENCE STANDARDS: Assistance in determining the design parameters and methodologies necessary to comply with the coastal construction requirements of this Chapter and seaward of the Coastal Construction Zone may be obtained from the following references adopted as set forth in Section 402 of the Code:

(1) Navel Facilities Engineering Command Deign Manual, NAV-FAC DM-26, U.S. Department of the Navy.

(2) Shore Protection Manual, U.S. Department of Army Corps of Engineers.

(3) U.S. Department of the Army Coastal Engineering Research Center Papers and Reports.

(4) Technical Design Memoranda of the Division of Beaches and Shores, Florida Department of Natural Resources.

(5) Coastal Construction Manual, Federal Emergency Management Agency.

(6)ASCE 7 With Commentary, American Society of Civil Engineers minimum design loads for buildings and other structures, except as otherwise noted in this Code.

(d) All buildings or structures which extend wholly or partially seaward of the Coastal Construction Control or 50 foot setback shall be designed in accordance with this Code and with the rules of the Department of Natural Resources, Division of Beaches and Shores, Chapter 16B-33, Rules and Proceeds for Coastal Construction and Excavation (Permits for construction seaward of the Coastal Construction Control Line and fifty foot setback).

2303 DESIGN

2303.1 GENERAL DESIGN REQUIREMENTS:

(a) Any system, method of design or method of construction shall admit of a rational analysis in accordance with well-established principles of mechanics and sound engineering practices.

(b) Buildings, structures and all parts thereof shall be designed and constructed to be of sufficient strength to support the estimated or actual imposed dead, live, impact, wind and any other loads, both during construction and after completion of the building or structure, without exceeding the allowable materials stresses specified by this Code.

(c) No building structure, or part thereof shall be designed for live loads less than those specified in this chapter or ASCE 7 With Commentary, except as otherwise noted in this Code.

(d) The live loads set forth herein shall be assumed to include the ordinary impact but where loading involves unusual impact, provisions shall be made by increasing the assumed live loads.

(e) In the design of floors, not less than the actual live load to be imposed shall be used. Special provisions shall be made for machine or apparatus loads where applicable.

(f) Floor and roof systems shall be designed and constructed to transfer horizontal forces to such parts of the structural frame as are designed to carry these forces to the foundation. Where roofs or floors are constructed of individual prefabricated units and the transfer of forces to the building frame and foundation is totally or partially dependent on such units, the units and their attachments shall be capable of resisting applied loads in both vertical and both horizontal directions. Where roofs or floors are constructed of individual prefabricated units and the transfer of forces to the building frame and foundation is wholly independent of such units, the units and their attachments shall be capable of resisting applied load normal to the surface, in and out.

(g) Any conflict between ASCE 7 With Commentary and this Code, the most stringent shall apply.

2303.2 GENERAL DESIGN FOR SPECIFIC OCCUPANCIES AND STRUCTURES:

(a) GROUP F OCCUPANCY: Public garages and commercial or industrial buildings of group F occupancy in which passenger cars or loaded trucks are placed, used or stored shall have floor systems designed to support the maximum concentrated wheel load placed in any possible position.

(b) GROUP J OCCUPANCY:

(1) SWAY FORCES:

(aa) The sway force applied to seats in stadiums, grandstands, bleachers and reviewing stands shall be not less than 24 pounds per lineal foot per row, applied parallel to the rows of seats.

(bb) Sway forces shall be applied simultaneously with gravity loads.

(cc) Sway forces need not be applied simultaneously with other lateral forces.

(2) FENCES:

(aa) All fences not exceeding 6'2" in height from grade shall be designed for a minimum of 75 M.P.H. wind load requirements.

All fences exceeding 6'2" in height from grade shall be designed for a minimum of 110 M.P.H. wind load requirements.

EXCEPTION: Fences constructed in accordance with the prescriptive requirements of this Code.

(bb) Masonry fence design shall be as specified by Section 2704.8 of this Code.

(cc) Wood fence design shall be as specified by Section 2915 of this Code.

(dd) Chain link fence design shall be as specified by Section 2811 of this Code.

(c) AWNING STRUCTURES:

(1) Fabric awnings, canopies and tents shall be designed as set forth in Chapter 43 of this Code.

(2) Rigid awnings, canopies, screen enclosures and utility sheds shall be designed as set forth in Chapter 44 of this Code.

(d) OTHER STRUCTURES: Structural supports for highway signs, luminaries, traffic signals and similar structures may be designed to meet the requirements of the American Society of State Highway Transportation Officials (A.S.S.H.T.O.) Standard Specifications and the wind load requirements of ASCE 7 With Commentary, except as otherwise noted in this Code.

2303.3 DEFLECTION: The deflection of any structural member or component, when subjected to live, wind and other superimposed loads set forth herein, shall not exceed the following:

(a) Roof and ceiling or components supporting plaster

. . . . . span in inches / 360

(b) Roof members or components not supporting plaster under

. . . . . span in inches / 240

(c) Floor members or components

. . . . . span in inches / 360

(d) Vertical members and wall members or components consisting of or supporting material that hardens in place is brittle, or lacks resistance to cracking caused by bending strains

. . . . . span in inches / 360

(e) Vertical members and wall members or components not required to meet the conditions of paragraph 2303.3(d) above

. . . . . span in inches
180

(f) Roof and vertical members, wall members and panels of carports, canopies, marquees, patio covers, utility sheds and similar minor structures not to be considered living areas, where the roof projection is greater than 12 feet in the direction of the span, for free standing roofs and roofs supported by existing structures. Existing structures supporting such roofs shall be capable of supporting the additional loading

. . . . . span in inches
180

(g) For group I occupancies only, roof and vertical members, wall members and panels of carports, canopies, marquees, patio covers, utility sheds and similar minor structures not to be considered living areas, where the roof projections 12 feet or less in the direction of the span, and for free standing roofs and roofs supported by existing structures

. . . . . span in inches
80

(h) Members supporting screens only

. . . . . span in inches
80

(i) Storm shutters and fold or pull down awnings, which in the closed position shall provide a minimum clear separation from the glass of 1", but not to exceed 2", when the shutter or awning is at its maximum point of permissible deflection

. . . . . span in inches
30

(j) (1) Roofs and exterior walls of utility sheds as defined in subsection 4401.3

. . . . . span in inches
80

(2) Roofs and exterior walls of storage larger than utility sheds

. . . . . span in inches
180

2303.4 VOLUME CHANGE: In the design of any building, structure or portion thereof, consideration shall be given to the relief of stresses due to expansion, contraction and other volume changes.

2304 MINIMUM LOADS

2304.1 LIVE LOADS: Minimum uniformly distributed live loads shall not be less than as set forth in Table 23-A1 and Table 2 of ASCE 7 With Commentary, except as otherwise noted in this Code.

2304.2 CONCENTRATED LOADS: Minimum concentrated loads shall not be less than as set forth in Table 23-A1 and Table 3 of ASCE 7 With Commentary, except as otherwise noted.

(a) Minimum design dead loads shall not be less than as set forth in Table C1 of ASCE 7 unless actual values are substantiated by quantitative information.

(b) Minimum densities for design loads for materials shall not be less than as set forth in Table C2 of ASCE 7 With Commentary.

TABLE 23-A1

MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS

See Tables 2 and C3 of A.S.C.E. 7 With Commentary, except as otherwise noted below.

OCCUPANCY OR USE	LIVE LOAD POUNDS PER SQUARE FOOT (P.S.F.)
ASSEMBLY PROJECTION ROOM	100
BALCONIES, EXTERIORS (see also assembly) serving private units of groups H or I occupancy and not used for assembly	60
BALCONIES SERVING OCCUPANCIES 80 P.S.F. OR LESS	80
ALL OTHER BALCONIES	100
CABANAS AND BATH HOUSES	50
PATH OF EGRESS SERVICING OCCUPANCIES 80 P.S.F. OR LESS	80
PATH OF EGRESS SERVICING OCCUPANCIES OVER 80 P.S.F.	100
RECREATIONAL FACILITIES including bowling centers, poolrooms and similar uses	75
STORAGE:	
LIGHT	75
MEDIUM	125
HEAVY	250*,+

* use weight of actual equipment when greater
+ increase when occupancy exceeds this amount.

2305 SPECIAL LOAD CONSIDERATIONS

2305.1 FLOORS: In the design of floors, consideration shall be given to the effective of known or probable concentrations of loads, partial load, vibratory, transitory, impact and machine loads. Design shall be based on the load or combination of loads which produce the higher stresses.

2305.2 BELOW GRADE STRUCTURES:

(a) In the design of basements, tanks, swimming pools and similar below grade structures, provisions hall be made for the forces due to hydrostatic pressure and lateral pressure of adjacent soil.

(b) For the lateral loads of soil on below grade structures, unless substantiated by more specific information, the angle of repose of fragmental rock and natural confined sand shall be 30 degrees to a horizontal line and the angle of repose of filled soil and muck shall be 15 degrees to a horizontal line.

(c) (1) For the hydrostatic pressure on any floor below a ground water level, calculations shall be based on full hydrostatic pressure, and such floors shall be designed for live load without hydrostatic uplift and hydrostatic uplift without live load.

(2) Private swimming pools may be designed with an approved pressure relief device for hydrostatic uplift as permitted by Sub-section 5002.4 of this Code.

2305.3 SAFEGUARDS:

(a) All railings, guardrails, stair railings, balcony railings and other similar safeguards shall be of such design and construction and shall be so supported so as to resist a uniform load of not less than 50 pounds per lineal foot or a concentrated load of not less than 200 pounds applied in any direction at the top of such barriers at any location on the safeguard, whichever condition(s) produces maximum stress(es). The reactions and stresses due to the above referenced uniform and concentrated loads shall be considered not be acting simultaneously.

(b) All intermediate rails, balusters, pickets, and other fillers shall be capable of resisting a uniform horizontal load over the gross area of not less than 25 pounds per square foot. Without restriction by deflection, but of not less strength than required to resist applicable wind loads as set forth in this Code.

(c) The main supporting members of such vertical barriers shall be designed and constructed to resist the forces set forth in paragraph (a) and (b) herein, whichever is more critical, but the reaction of the specified forces need not be additive.

(d) All handrails shall be of such design an construction and shall be so supported so as to resist a uniform load of not less than 50 pounds per lineal foot or a concentrated load of not less than 200 pounds applied in any direction and at any point on the rail, whichever condition(s) produces maximum stress(e=s). The reactions and stresses due to the above referenced uniform and concentrated loads shall be considered not to be acting simultaneously.

(e) The last sentence of the first paragraph in 4.4.2 of ASCE 7 is hereby deleted.

2305.4 ORNAMENTAL PROJECTIONS: Ornamental cantilevered projections on the exterior of buildings shall be designed for not less than 60 pounds per square foot live load or 200 pounds per lineal foot applied at the outer edge, whichever is more critical.

2305.5 INTERIOR WALLS AND PARTITIONS: Permanent, full height, interior walls and partitions shall be designed to resist a lateral live load of not less than five pounds per square foot and if sheathed with lath and plaster, deflection at this load shall not exceed the span (in inches) / 360.

2305.6 HELISTOPS/HELIPORTS: In addition to other design requirements of this chapter, heliport and helistop loading or touchdown areas shall be designed for the maximum stress induced by the following:

(a) Dead load plus actual gross weight of the helicopter.

(b) Dead load plus two single concentrated impact loads approximately 8 feet apart anywhere on the touchdown pad (representing each of the helicopter's two main landing gear, whether skid type or wheeled type), with each concentrated load covering one (1) square foot and having a minimum magnitude of 0.75 times the gross weight of the helicopter. Both loads acting together total a minimum of 1.5 times the gross weight of the helicopter.

(c) The dead load plus a uniform live load of 60 P.S.F.

2306 LOAD COMBINATION

2306.1 GENERAL:

(a) The safety of structures shall be checked using the provisions of 2.3 of ASCE 7 With Commentary.

2307 ROOF LIVE LOADS

2307.1 ROOF LIVE LOADS SPECIFIED:

(a) Roofs shall be designed for a live load of not less than 30 pounds per square foot, except as set forth herein.

EXCEPTIONS:

(1) Glass areas of greenhouse roofs shall be designed for a live load of not less than 15 pounds per square

foot.

(2) Ordinary pitched and curved roofs, with a slope of 12 to 12 or greater, where water is not directed to the interior of the roof, without parapets or other edge of roof drainage obstructions, may be designed for an allowable live load of not less than 20 pounds per square foot. Except as required for wood roof trusses as provided in Sub-section 2906.17 of this Code.

(b) Roofs of screen enclosures shall be set forth in Sub-section 4403.1.

(c) 4.11.1 of ASCE 7 With Commentary is hereby deleted.

(d) Special purpose roofs shall be designed in accordance with 4.11.2 of ASCE 7 With Commentary.

2307.2 ROOF DECKING: Roof decking shall be designed to support the live load set forth in Sub-section 2307.1 or a load of 100 pounds per foot applied as a one-foot wide strip perpendicular to and at the center of the span of the decking between supports, whichever is more critical.

2307.3 ROOF DRAINAGE:

(a) Where parapets or curbs are constructed above the level of the roof, provision shall be made to prevent rain water from accumulating on the roof in excess of that considered in the design, in the event the rain water drains or leaders become clogged.

(b) Where roofs are not designed in accordance with paragraph 2307.3(a), overflow drains or scuppers shall be placed to prevent an accumulation of more than four inches of water on any portion of the roof.

(c) Drains or scuppers installed to provide overflow drainage shall be not less in aggregate area than three times, the area of tributary downspouts or leaders, but of not less dimension than three inches.

(d) All roofs shall be designed with sufficient slope or camber to assure adequate drainage after the long term deflection from dead load, or shall be designed to support maximum loads including possible ponding of water due to deflection.

(e) PONDING LOADS: Roofs shall be designed to preclude instability from ponding loads.

(f) PROVISION FOR DRAINAGE OBSTRUCTION: Each portion of a roof shall be designed to sustain the loads of all rainwater that could accumulate on it if the primary drainage system for that portion is obstructed. Ponding instability shall be considered in this situation. If the overflow drainage provisions contain drain lines, such lines shall be independent of any primary drain lines.

2308 LIVE LOAD REDUCTIONS

2308.1 APPLICATION: No reduction in assumed live loads set forth in this section shall be allowed in the design of columns, walls, beams, girders, and foundations, except as permitted by the provisions of 4.8 of ASCE 7 With Commentary.

EXCEPTIONS: (1) No reduction of the assumed live loads shall be allowed in the design of any slabs, joists or other secondary members, except as set forth herein.

(2) No reduction in roof live loads shall be permitted, except as set forth by Section 2307.

2308.2 LIVE LOADS:

(a) Permissible reduction in live loads shall be as provided in Section 4.8.1. of ASCE 7 With Commentary.

(b) Limitations on live load reduction shall be as noted in Section 4.8.2 of ASCE 7 With Commentary.

(c) Places of public assembly shall include, but shall not be limited to group A or B assembly occupancies and group J, Division 3 occupancy.

2309 WIND LOADS

2309.1 GENERAL:

(a) (1) Buildings and structures, and every portion thereof, shall be designed and constructed to resist the forces due to wind pressure.

(2) The basic fastest mile wind speed shall be taken as not less than 110 miles per hour (MPH) at a height of 33 feet (10) meters) above the ground, except as permitted by other Chapters of this Code for canopies, tents, and utility sheds.

(3) Building and structures in the coastal building zone and eastward of the Coastal Construction Control line shall be designed in accordance with exposure D of ASCE 7.

(4) All other buildings and structures in Broward County shall be designed in accordance with exposure C of ASCE 7.

(5) All buildings and structures shall only utilize an importance factor "At Hurricane Coastline" in Table 5 of ASCE 7.

(b) (1) Wind forces shall be applied in any direction, with all possible combinations based on height, and shape and use factors set forth in subsection 2309.1 herein, but no roof shall be designed for less than 30 pounds per square foot live load, except as permitted by Section 2307 of this Chapter.

(2) For wind force calculations, roof live loads shall not be considered to act simultaneously with the wind load.

(c) Buildings and structures shall be designed and constructed to transfer wind forces to the ground.

(d) No allowances shall be made for the shielding effect of buildings or other structures.

(e) The minimum unit wind pressures to be used in design shall be obtained by multiplying the appropriate velocity pressure by the applicable pressure or force coefficient, by the applicable importance factor, by the applicable exposure coefficient and by the applicable gust response factor as noted in 6. of ASCE 7 With Commentary.

(f) The building official may accept a design based on other nationally recognized and accepted methods which are shown by wind tunnel tests or other satisfactory test data shown to be valid, and may require evidence to support values for wind pressure derived by such methods and used in the design of structures.

(g) Structural members providing stability for the building or structure shall be designed to resist the wind forces obtained by multiplying the applicable pressure or force coefficient, by the applicable importance factor, by the applicable exposure coefficient, and by the applicable gust response factor as noted in 6. of ASCE 7 With Commentary.

(h) Building components transferring wind loads to the structural frame such as, but not limited to, purlins, girts, wall panels, and sheathing, shall be designed to resist the forces obtained by multiplying the applicable pressure or force coefficient, by the applicable importance factor, by the applicable exposure coefficient and by the applicable gust response factor as noted in 6. of ASCE 7 With Commentary.

(i) The provisions for wind loads shall be as shown in 6. of ASCE 7 With Commentary.

2309.2 OVERTURNING MOMENT AND UPLIFT:

(a) Computations for overturning moments and uplift shall be based on the building as a whole and shall include applicable pressure or force coefficients, applicable importance factors, applicable exposure factors and applicable gust factors as noted in 6. of ASCE 7 With Commentary.

(b) Overturning stability of any building, structure or part thereof taken as a whole shall be provided and shall not be less than 150 percent of its wind load overturning moment. Overturning stability shall be based upon the dead load stabilizing moment of the building or structure or in combination with 2309.2(e) below.

(c) Uplift stability shall be provided for any building, structure or part thereof or isolated component thereof and shall not be less than 150 percent of the wind load uplift thereon. Uplift stability shall be based upon the dead

load stabilizing moment of the building or structure or in combination with 2309.2(e) below.

(d) Sliding stability shall be provided for any building, structure or part thereof taken as a whole or isolated component thereof and shall not be less than 150 percent of the sliding forces imposed thereon. Sliding stability shall be based upon the dead load of the building or structure or in combination with 2309.2(e) below.

(e) Stability may be provided by dead loads, anchors, attachments, the weight of earth superimposed over footings or anchors, the withdrawal resistance of piles or the resisting moment of vertical members embedded in the ground.

(f) All dead loads utilized in computing the resistance to overturning moment, uplift or sliding shall be the actual dead load of the materials and not those utilized in Tables C1 and C2 of ASCE 7 With Commentary.

2309.3 STRESSES:

(a) For members carrying wind stresses only, and for combined stresses due to wind and other loads, the allowable stresses and the allowable loads on connections may be increased 33 1/3 percent from the maximums set forth in this Code for the materials used. This allowance shall not apply where it is in conflict with the specifications for any specific material or materials. This allowance may be increased where permitted by the specifications for a specific material or materials.

EXCEPTIONS:

(1) Such increases in stresses shall not apply to foundations except as provided in section 2312 herein.

(2) Such increases in stresses shall not apply to towers, cantilevered projections, or metal sheathing where vibrations or fluttering action could be anticipated.

(3) Glass areas shall not be increased from those set forth in Table 35-E.

(4) Such increases in stresses shall not apply to glazing materials other than glass.

Such increases in stresses shall not apply to concrete expansion anchors, concrete adhesive anchors or powder driven fasteners.

(6) Such increases in stresses shall not apply to the structural support(s) for highway signs, luminaries, traffic signals, light poles or other similar flexible structures where vibrations or fluttering action could be anticipated unless the fundamental frequency of the structural support(s) are 1 Hz. or more.

(b) In no case shall the cross-section properties of a member or members less than that required for dead load plus live load without wind load.

2309.4 SCREEN ENCLOSURES:

(a) The wind loads on screen surfaces shall not be less than set forth in paragraph 4403.4(c).

(b) Design shall be based on such loads applied horizontally inward and outward to the walls with a shape factor of 1.3 and applied vertically upward and downward on the roof with a shape factor of 0.7.

2309.5 UTILITY SHEDS:

(a) The wind loads on utility shed structures as defined in Sub-section 4401.3 shall be not less than as set forth in Sub-section 4403.1.

(b) Any storage building larger in size than a utility shed shall be designed in accordance with all the provisions of this Chapter.

2309.6 PLUMBING, MECHANICAL, AND ELECTRICAL EQUIPMENT:

(a) All exterior located plumbing, mechanical, and electrical equipment and their frames, appurtenances, components, supports and anchoring devices shall be anchored to resist the forces due to wind pressure as noted in this Chapter.

(b) All exterior located plumbing, mechanical, and electrical equipment and their frames, appurtenances,

components, supports and anchoring devices shall be anchored to resist all applicable design wind, live and dead loads by rational analysis or by load tests.

2309.7 SIGNS:

(a) All exterior located signs and their frames, appurtenances, components, supports, foundations and anchoring devices shall be designed to resist the forces due to wind pressure as noted in this Chapter.

All exterior located signs and their frames, appurtenances, components, supports, foundations and anchoring devices shall be designed to resist all applicable design wind, live and dead loads by rational analysis or by load tests.

2309.8 AIR PERMEABLE CLADDING

(a) The design wind loads for air-permeable cladding shall be by one of the following methods:

(1) Rational Analysis by a Professional Engineer or Registered Architect utilizing:

(aa) A.S.C.E. 7.

(bb) Product specific equations specified in this section.

(2) Approved Test.

(3) Recognized Standards.

(b) RIGID ROOF TILE: Wind loads on rigid tile roof coverings may be determined as the lifting moment Ma. The lifting moment shall be determined in accordance with the following formula:

$$M_a = q_h C_L b L L_a [1.0 - G C_p]$$

where:

M_a = aerodynamic uplift moment (ft-lb) acting to raise the tail of the tile.

q_h = wind velocity pressure (psf) determined in 2309.1(a).

C_L = lift coefficient determined from Table 23-B.

b = exposed width (ft) of the roof tile.

L = length (ft) of the roof tile.

L_a = moment arm (ft) from the axis of rotation to the point of uplift on the roof tile. The point of uplift shall be taken at 0.76L from the head of the tile and the middle of the exposed width. For roof tiles with nails or screws (with or without a tail clip), the axis of rotation shall be taken as the head of the tile for direct deck applications and as the top edge of the batten for battened applications. For roof tiles fastened only by a nail or screw along the side of the tile, the axis of rotation shall be determined by testing. For roof tiles installed with battens and fastened only by a clip near the tail of the tile, the moment arm shall be determined about the top edge of the batten with consideration given for the point of rotation of the tiles based on straight bond or broken bond and the tile profile.

Gc_p = Roof coefficient for each applicable zone determined from ASCE-7. Roof coefficient shall not be adjusted for internal pressure.

Concrete and clay roof tiles complying with the following limitations shall be designed to withstand the wind loads prescribed in this section.

1. The roof tiles shall be mechanically fastened, mortar set or adhesive set.
2. The roof tiles shall be installed on solid sheathing which has been designed as components and cladding in accordance with 2309.1(h).
3. An underlayment shall be installed in accordance with 3403.4.
4. The tile shall be single lapped interlocking with a minimum head lap of not less than two inches (2") (51 mm).
5. The length of the tile shall be between 1.0 and 1.75 feet (305 and 533 mm).

6. The exposed width of the tile shall be between 0.67 and 1.25 feet (203 and 381 mm).
7. Maximum thickness of the tail of the roof tile shall not exceed 1.3 inches (33 mm).
8. Roof tiles using mortar set or adhesive set systems shall have at least 2/3 of the tile=s area free of mortar or adhesive contact.

TABLE 23-B
LIFT COEFFICIENTS FOR RIGID ROOF TILE

Roofing Material	C_L
Concrete & Clay Tile	0.20

2310 LIVE LOADS POSTED

(a) The live loads in every building, structure, or part thereof, of group F or group G occupancies approved by the building official shall be shown on plates supplied by the owner or his authorized agent, in that part of each space to which such loads apply.

(b) Parking garages designed for passenger cars only shall be posted with plates indicating for "passenger cars, vans, or light trucks only".

(c) Such plates shall be of approved durable materials displaying letters and figures not less than three (3) inches in height, and shall be securely affixed to the structure in conspicuous places.

(d) Such plates shall not be removed or defaced and where defaced, removed or lost, it shall be the responsibility of the owner to cause replacement as soon as possible.

2311 OCCUPANCY PERMITS

2311.1 OCCUPANT LOADS POSTED: Plans for proposed buildings or structures of group F or group G occupancy, and storage areas in buildings of any occupancy shall show the allowable loading for each portion of the floor and roof areas and certificates of use and occupancy, as defined in Section 307 of this Code, shall not be issued until such loads are posted as set forth in Section 2310.

2311.2 CHANGE IN OCCUPANT LOAD: No change in the occupancy of any building shall be made until a certificate has been issued certifying that the building official has approved the building as suitable for the loads characteristic of the proposed occupancy.

2311.3 MAXIMUM FLOOR AND ROOF LOADS OBSERVED: It shall be unlawful at any time to place, or permit to be placed, on any floor or roof of a building or structure, a load greater than that for which the floor or roof is approved by the Building Official.

2312 FOUNDATION DESIGN

2312.1 Design Procedure: The minimum area of a footing or number of piles under a foundation shall be determined in the following manner:

(a) The total load of the column which has the largest percentage of the live load to the total lead shall be divided by the allowable soil pressure or pile capacity.

The balance soil pressure or pile capacity shall be determined by dividing the total dead load by the area of the footing or the number of poles.

(c) The minimum number of other footings or number of piles shall be designed on the basis of their respective dead loads only.

(d) In no case shall the total load due to the combined dead, live, wind, and any other loads exceed the allowable bearing pressure of the soil for capacity of any pile upon which the foundation is supported.

(e) The live load used in the above calculations, may be the total reduced live load in the member immediately

above the foundation.

(f) The Building Official may require submittal of design computations utilized in foundation design.

2312.2 WIND EFFECTS:

(a) Where the pressure on the foundation due to wind is less than 25 percent of that due to dead or other live loads, wind pressure may be neglected in the footing design.

(b) Where this percentage exceeds 25 percent, foundations shall be so designed that the pressure due to combined dead, live and wind loads shall not exceed the allowable soil bearing values or allowable loads per pile by more than 25 percent.

2312.3 REQUIREMENT FOR COASTAL BUILDING ZONE: In addition to the other requirements of this Chapter, the following requirements shall apply to foundations of major structures extending wholly or partially within the coastal building zone, as defined in Sub-section 2302.1 of this Chapter:

(a) GENERAL:

(1) Major structures shall be securely fastened to their foundations and the foundation shall be adequately braced and anchored in such a manner as to prevent flotation, collapse or lateral displacement of the structure during a 100 year storm event.

(2) All sewage treatment and public water supply systems shall be flood-proofed to prevent infiltration of surface water anticipated under design storm conditions.

(3) Underground utilities, excluding pad transformers and vaults, shall be flood-proofed to prevent infiltration of surface water expected under design storm conditions or shall otherwise be designed to function when submerged under design storm conditions.

(b) FOUNDATION DESIGN:

(1) The design, location and construction of foundations for major structures shall be in compliance with National Flood Insurance Program regulations as found in the rules and regulations of the Federal Emergency Management Agency; F.E.M.A., 44 CFR, Parts 59 and 60; and Chapter 161, Beach and Shore Preservation, parts I, II, and III, Florida Statutes, 1989.

(2) Non-habitable major structures need not otherwise meet the specific structural requirements of 2312.3(b), except that they shall be designed to produce the minimum adverse impact on the beach and dune system and shall otherwise comply with the requirements of this Code.

(3) Foundation design and construction of a habitable major structure shall consider all anticipated loads during a 100 year storm event including wave, hydrostatic, and hydrodynamic loads acting simultaneously with live and dead loads otherwise be designed to function when submerged under design storm condition.

(4) Erosion computations for foundation design shall account for all vertical and lateral erosion and scour producing forces, including localized scour due to the presence of structural components. Foundation design and construction shall provide for adequate bearing capacity taking into consideration the anticipated loss of soil above the design grade as a result of localized scour.

EXCEPTION: Erosion computations shall not be required for structures located landward of the Coastal Construction Control Line.

(5) The use of fill for structural support of buildings within zones V1-30, VE and V on the community's flood insurance rate map (F.I.R.M.) shall be prohibited.

(c) PILE FOUNDATIONS: Pile foundations shall be required for habitable major structures located in Federal Insurance Administration Velocity Zones (V-Zones) or those impacted by wave action.

(1) Pile dimensions, spacing and embedment shall be designed consistent with the requirements of the site, taking into account all vertical, lateral, erosion and scour-producing forces.

(2) Piles shall be driven to a penetration which achieves adequate bearing capacity, taking into consideration the anticipated loss of soil above the design grade as the result of scouring.

(3) In addition to the normal foundation analysis, the pile foundation shall consider piles in column action, where appropriate from the bottom of the support structure to the design grade after scouring.

(4) Consideration shall also be given to the degree of exposure to wave attack and the resulting impact loads on lateral or diagonal bracing between piles.

(d) MONOLITHIC FOUNDATIONS:

(1) Monolithic foundations may be used if soil conditions permit and if located at an elevation which minimizes their effect in the beach and adjacent properties. Due consideration shall be given to their vulnerability to erosion under design storm conditions.

(2) In the event that a monolithic foundation is used, the maximum elevation of the top of the slab shall be below the design scour depth unless positive methods are provided to prevent scour.

(3) Other types of spread footings such as running footers or pads may be permitted when positive methods are provided to prevent scour.

2313 WAVE FORCE DESIGN

2313.1 WAVE FORCES: Calculations for wave forces resulting from design storm conditions may be based upon the minimum criteria and methods described in the standards set forth in Sub-section 2302.2 of this Chapter or other professionally recognized methodologies which produce equivalent design criteria.

2313.2 HYDROSTATIC LOADS:

(a) Calculations for hydrostatic loads shall consider the maximum water pressure resulting from a fully peaked, breaking wave superimposed upon the design storm surge with dynamic wave setup.

(b) Both free and hydrostatic loads shall be considered.

(c) Hydrostatic loads which are confined shall be determined using the maximum elevation to which the confined water would freely rise if unconfined.

(d) Vertical hydrostatic loads shall be considered both vertically downward and upward on horizontal or inclined surfaces of major structures, such as, but not limited to, floors, slabs, roofs, walls and etc.

(e) Lateral hydrostatic loads shall be considered as forces acting horizontally above and below grade on vertical or inclined surfaces.

(f) Hydrostatic loads on irregular or curved geometric surfaces shall be determined by considering the separate vertical and horizontal components acting simultaneously under the distribution of the hydrostatic pressures.

2313.3 HYDRODYNAMIC LOADS:

(a) Hydrodynamic loads shall consider the maximum water pressures resulting from the motion of the water mass associated with the design storm.

(b) Full intensity loading shall be applied on all structural surfaces above the design grade which would affect the flow velocities.

2314 LOAD TESTS

2314.1 APPLICATION: Whenever there is insufficient evidence of compliance with the provisions of this Code or evidence that any material or any construction does not conform to the requirements of this Code, or in order to substantiate claims for alternate materials or methods of construction, the Building Official may require testing by an approved agency, at the expense of the owner or this agent, as proof of his compliance. Testing methods shall be as specified by this Code for the specific material.

2314.2 TESTING METHOD: Such testing shall follow a nationally recognized standard test, or when there

is no standard test procedure for the material or assembly in question, the Building Official shall require that the material or assembly under dead load plus live load shall deflect not more than as set forth in Sub-section 2303.3 herein, and that the material or assembly shall sustain dead load plus twice the live load for a period of 24 hours, with a recovery of at least 80 percent.

2314.3 ALTERNATE TEST METHODS: When elements, assemblies or details of structural members are such that calculation of their load carrying capacity, deformation under load or deflection cannot be made by rational analysis, their structural performance shall be established by tests in accordance with test procedure as approved by the Building Official based on consideration of all probable conditions of loading.

2314.4 ROOF LOAD TESTING: Load tests on roofing and attachments shall be as set forth in Chapter 34 of this Code.

2314.5 Copies of the Test Procedure and the Test Report shall be submitted to the Building Official. As a minimum the Test Report shall identify the Test Procedure used. A detailed description of the construction tested, the various load capacities for which the construction was tested and the type of failure observed.

2315 IMPACT TESTS FOR WINDBORNE DEBRIS

2315.1 All parts or systems of a building or structure envelope such as, but not limited to, exterior walls, roof, outside doors, skylights, glazing and glass block shall meet impact test or be protected with an external protection device that meets the impact test.

(a) Test procedures to determine resistance to windborne debris shall be performed in accordance to this Section.

2315.2 LARGE MISSILE IMPACT TEST

(a) This test shall be conducted on three test specimens. This test shall be applicable to the construction units, assemblies, and materials to be utilized up to and including 30 feet in height in any and all structures.

(b) The test specimens shall consist of the entire assembled unit, including frame and anchorage as supplied by the manufacturer for installation in the building, or as set forth in a referenced specification, if applicable. Fasteners used in mounting the test specimen shall be identical in size and spacing as to what is used in field installations.

(c) The large missile shall be comprised of a piece of timber having nominal dimensions of 2 x 4 inches weighing 9 lb.

(d) The large missile shall impact the surface of each test specimen at a speed of 50 ft./sec.

(e) Each test specimen shall receive two impacts (except as noted in 2315.2(e)(1)(aa) and 2315.2(e)(2)(aa): the first within a 5 inch radius circle having its center on the midpoint of the test specimen and the second within a 5 inch radius circle in a corner having its center in a location 6 inches away from any supporting members.

(1) For window, glass block, fixed glass and skylight assemblies, both impacts shall be to glass or other glazing infill. For test specimens with more than one lite of glass, a single lite closest to the center of the assembly shall be selected and impacted twice in accordance with 2315.2(e). If a lite of glass is sufficiently small to cause the 5 inch radius circles to overlap, two separate lites shall be impacted one time each.

(aa) For window, fixed glass and skylight assemblies comprised of different glass thickness, types of glass or different types of glazing infill, each separate thickness or type shall be impacted twice in accordance with 2315.2(e).

(2) For doors, wall cladding and external protection devices, both impacts shall be to the thinnest section through the assembly. For doors, wall cladding and external protection devices with horizontal and/or vertical bracing, both impacts shall be within a single area which is not reinforced and shall be in accordance with 2315.2(e).

(aa) For doors with glass, the glass shall be impacted twice and the thinnest section through the

assembly which is not glass shall be impacted twice in accordance with 2315.2(e).

(f) In the case of glazing, if the three test specimens which comprise a test successfully reject the two missile impacts, they shall then be subjected to the cyclic pressure loading defined in Table 1.

(1) If external protection devices are employed to protect windows, fixed doors or skylights, they must resist the large missile impacts specified in (c) and (d) without deformations which result in contact with the windows, fixed glass, glass block, doors or skylights they are intended to protect.

(2) If external protection devices are not designed to be air tight, following the large missile impact test, they must resist an application of force corresponding to those listed on Table 2 of this section (Fatigue load testing) without detaching from their mountings. The acting pressure cycles shall be simulated with loads applied through a mechanical system attached to the shutter specimen to apply uniformly around the shutter perimeter a force equal to the product of the required pressure and the area of the shutter specimen.

(g) If air leakage through the test specimen is excessive, tape may be used to cover any cracks and joints through which leakage is occurring. Tape shall not be used when their is a probability that it may significantly restrict differential movement between adjoining members. It is also permissible to cover both sides of the entire specimen and mounting panel with a single thickness of polyethylene film no thicker than 0.050 mm (2 mils). The technique of application is important in order that the full load is permitted to be transferred to the specimen and that the membrane does not prevent movement or failure of the specimen. Apply the film loosely with extra folds of material at each corner and at all offsets and recesses. When the load is applied, there shall be no fillet caused by tightness of plastic film.

(h)A particular system of construction shall be deemed to comply with this recommended practice of there test specimens reject the two missile impacts without penetration and resist the cyclic pressure loading with no crack forming longer than five inches and 1/16 inch in width through which air can pass.

(i) If only one of the three test specimens in a test fails to meet the above listed criteria, one retest of this system of construction (another test sequence with three specimens shall be permitted.

(j) Any cladding assembly not incorporated in the South Florida Building Code, after successfully completing the impact test outlined in Section 2315 of this Code, shall be subject to fatigue loading testing.

2315.3 SMALL MISSILE IMPACT TEST:

(a) This test shall be conducted on three test specimens. This test shall be applicable to the construction units, assemblies, and materials to be utilized above 30 feet in height in any and all structures. Small missile impact test is not required if test specimens have passed the large impact tests with the exception of specimens with openings larger than 3/16 inches.

(b) Each test specimen shall consist of the entire assembled unit, including frame and anchorage as supplied by the manufacturer for installation in the building, or as set forth in a referenced specification, if applicable. The fasteners used in mounting the test specimen shall be identical in size and spacing to those to be used in field installations.

(c) The missiles shall consist of roof gavel weighing 2 grams plus or minus 5 percent or a spherical steel ball weighing 2 grams plus or minus 5 percent.

(d) Each missile shall impact the surface of each test specimen at a speed of 80 ft./sec.

(e) Each test specimen shall receive thirty small missile impacts (except as noted in 2315.3(e)(1)(aa) and 2315.3(e)(2)(aa): the first ten distributed uniformly over a two square foot area located at the center of the test specimen, the second ten distributed uniformly over a two square foot area located at the center of the long dimension of the specimen near the edge, and the third ten distributed uniformly over a two square foot area located at a corner of the specimen.

(1) For window and skylight assemblies, all impacts shall be to glass or other glazing infill. For test

specimens with more than one lite of glass, a single lite closest to the center of the assembly shall be selected and impacted in accordance with 2315.3(e). If a lite of glass is sufficiently small to cause the 5 inch radius circles to overlap, separate lites may be impacted, however, there must be a total of 30 impacts within the assembly.

(aa) For window, fixed glass and skylight assemblies comprised of glass with different thickness, types of glass or different types of glazing infill, each separate thickness or type shall be impacted in accordance with 2315.3(e).

(2) For doors, wall cladding and external protection devices, all impacts shall be to the thinnest section through the assembly. For doors, wall cladding and external protection devices with horizontal and/or vertical bracing, all impacts shall be within a single area which is not reinforced and shall be impacted in accordance with 2315.3(e).

(aa) For doors with glass, the glass shall be impacted in accordance with 2315.3(e) and the thinnest section through the assembly which is not glass shall be impacted in accordance with 2315.3(e)

(f) In the case of glazing, after completion of the small missile impacts, each test specimen shall then be subjected to the cyclic pressure loading defined in Table 1.

(1) If external protection devices are employed to protect windows, doors or skylights, they must resist the small missile impacts specified in (c) and (d) without deformations which result in contact with the windows, glass, doors or skylights they are intended to protect.

(2) If external protection devices are not designed to be air tight, following the small missile impact test, they must resist an application of force corresponding to those listed on Table 2 of this section (Fatigue load testing) without detaching from their mountings. The acting pressure cycles shall be simulated with loads applied through a mechanical system attached to the shutter specimen to apply uniformly around the shutter perimeter a force equal to the product of the required pressure and the area of the shutter specimen.

(g) If air leakage through the test specimen is excessive, tape may be used to cover any cracks and joints through which leakage is occurring. Tape shall not be used when there is a probability that it may significantly restrict differential movement between adjoining members. It is also permissible to cover both sides of the entire specimen and mounting panel with a single thickness of polyethylene film no thicker than 0.050 mm (2 mils). The technique of application is important in order that the full load is permitted to be transferred to the specimen and that the membrane does not prevent movement or failure of the specimen. Apply the film loosely with extra folds of material at each corner and at all offsets and recesses. When the load is applied, there shall be no fillet caused by tightness of plastic film.

A particular system of construction shall be deemed to comply with this test if three test specimens reject the small missile impacts without penetration and resist the cyclic pressure loading with no crack forming longer than five inches and 1/16 inch in width through which air can pass.

(i) If only one of the three test specimens in a test fails to meet the above listed criteria, one retest of the system (another test sequence with three specimens) of construction shall be permitted.

(j) Any cladding assembly not incorporated in the South Florida Building Code, after successfully completing the impact test outlined in Section 2315 of this Code, shall be subject to fatigue loading testing.

TABLE 1 - CYCLIC WIND PRESSURE LOADING

Inward Acting Pressure		Outward Acting Pressure	
Range	Number of cycles*	Range	Number of cycles*
0.2Pmax to 0.5 Pmax	3,500	0.3Pmax to 1.0 Pmax	50
0.0Pmax to 0.6 Pmax	300	0.5Pmax to 0.8 Pmax	1,050

0.5Pmax to 0.8 Pmax	600	0.0Pmax to 0.6 Pmax	50
0.3Pmax to 1.0 Pmax	100	0.2Pmax to 0.5 Pmax	3,350

Notes: Pmax denotes maximum design load in accordance with ASCE 7-88, "Minimum Design Load for Buildings and Other Structures." The pressure spectrum shall be applied in each test specimen beginning with inward acting pressures followed by the outward acting pressures in the order from the top of each column to the bottom of each column.

*Each cycle shall have minimum duration of one second and a maximum duration of three seconds and must be performed in a continuous manner.

TABLE 2 - FATIGUE LOADING SEQUENCE

Range of Test	Number of Cycles*
0 to 0.5p	600
0 to 0.6p	70
0 to 1.3p	1

where p = the design wind load for the height and location, when the assembly will be used. For wall and roof components, shape factors given in the South Florida Building Code as revised by ASCE 7-88 Standard shall be used.

*Each cycle shall have minimum duration of one second and a maximum duration of three seconds and must be performed in a continuous manner. Pressure shall be in negative direction. Assemblies shall be tested with no resultant failure or distress and shall have a recovery of at least 90 percent over maximum deflection.

2315.4 TEST REPORTS: APPROVALS AND APPEALS

As a condition of obtaining product approval for any construction unit, assembly, or material subject to the impact tests set forth in this section, test reports or a statement by a Florida Registered Professional Engineer referencing the compliance of the product along with the name, address and test report number of the testing facility shall be submitted to the Building Official. The reports shall be in the manner and contain such information relating to the test specimen and testing conditions as shall be required by the South Florida Building Code. The report shall be written, signed and sealed by a Florida Registered Professional Engineer.

2316 IMPACT TEST PROCEDURES

2316.1 SCOPE

(a) This Section covers impact test procedures for conducting the impact test of materials as required by Section 2315 of the South Florida Building Code.

2316.2 DEFINITIONS

(a) For definitions of terms used in this section, refer to Sections 2315 and/or 401 of the South Florida Building Code.

2316.3 DESCRIPTION OF TERMS SPECIFIC TO THIS TEST PROCEDURE

(a) SPECIMEN: The entire assembled unit submitted for test, including but not limited to anchorage devices and structure to which product is to be mounted.

(b) TEST CHAMBER: An airtight enclosure of sufficient depth to allow unobstructed deflection of the specimen during pressure cycling, including ports for air supply and removal, and equipped with instruments to measure test pressure differentials.

(c) MAXIMUM DEFLECTION: The maximum displacement of the specimen measured to the nearest 1/8 of an inch attained from the original position while the maximum test load is being applied.

(d) PERMANENT DEFORMATION: The permanent displacement of the specimen measured to the nearest 1/8 of an inch from the original position to final position that remains after maximum test load has been removed.

(e) TEST LOAD: As determined by Section 2309 and 2315 of the South Florida Building Code.

2316.4 TEST SPECIMEN

(a) Test Specimen: All parts of the test specimen shall be full size, using the same materials, details, methods of construction and methods of attachment as proposed for actual use. The specimen shall consist of the entire assembled unit attached to a given type of structural framing of the building, and shall contain all devices used to resist wind forces and wind-borne debris. When testing glazed products, the material used to make such glazed product wind-borne debris resistant (i.e. fillers, film and similar), shall be an integral part, factory applied, of such glazed product.

(b) Locking mechanisms shall be permanently mounted on the specimen. Such locking mechanism shall require no tools to be latched in the locked position. Devices such as pins shall be permanently secured to the specimen through the use of chains or wires which must be of corrosion resistant material. This section does not apply to specimens referenced in Section 3513 of the South Florida Building Code.

(c) Doors shall be provided with permanently posted instructions on latching for high wind pressures.

(d) Specimen and fasteners, when used, shall not become disengaged during test procedure.

2316.5 APPARATUS

(a) The description of the apparatus is general in nature. Any equipment, properly certified, calibrated, and approved by the supervising engineer capable of performing this test within the allowable tolerance is permitted.

2316.6 MAJOR COMPONENTS

(a) Cyclic Wind Pressure Loading: The number of cycles and amount of pressure indicated in Section 2315, Table 1 and 2 of the South Florida Building Code. Design wind pressure is to be determined by using Section 2309 of the South Florida Building Code.

(b) Test Chamber: The test chamber, to which the specimen is mounted, shall be provided with pressure tabs to measure the pressure difference across the test specimen and shall be so located that the reading is unaffected by the velocity of air supplied to or from the chamber. The specimen mounting frame must deflect under test load in such manner that the performance of the specimen will be affected.

(c) Air System: A controllable blower, a compressed-air supply, and exhaust system, or reversible controllable blower designed to provide the required maximum air pressure difference across the specimen. The system shall provide an essentially constant air-pressure difference for the required test period.

2316.7 MISSILE IMPACT:

(a) Timing System: The timing system, which is comprised of two, through-beam photoelectric sensors space at a known distance apart and used to start the stop an electronic clock, shall be capable to measure speeds accurate to +/-2 percent. The speed of the missile shall be measured anywhere between the point where 90% of the missile is outside of the cannon, to the point where the missile is one ft. away from the test specimen. The missile speed shall not be measured while the missile is accelerating. The through-beam photoelectric sensors shall be of the same model.

The electronic clock shall be activated when the reference point of the missile passes through the timing system. The electronic clock shall have an operating frequency of no less than 10kHz with a response time not to exceed 0.15 milliseconds. The speed of the missile shall be determined by dividing the distance between the two through-beam photoelectric sensors by the total time interval counted by the electronic clock.

(b) Calibration of Timing Equipment: The timing system shall be calibrated and certified by an independent qualified agency at six-month intervals using one of the following methods:

(1) Photographically, using a stroboscope,

(2) Photographically, using a high speed camera with a frame rate exceeding 500 frames per second,

(3) Photographically, using a high speed video camera with a frame rate exceeding 500 frames per second, or

(4) Any other certified timing system calibration device used by an independent certified agency approved by this office.

The calibration report shall include: the date of the calibration, the name of the agency conducting the calibration, the distance between the trough-beam photoelectric sensors (if used), the speed of the missile as measured by the timing system, the speed of the missile as determined from the calibration system, and the percentage difference in speeds. The system shall be determined to be accurate if the speed of the missile measured by the timing system and the speed measured by the calibration system agree within 2 percent.

(c) Large Missile:

(1) The large missile shall be a solid S4S nominal 2x4 #2 surface dry Southern Pine. The weight of the missile shall be as specified in Section 2315.2(c) of the South Florida Building Code and shall have a length of not less than 7 feet and not more than 9 feet. The missile shall be marked/ticked in dark ink at one inch intervals on center, and congruently numbered every three inches. A sabot shall be attached to the trailing edge of the missile to facilitate launching. The weight of the sabot shall not exceed 2 lb. The combined weight of the timber and sabot, which constitutes the missile, shall be between 9 lb. and 9.5 lb. The missile shall be propelled through a cannon as described in Section 2316.7(e) of this Code.

(2) When testing any specimen with more than one component, in addition to complying with the impacts required by Section 2315.2 of the South Florida Building Code, the framing member connecting these components shall be impacted at one half the span of such member with the large missile at a speed indicated in Section 2315.2(d) of the South Florida Building Code.

(d) Large Missile Cannon: The large missile cannon shall use compressed air to propel the large missile. The cannon shall be capable of producing impact at the speed specified in 2315.2(d). The missile cannon shall consist of four major components: a compressed air supply, a pressure release valve, a pressure gauge, a barrel and support frame, and a timing system for determining the missile speed. The barrel for the missile cannon shall consist of a 4-inch inside diameter pipe and shall be at least as long as the missile. The barrel of the large missile cannon shall be mounted on a support frame in a manner to facilitate aiming the missile so that it impacts the specimen at the desired location. The distance from the end of the cannon to the specimen shall be 9 feet plus the length of the missile.

(e) Small Missile: Each small missile shall consist of size #6 aggregate as described in ASTM D-1863 or a spherical steel ball weighing 2 grams plus or minus 5 percent. Each small missile at the time of testing shall be hard, durable, opaque and free from clay, loam, sand, and other foreign substances.

The missiles shall be propelled through cannon a described in Section 2316.7(g) of this Code. The small missile shall be launched in such a manner that each specimen shall be impacted over an area not to exceed two square feet per impact as described in Section 2315.3(e) of the South Florida Building Code.

(f) Small Missile Cannon: A compressed air cannon shall be used that is capable of propelling missiles of the size and speed defined in Section 2315.3(c) and 2315.3(d) of the South Florida Building Code. The cannon assembly shall be comprised of a compressed air supply and gauge, a remote firing device and valve, a barrel, and a timing system. The small missile cannon shall be mounted to prevent movement of the cannon so that it can propel missiles to impact the test specimen at points defined in Section 2315.3(e) of the South Florida Building Code. The timing system shall be positioned to measure missile speed within 5 feet of the impact point on the test specimen.

2316.8 TEST REPORTS:

(a) The following minimum information shall be included in the submitted report:

(1) Date of the test and the report, and report number.

(2) Name, location, and certification number of facilities performing the test.

(3) Name and address of requester of the test.

(4) Identification of the specimen (manufacturer, source of supply, dimension, model types, material, procedure of selection and any other pertaining information).

(5) Detailed drawings of the specimen showing dimensioned section profiles, type of framing specimen was attached to, panel arrangement, installation and spacing of anchorage, locking arrangement, sealants, hardware and any other pertinent construction details. Any deviation from the drawings or any modifications made to the specimen to obtain the reported values shall be noted on the drawings and in the report.

(6) Maximum deflection recorded and mechanism used to make such determination.

(7) Permanent deformation (provide cross section diagram to show where it occurred).

(8) Name, address, signature and seal of Florida Professional Engineer, witnessing the test and preparing the report, in accordance with Sub-paragraph 305.1(f)(1) of this Code.

(9) The results for all three specimens shall be reported, each specimen being properly identified, particularly with respect to distinguishing features or differing adjustments. A separate drawing for each specimen will not be required if all differences between them are noted on the drawings provided

(10) Location of impacts on each test specimen.

(11) The large and small missiles velocities.

(12) The weight of the missiles.

(13) Maximum positive and negative pressures used in the cyclic wind pressure loading.

(14) A description of the condition of the test specimens after testing, including details of any damage and any other pertinent observations.

(15) When the tests are made to check conformity of the specimen to a particular specification, an identification or description of that specification.

(16) A statement that the tests were conducted in accordance with this test method.

(17)A statement of whether or not, upon completion of all testing, the specimens meet the requirements of Section 2315 of the South Florida Building Code.

(18) A statement as to whether or not tape or film, or both were used to seal against air leakage, and whether in the judgment of the test engineer, the tape or film influenced the results of the test.

(19) Signatures of persons responsible for supervision of the tests and a list of official observers.

(20) All data not required herein, but useful to a better understanding of the test results, conclusions or recommendations, should be appended to the report.

CHAPTER 24
EXCAVATIONS, FOOTINGS AND FOUNDATIONS

2401 EXCAVATIONS
2402 BEARING CAPACITY OF SOILS
2403 SOIL BEARING FOUNDATIONS
2404 PILE FOUNDATIONS
2405 FOUNDATION WALLS AND GRADE BEAMS
2406 GRADES UNDER BUILDINGS
2407 RETAINING WALLS
2408 SEAWALLS AND BULKHEADS

2401 EXCAVATION

2401.1 GENERAL: Until provisions for permanent support have been made, all excavations shall be properly guarded and protected so as to prevent the same from becoming dangerous to life and property and shall be sheet piled, braced and/or shored, were necessary, to prevent the adjoining earth from caving in; such protection to be by the person causing the excavation to be made. All excavations shall comply with the minimum requirements of Florida Statute 553.60 "Trench Safety Act" and "Occupational Safety and Health Administration Excavation Safety Act" 29-CFR1926-650(P). No excavation, for any purpose, shall extend within one foot of the angle of repose of any soil bearing footing or foundation unless such footing or foundation is first properly underpinned or protected against settlement.

2401.2 PERMANENT EXCAVATIONS: No permanent excavations shall be made nor shall any construction excavations be left on any lot or lots which will endanger adjoining property or buildings or be a menace to public health or safety. Any such excavation made or maintained shall be properly drained and such drainage provisions shall function properly as long as the excavation exists. Permanent excavations shall have retaining walls of steel, masonry, concrete of similar approved material of sufficient strength to retain the embankment together with any surcharged loads.

2401.3 ENFORCEMENT: Where, in the opinion of the Building Official, an unsafe condition may result or damage may occur as the result of an excavation, he may order the work stopped or may approve the work of excavation subject to such limitations as he may deem necessary.

2402 BEARING CAPACITY OF SOIL

2402.1 DESIGN BEARING CAPACITY: Plans for new buildings, structures or additions shall clearly identify the allowable bearing capacity utilized in sizing the building's foundation support system.

(a) EXCEPTION: Plans for new buildings, structures or addition which are to be supported on a piling foundation system.

2402.2 ALLOWABLE BEARING CAPACITY: Prior to the installation of any footing foundation system for new buildings, structures or additions, the Building Official shall be provided with a statement of Allowable Bearing Capacity from an Architect or Professional Engineer. Said statement shall clearly identify the allowable in-place bearing capacity of the building pad for the new building or addition. The certified allowable in-place bearing capacity shall have been determined by way of recognized tests or rational analysis and shall meet or exceed the design bearing capacity identified under Section 2402.1 of this Code.

(a) EXCEPTION: All buildings, structures or additions which are to supported on a piling foundation system.

2403 SOIL BEARING FOUNDATIONS

2403.1 GENERAL: Footings shall be constructed of reinforced concrete, as set forth in Chapter 25 and in

this Section, and shall, insofar as practicable, be so designed that the soil pressure shall be reasonably uniform to minimize differential settlement.

2403.2 CONTINUOUS WALL FOOTINGS:

(a) Footings under walls shall be continuous or continuity otherwise provided and shall not be less than required to keep the soil pressure within that set forth in Section 2402 nor less than the following minimums:

Allowable Bearing Capacity (Pounds per square foot)	**No. of Stories**	**Depth and Width (2)** (Minimum)
	1	12" x 16" (1)
2500	2	12" x 24"

Based on rational analysis and soil investigation as set forth in Section 2402, the footing size or bearing capacity may vary, but the minimum width of a footing under the main walls of the building shall not be less than 16 inches nor less than eight inches more than the width of the foundation wall.

Footnote: (1) For single story wood frame exterior walls, the minimum size continuous footing shall be 16" deep x 24" wide.

(2) Any continuous wall footing acting as a shear wall foundation shall be specifically designed for that purpose.

(b) Masonry fences, flower bins, steps and similar decorative structures shall have reinforced concrete foundations designed for all live, dead and wind loads as set forth in Chapter 23. The minimum sizes of these foundations shall

be as follows:

Allowable Bearing Capacity (Pounds per square foot)	**Unbraced Wall** Above Grade (Ft)	**Depth and Width** (Minimum)
2500	less than or equal to 3 feet	12" x 24"
2500	greater than 3 feet but less than and including 6 feet	12" x 36"
2500	greater than 6 feet	None Provided (1)

Based on rational analysis and soil investigation as set forth in section 2402 the footing size or bearing capacity may vary, but the minimum width of a footing under masonry fences, flower bins, steps and similar decorative structures shall not be less than 16" nor less than 8" more than the width of the wall.

EXCEPTION: Masonry fences, wing walls and other similar walls that are exposed to lateral wind forces and do not have any lateral restraint above grade, shall have their continuous wall footings placed so the top of footing is no less than 16" below grade.

Footnote: (1) Foundations for masonry fences, flower binds, steps and similar decorative structures with unbraced wall heights in excess of six feet shall be based on rational analysis.

(c) The minimum continuous footings specified in this section shall be reinforced as follows:

Reinforcing	**Width Foundation**
2-#5 Bars	16" and 20" wide
3-#5 Bars	24" and 30" wide
4-#5 Bars	36" wide

Where footings are 30 inches or more in width, cross bars designed to resist bending at the face of the foundation wall shall be provided.

(1) Equivalent areas in #4 reinforcing bars may be substituted for the sizes as specified.

(2) Splices in reinforcing bars shall be not less than 36 bar diameters and reinforcement shall be continuous around all corners and changes in direction. Continuity shall be provided at corners or changes in direction by bending the longitudinal steel around the corner 48 bar diameters or by adding matching reinforcing steel, which shall extend 48 bar diameters from each corner or change in direction. When three or more bars are required, the bars shall be held in place and alignment by transverse bars spaced not more than four feet apart.

(3) The reinforcement for footings and other principal structural members in which concrete is deposited against the ground shall have not less than three inches of concrete between the reinforcement and the ground contact surface. If concrete surfaces after removal of the forms are to be exposed to the weather or be in contact with the ground, the reinforcement shall be protected with not less than two inches of concrete for bars larger than #5 and one and one-half inches for #5 or smaller bars.

(4) Excavations for continuous footing shall be cut true to line and grade and the sides of footings shall be formed, except where soil conditions are such that the sides of the excavation stand firm and square. Excavations shall be made to firm, clean bearing.

(d) Continuous footings shall be placed level and any changes in the grade of such footings shall be made with a step of the same cross section and design as the footings, or the smaller of the footings, so joined.

(e) Continuous footings with eccentric loading shall be designed to limit the soil pressure at the edges to within acceptable values by means of counter-balancing or by other approved methods.

(f) When foundation walls are to be poured separately from the footing, they shall be keyed and doweled to the footing with not less than #4 dowels, 20 diameters in length above and below the joint, and spaced not more than 4 feet apart. Where footing depth does not allow straight dowels standard hooks will be allowable.

(g) Concrete footings and pads shall not receive superimposed loads until 12 hours or more after the concrete is placed.

(h) Excavations for footings and foundations which are to serve as forms shall be thoroughly wet prior to the placing of concrete.

(I) The top of all continuous footings shall be a minimum of 8" below grade.

2403.3 ISOLATED FOOTINGS:

(a) Dimensions for an isolated footing shall not be less than 12 inches deep and 24 inches square. Isolated footings in soil having low lateral restraint and isolated piers shall be provided with adequate bracing to resist lateral movement.

(b) Isolated footings with eccentric loading shall be designed to limit the soil pressure at the edges by means of footings straps or other approved methods.

(c) When isolated footings support reinforced concrete columns, dowels equivalent in number and area to the column reinforcing and having a length not less than 36 bar diameters above and below the joint shall be provided in the footing. Where footing depth does not allow straight dowels standard ACI hooks will be allowable. Such dowels, or anchor bolts as required for steel columns, shall be held to proper grade and location during the pouring of the footing by means of templates or by other approved methods.

(d) The top of all isolated footings shall be a minimum of 8" below finish grade.

(e) Any isolated footing subjected to uplift forces shall be specifically designed for that purpose, as set forth in section 2309.2 of this Code.

2403.4 CONCRETE SLABS ON FILL:

(a) Concrete floors within buildings where placed directly on the supporting soil shall comply with this Sub-section.

(b) Where it is proposed to place concrete slabs directly on the supporting soil, a sub-grade shall be thoroughly compacted by approved methods. All fill placed under slabs shall be clean sand or rock, free of debris and other deleterious materials. The maximum size of rock within 12 inches below the floor slab in compacted fill shall be three inches in diameter. Where fill material includes rock, large rocks shall not be allowed to nest and all voids shall be carefully filled with small stones or sand, properly compacted.

(c) (1) Concrete floor slabs placed directly on the supporting soil shall be a minimum of 4 inches in thickness, reinforced with not less than 0.029 square inches of reinforcing per linear foot of slab in each direction.

(2) Where top soil has been stripped and fill has been compacted under the supervision of a special inspector to a minimum of 92 percent compaction for all layers as verified by field density tests as set forth herein, no reinforcement shall be required.

(3) Such unreinforced slab shall not be supported by foundation walls.

(4) Tests shall be made in accordance with Methods of Test for Moisture Density Relations of Soils. ASTM D1557, as set forth in Section 402, modified to use 25 blows on five layers with a 10-pound hammer dropping 18 inches.

(d) (1) Where a concrete slab is supported by a foundation wall or continuous footing, the slab shall be reinforced for a distance of not less than 2 ½ feet from the inside edge of the support with a minimum of twice the area of reinforcing set forth in Paragraph 2403.4(c) in the principal direction only.

(2) All concrete slab edges and concrete beams supporting exterior walls shall be recessed a minimum of 3/4" below top of slab or beam for a width of the exterior wall, or be provided with an alternate-water stop method as approved by the Building Official.

(e) The discontinuous edges of patioslabs and pool decks shall be at least 8 inches deep for a width of 8 inches and contain one #5 continuous bar.

(f) Reinforced concrete slabs on fill for garbage containers shall be a minimum of one foot larger on all sides than the garbage receptacle (Dumpster) and a minimum thickness of 6".

(g) TERMITE PROTECTION: All soil and fill under floors and/or within or under buildings shall have preconstruction soil treatment for protection against termites. The Standards of the National Pest Control Association shall be deemed as approved in respect to preconstruction soil treatment for protection against termites. Certificate of Compliance shall be issued to the building department by a licensed pest control company.

(h) When polyethylene sheets are utilized as a vapor barrier beneath a ground slab, the subgrade for that slab shall be considered a formed surface for the purpose of reinforcing steel coverage.

(i) Concrete slabs outside of buildings, other than patios and pool slabs, where placed directly on the supporting soil, for minor accessory uses such as, but not limited to, walkways, driveways, minor equipment pads, etc. shall be not less than four (4) inches thick. Such slabs shall be placed on clean, thoroughly compacted, sand or crushed rock free from organics, debris or other deleterious materials.

2403.5 MONOLITHIC FOOTINGS:

(a) Monolithic footings under walls shall be continuous or continuity otherwise provided and shall be not less than required to keep the soil pressure within that set forth in Section 2402 nor less than the following minimums:

Allowable Bearing Capacity (Pounds per square foot)	No. of Stories	Depth and Width (2) (Minimum)
2500	1	16" x 16" (1)
2500	2	16" x 24"

Based on rational analysis and soil investigation as set forth in Section 2402, the footing size or bearing capacity may vary, but the minimum width of a footing under the main walls of the building shall not be less than 16 inches nor less than eight inches more than the width of the foundation wall.

Footnote: (1) For single story wood frame exterior walls, the minimum size continuous footing shall be 16" deep x 24" wide.

(2) Any continuous Wall footing acting as a shear wall foundation shall be specifically designed for that purpose.

(b)A minimum outside finish grade of eight inches above the bottom of the exterior monolithic footing shall be required, but in no case shall the outside finish grade be above the top of the finish slab surface unless sufficient means to minimize moisture intrusion into the structure has been provided to the satisfaction of the Building Official.

(c) Continuous monolithic footings shall be placed level and any changes in the grade of such footings shall be made with a step of the same cross section and design as the monolithic footings, or the smaller of the monolithic footings, so joined.

(d) Continuous monolithic footings with eccentric loading shall be designed to limit the soil pressure at the edges to within acceptable values by means of counter-balancing or by other approved methods.

(e) Concrete monolithic footings and pads shall not receive superimposed loads until 12 hours or more after the concrete is placed.

(f) Excavations for monolithic footings and foundations which are to serve as forms shall be thoroughly wet prior to the placing of concrete.

(g) Monolithic foundation systems shall be limited for the support of a maximum of: two stories and/or floors or a maximum roof mean height of 25 feet above grade.

EXCEPTION: The monolithic foundation system has been designed by a Professional Engineer and ample consideration has been given to eccentric loading, foundation rotation and shear cracking at the slab/foundation interface.

(h) The minimum continuous monolithic footings specified in this section shall be reinforced as follows:

Reinforcing	Width Foundation
2-#5 Bars	16" and 20" wide
3-#5 Bars	24" and 30" wide
4-#5 Bars	36" wide

Where footings are 30 inches or more in width, cross bars designed to resist bending at the face of the foundation wall shall be provided.

(1) Equivalent areas in #4 reinforcing bars may be substituted for the sizes as specified.

(2) Splices in reinforcing bars shall be not less than 36 bar diameters and reinforcing shall be continuous, around all corners and changes in direction. Continuity shall be provided at corners or changes in direction by bending the longitudinal steel around the corner 48 bar diameters or by adding matching reinforcing steel, which shall extend 48 bar diameters from each corner or change in direction. When three or more bars are

required, the bars shall be held in place and alignment by transverse bars spaced not more than four feet apart.

(3) The reinforcement for monolithic footings and other principal structural members in which concrete is deposited against the ground shall have not less than three inches of concrete between the reinforcement and the ground contact surface. If concrete surfaces after removal of the forms are to be exposed to the weather or be in contact with the ground the reinforcement shall be protected with not less than two inches of concrete for bars larger than #5 and one and one-half inches for #5 or smaller bars.

(4) Excavations for continuous monolithic foundations shall be cut true to line and grade and the sides of footings shall be formed, except where soil conditions are such that the sides of the excavation stand firm and square. Excavations shall be made to firm, clean bearing.

(5) Unless otherwise determined by rational analysis monolithic footings shall have transfer reinforcement along the perimeter of the foundation. Said reinforcement shall be no less than #4 reinforcing steel bars spaced no greater than 12 inches on center and shall be no less than 5 feet 0 inches in length plus a standard ACI hook and shall be placed so as to transfer into the slab section commencing at a point no less than 3 inches from the edge form.

2404 PILE FOUNDATIONS

2404.1 GENERAL:

(a) Piles used for the support of any building or structure shall be driven to a resistance and penetration in accordance with the plans and/or specifications and as set forth herein.

(b) Piles may be jetted under the supervision of a Professional Engineer. Immediately after completion of jetting, pile shall be driven below the depth jetted to the required resistance, but not less than one foot, or to nominal refusal whichever occurs first. No jetting will be permitted that may be detrimental to existing adjacent structures or piles that have been driven.

(c) When isolated columns, piers and other loads are supported on piles a minimum of three piles shall be used for such support unless lateral bracing is provided at the pile cap to insure stability. Should a pile group be loaded eccentrically so as to produce an overload on any pile more than 10 percent of the allowable load, footing straps or other approved methods shall be required to counteract the effect of eccentric loading.

(d) The minimum center to center spacing of piles shall be not less than twice the average diameter of round piles or $1\text{-}^3/_4$ times the diagonal dimension of rectangular piles but in no case less than 30 inches, considering also provisions of Section 2404.1(1). Piles supporting walls shall have dowels in piling to offer sufficient resistance for lateral restraint of grade beam.

(e) Non-fluid soil shall be considered as providing full lateral support against column action. The portion of a pile which extends through air, water, fluid soil or other unstable material shall be designed as a structural column. Soils having a consistency stiffer than fluid soil may be considered as capable of providing lateral support. Where cast-in-place piles are used reinforcement shall extend ten feet below the plane where the soil provides lateral restraint. Sufficient reinforcing for all types of piles shall be provided at the junction of the pile and pile cap or grade beam to make a suitable connection. Shells conforming to Paragraph 2404.6(f) may be considered as reinforcement.

(f) Reinforced concrete caps shall be provided for all pile clusters and such caps shall extend laterally not less than 6 inches beyond the extreme pile surface and vertically not less than 4 inches below the pile butt. Pile caps may be omitted when piles are used to support grade beams, provided that the spacing of Paragraph (d) above is complied with and provided that the portions of the grade beams acting in place of the pile cap shall be computed by a recognized method of analysis to properly carry the loads.

(g) Piles shall be driven using an approved cushion block consisting of material so arranged as to provide

transmission of hammer energy equivalent to one-piece hardwood with the grain parallel to the axis of the pile and enclosed in a metal housing to prevent its lateral deformation between the hammer ram and the top of the pile.

(h) Friction piles shall be driven a minimum penetration of 12 feet below the cut-off or the existing ground, whichever is the lower.

(i) Diesel hammers may be used for driving piles if provided with one of the following means of determining the energy of the hammer's blow:

(1) Closed top diesel hammers shall be used with a rating instrument and charts to measure the equivalent WH energy per blow of the hammer. The equivalent WH energy as measured by the instrument shall be the ram's weight times the equivalent ram stroke which is the actual ram stroke plus an added value obtained from the energy stored in the bounce chamber. The energy per blow shall be the equivalent WH energy for the closed top diesel.

(2) Open top diesel hammers shall be equipped with a ram stroke indicator rod which is striped in increments above the hammer body and fastened to the body of the hammer. The energy per blow for the open top diesel shall be computed as the ram's working stroke times the ram's weight.

(3) The load bearing formula applicable for single-acting pile hammers shall be used to compute the bearing capacity of the driven pile.

(j) Followers shall be used only upon permission of the special inspector or Engineer and only where necessary to effect installation of piles. A follower shall be of such size, shape, length, material and weight as to permit driving the pile in the desired location and to the required depth and resistance, without loss of hammer energy in the follower.

(k) Splices shall be avoided as far as practicable. Splices shall be so constructed as to provide and maintain true alignment and position of the component parts of the pile during installation and subsequent thereto. Splices shall develop the required strength of the pile.

(l) The safe capacity of a group of friction piles in plastic material may be determined by load testing the group to 150 percent of the proposed group load or by the formula given in Sub-section 2404.2. When computed by formula, the allowable load for such a group shall be the allowable load for one pile times the number of piles in the group times the efficiency of the pile group as follows:

$$E = 1 - O\frac{(N-1)M+(M-1)N}{90MIN}$$

E ..... is the efficiency
S ..... the average spacing of the piles in inches
M ..... the number of rows
N ..... the number of piles in one row
D ..... the average diameter of the pile, in inches
O ..... arc tan $^{D}/_{S}$ in degrees

(m) Types of piles which are not provided for in this Section shall conform to the requirements herein for the type which it most nearly approximates, subject to such additional requirements as may be made by the Building Official.

(n) Pile driving hammers shall develop a minimum of one foot-pound of energy per pound of pile or mandrel, but not less than 7,000 foot-pounds of energy per blow.

(o) Piles may be driven with drop or gravity hammers provided the hammer shall weigh not less than 3,000 pounds and the fall of the hammer shall not exceed 6 feet.

(p) Piles shall be driven with a variation of not more than ¼ inch per foot from the vertical, or from the batter line indicated, with a maximum variation of the head of the pile from the position shown on the plans of not more than three inches, subject to the provisions of Paragraph 2404.1(c).

(q) The special inspector or Engineer supervising the pile driving operations shall be required to keep an accurate record of the material and the principal dimensions of each pile; of the weight and fall of the hammer, if a single-acting hammer or drop hammer; the size and make, operating pressure, length of hose, number of blows per minute and energy per blow, if a double-acting hammer; together with the average penetration of each pile for at least the last five blows, and the grades at tip and cut-off. A copy of these records shall be filed with the Building Official and kept with the plans.

(r) Where piling must penetrate strata offering high resistance to driving or where jetting could cause damage, the inspector or supervising Engineer may require that the piles be set in predrilled or punched holes. The equipment used for drilling or punching must be approved be the special inspector or Engineer. The piles shall reach their final penetration by driving.

(s) (1) The maximum load permitted on any pile shall not exceed 36 tons unless substantiated by load test performed at the site, as set forth in Sub-section 2404.9 herein.

(2) The Building Official may require tests on any pile where performance is questionable.

(t) Piles shall be designed and driven to develop not less than 10 tons safe bearing capacity.

(u) In soils in which the installation of piles causes previously installed piles to heave, accurate level marks shall be put on all piles immediately after installation and all heaves piled shall be reinstalled to the required resistance.

(v) Piles shall not be driven closer than two feet nor jetted closer than ten feet, to an existing building or structure unless approved by a special inspector or engineer.

2404.2 DRIVING FORMULA LOAD: Subject to pile load limitations contained in Paragraphs 2404.3(h) and 2404.4(b) and in the absence of pile load test data satisfactory to the Building Official, the load on a pile shall not exceed that computed from the following driving formula:

Drop Hammer: $$P = \frac{2Wh}{S+1}$$

Single Acting Hammers: $$P = \frac{2(W+Ap)h}{S+0.1}$$

Double Acting Hammers: $$P = \frac{2Wh}{S+0.1}$$

Or Differential

In which:

A = area of piston in square inches

p = pressure in pounds per square inch at the hammer

P = allowable total load in pounds

W = weight of striking part of hammer in pounds

h = height of fall of striking part of hammer in feet or stroke in feet

S = average penetration, in inches, per blow of not less than the five final blows

E = actual energy delivered by hammer per blow in foot pounds

2404.3 WOOD PILES:

(a) Wood piles shall conform to the Standard, Round Timber Piles, ASTM D25, as set forth in Section 402.

(b) Untreated wood piles in all cases shall be cut off not higher than mean low water and shall be capped with concrete.

(c) (1) Timber piles used to support permanent structures shall be treated in accordance with this section unless it is established that the tops of untreated timber piles will be below lowest ground water level assumed to exist during the life of the structure.

(2) Preservative and minimum final retention shall be in accordance with AWPB Standard C-3.

(3) When timber piles are used in salt water, the treatment shall conform to AWPB Standard MP-1, MP-2 or MP-4.Pile cut-offs shall be treated in accordance with AWPB Standard M-4.

(aa) All preservative treated wood piles shall have a metal tag, brand, or other preservative treatment identification mark.

(bb) Such mark shall identify the producer, and/or the appropriate inspection agency, and treatment specifications or quality mark.

(d) Wood piles which support a structure over water may project above the water to such height as may be necessary for structural purposes, provided that such piles used to support structures other than open wharfs, boat loadings, and other similar light structures shall have been treated in accordance with Sec. 2404.3(c)(1).

(e) Wood piles shall be driven with a protective driving cap or ring when necessary to prevent brooming or splitting of the butt. When brooming or splitting occurs, such piles shall be cut back to solid wood before the final resistance to penetrations is measured.

(f) If required, when driving through or to hard material or to rock, wood piles shall be fitted with a metal protective drive shown satisfactory to the Building Official.

(g) (1) The maximum allowable load on a round timber pile shall be determined in accordance with Paragraph 2404.1(s) herein, provided the maximum allowable stresses of timber are not exceeded.

(2) The allowable stresses for timber piles shall not exceed Table 24-A except as modified by Part 6 of National Design Specification for Wood Construction as set forth in Sec. 402.

TABLE 24-A

Species	Compression Parallel To Grain psi[4]	Bending psi[4]	Shear Horiz psi4	Comp Perp To Grain psi[4]	Modulus of Elasticity
Pacific Coast Douglas Fir (1)	1250	2450	115	230	1,500,000
Southern Pine (2)	1200	2400	110	250	1,500,000
Red Oak (3)	1100	2450	135	350	1,250,000
Red Pine (4)	900	1900	85	155	1,280,000

1. Pacific Coast Douglas Fir values apply to this species as defined in ASTM Designation 017670-76, Standard Specification for Pressure Treatment of Timber Products. For faster design, use Douglas Fir-Larch design values.
2. Southern Pine values apply to Longleaf, Slash, Loblolly, and Short Leaf Pines.
3. Red Oak values apply to Northern and Southern Red Oak.
4. Red Pine values apply to Red Pine grown in the United States.

2404.4 PRECAST CONCRETE PILES:

(a) Precast concrete piles shall be cast of concrete having a compressive strength of not less than 3,000 pounds per square inch at time of driving, and shall be reinforced with a minimum of four longitudinal steel bars having an area of not less than one percent nor more than 4 percent of the gross concrete area. All longitudinal bars shall be of uniform size and shall be tied by not less than #2 hoops spaced 8 inches in the body of the pile and not over 3 inches for the first 18 inches from both the butt and the tip. All reinforcement shall be protected by 2 inches or more of concrete, except that for piles subjected to the action of open water, waves or other severe exposure a 3-inch protective covering shall be furnished in the zone of exposure. For point bearing piles, the concrete area of the tip shall be not less than 75 percent of the area of the butt.

(b) All precast concrete piles shall have their date of manufacture and the lifting points clearly marked on the pile. Concrete piles shall not be driven until they have attained their full specification strength as verified by tests, nor shall the piles be removed from the forms until 50 percent of the specification strength has been attained. Piles shall not be transported nor driven until they have been cured not less than seven days for Type I cement and three days for Type III cement.

(c) In the absence of load tests, the maximum allowable load per pile shall not exceed the values set forth in Table 24-B.

TABLE 24-B

Size (Inches)	Maximum Load (Tons)
10 x 10	17
12 x 12	25
14 x 14	35

2404.5 PRESTRESSED PRECAST CONCRETE PILES:

(a) Prestressed precast concrete piles shall conform to Section 2509 and to Sub-section 2404.1, 2404.2, 2404.4, and 2404.9 except as specifically detailed in this Sub-section.

(b) Prestressed concrete piles shall be cast of concrete having a compressive strength of not less than 5,000 psi at time of driving and 3,000 psi before transfer of the prestressing force. The prestressing elements shall not be stressed initially in excess of 75 percent of its ultimate strength. The elements shall transfer a compressive stress to the concrete, after losses, of not less than 0.08 of the specified strength at driving. Under loads other than handling no tension will be permitted in the concrete.

(c) Longitudinal reinforcing shall be protected by 2 inches of concrete and shall be tied by #2 hoops or #5 AS&W gage spirals spaced at 8 inches in the body of piling 14 inches or smaller and 9 inches in the body of piling 16 inches or larger and not over 3 inches for the first 18 inches from both the butt and the tip.

2404.6 CAST-IN-PLACE:

(a) Cast-in-place concrete piles shall consist of a steel shell driven in intimate contact with the

surrounding soil and left in place and filled with concrete. Steel shells may be uniformly tapered, step-tapered, cylindrical or a combination of such shapes and may be laterally corrugated, spirally corrugated, longitudinally fluted or plain.

(b) Pile shells end enclosures shall be of sufficient strength and rigidity to permit their driving in keeping with the driving method used, and to prevent harmful distortion caused by soil pressures or the driving of adjacent piles until filled with concrete. A reduction of cross sectional area in excess of 15 percent shall be cause for rejection. The shells shall also be sufficiently watertight to exclude water during the placing of concrete.

(c) The minimum diameter shall be 8 inches.

(d) Concrete for cast-in-place piles shall develop a compressive strength of not less than 3,000 pounds per square inch at 28 days. The concrete shall be deposited in a continuous operation so as to insure a full-sized pile without voids or separation. Concrete shall be placed in the dry. The pile may be sealed by depositing concrete by tremie or other approved method.

(e) Splices of shell sections shall be designed to insure the alignment of the shells and develop the full strength of the shell station.

(f) (1) The load on the shell shall not exceed 25 percent of the minimum average tensile yield strength of the steel multiplied by the area of the shell.

(2) Shells having a wall thickness of 0.119 inch or more may be considered as carrying part of the load.

(3) Adequate allowance for corrosion shall be considered in the design but not less than the outer inch of the shell thickness shall be deducted before computing the area of the shell considered as carrying load.

(4) The metal for the shells shall conform to the Standards for Welded and Seamless Steel Pipe Piles, Grade 2, ASTM A252, for Hot-Rolled Carbon Steel Sheets and Strip of Structural Quality, ASTM A570 and Carbon Structural Steel, Cold-Rolled Sheet, ASTM A611, as set forth in Section 402.

(5) The yield strength used in design shall be that of the material in the fabricated shell.

(g) For friction piles the allowable load shall be computed at the cross section located at a point two-thirds of the embedded length of the pile, in material providing suitable lateral support, measured upward from the tip. The load on the concrete shall not exceed 25 percent of the 28-day strength of the concrete multiplied by the concrete area.

(h) For end bearing piles, the concrete area of the critical section shall be such that the unit stress on the concrete does not exceed 0.25f'c under the pile load. The area of the shell and the critical section of the concrete shall be taken at the elevation where the pile enters the stratum furnishing and bearing.

2404.7 ROLLED STRUCTURAL STEEL SHAPES:

(a) Rolled structural steel piles shall conform to the Standards for General Requirements for Hot-Rolled and Cold-Finished Carbon and Alloy Steel Bars, ASTM A29, and Carbon Steel Bars Subject to Mechanical Property Requirements, ASTM A306, set forth in Section 402, except that copper may be added to increase the corrosion resistant properties of the material.

(b) Sections of such pile of H form shall have flange protections not exceeding 14 times the thickness of web or flange and total flange width not less than 85 percent of the depth of the section.

(c) No section shall have a nominal thickness of metal less than 3/8-inch.

(d) For end-bearing piles, the allowable stress may be determined on the basis of an allowable stress of 25 percent of the yield value of the steel.

(e) In the absence of adequate corrosion protection, inch shall be deducted from each face in determining the area of the pile section.

(f) The allowable load, when used as friction piles, shall be determined by load tests at the site.

2404.8 SPECIAL PILES OR SPECIAL CONDITIONS: The use of types of piles or conditions not specifically covered herein may be permitted, subject to the approval of the Building Official, upon submission of acceptable test data, calculations or other information relating to the properties and load-carrying capacity of such piles.

2404.9 LOAD TEST ON PILES:

(a) Single piles tested shall be loaded to at least twice the desired design load and should pile groups be tested, the test load shall be not less than 1 times the total desired load for the group.

(b) The apparatus for applying known vertical loads to the top of the pile shall maintain constant load under increasing settlement, and shall apply the loads in such a way that no lateral forces or impact will occur. Hydraulic jacks, when used, shall be equipped with a calibrated pressure gage. Uplift piles used to provide the jacking resistance shall be a sufficient distance from the test pile so as not to influence its behavior under test.

(c) The test load shall be applied in increments of not more than 25 percent of the design load until the total test load has been applied.

(d) The method for determining vertical movement shall be subject to the approval of the Building Official. Readings shall be sufficient in number to define the time settlement and rebound curve.

(e) Each load increment shall be maintained for a minimum of one hour, and until the rate of settlement is less than 0.01 inch per hour. The total load shall be maintained until settlement does not exceed 0.01 inch in 24 hours. Settlement readings shall be taken at regular intervals during the test period.

(f) After the maximum load has remained on the pile for 24 hours and final settlement readings have been taken, the pile shall be unloaded in 50 percent decrements of design load. Rebound readings shall be taken at regular intervals during the unloading period, and final reading taken approximately 12 hours after the entire load has been removed.

(g) The maximum allowable pile load shall be one-half of that load which causes a net settlement of not more than 0.005 inch per ton of test load, a gross settlement of one inch (whichever is less) or a disproportionate increase in settlement.

(h) Control test piles may be tested in accordance with ASTM D1143, Method of Testing Piles Under Axial Compressive Load. If quick load test procedures are used, then the applied test load shall be not less than three times the working pile capacity and in accordance with the standard.

2405 FOUNDATION WALLS AND GRADE BEAMS

2405.1 EXTERIOR FOUNDATION WALLS:

(a) GENERAL:

(1) Exterior foundation walls of buildings, where the character of the soil is such that allowable soil loads of 1,500 pounds or less per square foot are used for design, shall be poured-in-place reinforced concrete from the footing to the bottom of the first or ground floor construction.

(2) Exterior foundation walls of buildings, where the character of the soil is such that allowable soil loads of more than 1,500 pounds per square foot are used for design, may be of unit masonry or concrete on continuous concrete footings.

(3) Under the exterior walls of buildings of Type V construction, in locations where extreme dampness exists, the Building Official may approve isolated piers, provided such piers are as otherwise set

forth in Paragraph 2405.2(b).

(b) DETAILED REQUIREMENTS:

(1) The thickness of the foundation wall shall be not less than eight inches.

(2) Where wood joist construction is used for the first or ground floor, the thickness of the exterior foundation walls shall be not less than eight inches, plus four inches for the bearing of joists.

(3) Foundations of unit masonry supporting joists shall be capped with four inches of concrete.

2405.2 INTERIOR FOUNDATION WALLS: Interior foundation walls shall be of the material and design as specified in Section 2405.1 except as follows:

(a) Interior foundation walls which support stud walls shall be exempted from the additional 4 inches of width required for the bearing of joists.

(b) The use of isolated piers, girders and beams may be substituted for interior foundation walls when designed by a Registered Architect and/or Engineer.

2405.3 GRADE BEAMS:

(a) Grade beams, supporting loads between piles or piers, shall be reinforced concrete, or structural steel protected by two inches of concrete cover.

(b) Grade beams shall be the thickness of the wall they support but never less than eight inches nor less than set forth for foundation walls herein.

(c) Grade beams shall be suitably designed and reinforced around access openings and vents.

2406 GRADES UNDER BUILDINGS

2406.1

(a) The grade of the ground under buildings of joist or suspended slab construction having no basements shall not be lower than the lowest surrounding finished lot area grade in order to prevent the accumulation and standing of ground, storm, or tide water under such buildings unless provided with other approved means of drainage.

(b) Plans for future raising of lots shall be taken into account in planning the grade of the ground under such buildings, or

(c) The Building Official may establish grades under such buildings based on present or future street or sidewalk grades abutting the property.

2407 RETAINING WALLS

2407.1 All walls exceeding 24 inches in height built to retain or support earth, or subject to pressure from adjoining earth, and any surcharge shall be designed to resist the pressure to which they are subjected, including water pressure that may exist.

2408 SEAWALLS AND BULKHEADS

2408.1

(a) All dredging, filling, excavation and waterfront construction such as docks, piers, wharves, bridges, groins, jetties, moles, breakwaters, seawalls, revetments, causeways, artificial nourishment of beaches or water deposition or removal of material in all water areas within the area jurisdiction of this Code, shall be planned and designed by a Professional Engineer in accordance with this Code and other applicable standards and requirements of the Administrative Authority, except that

(b) The requirement for professional design will not be required by the Building Official for bulkheads, docks, piers and similar structures constructed in conjunction with private residences on lakes, private canals and similar water frontage not subject to wind, wave, or tidal action; do not involve unusual soil conditions,

slope, or unstable soil, and are not part of a foundation or support for an above-grade structure.

CHAPTER 25
REINFORCED CONCRETE

2501 GENERAL
2502 STANDARDS
2503 DEFINITIONS
2504 MATERIALS
2505 CONCRETE QUALITY
2506 MIXING AND PLACING CONCRETE
2507 FORMWORK, EMBEDDED PIPES, AND CONSTRUCTION JOINTS
2508 DETAILS OF REINFORCEMENT
2509 PRECAST CONCRETE
2510 PRESTRESSED CONCRETE
2511 PNEUMATICALLY-PLACED CONCRETE (SHOTCRETE)

2501 GENERAL

2501.1 SCOPE: This chapter prescribes requirements for reinforced concrete in construction regulated by this code.

2501.2 APPLICATION: Reinforced concrete shall be of the materials. Proportions, strength and consistency as set forth in this chapter and shall be designed by methods admitting of rational analysis according to established principles of mechanics.

2501.3 REQUIREMENTS: All structures of reinforced concrete, including prestressed concrete shall be designed and constructed in accordance with the provisions of ACI 318 as adopted herein.

2501.4 ANCHORAGE OF CONCRETE WALLS: Concrete walls shall be anchored to all floors, roofs and other structural elements which provide required lateral support for the wall. Such anchorage shall provide a positive direct connection capable of resisting the horizontal forces specified in this chapter or a minimum force of 400 pounds per lineal foot of wall, whichever is greater. Walls shall be designed to resist bending between anchors where the anchor spacing exceeds 4 feet.

2502 STANDARDS

The following Standards latest edition, are hereby adopted as part of this Code as set forth in Section 402:

2502.1 AMERICAN CONCRETE INSTITUTE ACI:

(a) Standard Tolerances For Concrete Construction and Materials, ACI 117.

(b) Specifications For Structural Concrete For Buildings, ACI 301.

(c) ACI DETAILING MANUAL - 1988 (SP-66), ACI 315.

(d) Building Code Requirements for Reinforced Concrete, ACI 318.

(e) Recommended Practice for Concrete Form-work, ACI 347.

(f) Recommended Practice for Shotcreting, ACI 506.

(g) Specification for Materials, Proportioning, and Application of Shotcrete, ACI 506.2.

2502.2 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE):

(a) Specifications for the Design and Construction of Composite Slabs and Commentary on Specifications for the Design and Construction of Composite Slabs, ANSI/ASCE 3.

(b) Guideline for Structural Condition Assessment of Existing Buildings, ANSI/ASCE 11.

2502.3 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

(a) Standard specification for deformed and plain billet steel bars for concrete reinforcement, ASTM A615.

(b) Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation, ASTM C1077.

2503 DEFINITIONS

PLAIN CONCRETE: Concrete that is either unreinforced or contains less reinforcement than the minimum amount specified for reinforcement concrete.

REINFORCED CONCRETE: Concrete reinforced with no less than the minimum amount required by ACI 318, prestressed or non-prestressed, and designed on the assumption that the two materials act together in resisting forces.

PRESTRESSED CONCRETE: Reinforced concrete in which internal stresses have been introduced to reduce potential tensile stresses in concrete resulting from loads. The term prestressed concrete refers to pre-tensioned concrete in which the reinforcing is tensioned before hardening of the concrete, to post-tensioned concrete in which the reinforcing is tensioned after hardening of the concrete, or combinations of both pretensioning and posttensioning.

PRECAST CONCRETE: Plain or reinforced concrete elements cast elsewhere than its final position in a structure.

SHOTCRETE: Mortar or concrete pneumatically projected at high velocity onto a surface.

2504 MATERIALS

2504.1 CEMENTS:

(a) Cements shall conform to one of the following specifications for Portland cement as set forth in Section 402:

(1) Portland cement, ASTM C150.

(2) Blended Hydraulic Cements, ASTM C595, excluding Types S and SA which are not intended as principal cementing constituents of structural concrete.

2504.2 AGGREGATES:

(a) Aggregates for concrete shall conform to one of the following specifications as set forth in Section 402 or paragraph 2504.2(b):

(1) Concrete Aggregates, ASTM C33.

(2) Lightweight Aggregates for Structural Concrete, ASTM C330.

(b) Gradation of locally produced sand and crushed rock aggregate shall be as follows:

COARSE AGGREGATE		**FINE AGGREGATE**	
Percent Passing		**Percent Passing**	
1" sieve	100	3/8" sieve	100
1" sieve	95-100	#4 sieve	90-100
½" sieve	25-60	#8 sieve	70-95
#4 sieve	0-10	#16 sieve	50-85
#8 sieve	0-5	#30 sieve	30-70
		#50 sieve	10-45
		#100 sieve	0-10

(c) Aggregates failing to meet ASTM C33, ASTM C330, or the above special gradation but which have been shown by special test or actual service to produce concrete of adequate strength and durability may be used when certified by the Professional Engineer.

(d) Aggregates shall be quarried or washed in fresh water and shall contain not more than 1/20 of 1 percent salt by weight.

2504.3 WATER:

(a) Water used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or reinforcements.

(b) Mixing water for concrete, including that portion of mixing water contributed in the form of free moisture or aggregates, shall not contain deleterious amounts of chloride ion.

2504.4 REINFORCEMENT:

(a) Deformed reinforcement shall conform to one of the specifications set forth in section 402; except as provided in ACI 318.

(b) Prestressing tendons shall conform to one of the specifications as set forth in Section 402.

EXCEPTION: Wire strands, and bars not specifically listed in ASTM A421, A416, or A722 may be used provided they conform to minimum requirements of these specifications and do not have properties that make them less satisfactory than those listed in ASTM A416, A421, or A722.

(c) Reinforcement consisting of structural steel, steel pipe, or steel tubing may be used as specified in ACI 318.

(d) All welding of reinforcement shall conform to the Structural Welding Code-Reinforcing Steel, AWS D1.4, as set forth in Section 402 of this Code.

(1) Reinforcement to be welded shall be indicated on the drawings and welding procedures to be used shall be specified. ASTM steel specifications, except ASTM A706, shall be supplemented to require a report of material properties necessary to conform to welding procedures specified in AWS D1.4.

(e) Deformed reinforcement may be galvanized or epoxy-coated in accordance with the "Specifications for Zinc-coated (galvanized) Bars for Concrete Reinforcement", ASTM A767 or the "Specification for Epoxy-Coated Reinforcing Bars", ASTM A775. Zinc or epoxy-coated reinforcement shall conform to ASTM A615, A616 (S1), A617 or A706.

2504.5 ADMIXTURES:

(a) Admixtures to be used in concrete shall conform to one of the specifications as set forth in Section 402.

(b) An admixture shall be shown capable of maintaining essentially the same composition and performance throughout the work as the product used in establishing concrete proportions.

(c) Admixtures containing chloride ions shall not be used in concrete if their use will produce a deleterious concentration of chloride ion in the mixing water.

2504.6 TESTS OF MATERIALS:

(a) The Building Official, or his authorized representative, shall have the right to order the test of any material entering into concrete or reinforced concrete to determine its suitability for the purpose; to order reasonable tests of the concrete from time to time to determine whether the materials and methods in use are such as to produce concrete of the necessary quality; and to order the test under load of any portion of a completed structure, when conditions have been such as to leave doubt as to the adequacy of the structure to serve the purpose for which it is intended.

(b) Tests of materials and of concrete shall be made in accordance with applicable standards of the American Society for Testing and Materials (ASTM) as listed in Section 402. Tests shall be made by an approved testing laboratory and results of such tests shall be submitted to the Building Official. Approved testing laboratories shall comply with ASTM C-1077.

(c)A complete record of tests of materials and of concrete shall be available to the Building Official for inspection during progress of work and for 7 years after completion of the project, and shall be preserved by the Special Inspector, Specialty Engineer, the Professional Engineer of Record and/or the Architect of Record for that purpose.

(d) If any doubt develops concerning the safety of a structure or member, the Building Official may order a structural strength investigation by analysis or by means of load tests, or by a combination of analysis and load tests as set forth in ACI 318.

2505 CONCRETE QUALITY

2505.1 GENERAL:

(a) Concrete shall be proportioned and produced to provide an average compressive strength sufficiently high to minimize the frequency of strength tests below the specified compressive strength of concrete, f'c.

(b) Requirements for f'c shall be based on tests of cylinders made and tested as prescribed in Sub-section 2505.2(b)(3).

(c) Unless otherwise specified, f'c shall be based on 28 day tests. If other than 28 day tests are called for, f'c shall be indicated in design drawings or specifications.

(d) Design drawings shall show the specified compressive strength of concrete, f'c, for which each part of the structure is designed.

2505.2 EVALUATION AND ACCEPTANCE OF CONCRETE:

(a) Frequency of testing

(1) The Building Official may require a reasonable number of tests to be made during the progress of the work, or may promulgate and set forth in writing such reasonable rules for requiring tests to be made by an approved laboratory as he may consider necessary to insure compliance with this Code.

(2) Not less than three specimens shall be made for each standard test.

(3) Samples for strength of each class of concrete placed each day shall be taken not less than once a day; nor less than once for each 50 cubic yards of concrete, nor less than once for each 5,000 square feet of surface area for slabs or walls.

(4) On a given project, if total volume of concrete is such that frequency of testing required by Sub-paragraph 2505.2(a)(1) would provide less than five strength tests for a given class concrete, tests shall be made from at least five randomly selected batches or from each if fewer than five batches are used.

(5) Test cylinders taken on truck-mixed concrete shall be taken at the approximate one-quarter point of the load.

(6) The age for strength tests shall be 28 days, or where specified at the earlier age at which the concrete is to receive its full working load, but seven-day tests may be used, provided that the relationship between the seven and 28-day strengths of the concrete is established by tests for the materials and proportions used.

(b) Laboratory-cured specimens.

(1)A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at test age designated for determination of f'c.

(2) Samples of strength tests shall be taken in accordance with the Method of Sample Fresh Concrete,

ASTM C172, as set forth in Section 402.

(3) Cylinders for strength tests shall be molded and laboratory-cured in accordance with the Method of Making and Curing Concrete Test Specimens in the Field ASTM C31, as set forth in Section 402, and tested in accordance with the Method of Test of Compressive Strength of Cylindrical Concrete Specimens, ASTM C39, as set forth in Section 402.

(4) Strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:

(aa) Average of all sets of three consecutive strength tests equal or exceed f'c.

(bb) No individual strength test (average of two cylinders) falls below f'c by more than 500 psi.

(5) If any of the requirements of Subsection 2505.2 are not met, steps will be taken to increase the average of subsequent strength test results. Requirements of paragraph 2505.2(d) shall be observed if any individual strength test falls below f'c by more than 500 psi.

(c) Field cured specimens

(1) The Building Official may require strength tests of cylinders cured under field conditions to check adequacy of curing and protection of concrete in the structure.

(2) Field cured cylinders shall be cured under field conditions in accordance with Section 7.4 of the Method of Making and Curing Concrete Test Specimens in the Field, ASTM C31.

(3) Field cured test cylinders shall be molded at the same time and from the same samples as laboratory-cured test cylinders.

(4) Procedures for protecting and curing concrete shall be improved when strength of field cured cylinders at test age designated for determination of f'c is less than 85 percent of that of companion laboratory cured cylinders. The 85 percent may be waived if field cured strength exceeds f'c by more than 500 psi.

(d) Investigation of low-strength test results.

(1) When there is a question as to the quality of the concrete in the structure, the Building Official may require core tests in accordance with the Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete, ASTM C42, as set forth in Section 402, or order load tests on that portion of the structure where the questionable concrete has been placed.

(2) When concrete in structures has failed to meet the minimum standard, the Building Official shall order analysis and reports by a Professional Engineer to determine the adequacy of the structure.

(3) If the likelihood of low-strength concrete is confirmed and computations indicate that load-carrying capacity may have been significantly reduced, test of cores drilled from the area in question be required in accordance with the Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete, ASTM C42, as set forth in Section 402. In such case, three cores shall be taken for each strength test more than 500 psi below specified value of f'c.

(4) If concrete in the structure will be dry under service conditions, cores shall be air dried (temperature 60° to 80°F, relative humidity less than 60 percent) for 7 days before test and shall be tested dry. If concrete in the structure will be more than superficially wet under service conditions, cores shall be immersed in water for at least 40 hours and be tested wet.

(5) Concrete in an area represented by core tests shall be considered structurally adequate if the average of three cores is equal to at least 85 percent of f'c and if no single core is less than 75 percent of f'c. To check testing accuracy, locations represented by erratic core strengths may be re-tested.

(e) The maximum allowable slump of concrete shall be six inches. On projects inspected by a Special Inspector, this maximum may be exceeded, but no concrete shall exceed the slump as indicated on the

approved plans for proposed work.

2506 MIXING AND PLACING CONCRETE

2506.1 PREPARATION OF EQUIPMENT AND PLACE OF DEPOSIT:

(a) Preparation before concrete placement shall include the following:

(1) All equipment for mixing and transporting concrete shall be clean.

(2) All debris shall be removed from the spaces to be occupied by the concrete.

(3) Forms shall be properly coated.

(4) Masonry filler units that will be in contact with concrete shall be well drenched.

(5) Reinforcement shall be thoroughly cleaned of deleterious coatings.

(6) Water shall be removed from where concrete is placed unless a tremie is to be used or unless otherwise permitted by the Professional Engineer of Record.

(7) All laitance and other unsound material shall be removed before additional concrete is placed against hardened concrete.

2506.2 MIXING:

(a) All concrete shall be mixed until there is a uniform distribution of materials and shall be discharged completely before mixer is recharged.

(b) Ready-mixed concrete shall be mixed and delivered in accordance with requirements of the Specifications for Ready-Mixed Concrete, ASTM C94, or the Specifications for Concrete made by Volumetric Batching and Continuous Mixing, ASTM C685, as set forth in Section 402.

(c) Job-mixed concrete shall be mixed in accordance with the following:

(1) Mixing shall be done in a batch mixer of approved type.

(2) Mixer shall be rotated at a speed recommended by the manufacturer.

(3) Mixing shall be continued for at least 1½ minutes after all materials are in the drum, unless a shorter time is shown to be satisfactory by the mixing uniformity test of "Specification for Ready Mixed Concrete" (ASTM C94).

(4) Materials handling, batching, and mixing shall conform to applicable provisions of the Specifications for Ready-Mixed Concrete, ASTM C94.

(5) A detailed record shall be kept to identify:

(aa) Number of batches produced.

(bb) Proportions of materials used.

(cc) Approximate location of final deposit in structure.

(dd) Time and date of mixing and placing.

2506.3 CONVEYING:

(a) Concrete shall be conveyed from mixer to the place of final deposit by methods that will prevent separation or loss of the materials.

(b) Conveying equipment shall be capable of providing a supply of concrete at site of placement without separation of ingredients and without interruptions sufficient to permit loss of plasticity between successive increments.

2506.4 DEPOSITING:

(a) Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to

rehandling or flowing.

(b) Concreting shall be carried on at such a rate that concrete is at all times plastic and flows readily into the spaces between reinforcement.

(c) Concrete that has partially hardened or been contaminated by foreign materials shall not be deposited in the structure.

(d) Retempered concrete or concrete that has been remixed after initial set shall not be used unless approved by the Building.

(e) After concreting is started, it shall be carried

on as a continuous operation until placing of the panel or section, as defined by its boundaries or predetermined joints is completed except as permitted or prohibited by Sub-section 2507.4.

(f) Top surfaces of vertically formed lifts shall be generally level.

(g) When construction joints are required, joints shall be made in accordance with Sub-section 2507.4.

(h) All concrete shall be thoroughly consolidated by suitable means during placement and shall be thoroughly worked around the reinforcement and embedded fixtures and into corners of forms.

2506.5 CURING:

(a) Concrete, other than high-early-strength, shall be maintained in a moist condition for at least the first 7 days after placement, except when cured in accordance with Paragraph 2506.5(c).

(b) High-early-strength concrete shall be maintained in a moist condition for at least the first 3 days, except when cured in accordance with Paragraph 2506.5(c).

(c) Accelerated curing.

(1) Curing by high pressure steam, steam at atmospheric pressure, heat and moisture, or other accepted process, may be employed to accelerated strength gain and reduce time of curing.

(2) Accelerated curing shall provide a compressive strength of the concrete at the load stage considered at least equal to required design strength at that load stage.

(3) Curing process shall be such as to produce concrete with a durability at least equivalent to the curing method of Paragraph 2506.5(a) or (b).

(4) Supplementary strength tests in accordance with Paragraph 2505.2(c) may be required to assure that curing is satisfactory.

2506.6 TOLERANCES FOR CONCRETE SLAB SURFACES:

(a) All concrete slabs shall be finished in accordance with ACI 117 as set forth in Section 402 of this Code.

2506.7 BONDING:

(a) Before fresh concrete is deposited or placed on or against concrete which has hardened for 8 hours or longer, the forms shall be re-tightened, the surface of the hardened concrete shall be cleaned of all foreign matter and laitance, and dampened, but not saturated. Fresh concrete shall be deposited or placed on or against hardened concrete so dampened before the surface is completely free of shiny spots indicating free moisture. When the concrete against which fresh concrete will be placed is less than 8 hours old, all laitance, loose particles and dirt shall be removed.

(b) Where bonding of fresh to hardened concrete is necessary, construction joints and joints between footings and walls or columns, between walls or columns and beams or floors they support, and joints in unexposed walls shall be accomplished by reinforcement, dowels, adhesives, mechanical connectors or other approved methods. Hardened concrete at joints shall be dampened, but not saturated, immediately prior to

the placement of fresh concrete.

2507 FORMWORK EMBEDDED PIPES, AND CONSTRUCTION JOINTS

2507.1 DESIGN OF FORMWORK:

(a) Forms shall be designed in accordance with ACI 347, Recommended Practice For Concrete Form-work.

(b) Forms shall result in a final structure that conforms to shapes, lines and dimensions of the members as required by the design drawings and specifications.

(c) Forms shall be substantial and sufficiently tight to prevent leakage of mortar.

(d) Forms shall be properly braced or tied together to maintain position and shape.

(e) Forms and their supports shall be designed so as not to damage previously placed structures.

(f) Design of formwork shall include consideration of the following factors:

(1) Rate of method of placing concrete.

(2) Construction loads, including vertical, horizontal, and impact loads.

(3) Special form requirements for construction of shells, folded plates, domes, architectural concrete, or similar types of elements.

(g) Forms for post-tensioned concrete members shall be designed and constructed to permit movement of the member without damage during application of the post-tensioning force.

2507.2 REMOVAL OF FORMS AND SHORES:

(a) No construction loads shall be supported on, nor any shoring removed from, any part of the structure under construction except when that portion of the structure in combination with remaining forming and shoring system has sufficient strength to support safely its weight and loads placed thereon.

(1) Sufficient strength shall be demonstrated by structural analysis considering proposed leads, strength of forming and shoring system, and concrete strength data. Concrete strength data may be based on tests of field cured cylinders or, when approved by the Building Official, on other procedures to evaluate concrete strength. Structural analysis and concrete strength test data shall be furnished to the Building Official, when so required.

(b) No construction loads exceeding the combination of superimposed dead load plus specified live load shall be supported on any unshored portion of the structure under construction, unless analysis indicates adequate strength to support such additional loads.

(c) Forms shall be removed in such manner as not to impair the safety and service ability of the structure. All concrete to be exposed by form removal shall have sufficient strength not be damaged thereby.

(d) Form supports for prestressed concrete members may be removed when sufficient prestressing has been applied to enable prestressed members to carry their dead load and anticipated construction loads.

(e) Inaccessible forms may remain in place with the approval of the Professional Engineer of Record and/or the Architect of Record.

2507.3 CONDUITS AND PIPES EMBEDDED IN CONCRETE:

(a) Conduits, pipes and sleeves of any material not harmful to concrete and with limitations of Sub-section 2507.3 may be embedded in concrete with approval of the Professional Engineer of Record provided they are not considered to replace structurally the displaced concrete.

(b) Aluminum conduits and pipes shall not be embedded in structural concrete unless effectively coated or covered to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel.

(c) Conduits, pipes, and sleeves passing through a slab, column, wall, or beam shall not impair the

strength of the construction.

(d) Conduits, and pipes, with their fittings, embedded within a column shall not displace more than 4 percent of the area of cross section on which strength is calculated or which is required for the fire protection.

(e) Except when plans for conduits and pipes are approved by the Professional Engineer of Record, conduits and pipes embedded within a slab, wall, or beam (other than those merely passing through) shall satisfy the following:

(1) They shall not be larger in outside dimension than ½ the overall thickness of slab, wall, or beam in which they are embedded.

(2) They shall not be spaced closer than 3 diameters or widths on center.

(3) They shall not impair the strength of the construction.

(f) Conduits, pipes, and sleeves may be considered as replacing structurally in compression the displaced concrete, provided:

(1) They are not exposed to rusting or other deterioration.

(2) They are of uncoated or galvanized iron or steel not thinner than standard Schedule 40 steel pipe, and

(3) They have a nominal inside diameter not over 2 inches and are spaced not less than 3 diameters on centers.

(g) In addition to other requirements of Sub-section 2507.3 pipes that will contain liquid, gas, or vapor may be embedded in concrete under the following conditions:

(1) Pipes and fittings shall be designed to resist effects of the material, pressure, and temperature to which they will be subjected.

(2) Temperature of liquid, gas, or vapor shall not exceed 150℉.

(3) Maximum pressure to which any piping or fittings shall be subjected shall not exceed 200 psi above atmospheric pressure.

(4) All piping and fittings except as provided in (5) below shall be tested as a unit for leaks before concrete placement. Testing pressure above atmospheric pressure shall be 50 percent in excess of pressure to which piping and fittings may be subjected, but minimum testing pressure shall not be less than 150 psi above atmospheric pressure. Pressure test shall be held for 4 hours with no drop in pressure except that which may be caused by air temperature.

(5) Drain pipes and other piping designated for pressures of not more than 1 psi above atmospheric pressure need not be tested as required in (4) above.

(6) Pipes carrying liquid, gas or vapor that is explosive or injurious to health shall be tested again as specified in (4) above after concrete has hardened.

(7) No liquid, gas, or vapor, except water not exceeding 90℉ nor 50 psi pressure, shall be placed in the pipes until the concrete has attained its design strength.

(8) In solid slabs the piping, unless it is for radiant heating, shall be placed between top and bottom reinforcement.

(9) Concrete cover for pipes and fittings shall not be less than 1½" for concrete exposed to earth or weather, nor $^{3}/_{4}$" for concrete not exposed to weather or in contact with ground.

(10) Reinforcement with an area not less than 0.002 times the area of concrete section shall be provided normal to the piping.

(11) Piping and fittings shall be assembled by welding, brazing, solder-sweating, or other equally

satisfactory methods. Screw connections shall not be permitted. Piping shall be so fabricated and installed that cutting, bending, or displacement of reinforcement from its proper location will not be required.

2507.4 CONSTRUCTION JOINTS:

(a) Surface of the concrete construction joints shall be cleaned and laitance removed.

(b) Immediately before new concrete is placed, all construction joints shall be wetted and standing water removed.

(c) Construction joints shall be so made and located as not to impair the strength of the structure. Provision shall be made for transfer of shear and other forces through construction joints.

(d) Construction joints in floors shall be located near the middle of spans of slabs, beams, or girders, unless a beam intersects a girder at the middle location, in which case, joints in the girders shall be offset a distance approximately twice the width of the beam.

(e) Beams, girders, or slabs supported by columns or walls shall not be cast or erected until concrete in the vertical support member is no longer plastic.

(f) Beams, girders, haunches, drop panels and capitals shall be placed monolithically as part of a slab system, unless otherwise shown on the design drawing.

2508 DETAILS OF REINFORCEMENT

2508.1 BENDING REINFORCEMENT:

(a) All reinforcement shall be bent, cold, unless otherwise permitted by the Professional Engineer of Record.

(b) Reinforcement partially embedded in concrete shall not be field bent, except as shown on the design drawings or permitted by the Professional Engineer of Record.

2508.2 SURFACE CONDITIONS OF REINFORCEMENT:

(a) At the time concrete is placed, reinforcement shall be free from mud, oil, or other nonmetallic coatings that adversely affect bonding capacity.

(b) Steel reinforcement, except prestressing tendons, with rust, mill scale, or a combination of both shall be considered satisfactory, provided the minimum dimensions (including height of deformations) and weight of a hand-wire-brushed test specimen are not less than applicable ASTM specification requirements.

(c) Prestressing tendons shall be clean and free from oil, dirt, scale, pitting, and excessive ruts. A light oxide is permissible.

2508.3 PLACING REINFORCEMENT:

(a) Steel reinforcement shall be accurately placed and adequately secured in position by concrete or metal chairs or spacers or other acceptable methods. The minimum clear distance between parallel bars, except in columns, shall be equal to the nominal diameter of the bars. In no case shall the clear distance between bars be less than one inch, nor less than one and one-third times the maximum size of the coarse aggregate. When reinforcement in beams or girders is placed in two or more layers, the clear distance between layers shall not be less than the diameter of the bars, and the bars in the upper layers shall be placed directly above those in the bottom layer.

(b) Unless otherwise permitted by the Building Official and Professional Engineer of Record, reinforcement, prestressing tendons, and prestressing ducts shall be placed within the following tolerances:

(1) Tolerance for depth *d*, and minimum concrete cover in flexural members, walls and compression members shall be as follows, where d represents the distance from the extreme compression fiber to the centroid of the tension reinforcement.

	Tolerance on d	Tolerance on minimum concrete cover
d < 8 in.	±3/8 in.	-3/8 in.
d > 8 in.	±½ in.	-1/2 in.

EXCEPTIONS:

(aa) Tolerance for the clear distance to formed soffits shall be minus ¼-inch.

(bb) Tolerance for cover shall not exceed minus one-third the minimum concrete cover-required in the contract drawings nor less than 1 inch when exposed to weather.

(2) Tolerance for longitudinal location of bends and ends of reinforcement shall be +2 inches except at discontinuous ends of members where tolerance shall be +½ inch.

(c) Welded wire fabric (with wire size not greater than W5 or D5) used in slabs not exceeding 10 feet in span may be curved from a point near the top of slab over the support to a point near the bottom of slab at midspan, provided such reinforcement is either continuous over, or securely anchored at the support.

(d) Welding of crossing bars shall not be permitted for assembly of reinforcement unless approved by the Professional Engineer of Record.

(e) Spacing limits and concrete cover for reinforcement shall be shown on the design drawings.

2508.4 SPLICES IN REINFORCEMENT:

(a) In slabs, beams and girders, splices in reinforcement at points of maximum stress shall be avoided wherever possible. Such splices where used shall be welded, lapped or otherwise fully developed, but in any case, shall transfer the entire stress from bar to bar without exceeding the allowable bond and shear stresses. The minimum overlap for a lapped splice shall be as required by ACI 318. The clear distance between bars shall also apply to the clear distance from a contact splice and adjacent splices or bars.

(b) Splices of reinforcement shall be made only as required or permitted on design drawings, or in specifications, or as authorized by the Professional Engineer of Record.

(c) Lap splices shall not be used for bars larger than #11 except as provided in ACI 318.

(d) Lap splices of bundled bars shall be based on the lap splice length required for individual bars within a bundle, increased 20 percent for a 3 bar bundle and 33 percent for a 4 bar bundle. Individual bar splices within a bundle shall not overlap.

(e) Bars spliced by noncontact lap splices in flexural members shall not be spaced transversely farther apart than 1/5 the required lap splice length, nor 6 inches.

(f) Welded splices may be used, provided the metallurgical properties of the bars are suitable as determined by the Professional Engineer of Record in accordance with AWS D1.4.

(g) End bearing splices.

(1) In bars required for compression only, compressive stress may be transmitted by bearing of square cut ends held in concentric contact by a suitable device.

(2) Bar ends shall terminate in flat surfaces within 1½ degrees of a right angle to the axis of the bars and shall be fitted within 3 degrees of full bearing after assembly.

(3) End bearing splices shall be used only in members containing closed ties, closed stirrups, or spirals.

(h) Welded splices in reinforcing bars shall be made by certified welders and shall comply with the Standard Structural Welding Code - Reinforcing Steel AWS D1.4 as set forth in Section 402 herein.

2508.5 CONCRETE PROTECTION FOR REINFORCEMENT (Non-prestressed):

(a) The reinforcement of footing and other principal structural members in which the concrete is deposited against the ground shall have not less than three inches of concrete between it and the ground

contact surface. If concrete surfaces after removal of the forms are to be exposed to the weather or be in contact with the ground the reinforcement shall be protected with not less than two inches of concrete for bars larger than No. 5 and one and one half inches for No. 5 bars or smaller except as set forth in Paragraph 2508.5(e) of this Code.

(b) The concrete protective covering for reinforcement at surfaces not exposed directly to the ground or weather shall be not less than three fourth inch for slabs and wall; and not less than one and one half inches for beams, girders and columns. In concrete ribbed floors in which the clear distance between ribs is not more than thirty inches, the protection of reinforcement shall be at least three fourths inches.

(c) Concrete protection for reinforcement shall in all cases be at least equal to the diameter of bars except for concrete slabs and joists as set forth herein.

(d) Exposed reinforcement bars intended for bonding with future extensions shall be protected from corrosion by concrete or other adequate covering.

(e) For exterior balcony slabs, minimum concrete cover for negative moment reinforcement may be 3/4 inch for #5 bars and smaller, provided the following are satisfied:

(1) Slab surface shall be sloped inch per foot or greater to safeguard against ponding of water.

(2) Placement of slab reinforcement shall be under the supervision of a Special Inspector as defined in Sub-section 305.3.

(3) For concrete made with normal weight aggregate water cement ratio shall not exceed 0.40 by weight. For concrete made with lightweight aggregate, specified compressive strength of concrete f'c shall not be less than 4750 psi.

(4) A surface penetrant of the alkyl-alkyoxy silane classification or approved equal is applied after proper surface preparation.

(f) Concrete cover for cast in place, precast and prestressed concrete shall be in accordance with ACI 318 if not otherwise specified in this section. When this Code requires a thickness of cover for fire protection greater than the minimum concrete specified in ACI 318, such greater thickness shall be used.

(g) Exposed reinforcement, inserts, and plates intended for bonding with future extensions shall be protected from corrosion.

(h) For structures located in corrosive atmospheres such as within or eastward of the Coastal Building Construction Zone, reinforcement shall be epoxy-coated in accordance with the standard specification for Epoxy-Coated Reinforcing Steel Bars, ASTM A775, or the standard specification for zinc-coated (galvanized) steel bars for concrete reinforcement, ASTM A767 or the concrete mix shall be specifically designed by the Architect or Professional Engineer of Record or Specialty Engineer for use in a corrosive environment.

2509 PRECAST CONCRETE UNITS

2509.1 GENERAL:

(a) Precast concrete units shall comply with the minimum requirements set forth in this Chapter, and the Standards set forth in Sub-section 2502.1.

(b) All precast structural items shall be designed by a Professional Engineer.

(c) Only the material cast monolithically with the units at the time of manufacture shall be used in computing stresses unless adequate and approved shear transfer is provided.

(d) The Building Official may promulgate and set forth in writing such reasonable rules for requiring tests to be made by an approved laboratory as he may consider necessary to insure compliance with this Code or uniformity of the products produced. The quantity of tests shall be based on consideration of safety or volume of output.

(e) The Building Official or his representative shall have free access to the plant of any producer at all hours of normal operation, and failure to permit such access shall be cause for revocation of approval.

(f) Failure of any product to satisfy in every respect the quality prescribed, or failure to conform with plans and specifications, shall be cause for rejection of the products.

2509.2 STATEMENTS OF RESPONSIBILITIES OF ARCHITECTS AND PROFESSIONAL ENGINEERS ON DESIGN OF STRUCTURES UTILIZING PRECAST CONCRETE COMPONENTS:

(a) The structural construction documents shall indicate the configuration of precast components and shall include details of supports, anchors and connections for those components.

(b) The Structural Engineer of Record and/or the Architect of Record may delegate responsibility for the design of precast concrete components, or systems utilizing those components to a Specialty Engineer. In that case the Structural Engineer of Record and/or the Architect of Record shall require structural submittals for his or her review as an indication that his or her intent has been understood and that the specified criteria have been used. The structural submittals shall bear the impressed seal, signature and date of the specialty engineer who prepared them.

(c) The structural submittals shall include component details, calculations and fabrication and erection drawings. All such submittals shall identify the specific project.

2509.3 AGGREGATE:

The maximum size of the aggregate for precast units shall be not larger than one-third of the narrowest dimension between sides of the forms of the member in which the unit is cast nor larger than three-fourths of the minimum clear spacing between reforcing bars and sides of the forms, except that where concrete is placed by means of high frequency vibration the maximum size of the aggregate shall not be larger than one-half of the narrowest dimension between sides of the forms.

2509.4 STRENGTH OF CONCRETE:

(a) Concrete for precast structural units made up of crushed stone or other heavy aggregate shall have a compressive strength of not less than 2500 psi at 28 days.

(b) Concrete for precast units made of light weight aggregate concrete shall follow the general provisions of Paragraph 2505.1(b) with consideration of the nature and limitations of the aggregate and the strength of the product.

2509.5 WORKMANSHIP:

(a) The mix, the gradation of the aggregate and the workability shall be such as to insure complete filling of the form and continuous intimate bond between the concrete and all steel.

(b) Handling and conveying before curing shall be reduced to a minimum. Machinery for this purpose should be so designed that the unit will not be subject to bending or shock which will produce incipient cracks, broken edges or corners. Precast units shall not be freely transported or placed until the concrete is at least 14 days old, if made with Type I cement, or at least seven days old, if made with Type III cement, or until its strength, as established by define tests, is at least 75 percent of the required 28 day strength.

(c) The use of precast structural units not complying with ACI requirements or having visible cracks, honeycomb, exposed reinforcing except at ends, or, with a compressive section dimension more than one eighth inch less than specified dimension shall not be permitted.

2509.6 CURING:

(a) No precast structural unit shall be removed from the form until the concrete has attained a compressive strength of 50 percent of the 28-day design strength but not less then 1250 psi as verified by representative tests.

(b) Curing by high pressure steam, steam vapor, or other accepted processes may be employed to accelerate the hardening of the concrete and to reduce the time of curing.

(c) To insure the eventual placement of the units in the structure without damage, the handling shall be done in such a manner that bending shall be reduced to a minimum or prevented.

2509.7 IDENTIFICATION AND MARKING:

(a) All joists, beams, girders, columns, slabs, panels and other units shall show some mark plainly indicating the top of the unit. This mark or symbol shall indicate the manufacturer, the date of the manufacture and the length, size and type of reinforcing.

2509.8 CUTTING OF HOLES:

(a) No openings or channels not provided for in the structural design shall be made on the job without the specific approval of the Professional Engineer in accordance with his or her written, detailed instructions covering such work.

2509.9 ANCHORAGE:

(a) Anchorage of all precast concrete units shall be designed, based on rational analysis to transmit loads and other forces to the structural frame.

2509.10 BRIDGING:

(a) Joists shall be secured against lateral displacement by cast-in-place bridging, and such bridging shall be spaced not to exceed 32 times the width of the compression flange of the joist except that for roof systems, cast-in-place Portland-concrete slabs embedding the top flanges not less than one half inch, or steel inserts cast in the joist heads to which bulb-tees supporting gypsum decks are welded, shall be accepted in lieu of bridging.

2509.11 CONNECTIONS:

(a) All joists and connections will perform their function at all stages of loading without overstress and with proper safety factors against failure due to overload. Loading conditions to be considered in the design of joints and connections are service loads, including wind forces, volume changes due to shrinkage, creep, and temperature change erection loads, and loading encountered in stripping forms, shoring and removal of shores and the storage and transportation of members.

(b) INSPECTIONS:

(1) All structural precast units shall be inspected for quality control by an Architect or Professional Engineer qualified to perform these inspections prior to the concrete placement at the casting yard.

(2) All structural precast units and their attachments to the main structure shall be inspected after erection, but before concealment. Such inspections shall be performed by a qualified special inspector in accordance with Sub-section 305.3 of this Code or F.S. 553.71 Threshold Building Law.

2510 PRESTRESSED CONCRETE

2510.1 GENERAL:

(a) The term "prestressed concrete" refers to pretensioned concrete in which the reinforcing is tensioned before hardening of the concrete; or to postensioned concrete in which the reinforcing is tensioned after hardening of the concrete; or combinations of both pretensioning and post-tensioning.

(b) All prestressed structural items shall be designed by a Professional Engineer. Openings or channels not provided for in the structural design shall not be made on the job without the specific approval of the Professional Engineer.

(c) The Building Official may promulgate and set forth in writing such reasonable rules for requiring tests to be made by an approved laboratory as he may consider necessary to insure compliance with this Code or uniformity of the products produced.

(d) The Building Official or his representative shall have free access to the plant of any producer at all hours of normal operation and failure to permit such access shall be cause for revocation of approval.

(e) Failure of any product to satisfy the quality prescribed or failure to conform with plans and specifications shall be cause for rejection of the product.

2510.2 STATEMENT OF RESPONSIBILITIES OF ARCHITECTS AND PROFESSIONAL ENGINEERS ON THE DESIGN OF CAST-IN PLACE POST-TENSIONED CONCRETE STRUCTURAL SYSTEMS:

(a) The structural construction documents shall show the magnitude and location of all prestressing forces and all design assumptions.

(b) The Structural Engineer of Record and/or the Architect of Record shall require the submission of calculations and installation drawings from a Specialty Engineer for post-tensioning systems for review by the Structural Engineer of Record's and/or the Architect of Record's review as an indication that his or her intent has been understood and that specified criteria have been used. The installation drawings shall provide full details of materials to be used including necessary accessories and instructions for construction and shall identify the specific project and shall bear the impressed seal, signature and date of the Specialty Engineer who prepared them.

(c) It is the responsibility of the Structural Engineer of Record and/or the Architect of Record to review the post-tensioning system installation drawings so that the drawings are coordinated with the reinforcing steel shop drawings.

(d) The effect of post-tensioning on other parts of the building is the responsibility of the Structural Engineer of Record and/or the Architect of Record.

2510.3 DESIGN AND CONSTRUCTION:

(a) Design and construction shall be in accordance with ACI 318.

(b) Calcium chloride shall not be used in concrete for prestressed members.

2510.4 TENDON ANCHORAGE ZONES:

(a) Reinforcement shall be provided where required in tendon anchorage zones to resist bursting, splitting, and spalling forces induced by tendon anchorage. Regions of abrupt change in section shall be adequately reinforced.

(b) End blocks shall be provided where required for support bearing or for distribution of concentrated prestressing forces.

(c) Post-tensioning anchorages and supporting concrete shall be designed to resist maximum jacking force for strength of concrete at time of prestressing.

(d) Post-tensioning anchorage zones shall be designed to develop the guaranteed ultimate tensile strength of prestressing tendons using a strength reduction factor (ϕ) of 0.90 for concrete.

2510.5 CORROSION PROTECTION FOR UNBONDED PRESTRESSING TENDONS:

(a) Unbonded tendons shall be completely coated with suitable material to ensure corrosion protection.

(b) Tendon wrapping shall be continuous over entire length to be unbonded, and shall prevent intrusion of cement paste or loss of coating materials during concrete placement.

2510.6 POST-TENSIONING DUCTS:

(a) Ducts for grouted or unbonded tendon shall be mortar-tight and nonreactive with concrete, tendons, or filler material.

(b) Ducts for grouted single wire, strand, or bar tendons shall have an inside diameter at least ½-inch larger than tendon diameter.

(c) Ducts for grouted multiple wire, strand, or bar tendons shall have an inside cross-sectional area at least 2 times net area of tendons.

2510.7 GROUT FOR BONDED PRESTRESSING TENDONS:

(a) Grout shall consist of portland cement and water; or portland cement, sand and water.

(b) Materials for grout shall conform as specified in ACI 318 and be as follows:

(1) Portland cement.

(2) Water content shall be minimum necessary for proper pumping of grout, however, water-cement ratio shall not exceed 0.45 by weight.

(3) Sand, if used, shall conform to Standard Specifications for Aggregate for Masonry Mortar, (ASTM C144), except that graduation may be modified as necessary to obtain satisfactory workability.

(4) Admixtures conforming to ACI 318 and known to have no injurious effects on grout, steel, or concrete may be used. Calcium chloride shall not be used.

(5) Water shall not be added to increase grout flowability that has been decreased by delayed use of grout.

(6) Group temperatures shall not be above 90℉ during mixing and pumping.

2510.8 PROTECTION FOR PRESTRESSING TENDONS:

Burning or welding operations in the vicinity of prestressing tendons shall be carefully performed, so that tendons are not subject to excessive temperatures, welding sparks, or ground currents.

2510.9 APPLICATION AND MEASUREMENT OF PRESTRESSING FORCE:

(a) Prestressing force shall be determined by both of the following methods:

(1) Measurement of tendon elongation. Required elongation shall be determined from average load-elongation curves for prestressing tendons used.

(2) Observation of jacking force on a calibrated gage or load cell or by use of a calibrated dynamometer.

(3) Cause of any difference in force determination between (1) and (2) above that exceed 5 percent shall be ascertained and corrected.

(b) Where transfer of force from bulkheads or pretensioning bed to concrete is accomplished by flame cutting prestressing tendons, cutting points and cutting sequence shall be predetermined to avoid undesired temporary stresses.

(c) Long lengths of exposed pretensioned strand shall be cut near the member to minimize shock to concrete.

(d) Total loss of prestress due to unreplaced broken tendons shall not exceed 2 percent of total prestress.

2510.10 POST-TENSIONING ANCHORAGES AND COUPLERS:

(a) Couplers shall be placed in areas approved by the Professional Engineer and enclosed in housing long enough to permit necessary movements.

(b) In unbonded construction subject to repetitive loads, special attention shall be given to the possibility of fatigue in anchorages and couplers.

(c) Anchorage and end fittings shall be permanently protected against corrosion.

2511 PNEUMATICALLY PLACED CONCRETE (SHOTCRETE)

2511.1 (a) Pneumatically placed concrete is a proportioned combination of fine aggregate Portland cement and water which, after mixing, is pneumatically projected by air directly onto the surface to which it is to be applied.

(b) Pneumatically placed concrete shall conform to all requirements of Specifications for Materials, Proportioning and Application of Shotcrete ACI 506.2, published by the American Concrete Institute, except as modified herein.

(c) Pneumatically placed concrete shall be composed of Portland cement, aggregate, and water and so proportioned as to produce a concrete suitable for pneumatic application.

(d) Concrete ingredients shall be selected and proportioned in such manner as will produce concrete which will be extremely strong, dense, and resistant to weathering and abrasion.

2511.2 SAMPLING AND TESTING CEMENT AND AGGREGATE: The Contractor shall determine the source, kind and quality of the Portland cement and aggregates to be used in the work well in advance of the time scheduled for starting the work and when so directed shall submit such information for approval before starting shotcrete operation.

2511.3 SURFACE PREPARATION: To insure adequate bond, the newly chipped and sand-blasted surface shall be thoroughly moistened with water prior to application to shotcrete. In no instance shall shotcrete be applied in an area where free running water exists.

2511.4 PROPORTIONING: Prior to start of shotcreting the Contractor shall submit to the Professional Engineer of Record the recommended mix as a ratio of Portland cement to aggregate. Recommended mix shall be on the basis of test data from prior experience.

2511.5 MIXING:

(a) Shotcrete shall be thoroughly mixed by machine and then passed through a sieve to remove all large particles before placing in hopper of the cement gun. The mixture shall not be permitted to become damp. Each batch should be entirely discharged before recharging is begun. The mixer should be cleaned thoroughly enough to remove all adherent materials from the mixing vanes and from the drum at regular intervals.

(b) Water in any amount shall not be added to the mix before it enters the cement gun. Quantities of water shall be controlled be a valve at the nozzle of the gun. Water content shall be adjusted as required for proper placement, but shall in no case exceed four gallons of water per sack of cement, including the water contained in the aggregate.

(c) Remixing or tempering shall not be permitted. Mixed material that has stood 45 minutes without being used shall be discarded. Rebound materials shall not be reused.

2511.6 APPLICATION:

(a) In shooting walls and columns, application shall begin at the bottom and the first coat shall completely embed the reinforcement to the form.

(b) In shooting beams, application shall begin at the bottom and a surface at right angles to the nozzle shall be maintained.

(c) In shooting slabs, the nozzle shall be held at a slight angle to the work so that rebound is blown on to the finished portion where it shall be removed.

(d) Corners shall be filled first. "Shooting" shall be from an angle as near perpendicular to the surface as practicable, with the nozzle held approximately 3 feet from the work (except in confined control). If the flow of material at the nozzle is not uniform and slugs, sand spots, or wet sloughs result, the nozzle man shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.

(e) Shotcreting shall be suspended if:

(1) Air velocity separates the cement from the sand at the nozzle.

(2) Temperature approaches freezing and the newly placed shotcrete cannot be protected.

(f) The time interval between successive layers in sloping, vertical or overhanging work shall be sufficient

to allow initial but not final set to develop. At the time the initial set is developing, the surface shall be cleaned to remove the thin film of laitance in order to provide a good bond with succeeding applications.

2511.7 CONSTRUCTION JOINTS:

(a) Construction joints or day's work joints shall be sloped off to a thin, clean, regular edge, preferably at a 45 degree slope. Before placing the adjoining work, the slope portion and adjacent shotcrete shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.

2511.8 CURING AND PROTECTION:

(a) Curing shall be in accordance with ACI 506.2 depending upon atmospheric conditions.

(b) Immediately after placement, shotcrete shall be maintained in a moist condition for at least the first 24 hours.

(c) Final curing shall continue for 7 days after placement if Type I Portland cement is used, or for 3 days if high-early-strength Type III Portland cement is used, or until the specified strength is attained. Final curing may consist of the initial curing process or an approved moisture-retaining covering.

(d) Natural curing may be used when relative humidity remains at or above 85% when approved by the Professional Engineer of Record.

CHAPTER 26
REINFORCED GYPSUM CONCRETE AND INSULATING CONCRETE

2601 GENERAL
2602 DEFINITIONS AND STANDARDS
2603 DESIGN OF REINFORCED GYPSUM CONCRETE
2604 CONSTRUCTION DETAILS OF REINFORCED GYPSUM CONCRETE
2605 DESIGN OF INSULATING CONCRETE
2606 TESTS OF INSULATING CONCRETE
2607 CONSTRUCTION DETAILS OF INSULATING CONCRETE

2601 GENERAL

2601.1 SCOPE: This chapter prescribes requirements for Reinforced Gypsum Concrete and Insulating Concrete.

2601.2 APPLICATION: Reinforced Gypsum Concrete and Insulating Concrete used in construction regulated by this Code shall comply with the requirements of this chapter.

2601.3 UPLIFT: Minimum roof deck uplift loads shall comply with the design requirements of Chapter 23 utilizing rational analysis, but not less than U.L. 580, class 90.

2601.4 FASTENINGS: Fastenings shall be by bolting, welding or other approved fastening device that provides a resistance to lateral movement as required by rational analysis or test, but not less than 400 pounds per lineal foot.

2602 DEFINITIONS AND STANDARDS

2602.1(a) DEFINITIONS: The terms used in this chapter shall be defined as set forth in Section 401.

2602.2 STANDARDS:

(a) Standards referenced in this Chapter shall be those set forth in Section 402.

(b) Standards in Chapter 28 of this Code.

(c) Guideline for Structural Condition Assessment of Existing Buildings, ANSI/ASCE II.

(d) Specifications for the Design and Construction of Composite Slabs and Commentary on Specifications for the Design and Construction of Composite Slabs, ANSI/ASCE 3.

2603 DESIGN OF REINFORCED GYPSUM CONCRETE

2603.1 (a) Design:Reinforced Gypsum Concrete shall be designed by methods admitting of rational analysis based on established principles of mechanics. The general assumptions and principles specified for reinforced concrete in Chapter 25 shall be the basis of design of reinforced gypsum insofar as they are applicable.

(b) Standards:The Standard Specifications for Reinforced Gypsum Concrete, ANSI A59,1, is hereby adopted.

(c) Testing:The Building Official may require reasonable tests of Gypsum Concrete units or the materials of Gypsum Concrete construction to determine their quality.

2603.2 LIMITATIONS OF USE:

(a) Reinforced gypsum concrete used for roofs of Occupancies producing usually high humidities shall be constructed with the use of non-absorbative formboard.

(b) Reinforced gypsum concrete shall not be used:

(1) For floors.

(2) For direct support of concentrated loads, such as water tanks, fan bases, cooling towers, flag poles and signs. Details must provide for transmitting such loads directly to the walls or the primary framing.

(3) For exterior locations other than roofs.

(4) For ceilings of structures not completely enclosed, unless constructed with the use of non-absorbative formboard.

2604 CONSTRUCTION DETAILS OF REINFORCED GYPSUM CONCRETE

2604.1 POURED-IN-PLACE GYPSUM:

(a) Roof slabs of poured-in-place gypsum shall be solid and, for spans not exceeding 33 inches, shall have a minimum thickness of 2 inches not including the formboard.

(b)(1) Reinforcing fabric shall conform to the Standard for Welded Steel Wire Fabric for Concrete Reinforcement, ASTM A185, as set forth in Section 402, shall be galvanized with a zinc coating conforming to the Standard for Zinc Metal (Slab Zinc), ASTM B6, as set forth in Section 402, and shall contain a minimum weight of coating of 0.30 ounces per square foot of uncoated wire surface determined in accordance with the Standard for Tests for Weight of Coating on Zinc Coated (Galvanized) Iron or Steel Articles, ASTM A90, as set forth in Section 402.

(2) Reinforcing fabric shall have an effective cross-sectional area of not less than 0.026 square inches per foot of width of No. 12 gage wire spaced four inches on centers as principal reinforcing nor less than 0.0075 square inches per foot of width of No. 14 gage wire spaced eight inches on center as temperature reinforcing.

(3) Reinforcing fabric shall be lapped not less than 16 inches at the ends.

(4) Sides of fabric shall be butted or spaced not more than four inches.

(c) Sub-purlins shall be designed to provide a mechanical lock or key with the gypsum to resist uplift.

(d) Sub-purlins shall be rigidly secured to the primary roof framing by welding, riveting or bolting to the supporting members including end supports, and where welded, such welding shall be by rational analysis, but not less than 3/8-inch length on both sides of the sub-purlin. Sub-purlins terminating at or on masonry walls shall be securely anchored to the masonry by a continuous member. Supporting masonry running parallel to the sub-purlins shall not be used in the installation of sub-purlins on or adjacent to the masonry.

(e) Where sub-purlins are not used, resistance to uplift shall be otherwise provided of suitable design equivalent to the sub-purlins.

(f) Welding of sub-purlins to supporting members shall be done only under the supervision of a competent welding inspector as set forth in Sub-section 2805.2 and such welding inspector shall submit certification in writing to the Building Official that the welding was properly placed; or the Building Official may require that the welds not be covered or concealed until inspection and approval by the Building Official.

(g) Sub-purlins shall not be field-spliced between supports.

(h) Suspended ceilings shall not be hung from the gypsum. Such ceilings may be hung from the sub-purlins where the sub-purlins are so designed.

(i) Roof coverings shall be applied as specified in Chapter 34.

2604.2 PRECAST GYPSUM UNITS:

(a) Precast gypsum concrete units for roof construction shall be of uniform thickness, solid or hollow or may be recessed on the underside. The span of precast gypsum concrete shall not exceed six feet eight inches. For the purpose of this section any span over three feet shall be called a long span.

(b) Except as otherwise provided in Paragraph 2604.2(c), precast gypsum concrete units shall be designed by rational analysis, but not less than the following thickness:

(1) Solid units shall be not less than two inches thick, nor, if a long span, less than three inches thick.

(2) Hollow units shall be not less than three inches, nor the shell in compression less than three-fourths inch thick; if long span, the units shall be not less than five inches thick nor the shell in compression less than one and three-eighths inches thick.

(3) Recessed units shall be not less than five inches thick nor the panel less than one and three-eighths inches thick.

(c) Precast solid reinforced gypsum concrete units, not more than 15 inches wide and bound on the long edges with structural or pressed steel of approved design anchored to the units, shall be not less than two inches thick. If the length of units is not less than one and one-half times the span and the steel binding on the edges is designed to interlock with adjoining units in the manner of tongue-and-groove wooden plank and is of sufficient strength to transmit the load on one unit to adjoining units, the end joints may be staggered at random not less than two feet, and the construction may be designed as continuous.

(d) Precast gypsum concrete units for roof construction shall be reinforced, and unless the shape or marking of the unit is such so as to insure its being placed right side up, the reinforcing shall be symmetrical so that the unit can support its load either side up.

(e) Precast gypsum concrete units shall be bolted, or the edge-binding securely welded, to the supporting members. Clips or other methods where lateral movement would reduce the resistance to vertical uplift shall not be permitted.

2605 DESIGN OF INSULATING CONCRETE

2605.1 DESIGN: Insulating concrete roof deck systems shall be designed by methods admitting of rational analysis, empirical determination or shall be substantiated by approved tests.

2605.2 MATERIALS AND LIMITATIONS OF USE:

(a) Insulating concrete with galvanized formed steel sheets shall not be used over areas where highly corrosive chemicals are used or stored.

(b) Minimum average thickness of insulating concrete shall be 2 inches over the top plane of the substrate, but shall not be less than a minimum of $1^3/_4$ inches thick.

(c) Compressive strength shall be a minimum of 125 psi at 28 days.

(d) Galvanized coatings of formed steel sheets shall be in accordance with ASTM A525 with a minimum coating designation of G-90. Base steel shall conform to ASTM A446-72, Grade E.

(e) Minimum gauge when used with insulating concrete shall be 29 gauge _ Design thickness 0.0149 inches.

(f) Portland cement shall conform to ASTM C-150, Type I, II or III.

(g) Calcium chloride or any admixture containing chloride salts shall not be used in insulating concrete.

(h) Water shall be free from deleterious amounts of acid, alkali and organic materials.

(I) Vermiculite or Perlite shall conform to ASTM Standard C332, Group I.

2606 TESTS OF INSULATING CONCRETE

The Building Official may require tests of the insulating concrete to determine the quality in accordance with ASTM Specifications C-495 and C-513.

2607 CONSTRUCTION DETAILS

2607.1 Insulating concrete shall meet the following requirements:

(a) Insulating concrete over formed steel sheets shall be vented by slotting or perforating the sheets or by venting at side laps of the sheets.

(b) Insulating concrete over structural concrete slabs or other non-venting substrate shall be vented by approved methods as set forth in Chapter 34 of this Code.

(c) Insulating concrete installed over twin tees or other precast units shall be vented by grouting between units with insulating concrete or by preformed vents.

2607.2 INSULATION BOARD:

Installation of insulating board in conjunction with insulating concrete shall comply with uplift requirements set forth in Chapter 23 of this Code. Insulation board shall be placed in a 1/8-inch minimum slurry bed of insulating concrete within 30 minutes and shall be covered by insulating concrete. Insulation board shall be provided with holes for keying and/or slots for venting.

2607.3 REINFORCEMENT:

Reinforcing mesh shall be provided when necessary to meet fire-rating and/or special structural design requirement.

2607.4 STRUCTURAL FORMED STEEL SHEETS:

(a) Insulating concrete installed over galvanized steel sheets will be acceptable as a continuous interlock in lieu of attachment at side laps between supporting members.

(b) Attachments

(1) Structural steel sheets shall be attached to steel supports by certified workers welding through 16 gage welding washers. Alternately the sheets may be attached to steel or other structural supports utilizing approved mechanical fasteners installed by certified mechanics.

(2) Spacing of fasteners along the supports shall be a maximum of 15 inches on center for elevations less than 35 feet above grade.

(3) Spacing of fasteners along the supports for elevations equal to or greater than 35 feet above the grade shall be as follows:

(aa) Sheets with a cover width of 30 inches, 4 attachments per sheet at all supports.

(bb) Sheets with a cover width of 24 inches, 4 attachments per sheet at end of sheet support and 3 attachments per sheet at intermediate supports.

CHAPTER 27
MASONRY

2701 DESIGN
2702 QUALITY TESTS AND APPROVALS
2703 ALLOWABLE UNIT STRESSES IN MASONRY
2704 CONSTRUCTION DETAILS
2705 ENGINEERED UNIT MASONRY

2701 DESIGN

2701.1 Masonry shall be designed by a method admitting of rational analysis based on established principles of mechanics.

2701.2 When bearing wall buildings exceed 40 feet in height, complete calculations indicating unit stresses in components may be required by the Building Official.

2702 QUALITY, TESTS AND APPROVALS

2702.1 GENERAL:

(a) QUALITY: The quality of materials assembled into masonry and the method and manner of their assembly shall conform to the requirements of this Chapter.

(b) OTHER MATERIALS: A material of masonry, other than set forth herein, which is incombustible and otherwise sufficiently embodies the characteristics and satisfies the requirements of one of the materials herein may be approved by the Building Official, subject to such tests as he may prescribe.

(c) TESTS:

(1) The Building Official may require materials to be subjected to tests to determine their quality whenever there is reason to believe the materials used do not meet the requirements of this Code, and may require any tests to be repeated if there is any reason to believe that a material is no longer up to the standards on which the approval was based. The cost of such tests shall be borne by the person or persons proposing to use or continue the use of such material or product.

(2) Test of materials shall be made in accordance with the Standard Specifications of the American Society for Testing Materials, (ASTM), as such Standard Specifications are noted in this Chapter.

(d) APPROVALS:

(1) The provisions for tests for approval of masonry units shall not be construed as in lieu of any tests otherwise required under this Chapter.

(2) Failure of a manufacturer of masonry units to obtain approval or to submit tests as required in this Chapter, or such additional tests as the Building Official may require, shall be cause for rejection of such masonry units.

2702.2 BRICK:

(a) GENERAL: Brick shall include masonry units usually about two and one-fourth inches thick, three and three-fourths inches wide, and eight inches long, and not less than 75 percent solid.

(b)TESTS: Tests shall be made in accordance with Standard Methods of Testing Brick, ASTM C67, as set forth in Section 402.

(c) QUALITY:

(1) Burned clay or shale brick shall conform to the Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale), ASTM C62, as set forth in Section 402.

(2) Sand-lime brick shall conform to the Standard Specification for Calcium Silicate Face Brick

(Sand-Lime Brick), ASTM C73, as set forth in Section 402.

(3) Concrete brick shall conform to the Standard Specification for Concrete Building Brick, ASTM C55, as set forth in Section 402.

2702.3 STONE: Stone for masonry shall be hard and durable.

2702.4 CAST STONE: Cast alone shall be made of Portland cement, aggregates and water with or without admixtures. Cast stone for load-bearing masonry or where exposed to the weather shall have an average compressive strength, at 28 days, of at least 3000 pounds per square inch and shall have not more than seven percent water absorption by weight.

2702.5 CONCRETE BLOCKS:

(a) GENERAL:

(1) Concrete blocks shall be made out of Portland cement, water and approved aggregates. The materials shall conform to the requirements for the materials of concrete specified in Chapter 25, and the finished units shall meet the requirements of this Section.

(2) Concrete blocks used for fire-resistive walls rated two-hours or more or used for load-bearing or exterior walls shall have a minimum face-shell thickness of one and one-fourth inches, a minimum web thickness of one inch, and shall have a net cross-sectional area not less than 50 percent of the gross section.

(3) Concrete blocks for other purposes shall have wall and web thicknesses of not less than three-fourths inch.

(4) Where masonry walls are required by this Code to be eight inches in thickness, hollow concrete block units may be 7" x 7" x 15" modular dimension with corresponding widths for tie columns and tie beams.

(b) QUALITY: Standard units of hollow concrete block shall conform to the Standard Specification for Hollow Load-Bearing Concrete Masonry Units, ASTM C90, as set forth in Section 402, except that the maximum moisture content shall not exceed 50 percent of the total absorption.

2702.6 STRUCTURAL CLAY TILE:

(a) LIMITATIONS: All hollow burned clay wall tile used for fire-resistive walls rated two-hours or more, load-bearing or exterior walls shall be load-bearing tile.

(b) TESTS: Tests shall be made in accordance with the Standard Methods of Stamping and Testing Structural Clay Tile, ASTM C112, as set forth in Section 402.

(c) QUALITY:

(1) Structural clay load-bearing wall tile shall conform to the Standard Specification of Structural Clay Load-Bearing Wall Tile, ASTM C34, as set forth in Section 402.

(2) Structural clay floor tile shall conform to the Standard Specification for Structural Clay Floor tile, ASTM C57, as set forth in Section 402.

(3) Structural Clay non-load-bearing tile shall conform to the Standard Specification for Structural Clay Non-Load Bearing tile, ASTM C56, as set forth in Section 402.

2702.7 GYPSUM TILE:

(a) LIMITATIONS: Precast gypsum shall not be used in load-bearing masonry or in any masonry which will be exposed to the weather.

(b) TESTS: Tests shall be made in accordance with the Chemical Analysis of Testing Gypsum and Gypsum Products, ASTM C471, Physical Testing of Gypsum Plasters and Gypsum Cement, ASTM C472, and Physical Testing of Gypsum Board Products and Gypsum Partition Tile and Block, ASTM C473, as set forth in Section 402.

(c) QUALITY: Gypsum partition tile or block shall conform to the Standard Specification for Gypsum Tile

or Block, ASTM C52, as set forth in Section 402.

2702.8 PLAIN CONCRETE: Plain concrete is concrete cast in place and not reinforced, or reinforced only for shrinkage or change of temperature. Plain concrete shall be mixed, placed and cured as specified for concrete in Chapter 25. The minimum strength of regular concrete shall be not less than 2000 psi in 28 days. The minimum strength of light weight aggregate concrete shall be not less than 500 psi in 28 days.

2702.9 PLAIN GYPSUM CONCRETE: Plain gypsum concrete is gypsum concrete cast in place and either unreinforced or reinforced for shrinkage.

2702.10 MORTAR

(a) GENERAL: Except as otherwise set forth herein, all mortars and the materials therein shall conform to the Standard Specifications for Mortar of Masonry Units, ASTM C270, as set forth in Section 402.

The gradation of aggregates for masonry mortar shall be such that the fineness modules is between 1.20 and 2.35 when determined in accordance with the Standard Specifications for Aggregate for Masonry Mortar, ASTM C144, as set forth in Section 402.Aggregate shall be quarried or washed in fresh water and shall contain not more than one-twentieth of one percent salt by weight.

(b) MORTAR:

(1) Mortar used to bond unit masonry shall be Type M, S, N, or O and shall comply with either the property specifications set forth hereinafter or the proportion specifications of the standard set forth in Paragraph 2702.10(a).

MORTAR STRENGTH PROPERTY SPECIFICATIONS

Type	Minimum Average Strength (psi)
M	2500
S	1800
N	750
O	350

(2) The type of mortar based on consideration of the location of the unit masonry construction shall be as follows:

Use or Location	Type of Mortar
Below grade foundations and walls	M
Swimming pool walls and retaining walls	M
Fire resistive walls rated 2 hours or more	M or S
Exterior walls and load bearing walls	M or S
Piers less than 32 inches wide	M or S
Partitions	M, S, or N
Solid Masonry units One classification less than the above	
Mortar or grout under concentrated loads	M
Fences	M, S, N or O
Gypsum	Gypsum

(3) All solid unit masonry shall be laid in full beds with full end joints. All hollow unit masonry shall be laid with full mortar coverage of the face shells in both horizontal and vertical joints.

2703 ALLOWABLE UNIT STRESSES IN MASONRY

2703.1 COMPRESSION:

(a) Allowable working compressive stresses in masonry walls shall not exceed the limits in pounds per square inch of gross area in the following table:

	Type N or O Unit Mortar	Type M or S Mortar
Brick	200	300
Stone	450	600
Rubble Stone	200	300
Concrete Blocks	100	150
Clay tile	80	100

(b) The maximum allowable working stress in plain concrete shall be the following percentage of the ultimate strength of the concrete in compression:

Compression	0.20 f'c
Shear and diagonal tension	0.02 f'c

Where f'c represents the ultimate compressive strength.

2703.2 SHEAR: The shear in unit masonry shall not exceed one-tenth the allowable compressive stress except that unit masonry may be designed under the provisions of Sub-section 2705.

2703.3 TENSION: Unreinforced unit masonry shall be assumed to have no value in resisting tension except that unit masonry may be designed under the provisions of Sub-section 2705.

2703.4 CONCENTRATIONS: Walls of hollow masonry units shall not directly support concentrated loads.

2704 CONSTRUCTION DETAILS

2704.1 GENERAL:

(a) Masonry walls of hollow or solid units or plain concrete shall be constructed as specified in this Section or under the provisions of Sub-section 2705.

(b) Designed reinforced concrete walls, columns and beams shall be as specified in Chapter 25, except that such designed columns and beams shall be not less than the equivalent of the minimums herein set forth.

(c) Reinforced concrete required in this Section shall comply with Chapter 25, Reinforced Concrete.

(d) Second-hand masonry units shall not be used unless they conform to the requirements of this Code, are sound, and have been thoroughly cleaned and are approved for use by the Building Official.

(e) Bond shall be provided by lapping ends in successive vertical courses or by providing vertical or horizontal reinforcing to resist applied loads.

(f) Horizontal joint reinforcing shall be provided at every second course (16" vertically) for all exterior walls. Standard No. 8 ladder type for reinforced masonry and truss type for all others shall be provided. This reinforcement shall extend 4" into tie columns or tied to structural columns with approved methods where structural columns replace the tie columns.

2704.2 EXTERIOR WALLS:

(a) GENERAL:

(1) Exterior walls of unit masonry shall have a minimum thickness of eight inches except as otherwise set forth in Paragraph 2704.2(k) and in Paragraph 2702.5(a).

(2) No roof or other members shall be placed to develop direct horizontal thrusts on walls unless such walls are specifically designed.

(3) The maximum area of wall panels of 8-inch thick unit masonry, as measured between the concrete members which frame the panel such as the beams and tie columns, shall not exceed 240 square feet, except as set forth in Sub-paragraph 2704.2(b)(1).

(4) Masonry units shall be placed into a recess at the edge of a concrete slab or beam, _" deep and the width of the unit, or be provided with an alternate waterstop method as approved by the Building Official.

(b) TIE COLUMNS:

(1) (aa) Concrete tie columns shall be required in exterior walls of unit masonry. Concrete tie columns shall be required at all corners, at intervals not to exceed 16 feet center-to-center of columns, adjacent to any corner opening, adjacent to any wall opening exceeding eight feet in width, and at the ends of freestanding walls exceeding two feet in length. All gable and shed end corners shall have tie columns. Structurally designed columns may substitute for the tie columns herein required.

(bb) When openings are between 3 and 8 feet in width, such openings shall have one #5 vertical reinforcing bar at each side. The vertical bars shall be placed in concrete filled cells and shall extend into footings and into tie beams. All such bars shall be continuous from footing to tie beam, and shall terminate at each end with a standard ACI hook. All splices, where needed, shall be 30" minimum.

(2) Tie columns shall be not less than 12 inches in width. Tie columns having an unbraced height not exceeding 15 feet shall be not less in thickness than the wall nor less than a nominal eight inches, and, where exceeding 15 feet in unbraced height, shall be not less in thickness than 12 inches. The unbraced height shall be taken at the point of positive lateral support in the direction of consideration or the columns shall be designed to resist applicable lateral loads based on rational analysis.

(3) Tie columns shall be reinforced with not less than 4 #5 vertical bars for 8" x 12" columns nor less than 4 #6 vertical bars for 12" x 12" columns nor less reinforcing steel than 0.01 of the cross-sectional area for columns of other dimension nor less than may be required to resist axial loads or bending forces. Vertical reinforcing shall be doweled to the footing and splices shall be lapped 30 bar diameters. Columns shall be tied with #2 hoops spaced not more than 12 inches apart.

(4) The concrete tie columns set forth herein are a minimum to limit masonry panel areas and provide an integrated framework for masonry. The spacing of concrete columns for skeleton frame construction, designed as specified in Chapter 25, may exceed the spacing herein set forth provided the masonry panels have an area of less than 256 square feet and the structural system is designed to transmit horizontal wind loads to the columns.

(5) Concrete tie columns designed to limit masonry panel areas may be offset at the beams or other horizontal members to avoid openings, but the maximum spacing shall not be exceeded.

(6) Concrete columns in load-bearing walls shall be poured only after masonry units are in place. Where masonry walls of skeleton frame construction are laid up after the frame has been erected, adequate anchorage designed by a Professional Engineer shall be provided. Where structural steel members are made fire-resistive with masonry units, the panel walls shall be bonded to the fire-resistive materials.

(7) Where the spacing of tie columns, as set forth in (b)(1) above, has been satisfied and where structural columns of skeleton frame construction are spaced as specified in (b)(4) above, provision for resisting the horizontal and vertical loads at the edges of masonry panels abutting door and window openings in masonry walls where openings are not bounded by such, reinforced concrete columns shall be considered and, where necessary, transfer the forces through the materials of assembly to the ground.

(c) TIE BEAMS:

(1) A tie beam of reinforced concrete shall be placed in all walls of unit masonry, at each floor or roof level, and at such intermediate levels as may be required to limit the vertical heights of the masonry units to 16 feet. well compacted and confined soil below grade may be considered lateral restraint but only above a point one foot below the grade where such restraint begins.

(2)A tie beam shall be not less in dimension or reinforcing than required for the conditions of loading nor less than the following minimums: A tie beam shall have a width of not less than a nominal eight inches, shall have a height of not less than 12 inches and shall be reinforced with not less than four #5 reinforcing bars placed two at the top and two at the bottom of the beam except that a tie beam using "U" type beam block may be used with the following limitations:

(aa) Limited to one-story Group I occupancy.

(bb) Limited to unsupported spans of seven feet.

(cc) Beam block shall be reinforced with one #7 bar in the top and one #7 bar in the bottom of the pour.

(dd) Beam block shall provide not less than 14 inches vertical dimension nor less than four and one-half inches horizontal dimension of poured-in-place beam cross-section.

(ee) Where beam blocks are used, not less than 12 inches at each corner shall be formed out and fully poured.

(ff) Where beam blocks are used, consideration of resistance to uplift due to wind forces shall be based on only that portion of the dead load above the topmost mortar joint in the wall.

(3) The tie beam shall be continuous. Continuity of the reinforcing in straight runs shall be provided by lapping splices not less than 30 inches. Continuity shall be provided at corners by bending two bars, one outside top and one outside bottom around the corner 30 inches or by adding two #5 bent bars, one outside top and one outside bottom which extend 30 inches each way from the corner. Continuity at columns shall be provided by continuing horizontal reinforcing through columns or by bending horizontal reinforcing in the columns a distance of 18 inches.

(4)A tie beam shall not be required where floor or roof systems provide a rigid diaphragm of reinforced concrete with a minimum thickness of four inches or where a floor or roof system has an equivalent stiffness factor of not less than 0.5 inches-cubed as determined by the moment of inertia divided by the length. (Per foot of width, measured normal to the plane of the diaphragm and adequately anchored).

(5) Changes in level of the beams or structural concrete beams (beam) shall be made at tie columns or structural concrete columns and said tie columns or structural concrete columns shall be continuous from beam to beam.

(6) A tie beam may follow the rake of a gable or shed end if the slope does not exceed 3 in 12 and the requirements of Sections 2704.2(a)(2) and 2704.2(a)(3) are met.

(7) The concrete in tie beams shall be placed to bond to the masonry units immediately below and shall not be separated therefrom by wood, felt, or any other material which may prevent bond. Felt paper no wider than the width of the cells of the block may be used provided that it is depressed a minimum of 2 inches in one cell of each block.

(8) Tie beams subject to uplift and lateral wind forces shall be sized and designed to resist all such forces. Tie beams over openings shall be sized and designed to resist dead and live loads combined with wind loads, whichever governs.

(d) GABLE END AND SHED END WALLS: A horizontal tie beam shall be provided in line with the lower ends of the gables and sheds except as permitted in Section 2704.2(c)(6) and designed in accordance with 2704.2(a)(2), (3) and load requirements as set forth in Chapter 23 of this Code, or as designed by rational analysis. A concrete coping following the rake of the gable, not less than 64 square inches in area reinforced with 2-#5 shall be provided. Tie columns at gable and shed ends shall be provided. Any intermediate tie columns required within the gable shall extend to the coping beam. Tie beams resting on masonry which are not subject to uplift and lateral wind forces shall be provided according to 2704.2(c)(2).

(e) PARAPET WALLS:

(1) Masonry parapet walls shall be not less than eight inches thick, shall be reinforced with minimum tie columns and shall be coped with a concrete beam not less than 64 square inches in cross-section, reinforced with two #4 reinforcing bars.

(2) A parapet wall exceeding five feet in height above a tie beam or other point of lateral support shall be specifically designed to resist horizontal wind loads.

(f) PIERS:

(1) In any section of a masonry wall of an enclosed structure where openings are arranged to leave sections of walls less than 16 inches, such sections shall be steel or reinforced concrete.

(2) Isolated masonry piers of unenclosed structures shall be so constructed that the height of such piers shall not exceed ten times the least dimension, that the cells are filled with cement grout or concrete and reinforced with not less than two #5 bars anchoring the beam to the foundation.

(g) CAVITY WALLS:

(1) Cavity walls consisting of two separate walls with an air space of not less than two nor more than six inches may be constructed of solid or hollow-unit masonry provided such walls meet the specific requirements for tie columns and beams set forth in this Section and are bonded together at intervals not more than 24 inches apart, vertically and horizontally, by masonry ties or by durable, rigid metal ties 0.10 square inches in cross-section.

(2) The minimum thickness of the separate walls of cavity wall construction shall be not less than four inches, and units shall be laid in full beds of Portland cement mortar with full-end joints.

(h) BRICK AND STONE WALLS: Walls of brick and stone shall be laterally supported by tie columns and beams, or the equivalent thereof, as provided in this Section and shall meet these additional requirements.

(1) (aa) In all brick walls at least every sixth course on both sides of the wall shall be a header course or there shall be at least one full header in every 72 square inches of each wall surface.

(bb) In walls more than 12 inches thick, the inner joints of header courses shall be covered with another header course which shall break joints with the course below.

(cc) Solid-unit masonry shall comply with the Standard Building Code Requirements for Masonry, ANSI 41.1, as set forth in Section 402.

(2) Rubble stone walls shall be four inches thicker than is required for solid brick or concrete walls of the same respective heights, but in no part less than 16 inches.

(i) SUBSTITUTIONS:

(1) Where, for architectural reasons or otherwise, it is desirable to reduce the area of any required tie column or the beam below the specified requirements, the Building Official may grant such reduction, provided that the area of concrete omitted shall be replaced by reinforcing or structural steel in the ratio 1: (n-1).

(2) Where it is desired to substitute for the #5 reinforcing as required by this Section, three #4 bars may be substituted to replace two #5 bars.

(j) WALL ADDITIONS: Where new walls are connected to existing walls, such connection shall be by means of a starter columns of minimum 8" x 8" dimension reinforced with 2 #5 bars.

(k) CHASES, RECESSES AND OPENINGS:

(1) Unit masonry walls required to be a minimum of 8 inches thick, such as exterior walls, fire walls and bearing walls, may be chased or recessed not deeper than one-half the wall thickness for an area not exceeding eight square feet, provided the horizontal dimension of the chase or recess does not exceed four feet and provided the chasing shall not reduce the dimension of tie beams and the columns to less than herein required, except as follows:

EXCEPTION: Four-inch deep chases or recesses in 8-inch unit masonry walls may be constructed with

4-inch unit masonry panels provided such 4-inch masonry panel does not exceed five feet in width, does not exceed eight feet in height, is bonded on one vertical side to 8-inch masonry or a tie column, and is not load bearing. Where such panel exceeds two feet in width at locations 20 feet or more above grade in exterior walls, resistance in wind load shall be considered in the design, and a minimum of 4" x 8" tie column with two #5 vertical bars shall be provided in the free standing end of such 4-inch wall.

(2) Openings shall have lintels of reinforced concrete. Where such lintel is precast or formed separately from a tie beam, it shall bear not less than nominal 8 inches on the masonry, at each end, unless designed by rational analysis. Where such lintel is formed integrally with the tie beam by deepening the tie beam above the opening, and the tie beam itself is capable of safely supporting all loads, the beam may span up to 6 feet in length and may be deepened not to exceed 8 inches without additional reinforcing. Where the tie beam is deepened in excess of eight inches with a span less than six feet in length, and the tie beam itself is capable of supporting all loads, the dropped portion shall contain a #3 horizontal bar in the bottom, bent up at each end and fastened to the upper tie beam steel or two #4 horizontal bars. The dropped portion shall bear at least four inches on the masonry at each end. Where the span is in excess of six feet the principal beam reinforcing shall be at the bottom of the beam.

(i) GRILL BLOCK: Decorative grills or screens constructed of unit masonry laid with cells open through the wall shall be as set forth herein or designs shall be based on rational analysis to resist applicable loads and computations shall be submitted to the Building Official for approval.

(1) Unit masonry grills or screens as described in this Paragraph shall not be load-bearing.

(2) Unit masonry in exterior wall shall be laid in Type M or S mortar.

2704.3 INTERIOR BEARING WALLS: Interior-bearing walls shall be constructed as specified in Sub-section 2704.2 for exterior walls, except that interior bearing walls in one-story buildings of Group H or I occupancy where not required to be more than one-hour fire-resistive may be constructed of four-inch concrete block not exceeding nine feet in height, capped with a reinforced concrete beam not less than four inches in width nor less than 12 inches in height, reinforced with two one-half inch rods, and such walls shall support only a roof or ceiling not in excess of 700 pounds per lineal foot with no chases or recesses.

2704.4 FIRE WALLS: Masonry fire walls requiring a fire rating of two or more hours shall be constructed as set forth in Sec. 2704 and as set forth in Chapter 37. All fire walls shall be capable of withstanding a 5 psf minimum horizontal load.

2704.5 PANEL WALLS:

(a) Panel walls of unit-masonry shall be not less than eight inches thick and shall be limited in panel dimension as set forth in Section 2704.2.

(b) Panel walls of reinforced concrete shall be not less than four inches thick nor less than required by design as specified in Chapter 25.

2704.6 VENEERED WALLS:

(a) MASONRY BACKING:

(1) Veneering or facing on masonry backing shall not be considered as adding any strength to such walls and shall be limited in height above foundations or between proper and adequate supports to 30 feet. Veneering shall be securely anchored to masonry backing by means of substantial, non-corroding metal wall ties, spaced not farther apart than 16 inches vertically or 24 inches horizontally.

(2) Tile veneering, not more than one inch thick with individual units not exceeding 20 inches in any dimension and having not more than 200 square inches of surface area with corrugations or scoring on the back side thereof, need not be anchored in accordance with the above requirements but shall be cemented solid to the backing with Portland cement mortar so as to provide a continuous integral support to the backing.

(b) WOOD BACKING:

(1) In all cases, before applying masonry veneer, a substantial water-proofed paper or asphalt-saturated felt, weighing not less than 14 pounds per 100 square feet shall be applied horizontally, shingle fashion, over diagonal sheathing. Horizontal joints in the paper or felt shall be lapped not less than four inches and vertical end joints not less than six inches.

(2) Masonry veneer shall be not less than three and three-fourths inches thick and shall be bonded to the backing be means of substantial non-corroding metal wall ties spaced not farther apart than 16 inches vertically and 24 inches horizontally.

2704.7 PARTITIONS:

(a) The requirements specified herein shall apply to non-bearing interior separations, other than fire-walls, of unit masonry construction.

(b) The lateral distance between vertical supports of non-bearing interior partitions of unit-masonry shall not exceed 72 times the actual thickness of the partition, including plaster.

(c) The height of unit masonry partitions shall not exceed 36 times the actual thickness, including plaster.

2704.8 FENCES:

(a) Masonry fences so located on a property that such fence, at the proposed height or by a future addition to height, could be used as a wall of a building, shall be constructed with foundations and tie columns as provided for an exterior wall. Such fence shall be capped with a coping beam not less than 64 square inches in cross-section reinforced with a minimum of two #4 rods, when not exceeding a height of five feet, or shall be capped by a tie beam as provided for exterior walls if exceeding a height of five feet.

(b) Masonry fences, so located on a property that by zoning regulation such fence could not be used as a wall of a building, shall be constructed as follows:

(1) Fences not exceeding five feet in height shall be eight inches thick and shall not be required to have tie columns, but shall be required to have coping as provided herein; or such fences may be four inches thick with tie columns and coping not less than eight inches thick.

(2) Fences exceeding five feet in height shall be not less than eight inches thick and shall have tie columns and tie beams as required for exterior walls.

2704.9 OTHER MASONRY WALLS: Walls of masonry materials or arrangement of masonry units other than those specifically set forth in this Chapter shall be in conformance with the general provisions of this Code, may be classified by the Building Official as one of the types or arrangements provided for herein and subject to all or any of the requirements therefor and any such additional requirements as the Building Official may prescribe.

2704.10 GLASS BLOCK:

(a) Masonry of glass blocks may be used in non-load bearing exterior or interior walls and in openings which might otherwise be filled with windows, either isolated or in continuous bands, provided the glass block panels have a thickness of not less than three inches at the mortar joint and the mortared surfaces of the blocks are satisfactorily treated for mortar bonding.

(b) View panels in one (1) hour fire resistant walls shall be limited to glass block panels installed in steel channels or panel anchor framing may be used where a 3/4 hour fire rating is required. Three and seven eighths (3 7/8) inch thick glass block shall be limited to 120 square feet with no dimension greater than 12 feet. For masonry wall construction or to 94 square feet with no dimension greater than 10 feet 9 inches for non-masonry wall construction. Three and one eighth (3 1/8) inch thick glass block shall be limited to 100 square feet with no dimension greater than 10 feet for masonry wall construction or to 94 square feet with no dimension greater than 10 feet 9 inches for non-masonry wall construction. 3 inch thick glass block shall be limited to 100 square feet with no dimension greater than 10 feet and shall be limited to only masonry wall connection.

View panels in two (2) hour fire resistant walls shall be limited to glass block installed in steel channels and

with a water curtain in conformance with NFPA No. 13 on each side at interior walls or at the interior of exterior walls. Three and seven eighths (3 7/8) inch thick glass block shall be limited to 100 square feet with no dimension greater than 10 feet.

The view panel glass block assembly shall not exceed 25% of the wall area separating a tenancy from a corridor or a corridor from an enclosed vertical opening or one fire rated area from another fire rated area. Maximum three quarter hour fire rated glass block construction shall be utilized at non-masonry wall construction. Double studding for panel frame and frame supports shall be utilized at non-masonry wall construction. Panel anchors shall be provided at the sill and jambs in non-masonry wall construction using panel anchor framing. A fire retardant sealant shall be utilized at all channel and panel anchor framing. Expansion material at head and jambs shall be either fibrous glass or mineral wool. All fire rated glass block and panels shall conform to UL No. 9 and ASTM E163.

(c) Interior glass block panels having thickness of three and seven eighths (3 7/8) inches shall not exceed 250 square feet of unsupported wall surface and interior glass block panels having thickness of three and one eighth (3 1/8) inches shall not exceed 150 square feet of unsupported wall surface nor more than 25 feet in length nor more than 20 feet in height between supports.

(d) Glass block panels for exterior walls, in excess of 18 square feet in area or over 35 feet above grade, shall be designed by rational analysis by a Professional Engineer.

(1) Exterior glass block panels using three and seven eighths (3 7/8) inch thick glass block units shall not exceed 144 square feet of unsupported wall surface if channel type restraint or panel anchors are utilized or 250 square feet of unsupported wall surface if channels or panel anchors with intermediate stiffeners are utilized nor more than 25 feet in length nor more than 20 feet in height between supports.

(2) Exterior glass block panels having a thickness of three and one eighth (3 1/8) inches shall not exceed 85 square feet of unsupported wall surface nor more than 25 feet in length nor more than 10 feet in height if panel anchors or channel type restraints or channels are utilized.

(e) Glass block panels shall be held in place in the wall openings to resist both external and internal pressures due to wind and other forces. Glass block panels shall be set in recesses or metal channel frames at the jambs and, for panels exceeding ten feet in horizontal dimension between supports, at the head as well, so as to provide a bearing surface at least one inch wide along the panel edges; except, glass block panels exceeding neither 100 square feet in area nor ten feet in either horizontal or vertical dimension, and situated not more than two floors or stories or less than 25 feet above grade, anchorage may be provided by means of non-corroding perforated metal strips.

(f) Glass block panels shall have hot dipped galvanized steel reinforcement in the horizontal mortar joints, extending from end to end of mortar joints, but not across an expansion joint, with any unavoidable joints spliced by lapping the reinforcement not less than 6 inches. The reinforcement shall be spaced not more than 2 feet apart vertically for three and seven eighths (3 7/8) inch thick glass block and 16 inches apart vertically for three and one eighth (3 1/8) inch thick glass block. In addition reinforcements shall be placed in the joint immediately below and above any openings within a panel.

The reinforcement shall consist of two parallel, longitudinal, hot dipped galvanized steel wires, 9 gauge or larger, spaced two (2") inches apart for use with three and seven-eights (3 7/8) inch thick glass block, and one and five-eighths (1 5/8") inches apart for use with three (3") inches and three and one-eighth (3 1/8") inches thick glass block and having a butt-welded thereto 9 gauge hot dipped galvanized cross wires at intervals not exceeding 16 inches O.C. All hot dipped galvanizing of the horizontal joint reinforcing at glass block panels shall be after the welding of the cross wires to the longitudinal wires.

(g) Glass block shall be laid in only type S or N mortar as required by the glass block manufacturer and/or the Professional Engineer or shall be an equivalent approved material. Both vertical and horizontal mortar joints for straight walls shall be at least one-quarter and not more than three-eighths inch thick and shall be completely

filled. For curved walls, the inside vertical joints shall not be less than one-eighth inch thick, and the outside vertical joints shall not be more than five-eighths inches thick.

(h) Every exterior glass block panel shall be provided with expansion joints at the sides and top. Expansion joints shall be entirely free of mortar, and shall be filled with resilient materials.

2705 ENGINEERED UNIT MASONRY

2705.1 Where design and construction of walls is of engineered unit masonry as set forth in this Section, the requirements of Sections 2703 and 2704 shall not apply.

2705.2 STANDARDS:

(a) Structural design shall be in accordance with ACI-530-2/ASCE 5-92/TMS 402-92, Building Code Requirements for Masonry Structures and the commentary on Building Code requirements for Masonry Structures.

(b) To satisfy this Sub-section all construction shall be in accordance with ACI 530.1-92/ASCE 6-92/TMS 602-92, specifications for Masonry Structures and the commentary on specifications for Masonry Structures.

(c) Structural clay brick masonry construction shall be in accordance with BIA Building Code Requirements for Engineered Brick Masonry.

2705.3 The design of the engineered unit masonry for buildings and structures shall be by a Professional Engineer.

EXCEPTION: Group I Occupancy may be designed by a State of Florida Registered Architect.

2705.4 A Special Inspector shall furnish inspections for all engineered unit masonry.

EXCEPTION: Building Inspectors (structural) certified by the Broward County Board of Rules and appeals who have satisfactorily completed an approved masonry course may perform inspections for Group I Occupancy.

2705.5 Toothing of engineered unit masonry shall be permitted only with the approval of the Special Inspector.

CHAPTER 28
STEEL AND IRON

2801 GENERAL
2802 MATERIAL
2803 DESIGN LOADS
2804 MINIMUM THICKNESS OF MATERIAL
2805 CONNECTIONS
2806 TUBULAR COLUMNS
2807 PROTECTION OF METAL
2808 OPEN-WEB STEEL JOISTS
2809 COLD-FORMED STEEL CONSTRUCTION
2810 METAL SYSTEMS BUILDING

2801 GENERAL

2801.1 DESIGN: Steel and iron members shall be designed by methods admitting of rational analysis according to established principles or methods.

2801.2 SCOPE: The design, fabrication and erection of steel and iron for buildings and other structures shall be as set forth in this Chapter. The requirements set forth in Sections 2802 through 2808, inclusive and 2810, apply to structural steel for buildings and other structures. Sections 2809 and 2810, applies to cold-formed members of sheet or strip sheet or strip steel and light-gauge steel construction.

2801.3 STANDARDS: The following Standards are hereby adopted as set forth in Section 402:

(a) American Institute of Steel Construction (AISC):

(1) Manual of Steel Construction, Allowable Stress Design ASD, AISC.

(2) Manual of Steel Construction, Load Resistance Factor Design LRDFD, AISC.

(3) Simple Shear Connection, ASD,AISC.

(4) Simple Shear Connections, LRFD,AISC.

(5) Serviceability Design Considerations for Low-rise Buildings, AISC.

(6) Plastic Design in Steel, AISC.

(7) Engineering for Steel Construction, AISC.

(8) Detailing for Steel Construction, AISC.

(9) Iron and Steel Beams - 1873 to 1952, AISC.

(10) Plastic Design of Braced Multistory Steel Frames, AISC.

(11) Torsional Analysis of Steel Members, AISC.

(b) American Iron and Steel Institute (AISI).

(1) Specification for the Design of Cold-formed Steel Structural Members, AISI.

(2) Fire-Resistant Steel-Frame Construction, AISI.

(3) Fire-Safe Structural Steel - A Design Guide, AISI.

(4) Designing Fire Protection for Steel Trusses, AISI.

(5) Cold-formed Steel Design Manual, AISI.

(6) Specifications for the Design of Light-Gage Cold-Formed Stainless Steel Structural Members, AISI.

(7) Specification for the Criteria for Structural Application of Steel Cables for Buildings, AISI.

(8) Designing Fire Protection for Steel Columns, AISI.

(9) Design Manual for Structural Tubing, AISI.

(c) American National Standards Institute (ANSI)/AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE):

(1) Specifications for the Design and Construction of Composite Slabs and Commentary on Specifications for the Design and Construction of Composite Slabs, ANSI/ASCE 3.

(2) Specification for the Design of Cold-Formed Stainless Steel Structural Members, ANSI/ASCE 8.

(3) Guideline for Structural Condition Assessment of Existing Buildings, ANSI, ASCE II.

(d) American National Standards Institute (ANSI)/American Welding Society (AWS):

(1) Standard Welding Procedure and Performance Qualification, AWS B2.1.

(2) Recommended Practice for Stud Welding, AWS C5.4.

(3) Structural Welding Code - Steel, ANSI/AWS D1.1.

(4) Structural Welding Code - Sheet Steel, AWS D1.3

(5) Structural Welding Code - Reinforcing Steel, ANSI/AWS D1.4.

(6) Specification for Welding of Sheet Metal, AWS D9.1.

(e) American Society for Testing and Materials (ASTM).

(1) Standard Specification for General Requirements for Rolled Steel Plates, shapes, Sheet Piling, and Bars for Structural Use, ASTM A6.

(2) Standard Specification for High-Strength Bolts for Structural Steel Joints, ASTM A325.

(3) Standard Specification for Heat-Treated Steel Structural Bolts. 150 KSI Minimum Tensile Strength, ASTM 490.

(4) Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process, ASTM A525.

(f) National Association of Architectural Metal Manufacturers (NAAMM).

(1) Metal Bar Grating Manual, NAAMM.

(g) Rack Manufacturers Institute (RMI)/American National Standards Institute (ANSI):

(1) Industrial Steel Storage Racks Manual, RMI.

(2) Manual of Safety Practices - A Code of Practices for the Use of Industrial and Commercial Steel Storage Racks, RMI/ANSI MH16.2.

(h) Research Council on Structural Connections of the Engineering Foundation (RCSCEF):

(1) Specification for Structural Joints Using ASTM A325 or A490 Bolts, RCSCEF.

(i) Shelving Manufacturers Association, a Products Section of the Material Handling Institute (SMA) / American National Standards Institute (ANSI):

(1) Specification for the Design, Testing, Utilization and Application of Industrial Grade Steel Shelving, SMA/ANSI MH281.

(j) Steel Deck Institute, Inc. (SDI).

(1) Standard Practice Details, (SDI).

(2) SDI Manual of Construction with Steel Deck, SDI.

(3) Deck Damage and penetrations, SDI.

(4) Steel Deck Institute Design Manual, SDI.

(5) LRFD Design Manual for Composite Beams and Girders with Steel Deck, SDI.

(6) Diaphragm Design Manual, SDI.

(k) Steel Joist Institute (SJI).

(1) Standard Specifications, Load Tables, and Weight Tables for Steel Joists and Joist Girders, SJI.

(2) Structural Design of Steel Joist Roofs to Resist Ponding Loads, Technical Digest No. 3, SJI.

(3) Vibration of Steel Joist-Concrete Slab Floors, Technical Digest No. 5, SJI.

(4) Structural Design of Steel Joist Roofs to Resist Uplift Loads, Technical Digest No. 6, SJI.

(5) Welding of Open Web Steel Joist, Technical Digest No. 8, SJI.

(6) Handling and erection of Steel Joists and Joist Girders, Technical Digest No. 9, SJI.

(7) 60 - Year Steel Joist Manual, SJI.

(l) Steel Structures Painting Council (SSPC).

(1) Red Lead Iron Oxide, Raw Linseed Oil Alkyd Primer, SSPC - Paint 2.

(2) Steel Joist Shop Paint, SSPC - Paint 15.

(3) A Guide to the Shop Painting of Structural Steel, SSPC/AISC.

(m) Underwriters Laboratories, Inc. (UL):

(1) Test for Uplift Resistance of Roof Assemblies, UL 580.

(n) Welded Steel Tube Institute, Inc. (WSTI):

(1) Manual of Cold Formed Welded Structural Steel Tubing:

2801.4 Statements of the structural responsibilities of Architects and Professional Engineers on the Design of Structural Steel Systems.

(a) The Structural Engineer of Record and/or the Architect of Record shall be responsible for all aspects of the structural design including the design of components and connections. The Structural Construction Documents may assign to the fabricator the responsibility for implementing the design as specified and for maintaining fabrication and erection tolerances and for ensuring the fit and erectability of the structure.

(b) The Structural Engineer of Record and/or the Architect of Record may elect to detail all connections on the structural construction documents and require fabrication in accordance with those details.

(c) Alternately the Structural Engineer of Record and/or the Architect of record may permit the fabricator to select or modify connections subject to review and approval by the Structural Engineer of Record and/or the Architect of Record. In that case, the Structural Construction Documents shall specify criteria for the design of connections and shall identify the nature, magnitude and location of all design loads.

(d) The Structural Engineer of Record and/or the Architect of Record shall require the submission of fabrication and erection drawings for review as an indication that his or her intent has been understood and the specified criteria have been used.

(e) Structural Submittals requiring engineering input such as those dealing with substitute connections shall be accompanied by design calculations and shall bear the impressed seal, signature, and date of the Specialty Engineer who prepared them.

2802 MATERIAL

2802.1 STEEL: Steel shall conform to the physical requirements set forth in the applicable Standard in Sub-section 2801.3(a) through 2801.3(m).

2802.2 HIGH-STRENGTH STEEL BOLTS: High-strength steel bolts shall conform to the requirements set forth in the Standards of Sub-section 2801.3.

2802.3 USED AND DAMAGED MATERIAL: All steel shall be straight and true, and any section damaged to be out of shape shall not be used. Steel previously used or fabricated for use or fabricated in error shall not be used except with the approval of the Building Official. Filled holes or welds shall not be concealed. Straightened or Retempered fire-burned steel shall not be used except with the approval of the Building Official.

2802.4 TESTS: The Building Official may require tests and/or mill records to determine the quality of materials.

2802.5 RIBBED BOLTS: Ribbed bolts shall be made from a carbon manganese steel with a minimum tensile strength of 70,000 psi.

2803 DESIGN LOADS

Design shall be based on the dead, live, wind and other loads set forth in Chapter 23 and the additional stress considerations set forth in this Chapter.

2804 MINIMUM THICKNESS OF MATERIAL

The minimum thickness of material shall not be less than as set forth in the applicable Standards listed in Paragraphs 2801.3(a), 2801.3(d) or 2801.3(j) except as otherwise set forth herein.

2805 CONNECTIONS

2805.1 Connections shall conform to the requirements of the Standards as set forth in Sub-section 2801.3.

2805.2 A Special Inspector in accordance with Sub-section 305.3 shall inspect the welding and high strength bolting of structural steel framing and welding, bolting and fastening of lightweight material systems and metal sidings of buildings with areas exceeding 1,000 sq.feet.

2805.3 Welding in the shop or field shall be performed only by AWS Certified Welders.

2806 TUBULAR COLUMNS

2806.1 Tubular columns and other primary compression members, excluding secondary posts and struts not subject to bending and whose design load does not exceed 2,000 pounds, shall have a minimum least dimension of 2½ inches and a minimum wall thickness of 3/16 of an inch.

2806.2 Tubular members when filled with concrete shall have one-quarter inch diameter pressure relief holes drilled through the shell, within 6 inches of the top and bottom of the exposed length of the member and one hole at mid-height.

2806.3 Concrete fill in tubular members shall not be assumed to carry any of the load except compression members having a least dimension of 8 inches or greater and having a one-inch inspection hole in the plate at each end.

2807 PROTECTION OF METAL

2807.1 All field rivets, bolts, welds and abrasions to the shop coat shall be spot painted or treated with the material used for the shop coat, or an equivalent comparable to the shop coat, after removal of all objectionable deleterious materials.

2807.2 Primary structural steel members, except where intended to be encased in concrete, or which will be concealed by interior building finishes, shall have one shop coat of paint and, if exposed to the atmosphere or elements in the complete building or structure shall receive a second shop coat of paint or be field painted in addition to the initial shop coat with lead, graphite, asphalt paint or other approved coating compatible with the shop coat, except as herein provided. Surfaces of members in contact with, but not encased in, concrete or masonry shall be asphalt coated or otherwise effectively coated where the thickness of the metal is 3/16 inch or less.

2807.3 Members having a corrosion-resistive metallic coating of zinc of not less than 1.25 ounces class or other

equivalent approved coating are not required to have the shop and field coating.

2807.4 Where structural members are exposed to industrial fumes, fresh and/or salt water, salt water spray, and other corrosive agents, such members shall be effectively protected with a corrosion-resistive metallic or other equivalent approved coating.

2807.5 Corrosion-resistant steels with or without painting or coating may be approved where sufficient test or other factual data establishing the satisfactory performance under the particular exposure conditions or usage is submitted to and approved by the Building Official.

2808 OPEN-WEB STEEL JOISTS

2808.1 STANDARDS: Open web steel joists shall comply with the Standards set forth in Paragraphs 2801.3(j) and 2801.3(k) of this Code.

2808.2 Statements of Responsibilities of Architects and Professional Engineers on the design of structural systems utilizing open web steel joists:

(a) The Structural Construction Documents shall designate the standards for joist design and shall indicate layout, end supports, anchorage, bridging requirements, etc. including connections to walls. The Structural Construction Documents shall indicate special requirements for concentrated loads, openings, extended ends and resistance to uplift.

(b) The Structural Engineer of Record and/or the Architect of Record shall require structural submittals for the Structural Engineer of Record's review and/or the Architect of Record's review as an indication that his or her intent has been understood and that the specified criteria have been used. The Structural Submittals, unless Catalog Submittals, shall bear the impressed seal, signature and date of the Specialty Engineer who prepared them.

(c) The Structural Submittals shall identify the specific project, shall list the design criteria and shall show all joist location information and details necessary for proper installation.

2808.3 DESIGN:

(a) Open web steel joist systems shall be designed to accommodate the loads and forces set forth in Chapter 23.

(b) Net uplift forces for all zones, applied to the Joist Systems, shall be clearly indicated on the Structural Construction Documents.

(c) The slenderness ratio about the horizontal axis can be used in determining the capacity of the top chord provided the top chord is stayed laterally by the deck system. The top chord is considered to be stayed laterally, for superimposed dead and live loads, where the deck system is:

(1) A poured-in-place concrete slab in direct contact with the top chord;

(2) A light gage steel deck complying with Section 2809;

(3) Or another approved deck system designed and constructed as a diaphragm with fastenings to the top chord not further apart than 24 inches.

(d) Fastenings shall be bolting, welding or other approved fastening device that provides a resistance to lateral movement as required by rational analysis or by test, but not less than 400 pounds per lineal foot.

2808.4 CONNECTIONS: The joints and connections of members of steel joists shall be made by welding or bolting.

2808.5 BRIDGING:

(a) All bridging and anchors shall be completely installed before application of any construction loads. Bridging shall secure the chords against lateral movement and shall position and hold the joists vertical and in

a straight line.

(b) Bridging members shall be connected to the chords of the joists by bolting or welding capable of transmitting the forces required of the bridging members.

(c) Bridging shall be connected to the chords of the joists by bolting or welding at all points of contact and shall be capable of transmitting the forces required of the bridging members. The ends of all bridging lines shall terminate at walls or beams and shall be anchored thereto and where anchorage is not possible, stability shall be provided by additional bracing.

(d) Where uplift forces are a design requirement, a single line of continuous bottom chord bridging shall be provided near the first bottom chord panel points unless the Engineer of Record and/or the Architect of Record or the Specialty Engineer certifies that this bridging is not required.

2808.6 END SUPPORTS AND ANCHORAGE:

(a) Joists shall not bear directly on unit masonry unless masonry is designed as engineered unit masonry with properly reinforced, fine or course grout filled, continuous bond beam.

(b) The ends of joists shall be bolted, welded or encased in concrete at each point of bearing to provide not less resistance than 50 percent of the SJI rated end reaction horizontally and downward and 100 percent of the net uplift reaction specified by the Structural Construction Documents.

(c) The ends of K-series Joists shall have a minimum bearing of 4 inches on reinforced concrete or engineered unit masonry or 2½ inches over steel supports including embedded bearing plated on reinforced concrete. The ends of LH and DLH Series Joists shall extend a distance of not less than 6 inches over reinforced concrete or engineered unit masonry and shall be anchored to a steel bearing plate or angle located not more than ½ inch from the face of the wall or 4 inches over steel supports. Shorter bearing lengths may be used with special engineering consideration.

2808.7 FABRICATION: The fabrication of joists shall specifically comply with Paragraph 305.1(b) herein.

2808.8 SHOP STANDARDS: The applicant for building permit will not be required to submit shop drawings for steel joists except as set forth in Paragraphs 2808.8(a) and 2808.8(b).

(a) The prime drawings required by Sub-section 302.2 herein shall describe all steel to be used in the proposed building or structure, including open-web frames and trusses, and shall detail member sizes, spacing, attachment and welding including provision for unusual loadings such as concentrated loads, unusual cantilevering, soffit framing and continuity except that such prime drawings may designate standard open-web steel joists by SJI number and symbol.

(b) Where standard open-web steel joists are designated on the prime drawings by customary SJI numbers or symbols, the manufacturer, fabricator or supplier may be required to submit design computations, stress diagrams, sizes of members and sizes of welds to the Building Official for approval before installation to demonstrate that the units to be provided do, in fact, comply with the specifications and performance Standards set forth by SJI. Only such design computations as are prepared by a Professional Engineer will be accepted. Resubmission of any fabricator's design so submitted and approved will not be required for each subsequent job. Proof of the characteristics of the material may be required for any steel for which a minimum yield strength in excess of 36,000 pounds per square inch is used as the basis of design.

2809 COLD-FORMED STEEL CONSTRUCTION

2809.1 SCOPE: Cold-formed steel construction shall include individual structural members, structural decks or wall panels, and nonstructural roofing, siding and other construction elements formed from sheet or strip steel and as set forth in Paragraphs 2801.3(b) and 2801.3(c).

2809.2 STANDARDS:

(a) Cold-formed steel construction shall include individual structural members, structural decks or wall panels and non-structural roofing, siding and other construction elements formed from sheet or strip steel and as set forth in Paragraphs 2801.3(b) and 2801.3(c).

(b) Galvanizing as referred to herein is to be zinc coating conforming to the Standard set forth in Sub-paragraph 2801.3(e)(4).

(c) Gauge as referred to herein is the "Manufacturers Standard Gauge" (AISI) for uncoated sheet and strip, and "Galvanized Sheet Gauge" (ASTM A525) for galvanized sheet and strip.

2809.3 INDIVIDUAL STRUCTURAL MEMBERS:

(a) Design, fabrication and erection of individual cold-formed steel structural members shall be as set forth herein.

(b) All structural members shall be positively connected to resist the loads set forth in Chapter 23 herein.

(c) All connections shall be by welding, riveting, bolting or other approved fastening devices or methods providing positive attachment and resistance to loosening. Fasteners shall be of compatible material.

(d) Wire cables shall not be used as a load carrying component.

(e) Doors and windows in pre-engineered metal building systems shall be designed as a structural member and shall conform to all of the requirements in Chapter 28.

(f) All doors shall be anchored as part of the frame in the closed position.

2809.4 STRUCTURAL SHEETS:

(a) Decks and panels properly supported by and attached to the building frame, including but not limited to those having an approved fill material on their top surface, may be considered to act as diaphragms in resisting lateral forces where designed as such subject to requirements of Chapter 23 and the other limitation of this Code. Diaphragm attachments shall be based on recommendations of the Steel Deck Institute (S.D.I.) Diaphragm Design Manual, Latest Edition of testing by recognized Laboratories conforming to Chapter 23 criteria.

(b) Poured fill and/or applied materials on roof and floor decks shall not be assumed to have any structural value to support or resist vertical or lateral loads or to provide stability or diaphragm action unless so designed and poured fill and/or applied materials does not degrade when subjected to moisture.

(c) Positive attachment of sheets shall be provided to resist uplift forces. Attachment shall be as required by Paragraph 2809.3(b) of this Chapter based on rational analysis and/or test, but not less frequently than the following maximum spacing:

(1) One fastener shall be placed near the corner of each sheet or at overlapping corners of sheet;

(2) Along each supporting member, the spacing of fasteners shall not exceed 8 inches on centers at ends of sheets nor 12 inches on centers at intermediate supports;

(3) The spacing of edge fasteners between panels, and between panels and supporting members, parallel to the direction of span, where continuous interlock is not otherwise provided shall be not more than 12 inches on centers;

(4) Poured light-weight concrete fill will be acceptable as continuous interlock.

(5) Attachment to the supporting structure shall be provided at all perimeters and discontinuities by fasteners at no more than 8-inches on center.

(d) Wall panels shall be attached as set forth in Sub-paragraphs 2809.4(c)(1), (2) and (3) above.

(e) Exterior exposed metal siding and roof panels shall be not less than 24 gauge.

(f) Deflection of metal siding and roof panels shall not exceed L/240.

(g) The bending stress of metal siding and roof panels shall be designed utilizing a safety factor or not less than 2.5.

(h) Minimum roof decking uplift loads shall comply with the design requirements of Chapter 23 utilizing rational analysis, but not less than U.L. 580, class 90.

(i) Metal building siding and roof decking shall be designed without an allowable increase in stresses of 1/3 due to wind load.

(j) Metal siding and roof panels shall be designed, where possible, to be continuous over two (2) or more spans.

(k) Fastenings shall be by bolting, welding or other approved fastening device that provides a resistance to lateral movement as required by rational analysis or by test, but not less than 400 pounds per lineal foot.

2809.5 NON-STRUCTURAL SHEETS:

(a) Steel sheet sections not suitable by rational analysis for self-supporting structural sheets shall be termed roofing and siding. Roofing and siding shall be used only over solid wood sheathing or equivalent backing.

(b) Attachment of sheets shall be as set forth in Paragraph 2809.4(c) except that connections shall not be more than 12 inches on center each way, and except that attachment may be by 8d nails or by No. 6 wood screws, in accordance with the Standard set forth in Sub-section 2901.4.

2809.6 PROTECTION OF METAL:

(a) All members shall be treated with protective paint coatings or equivalent protection, except as follows:

(b) Where exposed to high humidity atmospheres, industrial fumes or other corrosive agents or where less than 22 gauge is used, the sheets shall be protected by being galvanized in accordance with the Standards of Sub-paragraph 2801.3(e)(4) and have a minimum of G90 class coating or be of an approved alloy or be otherwise coated to provide equal durability and protection.

(c) Abrasions or damages to the protective coating shall be spot-treated with a material and in a manner compatible to the shop protective coating.

2809.7 WELDING:

(a) Welding shall conform to the requirements of Sub-section 2801.3 and Section 2805 herein.

(b) The fusion welding of structural members and structural sheets defined in 2809.4 and less than 20 gauge in thickness shall have minimum of 5/8 inch diameter welds through weld washers not less than 14-gauge in thickness and one inch in diameter, contoured if necessary to provide continuous contact, or an equivalent device.

2810 PRE-ENGINEERED, PREFABRICATED METAL BUILDING SYSTEMS AND COMPONENTS (PRE-ENGINEERED STRUCTURES)

2810.1 Scope: Metal Systems Buildings (Pre-engineered Structures) shall include, but shall not be limited to, tapered or straight web structural steel frames and predominately cold formed steel secondary components, including, but not limited to, girts, purloins, roof sheets, wall sheets, wall panels and etc.

2810.2 Standards: Frames and components shall comply with the standards set forth in Sub-section 2801.3 and Section 2809 of this code.

2810.3 Statements of Responsibilities of Architects and Professional Engineers on the design of Pre-engineered Structures.

(a) Structural Construction Documents: Structural Construction Documents for Pre-engineered Structures shall indicate the necessary measures for adapting the structures to the specific site. The Structural Construction Documents shall indicate all openings, concentrated loads and other special requirements. Foundation conditions assumed in the design shall be indicated as well as the location and magnitude of building reactions on that

foundation under all design conditions.

(b) Structural Submittals:

(1) The Structural Engineer of Record and/or the Architect of Record shall require Structural Submittals for review as an indication that his or her intent has been understood and that specified criteria have been used. The Structural Submittals shall bear the impressed seal, signature, and date of the Specialty Engineer who prepared them.

(2) The Structural Submittals shall identify the project and list loading and other design criteria. The Fabrication and Erection Drawings shall indicate in detail the construction of the standard structure used or as modified to comply with the requirements of the particular project. The Fabrication and Erection Drawings shall indicate all connection details, openings, and other special details. The Fabrication and Erection Drawings shall show the magnitude and location of building reactions on the foundation under all design conditions. Calculations supporting the design shall be submitted not only for the standard structure, but also for modifications and for related components requiring structural design.

2810.4 DESIGN:

(a) A building or component system in this Section shall have a Structural Engineer of Record and/or Architect of Record responsible for the overall design and performance of the entire building including the foundation and the anchorage of the Pre-engineered Metal Systems Buildings thereto. The Structural Engineer of Record and/or the Architect of Record shall provide the Structural Construction Documents necessary for permitting.

(b) Calculations for drift and deflection of the Metal System Building shall be by the Specialty Engineer. Calculations for deflections shall be done using only the bare frame method. Reductions based on engineering judgement using the assumed composite stiffness of the building envelope shall not be allowed. Drift shall follow AISC, serviceability design considerations for low-rise buildings. The use of composite stiffness for deflection calculations shall be permitted only when actual calculations for the stiffness are included with the design for the specific project. When maximum deflections are specified by the Structural Construction Documents, calculations shall be included in the design data.

(c) The manufacturer shall design the Metal System Building and/or Component System in accordance with the provisions of Chapter 23 of this Code, and the design shall be signed, dated, and sealed by the Specialty Engineer and reviewed by the Structural Engineer of Record and/or the Architect of Record. The manufacturer of the Metal System Building and/or Component System shall be responsible to provide all reactions to the Structural Engineer of Record and/or to the Architect of Record.

(d) Fastenings shall be by bolting, welding or other approved fastening device that provides a resistance to lateral movement as required by rational analysis or by test, but not less than 400 pounds per lineal foot.

2810.5 PERMITTING:

(a) The applicant for a building permit will not be required to submit Structural Submittals and calculations, including, but not limited to, Building or Component Fabrication and Erection Drawings and etc. Prior to the issuance of the permit provided the requirements in Paragraph (1) below are met. Structural Submittals and calculations, including, but not limited to, Fabrication and Erection Drawings and etc. shall be signed, dated and sealed by the Specialty Engineer and reviewed by the Architect of Record and/or the Structural Engineer of Record and submitted and approved by the Building Department prior to the commencement of erection. As-built drawings, signed, dated and sealed by the Specialty Engineer shall be on file with the Building Department prior to the issuance of Certification of Occupancy.

(1) The Structural Construction Documents shall indicate the overall building dimensions, haunch and eave heights, roof slopes, bay spacing, column locations, approximate frame and component profiles, foundation

and appropriate fire rating details and such Structural Construction Documents shall be submitted at the time of the application for the Building Permit.

(b) Where the roofing and siding are structural sheets consisting of clip mounted standing seam or other direct screw attached panel system and are in themselves the finished product, a separate roofing permit shall not be required.

2810.6 FABRICATION AND ERECTION:

(a) Fabrication shall be done in accordance with the standards mentioned above. The manufacturer shall provide a letter certifying that the building has been designed and fabricated in accordance with the above referenced standards.

(b) Temporary bracing shall be provided during erection and shall remain in place until all structural frames, purloins, girts, flange braces, cable or rod bracing and sheets used as diaphragms have been installed.

2810.7 ROOF SHEETS, WALL SHEETS, ROOF PANELS AND WALL PANELS:

(a) Roof sheet shall be designed furnished and installed in accordance with rational analysis pursuant to the requirement of Chapter 23 and/or by testing.

(b) Wall sheets or panels shall be designed, furnished and installed in accordance with rational analysis pursuant to the design requirements of Chapter 23 and/or by testing and not less than the manufacturers recommendations, but in all cases fasteners shall not exceed 8 inches on center at bases, laps and eaves, and shall not exceed 12 inches on center at intermediate supports and shall not exceed 20 inches on center at side laps.

(c) Clip mounted standing seam roof sheets shall not be used as diaphragms nor shall they be considered as adequate lateral bracing of the flange of the secondary member to which they are attached unless one or both of these features are designed into the sheeting system and the manufacturer can certify by testing and/or analysis that such capabilities exist and are appropriately defined.

(d) Structural Standing Seam Roof Sheets shall be a minimum of 24 gauge (0.023 inches nominal) in thickness.

(e) Direct screw attached roof and wall sheets may be used as diaphragms provided the sheets are a minimum of 24 gauge (0.023 inches nominal) in thickness. Additionally, these sheets shall be considered to laterally brace the flange of the secondary member to which they are attached.

(f) See Section 2809 for additional requirements for roof sheets, wall sheets, roof panels and wall panels.

2810.8 ROOF PURLINS AND WALL GIRTS:

(a) Adequate bracing shall be provided to the compression flanges of secondary members with special attention to those members subject to uplift or outward pressures where no roof or wall sheets are attached to provide such bracing. Sag Rods shall not be considered bracing when located in the neutral axis of the web secondary members.

(b) Roof purlins and wall girts shall be laterally braced in addition to relying on deck and panel diaphragm action.

(c) The ends and bearing points of secondary members shall be designed to carry 100% of dead, live and collateral loads superimposed on them due to wind.

(d) Upward or outward forces due to wind are to be calculated without live and collateral loads. Where downward or inward forces due to wind are involved, the dead load forces plus collateral load forces must be combined but the roof live load may be omitted.

2810.9 INDIVIDUAL STRUCTURAL MEMBERS:

(a) Wire cables shall not be used as a load carrying component.

(b) Doors and windows in Pre-engineered Metal Building Systems shall be designed as a structural member and small conform to all of the requirements in Chapter 28.

(c) All doors shall be anchored as part of the frame in the closed position.

(d) No increase in strength shall be allowed due to the effect of cold work.

(e) See Section 2809 for additional requirements for pre-engineered, prefabrication Metal Building Systems and components.

2810.10 INSPECTION:

(a) Metal System Buildings shall be inspected by a Special Inspector in accordance with Sub-section 305.3.

(b) Metal Systems Building construction shall comply with the requirements of the AISC Metal Building Certification Program. Category MB Certified.

(c) LETTER OF CERTIFICATION: The Metal Systems Building Manufacturer shall submit a written certification prepared by and signed, dated and sealed by the Specialty Engineer registered to practice in Florida verifying that the Building System Design and Metal Wall and Roof System Design including, but not limited to, panels, clips, support system components and etc., meet the indicated loading requirements and Codes of the authorities having jurisdiction. The certification shall reference specific dead loads, live loads, wind loads/speeds, tributary area load reductions (if applicable), contracted loads, collateral loads, end use categories, crane loads, accessory loads, load combinations, governing Code bodies including year and load applications. The letter of certification shall be provided to the Structural Engineer of Record and/or the Architect of Record, the Special Inspector and the Building Department prior to the issuance of the Certificate of Occupancy.

(d) Structural Construction Documents demonstrating compliance with this Code shall be reviewed and approved by the Special Inspector prior tot he issuance of a Certificate of Occupancy.

2811.1

(a) Chain link fences in excess of 12 feet in height shall be designed according to the loads as specified in Section 2303.2(b).

(b) Chain link fences less than 12 feet in height shall be designed according to the loads as specified in Section 2303.2(b) or may be constructed to meet the minimum requirements specified in Table 28-A.

Table 28-A

Chain Link Fence Minimum Requirements

Fence Height	Terminal Post Dimensions (o.d. x wall thickness)	Line Post Dimensions (o.d. x wall thickness)	Terminal Post Concrete Foundation Size (Diameter x Depth)	Line Post Concrete Foundation Size (Diameter x Depth)
Up to 4'	2-3/8" x .042"	1-5/8" x .047"	10" x 24"	8" x 24"
Over 4' to 5'	2-3/8" x .042"	1-7/8" x .055"	10" x 24"	8" x 24"
Over 5' to 6'	2-3/8" x .042"	1-7/8" x .065"	10" x 24"	8" x 24"
Over 6' to 8'	2-3/8" x .110"	2-3/8" x .095"	10" x 36"	10" x 36"
Over 8' to 10'	2-7/8" x .110"	2-3/8" x .130"	12" x 40"	10" x 40"
Over 10' to 12'	2-7/8" x .160"	2-7/8" x .120	12" x 42"	12" x 42"

Notes:

1. This **Table** is only applicable to fences with unrestricted air flow.
2. **Fabric** - 12-1/2 Gauge minimum.
3. **Tension Bands** - Use one less than the height of the fence in feet, evenly spaced.
4. **Fabric Ties** - Must be the same gauge as the gauge of the fabric, minimum.
5. **Fabric Tie Spacing on the Top Rail** - Five ties between posts, evenly spaced.
6. **Fabric Tie Spacing on Line Posts** - One less than the height of the fence in feet, evenly spaced.
7. Either **Top Rail** or **Top Tension Wire** shall be used.
8. **Braces** must be used at Terminal Posts if top tension wire is used instead of Top Rail.
9. **Post Spacing** - 10' o.c. Maximum
10. **Posts** shall embed to within 6" of the bottom of the foundation.
11. In order to follow the contour of the land, the bottom of the fence may clear the contour of the ground by up to 6" without increasing **Table** values to the next higher limit.

CHAPTER 29
WOOD

2901 GENERAL
2902 QUALITY
2903 SIZES
2904 ALLOWABLE UNIT STRESSES
2905 VERTICAL FRAMING
2906 HORIZONTAL FRAMING
2907 FIRESTOPS
2908 ANCHORAGE
2909 SHEATHING
2910 FURRING
2911 CONNECTORS
2912 WOOD SUPPORTING MASONRY
2913 PROTECTION OF WOOD
2914 FIRE RETARDANT WOOD
2915 FIRE RETARDANT TREATED SHAKES AND SHINGLES

2901 GENERAL

2901.1 DESIGN:

(a) Wood members and their fastenings shall be designed by methods admitting of rational analysis according to established principles of mechanics.

(b) All minimum standards of this chapter are based on exposure C importance factor 1 of ASCE 7.

2901.2 WORKMANSHIP: All wood members shall be framed, anchored, tied and braced to develop the strength and rigidity necessary for the purposes for which they are used and to resist the loads imposed as set forth herein.

2901.3 FABRICATION: Preparation, fabrication, and installation of wood members and the glues, connectors and mechanical devices for fastening shall conform to good engineering practices.

2901.4 STANDARDS: The following Standards, as set forth in Section 402, are hereby adopted for the design and quality of wood members and their fastenings:

AMERICAN HARDBOARD ASSOCIATION	
AHA	
1210 W. Northwest Highway, Palatine, IL 60067	
Basic Hardboard	ANSI/AHA A135.4-1982
Prefinished Hardboard Paneling	ANSI/AHA A135.5-1982
Hardboard Siding	ANSI/AHA A135.6-1990
Cellulosic Fiberboard	ANSI/AHA A194.1-1985
AMERICAN INSTITUTE OF TIMBER CONSTRUCTION	AITC
11818 SE Mill Plain Blvd., Suite 415, Vancouver, WA 98684-5092	
Structural Glued Laminated Timber	ANSI/AITC A190.1-92
Typical Construction Details	AITC 104-84
Standard Appearance Grades for Structural Glued Laminated Timber	AITC 110-84
Standard for Tongue and Groove Heavy Timber Roof Decking	AITC 112-81
Standard for Dimensions of Glued Laminated Structural Members	AITC 113-86
Standard for Specifications for Structural Glued Laminated or Softwood Species	
Design	AITC 117-87
Manufacturing	AITC 117-88

Standard Specifications for Hardwood Glued Laminated Timber Technical Note No. 7	AITC 119-85 September 1984 Updated 10/9/85
AMERICAN PLYWOOD ASSOCIATION PO Box 11700, Tacoma, WA 98411-0700	APA
Plywood Design Specification	Y510-1990
Plywood Design Specification - Design and Fabrication of Plywood Curved Panels - Supplement No. 1	S811-1990
Plywood Design Specification - Design and Fabrication of Plywood-Lumber Beams - Supplement No. 2	S812-1990
Plywood Design Specification - Design and Fabrication of Plywood Stressed-Skin Panels - Supplement No. 3	U813-1990
Plywood Design Specification - Design and Fabrication of Plywood Sandwich Panels - Supplement No. 4	U814-1990
Plywood Design Specification - Design and Fabrication of All-Plywood Beams - Supplement No. 5	H815-1989
Adhesives for Field-Gluing Plywood to Wood Framing	AFG-01-1984
Plywood Folded Plates Laboratory Report 121	V910-1990
APA Design/Construction Guide-Diaphragms	L350-1990
U.S. Products Standard PS 1-83 for Construction and Industrial Plywood	H850-1990
APA Design/Construction Guide-Residential and Commercial	E30-1990
Performance Standards and Policies for Structural-Use Panels	PRP-108-1991
APA 303 Siding Manufacturing Specifications	B840-1991
AMERICAN SOCIETY FOR TESTING MATERIALS 1916 Ray Street, Philadelphia, PA 19103	ASTM
Test Methods for Hygroscopicity of Fire Retardant Wood and Wood Base Products	0321-79
AMERICAN WOOD PRESERVERS ASSOCIATION PO Box 849, Stevensville, MD 21666	AWPA
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY Gaithersburg, MD 20899	NIST
U.S. Product Standard for Construction and Industrial Plywood	PS 1-1983
Performance Standard for Wood-Based Structural Use Panels	PS 2-1992
American Softwood Lumber Standard	PS 20-1970 Amended 1986
AMERICAN FOREST AND PAPER ASSOCIATION 1250 Connecticut Ave., NW, Washington, DC 20036	AFPA
All Weather Wood Foundation Technical Report No. 7	Mar.-1982
Supplement to Technical Report No. 7	June 1983
Wood Construction Data No. 6, Structures of Wood Frame Structures for Permanence	1988
National Design Specification for Wood Construction	1991
Design Values for Wood Construction	1991
Design Values for Joists and Rafters	1992
Span Tables for Joists and Rafters	1993

TRUSS PLATE INSTITUTE, INC.	TPI
583 D'Onofrio Dr., Suite 200, Madison, WI 53719	
Design Specifications for Metal Plate Connected Parallel Chord Wood Trusses	PCT-80
Design Specifications for Metal Plate Connected Wood Trusses	TPI-85
Handling Installing and Bracing Metal Plate Connected Wood Trusses	HIB-91
UNDERWRITERS LABORATORIES, INC.	UL
333 Pfingsten Road, Northbrook, IL 60062	
Test Methods for Fire Resistance of Roof Covering Materials	UL790-1983

2902 QUALITY

2902.1 IDENTIFICATION:

(a) (1) All lumber used structurally, including end-jointed lumber or edge-glued, shall be identified by the grade mark of an accredited lumber grading or inspection bureau or agency. Grading practices and identification shall be in accordance with the rules published by an agency approved in accordance with procedures of the American Softwood Lumber Standard, PS 20-70 as set forth in Section 402, or its equivalent. It is permissible for pre-cut material, rough-sawn lumber and lumber thicker than three inches to be covered by a Certificate of Inspection by an accredited grading agency in lieu of grade marking.

(2) Structural glued laminated timber shall be manufactured and identified as required in the listed Standards, ANSI/AITC A190.1-1992 as set forth in Section 402.

(3) All wood-based structural-use panels used structurally, including siding, roof sheathing, wall sheathing, floor sheathing, diaphragms and built-up members, shall be identified for grade and exposure level by the grade stamp of an approved testing and grading agency indicating conformance with PS-1 or PS-2.

(4) Wood shingles and/or shakes shall be identified by the grade mark of an approved grading or inspection bureau or agency.

(5) Fiberboard shall conform to ANSI/AHA A 194.1.

(6) Hardboard shall conform to ANSI/AHA A135.4 as set forth in Section 402, and shall be identified as to Classification.

(7) Particle board shall conform to the Mat-Formed Wood Particle board Standard, ANSI A208.1, as set forth in Section 402, and shall be identified to the grade mark or certificate of inspection issued by an approved agency.

(8) All lumber, timber, plywood, pile and poles supporting permanent structures and required to be pressure treated shall bear the quality mark of an inspection agency, accredited in accordance with procedures of the American Softwood Lumber Standard (PS 20-70), or its equivalent, which maintains continued supervision, testing and inspection over the quality of the product.

(9) All wood required to be fire-retardant treated shall bear identification showing the fire performance rating thereof issued by an approved testing agency having a follow-up service. When exposed to the weather, the material shall be identified as suitable for such use in accordance with Sec. 2914.4. When exposed to sustained high humidity, the material shall be identified as a low hygroscopic type suitable for interior use.

2902.2 WOOD-BASED STRUCTURAL-USE PANELS: Wood-based structural-use panels permanently exposed in outdoor locations shall be rated for exterior use and where used structurally for wall, floor or roof cladding or for diaphragms shall be rated for Exposure 1.

2902.3 MOISTURE CONTENT: All lumber two inches or less in thickness shall contain not more than 19 percent moisture at the time of permanent incorporation in a building or structure and/or at the time of treatment with a wood preservative.

2902.4 GRADE AND SPECIES:

(a) All structural wood members shall be of sufficient size or capacity to carry all loads as required by Chapter 23, without exceeding the allowable design stresses specified in the National Design Specification set forth in Section 402.

2903 SIZES

2903.1 Sizes of lumber, structural glued-laminated timber and plywood referred to in this Code are nominal sizes.

2903.2 Computations to determine the required sizes of members shall be based on net dimensions (actual sizes).

2904 UNIT STRESSES

2904.1

(a) (1) Lumber used for joists and rafters shall be of a species and grade capable of resisting all loads determined in accordance with Chapter 23 and the Span Tables for Joists and Rafters as set forth in Section 402 or as designed by structural analysis.

(2) The designer shall specify, on the design drawings, the size, spacing, species and grade, of all load supporting wood members.

(3) Lumber used for studs in bearing walls shall be of a species and grade capable of resisting all loads determined in accordance with Chapter 23 and in no case be less than stud grade. The unbraced height of the wall shall be no more than 8 ft. 6 in. (including top and bottom plates). Heights may be increased where justified by rational analysis.

(4) Lumber used for studs in non-bearing, non-shear wall partitions shall have a modulus of elasticity of not less than 0.9×10^6 pounds per square inch.

(b) Nominal stress is the basic assigned to the grade and species before any modification due to repetitive loading, duration of load, etc.

2905 VERTICAL FRAMING

2905.1 STUDS IN BEARING AND EXTERIOR WALLS: Wall framing over 8'6" in unbraced height (including top and bottom plates); for second story or above; supporting floor and roof loads or in Exposures D or in other than Importance Factors I or IV of ASCE 7, shall be designed by rational analysis by an Architect or Professional Engineer with the size, spacing, species, and grade of lumber indicated on the design drawing.

(a)MINIMUM SIZE: Studs shall be not less than 2" x 6" for exterior walls or 2" x 4" for interior bearing or load resisting walls unless designed by rational analysis.

(b)SPACING: Studs shall be spaced not more than 16 inches on centers unless designed by rational analysis.

(c) PLACING:

(1) Studs in exterior and bearing walls shall be placed with the longer dimension perpendicular to the wall.

(2) Stud bearing walls shall be supported by foundation plates, sills, or girders, or floor framing directly over supporting walls or girders. Stud bearing walls when perpendicular to supporting joists may be offset from supporting walls or girders not more than the depth of the joists unless such joists are designed for the extra loading conditions.

(3) Stud walls framing into minimum 2 inch thick nominal base plates of exterior bearing walls and interior bearing walls resting on masonry or reinforced concrete shall be anchored past the plate to the masonry or reinforced concrete, or shall be anchored to a sill plate which is anchored in accordance with Sec. 2905.1(d)(1).

(d) SILLS AND BASE PLATES:

(1) Sills and base plates, where provided in contact with masonry or reinforced concrete, shall be of an approved durable species or be treated with an approved preservative and shall be attached with 2-inch diameter anchor bolts with oversize washer spaced not over 2 feet apart and embedded not less than 7 inches in the

concrete. Base plates shall be placed into a recess at the edge of a concrete slab or beam the width of the base plate and $^3/_4$" deep, or be provided with an alternate waterstop method as approved by the Building Official. Alternate methods of anchorage shall be designed by rational analysis.

(2) Where the base plate is supported on joists or trusses running perpendicular to the joists or trusses, and the studs from the wall above do not fall directly over a joist or truss; a double base plate, or a single base plate supported by a minimum 2" x 4" inset ribbon, or another rationally designed method shall be used to support the upper stud wall.

(e) TOP PLATES:

(1) The top plates of stud bearing walls shall be doubled and lapped at each intersection of walls and partitions.

(2) Joints shall be lapped not less than four feet.

(f) CORNERS: Corners of stud walls and partitions shall be framed solid by not less than three studs.

(g) SPLICING: Studs, other than end-jointed lumber, shall be spliced only at points where lateral support is provided.

(h) FRAMING TYPES:

(1) Wood framing may be any one, or a combination of, the following types: Platform, balloon, plank and beam, or pole type.

(i) NOTCHING:

(1) Studs which carry loads in excess of 75 percent of their capacity shall not be notched or cut.

(2) Studs which carry loads 75 percent or less of their capacity may be notched to one-third of the depth without limit of the number of consecutive studs.

(j) PIPES IN WALLS:

(1) Stud walls and partitions containing pipes shall be framed to give proper clearance for the piping.

(2) Where walls and partitions containing piping are parallel to floor joists, the joists shall be doubled and may be spaced to allow vertical passage of pipes.

(3) Where vertical pipe positions necessitate the cutting of plates, a metal tie not less than 1" x 1/8" shall be placed on each side of the plate across the opening and nailed with not less than two 16d or three 8d nails at each end.

(k) HEADERS:

(1) All headers in bearing walls shall be designed by rational analysis.

(2) Headers or lintels over stud wall openings shall have not less than nominal two-inch bearings.

(l) STUDS JOINING MASONRY OR REINFORCED CONCRETE: Where stud walls or partitions join masonry or reinforced concrete walls, such studs shall be secured against lateral movement by nailing or bolting to the masonry, or reinforced concrete.

(m)WIND BRACING: Exterior stud walls shall be effectively wind-braced in accordance with Sub-section 2909.3.

(n) The intermixing of wall framing described in this chapter with other types of structural wall systems as provided in this Code shall not be permitted unless such wall framing and connections are designed by a Professional Engineer or Architect.

2905.2 INTERIOR NON-BEARING PARTITIONS:

(a) Studs in interior non-bearing partitions with openings shall be of not less size than 2" x 3" spaced not more than 16 inches on centers or shall be of not less size than 2" x 4" spaced not more than 24 inches on centers.

(b) Studs in interior non-bearing partitions without openings shall be of not less than 2" x 3" spaced not more

than 24 inches on centers.

(c) Interior non-bearing stud partitions may have a single top plate.

(d) Headers over openings not exceeding four feet in width may be of two-inch nominal thickness placed flat and end-nailed through the studs with no solid bearing provided.

(e) Studs in interior non-bearing partitions exceeding nine feet in height shall be placed with the longer dimension perpendicular to the partition.

(f) Stud partitions subject to frequent wetting shall be protected with 15-pound asphalt-saturated felt, or by other approved methods.

(g) Wardrobe units serving as non-bearing partitions, prefabricated or partially prefabricated may be of 2" x 2" studs spaced not farther apart than 16 inches on center provided there is a wood based structural-use panel skin glued or nailed to the studs.

2905.3 COLUMNS AND POSTS:

(a) Columns and posts shall be framed to true end bearing. Anchorage against lateral and vertical forces shall be specified by the Architect or Professional Engineer of Record.

(b) The bottom of columns and posts shall be protected against deterioration.

(c) Splicing of columns and posts shall be done only in regions where lateral support is adequately provided about both axes.

(d) Design dimensions of columns and posts shall not be reduced by notching, cutting or boring.

2906 HORIZONTAL FRAMING

2906.1 SIZE:

(a) The minimum size of joists and rafters shall be in accordance with the span tables for joists and rafters as adopted in Section 402 or as designed by rational analysis.

2906.2 SPACING: Joists and rafters, where a plaster ceiling is directly supported, shall comply with Paragraph 3502(c).

2906.3 BEARING:

(a) Joists and rafters shall have:

(1) Not less than three inches of bearing on wood, metal, masonry or reinforced concrete, except as provided in Paragraphs (b), (c), (d) and (e).

(b) Joists and rafters on masonry or reinforced concrete may bear:

(1) On and be anchored to a wood plate provided such plate shall be not less than 2" x 4" and attached to the masonry or reinforced concrete with one-half inch diameter bolts, 8 inches long and spaced not more than two feet apart;

(2) On 2" x 4" wood plate attached to the masonry or reinforced concrete with one-half inch diameter bolts, 8 inches long and spaced and not more than four feet apart, provided that each joist or rafter is fastened to the masonry or reinforced concrete by anchors of non-corrosive material, designed for the required uplift loads, but in no case shall they be rated for less than 450 pounds embedded in the masonry or reinforced concrete;

(3) On a channel-shaped metal saddle and fastened to the masonry or reinforced concrete by an approved anchor embedded in the masonry or reinforced concrete;

(4) On masonry, or reinforced concrete, provided that each joist or rafter in contact with masonry or reinforced concrete is of an approved durable species or pressure treated with an approved preservation and anchored as in (3) above.

(c) Floor joists may butt into a header beam if an approved joist hanger providing not less than three inches

of bearing transmits the vertical load to the top of the header, provided, however, that approved devices or other approved means of support may be used in lieu of such bearing.

(d) Ceiling joists may butt into a header beam, as set forth for floor joists, or approved devices or other approved means of support may be used in lieu of such bearing.

(e) In lieu of the above, bearing and anchorage may be designed by a Professional Engineer or Architect.

2906.4 SPLICING: Horizontal members shall not be spliced between supports except that properly designed splices or approved end-jointed lumber may be used.

2906.5 NOTCHING AND BORING:

(a) Unless local unit stresses are calculated on the basis of reduced size, wood members in bending shall not be cut, notched or bored except as follows:

(1) Notches may be cut in the top or bottom not deeper than one fifth of the depth, not longer than one-third the depth of the member and shall not be located in the middle one-third of the span.

(2) Holes may be bored in the middle one-third of the depth and length and not larger than one-sixth of the depth. Space between any two holes in the same joist shall be not less than the depth of the joist.

(b) Where necessary to run service pipes in the space between the ceiling and floor larger than can be accommodated by the above provision, such ceilings shall be furred or provision made for headers or beams and/or for changing direction of the joists where the design permits.

2906.6 OPENINGS:

(a) Joists shall be doubled adjacent to openings where more than one joist is cut out or shall be so increased in size or number as may be needed to meet the stress requirements.

(b) Headers shall be of the same size as the joists and where supporting more than one joist shall be doubled members.

(c) Headers shall be supported by approved metal hangers or ledgers or other approved members.

2906.7 WOOD ENTERING MASONRY OR REINFORCED CONCRETE:

(a) Wood joists, beams or girders which frame into masonry or reinforced concrete shall have a minimum of 2 inch air space at the top, end and sides or shall be preservative pressure treated or of an approved durable species. Joists, beams or girders bearing on masonry or reinforced concrete shall be pressure treated or protected by an approved method.

(b) Where masonry or reinforced concrete extends above such wood members, joists shall be fire-cut so the top edge does not enter the masonry or reinforced concrete more than one-inch or shall be provided with wall plate boxes of self-releasing type or approved hangers.

(c) Where joists enter a masonry or reinforced concrete wall required to be fire-resistive, such joists shall be separated from the opposite side of the wall by at least four inches of solid masonry or reinforced concrete.

2906.8 FLOOR JOISTS:

(a) Floor joists under all walls or partitions parallel to the joists shall be doubled.

(b) Doubled joists may be separated not more than six inches.

(c) Floor joists supporting concrete for bathroom floors shall have a maximum spacing of 12 inches.

2906.9 CEILING JOISTS:

(a) In buildings with pitched roofs, the ceiling joists, where practicable shall be nailed to the rafters and shall be designed to carry all imposed loads including but not limited to lateral thrust.

(b) Ceiling joists spanning more than 14 feet shall be laterally supported at mid-span.

2906.10 ROOF JOISTS: Roof joists may cantilever over exterior walls as limited by the allowable stress, but the length of such cantilever shall not exceed one half the length of the portion of the joist inside the building;

and where the cantilever of tail joists exceed three feet, the roof joist acting as a header shall be doubled.

2906.11 ROOF RAFTERS:

(a) Hip rafters, valley rafters and ridge boards shall be provided and shall be not less in size than the largest rafter framing thereto nor less than required to support the loads.

(b) (1) Collar ties and or ceiling joists, and their connections when used to resist lateral thrust shall be designed by a professional engineer or architect.

(2) Collar ties shall not be required if the ridge is designed as a supporting beam.

(c) The actual roof and ceiling dead loads may be used to resist uplift loads, but the maximum combined dead load used to resist uplift loads shall not exceed 10 pounds per square foot.

2906.12 HEAVY TIMBER CONSTRUCTION: Heavy timber construction of floors and roofs (including heavy timber trusses) shall comply with Sub-section 2003.3, the Standards in Section 402 and shall be designed by an architect or engineer to withstand the loads required by Chapter 23 of this Code.

2906.13 VERTICAL LAMINATED BEAMS: Vertically laminated built-up beams shall be made up of members continuous from bearing to bearing.

2906.14 GLUED LAMINATED MEMBERS: Glued laminated members shall comply with the Standard set forth in Section 402.

2906.15 RESERVE FOR FUTURE USE

2906.16 STAIR STRINGERS:

(a) Stair stringers shall, where practicable, be framed to provide four inches of bearing at the ends.

(b) Where it is not practicable to provide such bearing, the stringers shall be hung in steel hangers of approved type.

(c) Stair stringers shall not be notched or cut in the effective area.

(d) Two stringers shall be provided for each flight of stairs no more than 36 inches in width, and an additional stringer shall be provided for each 18 inches of additional stair width, except for public stairs were the number and size of stair stringers shall be determined by rational analysis by a Registered Professional Engineer.

2906.17 WOOD TRUSSES - STANDARD CONDITIONS:

(a) LUMBER SPECIFICATIONS:

(1) Trusses shall be fabricated of lumber applying the stress ratings listed in "Design Values for Wood Construction" as published by the American Forest & Paper Association. Trusses as fabricated shall conform to grade as specified on engineering design for the applicable.

A minimum rating of 1000 psi fb before any southern Yellow Pine, Douglas Fir, Hem-Fir or Fir-Larch increase shall be required for top and bottom chords; web members may be No. 3 Southern Yellow Pine, Stud Grade or better, as required by the engineering.

(2) Minimum percentage of trusses which are to have grade marks on their chord members shall be:

For trusses spanning 10 feet or less: 33%

For trusses spanning over 10 feet to 20 feet: 50%

For trusses spanning over 20 feet: 75%

A chord member is defined as the entire top or bottom truss member which may consist of shorter spliced pieces.

Web members of all trusses:

One web member marked on each truss.

Each truss shall bear the fabricator's stamp on a web member and 50% are to be clearly visible for the inspector to be reasonably sure of the fabricator.

(3) Lumber to be 12" for 2" nominal; minimum size shall be 2 x 4 nominal.

(4) Moisture content shall not exceed 19% at time of truss fabrication.

(b) TRUSS CONNECTOR PLATE SPECIFICATIONS:

All connector plates over 3" and 25% of 3" or less as per TPI standards, must bear the name or logo of the plate manufacturer or be rejected. Plate manufacturers must certify at least twice each year that their plates meet the specifications of the Truss Plate Institute TPI-85 or latest edition, Section 202, with respect to grade of steel, thickness or gauge of material, galvanizing requirement specification ASTM G-60 (min). This requirement shall be met by means of certified mill reports or independent laboratory reports.

(c) TRUSS DESIGN:

(1) Design criteria shall be the latest approved edition of:

Truss Plate Institute "Design Specification for Metal Plate Connected Wood Trusses" "Design Specification for Metal Plate Connected Parallel Chord Wood Trusses", and this Code.

(2) The size and location of all plates shall be shown on the drawings. Truss design drawings must clearly show plate locations at each joint.

(3) Truss designs are for uniform distributed live loads, dead loads, and concentrated loads as shown.

(4) With the exception of cutting top chord overhangs only to length, trusses may not be cut or altered without prior consent from manufacturer. Where certain truss members have been cut, field altered, or repaired to meet construction needs, the Building Department will require sealed drawings by a Florida Registered Professional Engineer.

(5) The nailing or bolting pattern of all multiple member girders must be specified on the girder design.

(6) Designs must show or specify the minimum permanent bracing required to prevent buckling of the truss members, including the bottom chord, where bracing is not provided by the ceiling construction.

(7) Hip sets shall be detailed in a manner to indicate all connections according to engineering drawings for the attachment of skewed members.

(8) Standard roof trusses shall be designed for a live load of 30 psf and a minimum dead load of 15 psf on the top chord; and a minimum dead load of 10 psf on the bottom chord, or a minimum total load of 55 psf. A load duration factor of one-third (33%) is allowed for design of roof trusses with slopes of 1 to 12 or greater and without drainage obstructions. Roof trusses shall be designed for wind loads as required in Chapter 23.

(9) Flat roof trusses (those with slopes of less than 1 to 12) shall be designed for the same loads, except that the dead load on the top chord may be taken as 10 psf in lieu of 15 psf, and the total load reduced to 50 psf. A load duration factor of 25% is permitted for flat roof trusses.

(10) The actual roof and ceiling dead loads may be used to resist uplift loads, but the maximum combined dead load used to resist uplift loads shall not exceed 10 pounds per square foot.

(11) The gable end truss shall be designed for a live load of 30 pounds per square foot and a dead load of 15 pounds per square foot on the top chord and the dead load of 10 pounds per square foot on the bottom chord may be omitted where continuous support is provided. In addition, the gable end trusses shall be designed to sustain a horizontal wind load perpendicular to the plane of the truss in accordance with the provisions of Chapter 23 of this Code. The anchorage of the gable end shall be designed by the Architect or Professional Engineer of Record but shall not be greater than 4'0" on center.

(aa) Where a truss with a vaulted bottom chord exists adjacent to a gable end, the gable end wall shall be designed to be continuous from a point of positive lateral support where side-sway of the overall frame is inhibited, to the underside of the roof sheathing or outlookers, or the gable end may have a vaulted bottom chord matching the profile of the adjacent truss and bracing be designed in accordance with Sub-paragraph 2906.17(e)(4) of this Code.

(12) Floor trusses shall be designed in accordance with the load criteria set forth in Sections 2301 and

2302 of the Code.

(13) Flat and floor trusses must be clearly marked so that they will be installed right side up. These marks must remain visible after the flooring, sheathing, and insulation have been installed.

(d) PERMITTED USE:

Wood trusses may be utilized as follows:

(1) Floors acceptable in Type III Protected, Type III Unprotected and Type V Constructions, fire rating per the South Florida Building Code.

(2) Roofs acceptable for Type III Protected and Unprotected and Type V Constructions, fire rating per the South Florida Building Code.

(e) TRUSS INSTALLATION:

(1) All trusses shall be installed in accordance with Truss Plate Institute's "Commentary and Recommendations for Handling Installing and Bracing Metal Plate Connected Wood Trusses" (HIB-91), in addition to any other specific requirements as shown on permit drawings.

(2) Temporary bracing shall be required during the erection of roof trusses to keep the trusses in a true and plumb position and to prevent toppling of the trusses during erection, until the roof sheathing is applied. The provisions for temporary bracing shown in HIB-91 shall be used for this bracing or a Professional Engineer or Architect shall design the temporary bracing system. The ultimate responsibility to see that this bracing is installed properly during the erection process lies with the permit holder. This bracing is extremely important for the protection of life and property during the erection process. Temporary truss bracing shall always be required.

(3) Permanent bracing of individual truss members may be required on certain members of the trusses to prevent the members from buckling in the plane normal to the trusses (buckling in the narrow direction). This bracing shall be designed for both upward and downward loads and shall be shown on the individual truss drawings (truss engineering usually shown on 8-2" x 11" sheets). The design of this bracing shall be the responsibility of the Specialty Engineer. The contractor shall be responsible for seeing that this bracing is properly installed. This bracing may be in the form of (but not limited to) "T" bracing of an individual member, or lateral bracing of a series of members common to a number of trusses. Where lateral bracing is used, this bracing shall be restrained against lateral movement, in accordance with details provided by the Specialty Engineer or by the Architect or Professional Engineer of Record.

(4) Where the ceiling is to be attached directly to the underside of the trusses, the trusses shall be laterally braced with continuous 1" x 4" members nailed to the upper side of the bottom cord at a maximum of 6'0" on center with two (2) 8d common nails at each intersection. This lateral bracing shall be restrained at each end and at 20'0" intervals. Where false bottom chords are hung from the bottom chord of the trusses, the actual bottom chord shall be laterally braced as per the requirements shown on the truss engineering.

(aa) Where a ceiling is to be attached to 1 x 3 wood stripping or metal furring channels not less than 25 gauge and hot dipped galvanized and complying with ASTM C645, which is fastened to the truss bottom chords with no less than two-8d common nails or two 1-1/4" furring channel screws, respectively, at each truss intersection and spaced to comply with Chapter 35 of this Code, said stripping or metal furring channels may serve also as the lateral bracing of the truss bottom chord so as to minimize the effects of buckling of the bottom chord when subjected to compressive stresses under reverse load conditions. In addition, the rigid ceiling that is created by this 1 x 3 stripping or metal furring channels must also be restrained from lateral movement, in accordance with the details provided by the Architect or Professional Engineer of Record.

EXCEPTION: Where the fire rated design assembly does not allow for this specific installation, Paragraph 2906.17(e)(4), shall apply.

(5) Permanent bracing of the truss system for the overall lateral stability of the structure may be required and is the responsibility of the Architect or Professional Engineer of Record. This bracing shall be shown on the

truss engineering shall be shown on this plan as well as all truss to truss connections. The reactions at all supports (both upward and downward) shall be shown on the individual truss engineering. The Architect or Professional Engineer of Record shall approve this placement plan as to conforming with the general intent of the truss framing plan.

(4) The above criteria shall be applicable to both floor and roof trusses.

2907 FIRESTOPS

2907.1 Fire stopping shall be provided to cut off all concealed draft spaces both vertical and horizontal.

(a) Firestops shall form effective fire barriers between stories and between a story and roof space.

(b) Fire stopping shall be tightly and securely fitted into place and where of wood, shall be not less than a nominal two inches in thickness.

(c) Spaces between chimneys and wood framing shall be solidly filled with mortar or loose incombustible materials supported on incombustible supports.

2907.3 Firestops shall be provided in specific locations as follows:

(a) In exterior and interior walls and partitions at ceiling and floor levels and shall be so placed that the maximum dimension of any concealed space is not over eight feet.

(b) Around the top, bottom and sides of sliding door pockets.

(c) Between stair stringers at least once in the middle of each run, at the top and bottom, and between studs, along and in line with adjacent run of stairs.

(d) Between chimneys, fireplaces and wood framing, except in the case of approved metal chimney installation.

(e) In any location where a concealed space would permit a spread of fire.

(f) Concealed attic spaces shall be divided into horizontal areas in accordance with Sub-section 2006.5 and 2205.4.

2908 ANCHORAGE

2908.1 Anchorage shall be continuous from the foundation to the roof and shall satisfy the uplift requirements of Section 2306.

2908.2

(a) Joists fire-cut into a masonry wall shall be anchored to the concrete beam on which they bear.

(b) Such anchors shall be spaced not more than four feet apart and shall be placed at opposite ends across the building on the same run of joists.

2908.3 Joists shall be nailed to bearing plates, where such plates occur, to each other where contiguous at a lap, and to the studs where such studs are contiguous; and ceiling joists shall be nailed to roof rafters where contiguous.

2908.4 Every roof rafter and/or roof joist shall be anchored to the beam or studs on which they bear, and roof rafters opposing at a ridge shall be anchored across the ridge as set forth in Sub-section 2908.6.

2908.5 Anchors providing uplift restraint for wood members shall be of non-corrosive material designed for the required uplift loads, but in no case shall they be rated for less than 450 pounds, and shall be fastened in accordance with the manufacturers specifications. The Architect or Professional Engineer of Record shall indicate, on the drawings, the uplift loads at all locations where framing anchors are specified.

2909 SHEATHING

2909.1 FLOOR SHEATHING:

(a) Floor sheathing, where a part of a required fire-resistive assembly, shall comply with Chapter 37.

truss framing plan provided by the Architect or Professional Engineer of Record and may be in pictorial form or written form on the framing plan.

(aa) At gable ends, this bracing shall be designed to transmit lateral loads imposed on the gable to the roof diaphragms and/or ceiling diaphragms (where available). Where the wall supporting the gable is not designed to withstand lateral loads independent of the gable (by using shear walls or other methods), anchorage of the gable to the wall shall be designed to transmit the loads from the wall to the bracing and the bracing designed to transmit the lateral loads from the gable and wall to the roof diaphragms and/or ceiling diaphragms (where available). Ceiling diaphragms that provide lateral support at gable end walls shall be designed by the Architect or Professional Engineer of Record, and shall have sufficient continuous bottom chord bracing, end restraints, intermediate restraints and connections so as to sufficiently transfer the lateral loads at the top of the gable end walls to the intersecting shear walls. In no case shall the rigid ceiling as defined in Paragraph (4)(aa) be utilized as an integral part of the system needed for lateral bracing of the gable end walls.

(6) The installation of large trusses, including temporary bracing, safety precautions and permanent bracing as required by the Specialty Engineer and the Architect or Professional Engineer of Record, shall be performed under the direct supervision of either a Licensed Building Contractor, Licensed General Contractor, Architect or Professional Engineer. Large trusses are those measuring more than 35 feet in overall length, or 6 feet in overall height.

(7) Where masonry or reinforced concrete extend above wood trusses; trusses shall be designed so as not to compromise the structural integrity of the masonry or concrete wall it abuts in the event of collapse due to fire.

(f) DESIGN DRAWINGS FOR INDIVIDUAL TRUSSES:

Design drawings for individual trusses submitted for approval shall consist of two (2) duplicate sets of prints of the following:

(1) Design drawings for individual trusses submitted for permit must be presented with the Professional Engineer's impress seal and signature.

(2) Drawings of special details and connections must bear the impress seal and signature of an Professional Engineer.

(g) ROOF OR FLOOR FRAMING:

(1) When applying for permit, the Architect or Professional Engineer of Record shall provide a framing plan. The truss manufacturer shall submit to the Architect or Professional Engineer of Record a truss placement plan which conforms with this framing plan, plus a collation of the applicable truss designs and truss connections which denote their locations on the placement plan. The truss placement plan does require the seal of an Engineer, and shall be reviewed and accepted by the Architect or Professional Engineer of Record for conformance to design concepts and load interaction with the building. After the Architect or Engineer of Record has indicated his review and acceptance, and prior to pouring the tie beam (or prior to the erection of the trusses in the case of a wood frame building), the truss placement plan, design drawings for individual trusses, and truss to truss connection details shall be submitted to the building department. The designs for individual trusses shall be prepared by a Florida Professional Engineer. See Paragraph 2906.17(f) above.

(2) The truss framing plan shall be provided by the Architect or Professional Engineer of Record. It shall show all load bearing walls or columns; location of all girder members; provisions for anchorage of the truss system for the overall lateral stability of the structure where required; and provisions for anchorage to the structure of any lateral bracing of individual truss members that may be required. All information pertinent to the geometry of the truss system, uniform load and special load requirements, and other special information regarding the truss system shall be shown on this framing plan.

(3) The truss placement plan shall be provided by the Specialty Engineer. It shall show the location of all truss components and the roof ridges and supports. The locations of girders and direction of span of the non-girder members shall follow the truss framing plan. The individual truss labels corresponding to the individual

(b) The finish floor shall be tongue-and-grooved not less than nominal one-inch lumber laid perpendicular to the joists with end joints on the joists, or a sub-floor shall be provided as set forth in Paragraph (c), (d) and (e).

(c) Square-edged or spaced sub-flooring may be used under only a finish floor having a strength equal to or greater than one-half inch tongue-and-groove wood strip flooring, and under finish floors of less strength, a tongue-and-groove, wood-based structural-use panel sub-floor shall be required.

(d) (1) Lumber sub-flooring shall be not less than 5/8-inch thick when joists are placed not more than 16-inches on center nor less than $^3/_4$-inch thick when joists are spaced no more than 24 inches on center. End joints shall be on joists, joints shall be staggered and parallel to the joists, and ends at walls and similar places shall be supported by a ribbon or by blocking.

(2) Wood-based structural-use panels sub-floors of C-D and Underlayment grade bonded to wood joists using adhesives meeting the requirements of AFG-01 shall be applied using maximum spans and nail size and spacing be used as per Section 2909.1(e)(1) of this Code.

(e) Wood-based structural-use panel sub-flooring shall be continuous over two or more spans with face grain perpendicular to the supports. The allowable spans shall not exceed the following:

Wood-Based Structural-Use Panel Sub-Floor (1)

Panel Span Rating (2)	Maximum Panel Span (3)
32/16	16" (4)
40/20	20" (4)
48/24	24"

(1) These values apply for Sheathing grade C-D and C-C grades only. Spans shall be limited to values shown, and reduced for the possible effects of concentrated loads.

(2) Span Rating appears on all panels in the construction grades listed in Footnote (1).

(3) Panel edges shall have approved tongue-and-groove joints or shall be supported with blocking unless 3-inch minimum thickness underlayment is installed or unless finish floor is one inch nominal wood strip or where a minimum of 12 inches of approved cellular or lightweight concrete is placed over the subfloor and the sheathing is rated for Exposure 1. Allowable uniform load based on deflection of 1/360 of span is 100 pounds per square foot.

(4) May be 24 inches if nominal one inch wood strip finish floor is laid at right angles to joists.

(1) Wood-based structural-use panels shall be nailed to supports with 8d common nails up to 3/4-inch thick, and 10d common nails or 8d ring shank when greater than 3/4-inch up to 1-1/8 inches thick.

(aa) Nails shall be hand driven 8d common nails (0.131" diameter by 22" long with a 0.281" diameter full round head) or power driven 8d nails of the same dimensions (0.131" diameter by 22" long with a 0.281" diameter full round head). Nails of a smaller diameter or length may be used only when approved by an Architect or Professional Engineer and only when the spacing is reduced accordingly.

(bb) Nails shall be hand driven 10d common nails (0.148" diameter by 3" long with a 0.312" diameter full round head) or power driven 8d nails of the same dimensions (0.148" diameter by 3" long with a 0.312" diameter full round head). Nails of a smaller diameter or length may be used only when approved by an Architect or Professional Engineer and only when the spacing is reduced accordingly.

(2) Nail spacing shall be 6 inches on center at panel edges and 10 inches on center at intermediate supports.

(f) Flooring shall be nailed with 8d common nails not less than two in each board at each support.

(g) Floors for heavy timber buildings shall be sheathed as specified for mill floors, Sub-section 2906.12.

(h) Flooring shall not extend closer than one-half inch from masonry walls.

(I) If resilient flooring is to be applied directly to a wood-based structural-use panel sub-floor without separate underlayment, the sub-floor shall be of Underlayment or C-C plugged grade or better. Wood-based structural-use panels shall be continuous over two or more spans with face grain perpendicular to supports.

Minimum nominal thickness and maximum joist spacing shall comply with the following table:

ALLOWABLE SPAN FOR WOOD-BASED STRUCTURAL-USE PANEL COMBINATION SUB-FLOOR UNDERLAYMENT (1)

Maximum Plywood Span (inches)

(2)(3)

Species Groups	16" (4)	20" (4)	24"	48"
1	2"	5/8"	3/4"	
2, 3	5/8"	3/4"	7/8"	
4	3/4"	7/8"	1"	
Span Rating	16 o.c.	20 o.c.	24 o.c.	48 o.c.

(1) Applicable underlayment grade, C-C (plugged) and all grades of sanded Exterior type plywood.

(2) Spans shall be limited to values shown based on possible effect of concentrated loads.

(3) Allowable uniform live load based on deflection of 1/360 of span is 100 pounds per square foot except total load for 48 on center is 65 pounds per square foot. Panel edges shall have approved tongue-and-groove joints or shall be supported with blocking, unless 3-inch minimum thickness underlayment is installed or unless finish floor is one inch nominal wood strip or where a minimum of 12 inches of approved cellular or lightweight concrete is placed over the subfloor and the sheathing is rated for Exposure 1.

(4) If a wood finish floor is laid perpendicular to the joists or supports, thicknesses shown for 16-inch and 20-inch spans may be used for 24-inch spans.

(j) Underlayment Hardboard shall meet the property requirements for 7/32 inch and 3-inch service hardboard and shall be 0.215 plus or minus 0.005 inch thickness; when supported on sub-flooring, such sub-flooring shall comply with the requirements of Paragraphs (c) and (d) or (e) above.

(k) Particle board floor underlayment shall conform to Type 1-B-1 of the Standard listed in Section 402. Underlayment shall be not less than 3-inch in thickness and shall be installed in accordance with the installation instructions of the National Particle board Association.

2909.2 ROOF SHEATHING:

(a) Wood roof sheathing shall be boards or wood-based structural-use panels, except as may be otherwise approved by the Building Official.

(b) Board roof sheathing shall have a net thickness of not less than three-fourths inch when the span is not more than 28 inches or 5/8-inch when the span is not more than 24 inches, shall have staggered joints and shall be nailed with 8d common nails not less than two in each six-inch board nor three in each eight-inch board at each support.

(c) Wood-based structural-use panel roof sheathing shall be rated for Exposure 1, have a minimum nominal thickness of 19/32 inches and shall be continuous over two or more spans with face grain perpendicular to supports. Panel roof sheathing shall be provided with a minimum of 2" x 4" edgewise blocking at all horizontal panel joints with edge and end spacing in accordance with manufacturers' specifications, for a distance at least four feet from each gable end. The allowable spans shall be based on accepted methods of engineering practice and shall be clearly identified on the design drawings, but in no case shall the panel span rating be less than the

values outlined on the following table:

(d) DIAPHRAGM BOUNDARIES: All roof sheathing acting as a diaphragm shall be attached to a minimum 2 inch thick nominal member with its depth equal to or one size greater than the intersecting top chord. This shall be achieved with a continuous structural sub-facia, facia or blocking between framing members where a soffit is provided and shall be effectively nailed to said structural sub-facia, facia or blocking at 4 inches on center with nails as required for the appropriate thickness of sheathing.

ALLOWABLE SPANS FOR WOOD-BASED STRUCTURAL-USE PANEL
ROOF SHEATHING (1)

Panel Identification Index (2)	Maximum Span If Block or Other Edge Supports	Maximum Span Without Edge Support
32/16	32"	28"
40/20	40"	32"
48/24	48"	36"

Notes: (1) Values apply to sheathing grade C-C and C-D panels.
(2) Span Rating appears on all panels listed in Footnote (1).

(1) Fastening of up to and including 19/32 inches roof sheathing panels shall be based on accepted methods of engineering practice and shall be clearly identified on the design drawings, but in no case shall the roof sheathing panels be fastened to the supporting structural member with less than 8d common nails spaced six inches on center over all supports, including the blocking required in Sub-section 2909.2(c). Nail spacing over gable ends shall not exceed four inches on center.

(aa) Nails shall be hand driven 8d common nails (0.131" diameter by 22" long with a 0.281" diameter full round head) or power driven 8d nails of the same dimensions (0.131" diameter by 22" long with a 0.281" diameter full round head). Other fasteners may be permitted when the Architect or Professional Engineer specifies all fastener dimensions, spacing, penetration, and orientation.

(2) Fastening of roof sheathing panels with a nominal thickness in excess of 19/32 inches shall be based on accepted methods of engineering practice and shall be clearly identified on the design drawings, but in no case shall the roof sheathing panels be fastened to the supporting structural member with less than 10d common nails spaced no more than six inches on center over all supports, including the blocking required in Sub-section 2909.2(c). Nail spacing over gable ends shall not exceed four inches on center.

(aa) Nails shall be hand driven 10d common nails (0.148" diameter by 3" long with a 0.312" diameter full round head) or power driven 10d nails of the same dimensions (0.148" diameter by 3" long with a 0.312" diameter full round head). Other fasteners may be permitted when the Architect or Professional Engineer specifies all fastener dimensions, spacing, penetration, and orientation.

(d) DIAPHRAGM BOUNDARIES: All roof sheathing acting as a diaphragm shall be attached to a minimum 2 inch thick nominal member with its depth equal to or one size greater than the intersecting top chord. This shall be achieved with a continuous structural sub-facia, facia or blocking between framing members where a soffit is provided and shall be effectively nailed to said structural sub-facia, facia or blocking at 4 inches on center with nails as required for the appropriate thickness of sheathing.

(e) When existing roofs are reroofed to the point that the existing roofing is removed down to the sheathing, the existing roof sheathing shall be renailed with 8d common nails (0.131 diameter by 22" long with a 0.281 diameter full round head). Nail spacing shall be six inches on center at panel edges, six inches on center at intermediate supports and where applicable four inches on center over gable ends and sub-facia. Existing fasteners may be utilized to achieve such minimum spacing. See Sub-paragraph 3401.1(b)(5) and Paragraph 3401.8(h).

(f) Roof sheathing for heavy timber construction shall comply with Sub-section 2906.12.

2909.3 STORM SHEATHING: Exterior stud walls shall be sheathed to resist the racking load of wind as set forth in Section 2309 of this code, and the concentrated loads that result from hurricane generated wind-borne debris as set forth in Section 3501, and shall be any of the following types:

(a) Tightly-fitted, diagonally-placed, boards not less than 5/8-inch thickness, nailed with three 8d common nails to each support for 1" x 6" boards and four 8d common nails for 1" x 8" boards.

(b) Wood-based structural-use panel wall sheathing rated for Exposure 1, with a minimum nominal thickness of 15/32 inches, and be continuous over two or more spans. Panel wall sheathing shall be provided with a minimum of 2" x 4" edgewise blocking at all horizontal panel joints, fastened with a minimum of two-16d common nails. Maximum stud spacing, span rating, and nail spacing shall be based on accepted methods of engineering practice and shall be clearly identified on the design drawings. In no case shall rating or nail size be less than, nor the nail spacing be greater than that shown in the following table:

WOOD-BASED STRUCTURAL-USE PANEL WALL SHEATHING

Min. Panel Span Rating Studs	Max. Stud Spacing	Nail Size	Nail Spacing (on center) Edges/Field	Corner
32/16	24 inches	8d Common	6 inches	4 inches

(1) When wood-based structural-use panel sheathing is used, building paper and diagonal wall bracing can be omitted.

(2) When sidings such as shingles are nailed only to the wood-based structural-use panel sheathing, apply the wood-based structural-use panels with face grain across studs.

(3) Nails shall be hand driven 8d common nails (0.131" diameter by 2-1/2" long with a 0.281" diameter full round head) or power driven 8d nails of the same dimensions (0.131" diameter by 2-1/2" long with a 0.281" diameter full round head). Other fasteners may be permitted when the building designer specifies all fastener dimensions, spacing, penetration, and orientation.

(4) With edge and end spacing in accordance with manufacturers' specifications.

2909.4 EXTERIOR WALL CLADDING:

(a) Wood-based structural-use panels may serve for both storm sheathing and exterior cladding provided:

(1) Panel thickness shall be not less than 15/32 inch, and the supporting studs are spaced not more than 24 inches on centers.

(2) All joints shall be backed solidly with a minimum of 2" x 4" blocking, or joints shall be lapped horizontally or otherwise watertight.

(3) Where the panels are installed in a vertical orientation, horizontal cats spaced not farther apart than four feet shall be provided.

(4) Fastening shall be as set forth for storm sheathing except that the fasteners shall be non-corrosive.

(b) Where storm sheathing is provided in accordance with Sub-section 2909.3, exterior cladding may be as permitted in Chapter 35, or may be one of the following:

(1) Wood siding shall be installed according to its product approval.

(2) Wood shingles or shakes attached to the storm sheathing, and/or to nailing boards or shingle backer securely attached to the storm sheathing. The minimum thickness of wood shingles or shakes between nailing boards shall be not less than three-eighths inch.

(3) Hardboard of siding quality for exterior use shall be applied in accordance with the manufacturer's directions and as approved by the Building Official.

2910 FURRING

Where the interior of masonry walls are furred, such furring shall be treated and firestopped as herein required and shall be securely fastened to the masonry with not less than one cut nail in alternate courses of block.

2911 CONNECTORS

2911.1 The allowable loads on all types of connectors shall be as set forth in the Standards listed in Section 402 and the following Table:

Number of Nails for Connecting Wood Members

Connection	Common Nails	Number and Spacing
Joist to sill or girder, toe nail	16d	2
Bridging to joist, toe nail	8d	2 each end
1" x 6" sub-floor or less to each joist, face nail	8d	2
Over 1" x 6" sub-floor to each joist, face nail	8d	3 + 1 for each size increase
2" sub-floor to joist or girder, blind and face nail	16d	2
Sole plate to joist or blocking, face nail	16d	16" o.c.
Top or sole plate to stud, end nailed	16d	2
Stud to sole plate, toe nail	8d	3 or 1 16d
Doubled studs, face nail	16d	24" o.c.
Doubled top plates, face nail	16d	16" o.c.
Top plates, laps and intersections, face nail	16d	2
Continuous header, two pieces	16d	16" o.c. along each edge
Ceiling joists to plate, toe nail	16d	2
Continuous header to stud, toe nail	16d	3
Ceiling joists, laps over partitions, face nail	16d	3
Ceiling joists to parallel rafters, face nail	16d	3
Rafter to plate, toe nail	16d	3
1" x 6" sheathing, to each bearing, face nail	8d	2
Over 1" x 6" sheathing, to each bearing, face nail	8d	3 + 1 for each size increase
Built-up corner studs, face nail	16d	30" o/c
Built-up girders and beams	20d	32" o/c at top and bottom and staggered, 2 ends and at each splice
2-inch planks	16d	2 each bearing

2911.2 Nails, bolts and other metal connectors which are used in location exposed to the weather shall be galvanized or otherwise corrosion resistant.

2911.3 In general, nails shall penetrate the second member a distance equal to the thickness of the member being nailed thereto. There shall be not less than two nails in any connection.

2911.4 Except for wood-based structural-use panels and other laminated members manufactured under technical control and rigid inspection, gluing shall not be considered an acceptable connector in lieu of the connectors herein specified.

2911.5 Safe loads and design practice for types of connectors not mentioned or fully covered herein shall be determined by the Building Official before approval.

2912 WOOD SUPPORTING MASONRY

Wood shall not support masonry or concrete except as follows:

2912.1 Wood foundation piles may be used to support concrete or masonry.

2912.2 Veneered wood-based structural-use panel decking, wood joists, and wood studs supporting such wood joists may be used to support reinforced concrete slabs, concrete-base tile and terrazzo floors, and light-weight concrete topping as follows:

(a) There shall be an approved moisture vapor barrier between the concrete or other cementitious materials and the wood.

(b) Wood members supporting concrete shall be preservative treated in compliance with the Standards of AWPA set forth in Section 402 and Section 2913.

(c) Veneered wood-based structural-use panel decking shall be rated for Exposure 1.

(d) Wood rafters and roof sheathing may support concrete roof tile.

2913 PROTECTION OF WOOD

2913.1 WOOD PILES: Wood piles shall be treated with preservatives as set forth in Paragraph 2404.3(b).

2913.2

(a) PRESERVATIVE TREATED OR DURABLE SPECIES WOOD:

(1) All wood in areas of buildings where the climatic condition is conducive to deterioration which would affect the structural safety shall be treated in an approved method with an approved preservative or shall be of an approved durable species.

(2) All wood in contact with ground or below ground level which supports permanent structures shall be approved pressure treated wood suitable for ground contact use with the following exceptions:

(aa) Naturally durable wood or pressure treated wood may be used in contact with the ground for support of structures other than buildings and walking surfaces.

(bb) Untreated wood may be used for supports where entirely below ground water level and continuously submerged in fresh water.

(3) All wood in contact with concrete or masonry including sills, sleepers, plates, posts, columns, beams, girders and furring shall be treated in an approved method with an approved preservative or shall be of an approved durable species.

(4) The expression "pressure treated wood" refers to wood meeting the retention, penetration and other requirements applicable to the species, product, treatment and conditions of use in the approved standards of the American Wood Preservers Association (AWPA).

(5) Wood structural members supporting moisture permeable floors or roofs which are exposed to the weather, such as concrete or masonry slabs, shall be of approved naturally durable or pressure treated wood unless separated from such floors or roofs by an impervious moisture barrier.

(6) The expression "durable wood" refers to the heartwood of the following species with the exception that an occasional piece with corner sapwood may be included if 90% or more of the width of each side on which it occurs is heartwood:

Decay resistant: Redwood, Cedars, Black Locust.

Termite Resistant: Redwood, and Eastern Red Cedar.

(7) When wood pressure treated with a water-borne preservative is used in enclosed locations where drying in service cannot readily occur, such wood shall be at a moisture content of 19 percent or less being covered with insulation, interior wall finish, floor covering or other material.

(8) All wood framing and sheathing in exterior walls less than 8" from exposed earth that rest on concrete or masonry foundations shall be approved naturally durable or pressure treated wood.

(9) All posts, poles, and columns embedded in concrete which is in contact with ground and supporting permanent structures shall be approved pressure treated wood suitable for ground contact use except naturally

durable wood may be used for posts, poles and columns embedded in concrete for structures other than buildings and walking surfaces or in structures where wood is above ground level and not exposed to weather.

(10) When wood joists or the bottom of a wood structural floor without joists are closer than 18 inches, or wood girders are closer than 12 inches to exposed ground in crawl spaces or unexcavated areas located within the periphery of the building foundation, the floor assembly, including posts, girders, joists and subfloor, shall be approved naturally durable or pressure treated wood.

(11) For conditions not specifically covered, compliance with American Forest & Paper Association Wood Construction Data #6 "Design of Wood Frame Structures for Permanence" shall be deemed as compliance with this Code.

(b) VENTILATION: Attic space between ceiling joists and roof rafters shall be effectively ventilated. Openings shall be located to provide effective cross ventilation, and such openings shall be covered with a corrosion resistant mesh with openings not greater than one-eighth inch.

2913.3 LIGHT AND VENTILATION:

(a) The space between the bottom of wood floor joists and the ground of any building, except such space as is occupied by a basement or cellar, shall have ventilating openings through foundation walls and such openings shall be covered with a corrosion-resistant wire mesh with openings not greater than one-sixteenth inch.

(b) Where practicable, ventilating openings shall be arranged on three sides.

(c) The minimum total area of ventilating openings shall be two square feet for each 15 linear feet of exterior wall. Such openings need not be placed in the front of the building.

2913.4 DEBRIS:

(a) Before any new building is erected all stumps and roots shall be removed from the soil to a depth of at least 12 inches below the surface of the ground in the area to be occupied by the building.

(b) In buildings or portions thereof having wood first-floor systems, all wood forms which have been used in placing concrete, if within the ground or less than 18 inches above the ground, shall be removed before the building is occupied or used for any purpose.

(c) Loose or casual wood shall not be stored in direct contact with the ground under any building, and this space must be thoroughly cleaned of all wood and debris.

2913.5 TERMITE PROTECTION: All soil and fill under floors and/or within or under buildings shall have pre-construction soil treatment for protection against termites. The Standards of the National Pest Control Association shall be deemed as approved in respect to preconstruction soil treatment for protection against termites. Certificate of Compliance shall be issued to the building department by a licensed pest control company.

2913.6 EXISTING BUILDINGS: Whenever the Building Official has knowledge of the existence of termites in any building or structure, he shall notify the owner in writing and direct that necessary measures be taken for the extermination of the termites within a reasonable length of time, not to exceed 60 days.

2914 FIRE RETARDANT WOOD

2914.1 Fire-retardant treated wood shall be defined as any wood product which, when impregnated with chemicals by a pressure process, or other means during manufacture, shall have when tested in accordance with ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials, a flamespread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20 minute period. In addition, the flame front shall not progress more than 10 feet beyond the center line of the burner at any time during the test.

2914.2 Fire-retardant treated wood shall bear identification showing fire performance rating issued by an approved testing agency having a re-examination service. If intended for exterior use, the wood shall be further identified to indicate suitability for exposure to the weather, as defined in Sub-section 2914.4.

2914.3 Where fire retardant treated wood is exposed to weather, it shall be further identified to indicate that there is no increase in the listed flamespread classification as defined in Item 1 when subject to ASTM 02898. Standard Method for Accelerated Weathering of Fire Retardant Treated Wood for Fire Testing.

2914.4 Where experience has demonstrated a specific need for use of material of low hygroscopicity, fire retardant treated wood to be subjected to high humidity conditions shall be identified to indicate the treated wood has a moisture content of not over 28 percent when tested in accordance with ASTM 03201 procedures at 92 percent relative humidity.

2914.5 Fire retardant treated wood shall be dried to a moisture content of 19 percent or less for lumber and 15 percent or less for plywood before use.

2915 WOOD FENCES

2915.1 Wood fences shall be constructed of decay and termite-resistant material, as specified in Section 2913.2 of this Code.

Note: Cypress may be used for fence cladding and not embedded in the ground.

2915.2 Wood fences shall be designed according to the loads as specified in Section 2303.2(b)(2).

EXCEPTION: Unless designed by rational analysis, wood fences not exceeding 6'2" in height may be constructed to meet the following minimum requirements:

(1) Vertical post of nominal 4 x 4 spaced a maximum of 8'0" o/c, having a minimum fiber stress of 1100 psi in bending.

(2) Post shall be embedded 2'0" into a concrete footing 10" in diameter and 2'0" deep.

(3) Horizontal framing shall consist of a minimum of 3 horizontal rails of a nominal 2 x 4 material and shall be fastened according to Chapter 29.

(4) All lumber shall be a minimum of #2 grade or better.

All fasteners shall be corrosion resistant.

2916 FIRE RETARDANT TREATED SHAKES AND SHINGLES

2916.1 Fire retardant treated shakes and shingles, when impregnated with chemicals by the full-cell vacuum pressure process, shall be considered fire retardant (classified) roof coverings when tested in accordance with ASTM E108, Fire Tests of Roof Coverings, including the rain test ASTM D2898, Accelerated Weathering of Fire Retardant Treated Wood for Fire Testing. The fire-resistance tests shall include the intermittent flame test, spread of flame test, burning brand test and flying brand test. In addition, at the conclusion of the rain test, test panels shall be subjected to the intermittent flame test, burning brand test and flying brand test.

2916.2 Each bundle of fire retardant treated shakes and shingles shall be identified with labels indicating the manufacturer, the classification of the material (Class B or C), and the quality control agency.

CHAPTER 30
ALUMINUM

3001 GENERAL
3002 ALLOWABLE UNIT STRESSES
3003 DESIGN
3004 FABRICATION AND CONSTRUCTION DETAILS

3001 GENERAL

3001.1 DESIGN: Aluminum members shall be designed by methods admitting of rational analysis according to established principles of mechanics.

3001.2 STANDARDS: The following Standards are hereby adopted as set forth in Section 402:

(a) Specifications for Aluminum Structures, The Aluminum Association, Inc.

(b) The Aluminum Formed Sheet Building Sheathing Design Guide, The Aluminum Association, Inc.

(c) The Commentary On Specifications For Aluminum Structures, The Aluminum Association, Inc.

(d) Engineering Data For Aluminum Structures, The Aluminum Association, Inc.

(e) Guidelines For Structural Condition Assessment Of Existing Buildings, ANSI/ASCE II.

3001.3 DEFINITIONS:

PRIMARY MEMBER: Structural framing members providing structural support to other members and/or surfaces of a structure including, but not limited to beams, posts, columns, joists, structural gutters, headers and etc.

SECONDARY MEMBERS: Structural framing members which do not provide basic support for the entire structure, generally including, but not limited to, such members as purlins, kickplate rails, chair rails, roof or wall pans and panels, etc.

STRUCTURAL MEMBERS: Members or section which provide support to an assembly and/or resist applied loads.

3001.4 IDENTIFICATION: Aluminum for structural elements shall at all times be segregated or otherwise handled in the fabricator's plant so that the separate alloys and tempers are positively identified and, after completion of fabrication, shall be marked to identify the alloy and temper. Such markings shall be affixed to complete members and assemblies or to boxed or bundled shipments of multiple units prior to shipment from the fabricator's plant.

EXCEPTION: Certification by the fabricator and or contractor shall be provided attesting to the alloy and temper of the material.

3002 ALLOWABLE UNIT STRESSES

3002.1 The design, fabrication and assembly of aluminum members for building and other structures shall conform to the Standard set forth in Sub-section 3001.3 and as otherwise set forth herein.

3002.2 The use of aluminum alloys, other than those listed in the standard shall provide performance not less than those required by the Standard and as set forth herein.

3002.3 Aluminum members shall be limited by the deflections set forth in Sub-section 2303.3 herein.

3003 DESIGN

3003.1 The Building Official may require that any structure using aluminum primary or secondary members be designed by a Professional Engineer.

3003.2 Increases in allowable unit stresses as set forth for wind loads in Sub-section 2309.3 herein shall be applicable to aluminum structural members except that allowable unit stresses thus increased shall not exceed 75 percent of the minimum yield strength.

EXCEPTION: No increase in allowable stresses due to wind loads shall be permitted for aluminum sheet decking, siding and cladding.

3003.3 In addition to flexural and shearing stresses, the critical factors of buckling, fatigue, stress raisers such as notches or holes or sharp re-entrant corners, deflection and connections shall be considered and provided for by proper design.

3003.4 All solid roof systems shall be designed for a minimum 30 PSF live load.

3003.5 All buildings and structures shall be designed to resist uplift. In the case of placement on existing slabs and foundation, sufficient information and calculations shall be provided by the Professional Engineer and/or Architect to verify the ability of the slab or foundation to resist uplift loads.

3003.6 Sheet metal screws may be used only for connections of secondary members. All primary members will be connected with bolts, pop rivets or other positive fasteners.

3003.7 Sheet metal screws may be utilized only in bearing and/or shear in aluminum less than 0.090 inches in thickness. Any connections in tension shall be bolted, pop-riveted or secured with other positive connectors.

3003.8 All connection devices shall be rated by load testing by an approved testing laboratory or as listed in the manufacturers certified published data.

3003.9 All expansion anchors shall not be installed less than 3 inches from the edge of concrete slab and/or footings. All expansion anchors shall develop an ultimate withdrawal resisting force equal to four (4) times the imposed load, with no stress increase for duration of load.

3003.10 All connections shall be designed for positive fastening with a minimum factor of as required by the standard of this Code.

3003.11 Cables are not permitted to be used as required structural supports.

3004 FABRICATION AND CONSTRUCTION DETAILS

3004.1 CONNECTIONS: Aluminum members shall be designed as set forth in the Standards in Sub-section 3001.2.

(a) FASTENERS: Bolts and other fasteners shall be aluminum, stainless steel or aluminized, hot-dip galvanized or electro-galvanized steel. Double cadmium plated steel bolts may also be used. Steel rivets shall not be used, except where aluminum is to be joined to steel or where corrosion resistance of the structure is not a requirement or where the structure is to be protected against corrosion.

(b)PAINTING: Except as prescribed in Sub-section 3004.4, painting or coating of aluminum alloy parts shall be required only when called for on the plans.

(c) WELDING: Aluminum parts shall be welded with an inert gas shielded arc or resistance welding process. No welding process that required a welding flux shall be used. Filler alloys complying with the requirements of the standard in this chapter shall be used.

(d) WELDER QUALIFICATIONS: All welding of structural aluminum member shall be performed by certified welders.

(e) ERECTION: During erection, structural aluminum shall be adequately braced and fastened to resist dead, wind and erection loads.

3004.2 STRUCTURAL ALUMINUM DECKING AND SIDING:

(a) Aluminum sections spanning between supports shall be limited in span to satisfactorily support the

positive and negative loads set forth in Chapter 23 and the deflection of decking shall not exceed that set forth in Sub-section 2303.3.

(b) Aluminum sheet used for roof decking or siding shall be not less than 0.032 inches in thickness.

(c) Aluminum sheets shall be secured to the supports to adequately resist positive and negative loads. Attachments shall be at intervals required by rational analysis and/or tests, but shall not exceed eight inches O.C. and shall be secured to each other at side laps at intervals as required by rational analysis and/or tests, but shall not exceed 12 inches O.C.

(d) Fasteners shall have a head, and/or be provided with washers not less than one-half inch in diameter.

(e) Fasteners located at end laps shall be placed not more than two inches nor less than one inch from the end of overlapping sheets.

(f) Where roof or wall cladding is of aluminum an approved membrane to protect against water intrusion to the interior shall be provided or the aluminum cladding shall be designed and constructed with an approved continuous edge-interlock, overlap or seam to prevent water intrusion.

3004.3 NON-STRUCTURAL ALUMINUM DECKING AND SIDING:

(a) Non-structural aluminum sheets shall be backed with cladding as set forth in Chapter 35.

(b) Non-structural aluminum sheets shall have a minimum thickness of 0.032 inches.

(c) An approved membrane to protect against water intrusion shall be provided or the aluminum cladding shall be designed and constructed with an approved continuous edge.

(d) Non-structural decking and siding shall be attached as set forth in Sub-section 3004.2, except that the attachment of aluminum residential siding shall be by rational analysis and/or tests utilizing minimum 0.120 inch diameter aluminum nails of sufficient length to penetrate wood studs a minimum of 2 inches. Nails at wood studs shall be as required by ratinal analysis and/or tests, but spaced not greater than 24 inches on centers horizontally and not greater than eight inches on center vertically.

3004.4 DISSIMILAR MATERIALS:

(a) Aluminum may contact compatible metals such as, but not limited to:

(1) Non-magnetic stainless steel provided the contacting surfaces and any attachments are enclosed for protection from the weather.

(2) Zinc

(3) White bronze

(b) Aluminum contacting metals not considered compatible shall be protected as follows:

(1) Painting the dissimilar metal with a prime coat of zinc-chromate primer or other suitable primer, followed by one or two coats of aluminum metal-and-masonry paint or other suitable protective coating, excluding those containing lead pigmentation;

(2) Painting the dissimilar metal with a coating of a heavy-bodied bituminous paint;

(3) Placing a good quality caulking material between the aluminum and the dissimilar metal;

(4) Applying a non-absorptive tape or gasket;

(5) Hot-dipped galvanizing or zinc-plating steel members after fabrication.

(c) Dissimilar metals shall be painted if used in locations where drainage from them passes over aluminum.

(d) Aluminum surfaces in contact with lime-mortar, concrete, or other masonry materials, shall be protected with alkali-resistant coatings, such as heavy-bodied bituminous paint or water-white methacrylate lacquer.

(e) Aluminum in contact with wood or other absorbing materials which may become repeatedly wet shall be painted with two coats of aluminum metal-and-masonry paint or a coat of heavy-bodied bituminous paint, or the wood or other absorbing material shall be painted with two coats of aluminum house paint and the joints sealed with a good quality caulking compound.

(f) Where aluminum is in contact with treated wood, wood shall be treated with pentachlorophenol, 5 percent minimum concentration, or creosote, or zinc naphthanate, following the protective measures outlined in Paragraph (e) above.

3004.5 EXPANSION AND CONTRACTION: Aluminum work shall be designed and anchored so that the work will not be distorted nor the fasteners over-stressed from the expansion and contraction of the metal.

PART VII
DETAILED REGULATIONS
CHAPTER 31
MEANS OF EGRESS

3101 GENERAL
3102 REQUIRED MEANS OF EGRESS
3103 DOORS
3104 CORRIDORS AND EXTERIOR EXIT BALCONIES
3105 STAIRWAYS
3106 RAMPS
3107 HORIZONTAL EXIT
3108 EXIT ENCLOSURES
3109 SMOKEPROOF ENCLOSURES
3110 EXIT DISCHARGE
3111 EXIT COURTS, EXIT PASSAGEWAYS, AND YARD AREAS
3112 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING, AND SIGNS
3113 AISLES
3114 SEATS
3115 GROUP A OCCUPANCIES
3116 GROUP B OCCUPANCIES
3117 GROUP C OCCUPANCIES
3118 GROUP D OCCUPANCIES
3119 GROUP E OCCUPANCIES
3120 GROUP F OCCUPANCIES
3121 GROUP G OCCUPANCIES
3122 GROUP H AND I OCCUPANCIES
3123 GROUP J OCCUPANCIES
3124 COVERED MALLS, WALKWAYS AND PASSAGEWAYS
3125 SPECIAL HAZARDS
3126 FIRE ALARMS

3101 GENERAL

3101.1 PURPOSE: The purpose of this Chapter is to determine occupant loads and to provide minimum standards of egress facilities for occupants of buildings, structures, reviewing stands, bleachers, and grandstands.

3101.2 SCOPE:

(a)(1) Every building, structure, or portion thereof, shall be provided with means of egress as required by this Chapter.

(2) Where there is a conflict between a general requirement and a specific requirement for an individual Group of Occupancy, the specific requirement shall be applicable.

3101.3 DEFINITIONS: For the purpose of this Chapter, terms shall be defined as set forth in Section 401 herein.

3101.4 DETERMINATION OF OCCUPANT LOAD:

(a) The occupant load in any building or portion thereof shall be determined by dividing the gross or net floor area assigned to that use by the square feet per occupant as set forth in Table 31-A.

TABLE 31-A SQUARE FEET PER OCCUPANT BASED ON FLOOR AREA

Use (1)	Minimum of Two Means of Egress Required Where Number of Occupants is Over	Square Foot per Occupant
Aircraft Hangars (No repair)	10	500 Gross
Auction Rooms	30	7 Net
Assembly Areas, Concentrated Use		
(without fixed seats)	50	7 Net
(where fixed are provided see Sub-section 3101.6)		
Auditoriums		
Bowling Alleys (Assembly areas)		
Churches		
Dance Floors		
Lodge Rooms		
Reviewing Stands		
Stadiums		
Assembly areas, Less Concentrated Use	50	15 Net
Conference Rooms		
Dining Rooms		
Drinking Establishments		
Exhibit Rooms		
Gymnasiums		
Lounges		
Skating Rinks		
Stages		
Assembly Areas, Standing or Waiting Spaces	50	3 Net
Children Homes and Homes for the aged (6)	5	120 Gross
Classrooms	50	20 Net
Dormitories (5)	10	200 Gross
Dwellings (7)	N/A	N/A
Garage, Parking	30	200 Gross
Hospitals, Sanitariums and Nursing Homes (6)		
Sleeping Areas	5	120 Gross
Institutional Areas	5	240 Gross
Hotels and Apartments (6)	10	200 Gross
Industrial and Manufacturing (6)	25	100 Gross
Kitchens, Commercial	30	200 Gross
Library Reading Rooms	50	100 Gross
Toilets and Locker Rooms	30	50 Gross
Mechanical Equipment Rooms	30	300 Gross
Nurseries for Children (Day Care)	50	20 Net
Offices (4)	30	100 Gross
School Shops and Vocational Rooms	50	50 Net
Storage, Shipping Similar Uses (6)	50	100 Gross
Storage Warehouses (3) (6)	10	1,500 Gross
Stores Retail Sales Rooms		
Basement	(2)	30 Gross
Ground Floor	50	30 Gross
Upper Floors	10	60 Gross

(1) Refer to Sections 3118 through 3123 for other specific requirements.
(2) See Paragraph 3102.1(j) for basement requirements.
(3) See Sub-section 3120.4
(4) See Sub-section 3121.2
(5) See Sub-section 3122.6
(6) See Sub-section 3123.2
(7) See Sub-section 3122.2

(b) When the square feet per occupant are not given for a particular occupancy, it shall be determined by the building Official, based on the area given for the Occupancy which it most nearly resembles, except that the occupant load of the area having fixed seats installed. Aisles serving the fixed seats and not used for any other purposes shall not be assumed as adding to the occupant load.

(c) (1) The occupant load permitted in a building or portion thereof may be increased to exceed that set forth in this Section if the necessary means of egress are provided.

(2) An approved aisle or seating diagram may be required by the Building Official to substantiate an increase in occupant load.

(d) In determining the occupant load, all portions of a building shall be presumed to be occupied at the same time, except that accessory use areas which ordinarily are used only by persons who occupy the main area of the occupancy shall be provided with means of egress as though the accessory use areas where completely occupied, but occupant load of the accessory use area need not be included in computing the total number of occupants for the building, or main area.

3101.5 OVERCROWDING: The number of occupants of any building or portion thereof shall not exceed the occupant load set forth herein.

3101.6 BENCHES, PEWS, BOOTHS:

(a) Where benches or pews are used, the occupant load shall be based on one person for each 18 inches of length of the pews or benches.

(b) Where booths and stand up or stool bars are used in dining and other service areas, the occupant load shall be based on one person for each 24 inches or major portion of length of booth or service bar.

3101.7 MIXED OCCUPANCIES: The occupant load of a building containing mixed occupancies shall be determined by adding the number of occupants of the various portions as set forth in table 31-A.

3101.8 MORE THAN ONE PURPOSE: For determining the requirements for means of egress, the occupant load of a building or portion thereof which is used for different non-concurrent purposes, shall be determined by the occupant load which gives the largest number of persons.

3101.9 OBSTRUCTION OF MEANS OF EGRESS: No obstruction shall be placed in the required width of a means of egress except projections as set forth in this Chapter.

3101.10 POSTING OF ROOM CAPACITY:

(a) Any room having an occupant load of more than 50 persons where fixed seats are not installed, and which is used for classroom, assembly, or similar purpose shall have the capacity of the room posted in a conspicuous place near the main means of egress from the room.

(b) Approved signs shall be maintained in a legible manner by the owner or his authorized agent, and shall indicate the number of occupants permitted for each room use.

3101.11 CHANGES IN ELEVATION: Except in Group I Occupancy, changes in elevation of less than 12 inches along any path of egress serving a tributary occupant load of 10 or more, shall be by means of ramps.

3102 REQUIRED MEANS OF EGRESS

3102.1 NUMBER OF MEANS OF EGRESS:

(a) (1) Every building or usable portion thereof shall have at least one means of egress, and shall have not less than two means of egress where required by Table 31-A.

(2) Where the actual occupant load exceeds the occupant load as computed by square foot area in Table 31-A, the actual occupant load shall be used.

(3) The number of means of egress required from any floor of a building shall be determined by using the occupant load of that floor.

(b) In all Occupancies, floors above the first story shall have not less than two means of egress as required or modified in Table 31-A.

(c) Each mezzanine use for other than storage

purposes shall have the number of means of egress as required for upper floors.

EXCEPTION: Mezzanines in Group G Occupancy of less than 1,000 square feet and not exceeding one-third of the ground floor area may be permitted with one exit with the following stipulations:

(1) That the building be equipped with a hard wired smoke detector system, installed in accordance with NFPA 72-E.

(2) Travel distance shall not exceed 50 feet from any point on the mezzanine to the exit.

(3) The entire area, including all communicating floor levels, shall be sufficiently open and unobstructed so that fire or other hazardous conditions in any part will be immediately apparent to the occupants of all such levels and area.

(4) Such mezzanines may have an open interior stairway as a required exit.

(d) For special requirements for Groups A, B, C, D, E, F, G, H, I, and J Occupancies, see Sections 3115, 3116, 3117, 3118, 3119, 3120, 3121, 3122, and 3123.

(e) For stage egress, see Section 607.

(f) Every story or portion thereof, having an occupant load of 500 to 1000 shall have not less than three means of egress.

(g) Every story or portion thereof, having an occupant load of more than 1000 shall have not less than four means of egress.

(h) (1) Where means of egress serve more than one floor, only the occupant load of each floor considered individually need be used in computing the capacity of the means of egress at that floor, provided that the capacity of

the means of egress shall not be decreased in the direction of egress travel.

(2) Where means of egress from floors above and below converge at an intermediate floor, the capacity of the means of egress from the point of convergence shall not be less than the sum of the floors.

(i) The maximum number of means of egress required for any story shall be maintained until egress is provided from the structure. (See Section 3111.)

(j) (1) For the purposes of this Section, basements or cellars and occupied roofs shall be provided with means of egress as required for stories.

(2) Basements and cellars used for other than service of the building shall have not less than two means of egress.

3102.2 WIDTH:

(a) The width of means of egress shall be as set forth in this Chapter for the respective occupancies.

(b) (1) Means of egress shall be measured in units of exit width of 22 inches.

(2) Fractions of a unit shall not be counted, except that 12 inches added to one or more full units shall

be counted as one-half a unit of exit width.

(c) (1) Units of exit width shall be measured in the clear at the narrowest point of the means of egress except that a griprail may project inside the measured width on each side not more than 32 inches and a stringer may project inside the measured width not more than 12 inches.

(2) An exit access door or exit door swinging into an aisle or passageway shall not restrict the effective width thereof at any point during the door swing to less than the minimum widths herein set forth.

(d) The total width of means of egress required shall be divided approximately equally among the separate exits.

(e) The maximum width of means of egress required from any story of a building shall be maintained until egress is provided from the structure.

(f) Every floor, section, or room considered separately shall have means of egress sufficient in width to provide for occupant load thereof.

3102.3 ARRANGEMENTS OF EXITS:

(a) Where two means of egress are required, such means of egress shall be located at distance apart equal to not less than one fifth of the perimeter of the area served or as remote from each other as practicable and so arranged as to minimize the possibility that both may be blocked by any one fire or other emergency condition.

(b) Where three or more means of egress are required, they shall be arranged a reasonable distance apart so that if one becomes blocked others will be available.

3102.4 TRAVEL DISTANCE:

(a) Travel distance shall not exceed that set forth in Table 31-B except that where applicable the maximum travel distances may be increased as set forth in Paragraph 3102.4(c).

(b) The "distance to an exit from any point" shall be measured on the floor or other walking surface along the center line of the natural path of travel starting one foot from the most remote point, curving around any corners or obstruction with a one-foot clearance therefrom, and ending at the center of the doorway or other point at which the exit begins. Where measurement includes stairs, it shall be taken in the plane of the tread nosing.

(c)(1) In any building requiring undivided floor areas so large the distances from points within the area to the nearest outside walls where exit doors could be provided exceed that set forth in Table 31-B, requirements for travel distance to exits may be satisfied by providing stairs leading to tunnels to overhead passageways in accordance with Section 3111.

TABLE 31-B

	Distance to An Exit in Feet:			
	From any Required Door of Single Room or Apartment		From any Point	
Group of Occupancy	Unsprinklered	Sprinklered	Unsprinklered	Sprinklered
A & B	150	200	N.R.	N.R.
C	150	200	N.R.	N.R.
C-Open Plan	100	100	—	—
D-1	100	150	N.R.	N.R.
D-2	150	200	100	150
E	75	75	N.R.	N.R.
F-1*	200	300	N.R.	N.R.
F-2	100	150	N.R.	N.R.
G-1	100	150	N.R.	N.R.
G-2	200	300	N.R.	N.R.
H***	200	250	100	150
I	N.R.	N.R.	N.R.	N.R.
J**	N.R.	N.R.	N.R.	N.R.

N.R.: No Requirement

*: For parking garages see Sub-section 3120.3

**: For Group J, Division 3 see Sub-section 3123.1

***: Travel Distance from any required door of single room or apartment with open exterior balcony means of egress may be increased by 50 feet.

(2) In cases when such arrangement are not practicable the authority having jurisdiction may, by special ruling, permit other arrangements for means of egress for one-story buildings.

(3) Travel distance in excess of the maximum distances set forth may be approved only if the building is provided with a complete automatic sprinkler system and if the height of the ceilings, ceiling curtain boards, and roof ventilation is such as to minimize the possibility that occupants may be overtaken by the spread of fire or smoke within six feet of the floor level before such occupants have time to reach floor exits, provided that in no case may the travel distance to reach the nearest exit exceed 400 feet.

(b) Doors equipped with self closing devices shall be operative at any point in their swing by not more than 15 pounds pressure applied at the outer edge thereof.

3103 DOORS

3103.1 GENERAL:

(a) This section shall apply to every door serving as an access to an exit, as an exit, or serving hazardous rooms or areas.

(b) Sub-sections 3103.8 and 3103.9 shall apply to all doors, regardless of occupant load.

3103.2 SWING:

(a) Doors shall swing in the direction of egress travel when serving any hazardous area or when serving an occupant load of 50 or more except that doors giving access to a stairway shall always swing in the direction of egress travel.

3103.3 HARDWARE:

(a) TYPE OF HARDWARE:

(1) Doors within an access to an exit and exit doors shall be openable from the inside without the use of a key or any special knowledge or effort at all times when the portion of the building area served is occupied.

(2) Flush bolts or surface bolts shall not be used.

(3) Doors which are a part of a required fire assembly as set forth in Section 3706 shall be provided with a latch and hardware to hold the door in a closed position in compliance with the conditions of test and approval.

(4) Exit discharge doors from smokeproof enclosures shall be provided with panic hardware.

(b) CLOSING DEVICES:

(1) Doors to enclosed corridors from Group A Occupancies and doors from any Occupancy to stairway or an exit enclosure shall be self-closing or shall be automatic-closing doors which close automatically when released by activation of a detector set to operate when smoke reduces the intensely of a one-foot long beam of white light by four percent, or any other detection device which will work within that limitation.

(2) Doors to enclosed corridors from Group B, C, D, F-2 or G Occupancies shall be self-closing when serving rooms of hazardous uses such as linen rooms, trash rooms and mechanical repair rooms.

(3) Doors to enclosed corridors from Group E or F-1 Occupancies shall be self-closing or be automatic closing set with a fusible link to operate at 165EF.

(4) Doors from any Group or Occupancy to a boiler or furnace room shall be self-closing.

(5) Doors to Corridors from Group H Occupancy shall be self-closing with rising butt hinges or closer, except in D-3 Occupancies which are considered H Occupancy.

3103.4 WIDTH AND HEIGHT:

(a) Every required doorway serving as a means of egress shall be of a size to permit the installation of a door not less than 32" in width and not less than 6'8" in height except where noted in Sec. 515.

(b) When installed as means of egress, doors shall be capable of opening at least 90 degrees and shall be so mounted that the clear width of opening is not less than 29 inches. (See also Section 515.)

(c) In computing the width required by Sub-section

3102.2, the actual width of the door leaf or leaves shall be used.

3103.5 DOORS LEAF WIDTH: No leaf or a required door in a means of egress shall exceed four feet in width.

3103.6 SPECIAL DOORS:

(a) Revolving, sliding and overhead doors shall not be used in required means of egress except as follows:

(1) (aa) Revolving and sliding doors may be used to provide not more than one half of the required units of exit in means of egress provided such doors are so designed and constructed as to fold, swing or breakaway under manual pressure.

(bb) Sliding doors may be used as a means of egress where serving a room not exceeding 200 square feet in area.

(cc) Sliding doors may be used as second means of egress for single family residential occupancy only.

(2) Overhead doors may be used to provide not more than one-half of the required units of exit in means of egress, or the entire required units of exit from rooms not exceeding 300 square feet area which are for the purpose of dead storage only, where doors are open at all times when the building is occupied by any person.

(b) Doors to cold storage rooms, where the use of such room is for storage only, may be a sliding door and may exceed the maximum width herein set forth for other doors provided that such door shall be operable from the inside.

(c) Doors to bonded rooms may be locked at all times where such locking is required by law.

(d) Any power, power-assisted or mechanically-activated door to be considered as means of egress shall be designed and constructed to be manually opened or closed in the event of power failure.

3103.7 EGRESS FROM DOOR: Every door required by this Section shall give immediate access to an approved means of egress from the building.

3103.8 CHANGE IN FLOOR LEVEL AT DOORS:

(a) Regardless of the occupant load, there shall be a floor or landing on each side of every door in means of egress.

(b) (1) The floor on both sides of a door in a means of egress shall be substantially level and at the same elevation for a distance on each side at least equal to the width of the widest single leaf of the door.

(2) Where the door in a means of egress discharges to the outside or to a balcony or other exterior exit or exit access, the floor level outside the door may be one step lower than inside, but not more than seven and one-half inches.

(3) Changes in elevation shall, where required, comply with Section 515 herein.

(c) EXEMPTION: In Group I Occupancies and within individual units of Group H Occupancies, a door may open on the top step of a flight of stairs or an exterior landing and the landing is not more than seven and one-half inches below the floor level.

3103.9 DOOR IDENTIFICATION:

(a) Glass doors shall conform to the requirements set forth in Section 3508.

(b) Other doors shall be so marked that they are readily distinguishable from the adjacent construction.

3103.10 ADDITIONAL DOORS:

(a) When additional doors are provided for egress purposes, they shall conform to all provisions of this Chapter.

(b) EXCEPTION: Approved revolving doors having leaves which will collapse under opposing pressures may be used in egress situations provided:

(1) Such doors have a minimum width of six feet six inches.

(2) Such doors are not used in Occupancies where panic hardware is required.

(3) At least one conforming door is located adjacent to each revolving door installed in a building.

(4) The revolving door shall not be considered to provide a unit or units of exit width.

3104 CORRIDORS AND EXTERIOR BALCONIES

3104.1 GENERAL:

(a) Except when otherwise specifically set forth, this section shall apply to every corridor and every exterior balcony serving as a required exit or as an exit access from the apartment door to an exit, as defined in Chapter 4 herein, for an occupant load of more than 10 persons.

(b) Sub-sections 3104.5 and 3104.6 shall apply regardless of occupant load.

3104.2 WIDTH AND HEIGHT:

(a) (1) Every corridor or exterior balcony serving as a required exit or as an exit access from the apartment door to an exit shall be not less in width than 44 inches.

(2) For special requirements based on Group of Occupancy, see Sections 3115 through 3123.

(b) Every corridor and exterior balcony shall be not less than seven feet six inches in height and no projection from the ceiling shall be less than six feet eight inches from the floor.

3104.3 PROJECTIONS:

(a)(1) The required width of corridors and exterior exit balconies shall be unobstructed.

(2) Widths shall be taken as the clear, unobstructed space between railings or between a railing and a wall.

(3) Handrails on both sides, trim at or above handrail height on both sides, or any combination of a handrail or such trim with doors opened 180 degrees shall not reduce the required width by more than seven inches.

(4) Doors in any position of swing shall not reduce the required width by more than one-half.

3104.4 ACCESSIBILITY TO EXITS:

(a) When more than one means of egress is required, they shall be so arranged that it is possible to go in either direction from any point in a corridor or exterior balcony to a separate means of egress, except from dead ends permitted by this Section.

(b) For access to means of egress within individual apartments, rooms and spaces see special requirements, Sections 3115 through 3123.

3104.5 DEAD ENDS: Exit access and exits shall be so arranged that there are not dead end pockets or hallways where depth exceeds the following distance based on Occupancy.

Group of Occupancy	Maximum Dead-Ends (in feet)
A and B (aisles)	20
C	20
D-1	No requirement
D-2	30
E	0
F-1 Storage Warehouses	150
F-1 Storage Shipping	75
F-2 Industrial	50
G-1	50
G-2	100
H (other than dormitories) (except as required by Florida State) (Hotel and Restaurant Commission)	35
H (dormitories)	0
I	No requirement

3104.6 CONSTRUCTION:

(a) (1) Walls and ceilings of corridors used as a required exit, or as an exit access serving more than one tenant, shall be not less than one-hour fire-resistive construction except where required to be two-hour resistive by sub-sections 1804.3 or 3108.2.

(2) Other corridors shall comply with the fire-resistive requirements set forth in Group of Occupancy and Type of Construction.

(b) Floors, walls, and ceilings of exterior exit balconies shall have the same period of fire resistance as required for the floors, walls and ceilings of the buildings.

(c) EXCEPTION: This Sub-section shall not apply to exterior exit balcony railings, corridors of a one-story building housing a Group F or G Occupancy occupied by one tenant only and which serves an occupancy load of 30 or less, nor to corridors formed by partitions regulated by Sub-section 1804.4, 1904.4, 2004.3, 2104.4, and 2203.4.

(d) EXCEPTION: Where exterior corridors or exterior balconies serving as a required means of egress are enclosed on both sides and above, and the length of the enclosure along the long axis is 25 feet or more, fire-resistivity of walls and the protection of openings therein shall be required as if such corridors or balconies were enclosed interior corridors.

(e) Exterior balconies serving as required means of egress shall not project into an area where protected openings are required.

3104.7 OPENINGS:

(a) (1) Where corridor walls are required to be of fire-resistive construction, every interior door opening shall be protected with a door complying with Sub-section 3706.2 and as set forth in Table 31-C of this Code.

(2) Closing devices will be required where and as set forth in Paragraph 3103.3(b).

(3) Glazed openings of the size and construction permitted for three-fourths hour fire door assemblies in Sub-section 3706.5 may be installed in such doors.

(b) Where corridor walls are required to be fire-resistive, interior openings other than doors, except ventilation louvers equipped with approved automatic fire shutters, shall have one-fourth inch fixed wire glass set in steel frames.

(c) The total area of all openings in corridors required to be fire-resistive shall not exceed 25 percent of the area of the corridor wall common to the room which is separated from the corridor.

(d) Where corridor walls are required to be fire-resistive, individual glass lights in doors shall not exceed the limits set forth in Sub-section 3706.5.

(e) EXCEPTION: In corridors in Group F and Group G Occupancies, where walls are not required to be fire-resistive, openings may have fixed, plain glass.

(f) Openings located between the end of an exterior means of egress and the nearest stairway shall be protected as required for corridors.

(g) Other openings to an exterior means of egress need not be protected unless required by other provisions of this Code.

(h) Glazing shall be permitted in corridor walls where a maximum of one-hour fire resistive construction is required provided all of the following is provided.

(1) This exception shall apply only to a Group G Occupancy and only those buildings more than 50 feet in height.

(2) All glazing shall be 3" minimum fully tempered safety glass or 3" minimum wire glass designed by a Florida licensed professional engineer.

(3) The entire building shall be fully sprinklered in accordance with Chapters 38 and/or 51 of the code and NFPA Pamphlet No. 13.

(4) A water curtain shall be provided on each side of all glazed openings in accordance with NFPA 101, Sec. 6-2.

(5) A mechanical smoke exhaust system shall be provided for the entire building in accordance with NFPA Pamphlet No. 90A, Appendix B and Chapter 51 of the Code with the exception of open air parking garage area.

(6) A smoke detection system shall be provided in all required means of egress in the entire building at the spacing as recommended by the manufacturer and in accordance with NFPA Pamphlet No. 72E, 1982 edition.

(7) Such smoke exhaust system, fire pumps if required, fire sprinkler system, fire alarm system, fire detection system, smoke control system, fire department use elevators, exit and emergency lighting, water flow indicators and supervisory switches and smoke detection system shall be on an emergency power generator system conforming to Sections 5109(a), (b), (d), (e), (g) and (h) of the South Florida Building Code (Broward County Edition).

(8)3'0" wide glazed door/doors shall be permitted for each tenant with a maximum of 122% of the lineal footage of wall of any individual tenant wall shall be permitted to be glazed. All glazed openings on each side of a corridor shall be staggered and shall not be placed across from one another.

(I) Glazing shall be permitted in corridor walls of Group G-1 and G-2 Occupancies in buildings 50' and under in height where a maximum of one-hour fire-resistance construction is required for permanent partitions (Type I, II and III protected construction) provided:

(1) The entire building shall be protected by automatic fire sprinkler installed in accordance with Chapter 38 of this Code.

(2) The entire building is protected by an automatic smoke detector system installed in accordance with NFPA 72E.

(3) The entire building is protected by a manual fire alarm system installed in accordance with Chapter 31 of this Code and NFPA 72A.

(4) Where the total amount of glazing in any wall exceeds 122% of the lineal footage of the walls, the glazing shall be protected by a water curtain on each side of all glazing in accordance with NFPA Life Safety Code 101 (1981 Edition). This sprinkler system shall be independent of all other fire systems.

(5) All glazing shall be 3" minimum fully tempered safety glass designed by a Florida licensed professional engineer.

(6) EXCEPTION: Glazing shall be permitted in any corridor wall where allowed in Section 507.2 in lieu of the requirements of (I) (1) through (I) (5) above.

3105 STAIRWAYS

3105.1 GENERAL:

(a) Every stairway serving any building or portion thereof shall conform to the requirements of this Section.

(b) EXCEPTION: Stairs or ladders used only to attend equipment shall comply with Sec. 3105.13 (d) for ladders or Sec. 3105.4(c) for stairs.

(c) Escalators conforming to the requirements of Section 3205 may serve as required stairways.

3105.2 WIDTH:

(a) Stairways serving an occupant load of more than 50 shall be not less than 44 inches in width.

(b) Stairways serving an occupant load of 50 or less may be 36 inches wide.

(c) Private stairways serving an occupant load of less than 10 may be 30 inches wide.

(d) Trim at or above handrail height and handrails projecting not more than three and one-half inches per side shall not be considered as reducing the required width.

(e) Width shall be measured between stair-railings or between a stair-railing and a wall or partition.

3105.3 RISE AND RUN:

(a) The rise of every step in a stairway shall not exceed seven inches and the run or tread shall be not less than eleven inches.

EXCEPTIONS:

(1) Existing stairs which complied with the code in effect at the date of application for the permit or at the time of establishment of its present group of occupancy may remain as is. Note: This section does supersede Sec. 104.

(2) In private stairways serving an occupant load of less than 10, the rise may be eight inches and the run may be nine inches.

(b) The maximum variation in height of risers and width of treads in any one flight shall be three-sixteenths inch.

(c) The maximum variation from horizontal of a tread shall be no more than three-sixteenths inch.

3105.4 STAIRWAYS (TREADS OF VARIED WIDTH):

(a) WINDING STAIRWAYS: In Group I Occupancies and in private stairways in Group H Occupancies, winders may be used as a required means of egress providing the rise does not exceed 8 inches, the width of tread is not less than 8 inches measured at a point not more than 15 inches from any side of the stairway where the treads are narrower, and all other requirements of stairs are complied with in accordance with Sections 3105.9 and 3105.14.

(b) SPIRAL STAIRWAYS: In Group I Occupancies and in private stairways in Group H Occupancies,

spirals may be used as a required means of egress providing the rise does not exceed 9 inches, the width of tread is not less than 8 inches measured at a point not more than 15 inches from any side of the stairway where the treads are narrower, and all other requirements of stairs are compiled with in accordance with Sections 3105.9 and 3105.14.

(c) LADDERS: Where ladders are the only means of access required, or where the stairway is not a required means of egress, a spiral stairway may be substituted not less than 24" wide providing it complies with all the other requirements in Sec. 3105.4(b).

3105.5 CIRCULAR STAIRWAYS:

(a) In buildings of Group I Occupancy, and in stairways within the individual units of Group H Occupancies, circular stairs shall comply with Sub-section 3105.4(a).

(b) In buildings of Occupancy other than set forth in Paragraph (a) above, circular stairs may be used as a required means of egress providing all the requirements for exit stairs are complied with, including required enclosures and minimum width of treads, except that such stairs shall have a radius of 25 feet or more at the inner edges.

3105.6 LANDINGS:

(a) Every landing shall have a minimum dimension measured in the direction of travel equal to the width of the stairway.

(b) Such dimension need not exceed four feet when the stair has a straight run.

(c) Doors swinging into landings which serve as a path of egress from floors above shall not reduce the width of such landings to less than 22 inches nor, when open, interfere with the full use of the landing except that in Group A, B, C, and D Occupancies, swinging doors during their swing shall not reduce the required width of stairs or landings.

(d) The vertical distance between landings shall not exceed 12 feet.

3105.7 BASEMENT STAIRWAYS:

(a) Stairs that continue to the basement or other stairs shall be interrupted at the story of discharge by partitions, doors, or other effective means to make clear the direction of egress to the street.

(b) Directional exit signs shall be provided as set forth in Sub-section 3112.6.

3105.8 HANDRAILS:

(a) Stairways having four or more risers shall be provided with handrails at the same vertical height as stair-railings as follows:

(1) Stairways 44 inches and less in width having one open or glazed side need not be provided with handrails.

(2) Stairways 44 inches and less in width having both sides enclosed shall be provided with at least one handrail, preferably on the right side descending.

(3) Stairways more than 44 inches but less than 88 inches in width shall be provided with a handrail on each enclosed side.

(4) Stairways 88 inches or more in width shall be provided with a handrail on each enclosed side and intermediate handrails of stair-railing construction located to provide intermediate handhold in each 176 inches of required width spaced equally across the stairway.

(b) The ends of handrails shall be returned to the wall or shall terminate at terminal posts.

(c) Handrails shall be smooth-surfaced throughout the entire length.

3105.9 STAIR-RAILINGS:

(a) The open and glazed sides of all stairways having four or more risers shall be provided with stair-railings.

(b) (1) Stair-railings shall be not less than 30 inches nor more than 34 inches in height as measured from the line of nosings to the top of the top rail.

(2) Stair-railings shall be designed and constructed to resist the loads set forth in Sub-section 2305.3 and to resist objects as provided in Paragraphs 516.2(d), (e) and (f) of this Code.

(c) Safeguards at landings shall be not less than 42 inches in height, as set forth in Sub-section 516.2 of this Code, and shall also comply with all applicable provisions therein.

3105.10 STAIRWAY CONSTRUCTION—INTERIOR:

(a) Interior stairways shall be constructed as set forth in Part V of this Code.

(b) Where there is enclosed usable space under stairs the walls and soffits of the enclosed space shall be protected on the enclosed side with the same degree of fire-resistive protection as is set forth in Sub-section 3108.2.

EXCEPTION: Stairways within two stories Group I Occupancy.

(c) Treads and risers in interior stairways, except stairways in Group I Occupancy, stairways within single units of Group H Occupancy, or stairways complying with the exceptions described in Paragraph 3108.1(d), shall be solid.

(d) Interior stairways shall be enclosed as set forth in Section 3108.

3105.11 STAIRWAY CONSTRUCTION—EXTERIOR:

(a) Exterior stairways shall be of incombustible material except that in Fire Zones No. 3 on Type V buildings, they may be of wood not less than two inches in nominal thickness.

(b) Exterior stairs shall not be limited in height and shall be protected as required for exterior walls based on distance separations, as set forth in Parts IV and V of this Code, and as set forth in Sub-Paragraphs 3105.12.

(c) Where there is enclosed usable space under stairs, the walls and soffits of the enclosed space shall be protected on the enclosed side with the same degree of fire-resistive protection as is set forth in Sub-section 3108.2.

3105.12 PROTECTION OF EXTERIOR STAIRWAYS:

(a) All openings in the exterior wall below, above, or measured horizontally within ten feet of an exterior exit stairway shall be protected in accordance with Section 3108.2.

(b) EXCEPTION: Openings may be unprotected when two separated exterior stairways serve an exterior exit balcony and the stair including the landing are located on the side of the balcony away from the building and separated from the building by the full required width of the balcony.

(c) Protection from wall openings in the top story will not be required where the stairs do not lead to the roof.

3105.13 STAIRWAY AND ACCESS TO ROOF:

(a) In every building which does not exceed 50 feet in height, one stairway shall extend to the roof unless access to the roof is for no purpose other than maintenance to the roof and equipment thereon. In such buildings, a scuttle or scuttles to provide access to all parts of the roof from a common space on the top floor shall be provided preferably at a stairway. In buildings exceeding one story in height which has equipment on the roof requiring frequent maintenance or adjustment, permanent ladders at scuttles shall be provided and such permanent ladders shall meet these minimum requirements:

(b) In buildings of three or more stories in height having a roof slope of 3 in 12 or less and where a stairway to the roof is not provided, a scuttle or scuttles to permit access to all parts of the roof from a common space on the top floor, preferably at a stairway, shall be provided.

(c) In such buildings where permanent stairways are not provided and there is equipment on the roof requiring maintenance or adjustment, permanent ladders at scuttles shall be provided.

(d) The Building Official may require permanent ladders to be provided for mechanics' access to machine

rooms, tank towers and spaces and for fire-fighting access to flat roofs where no stairways serve the roof, and such permanent ladders shall meet these minimum requirements:

(1) Distance between rails shall be not less than 16 inches.

(2) Distance between rungs shall be 12 inches in every case; top rungs to be within six inches of the roof or parapet line.

(3) Rungs shall have a diameter not less than seven-eighths inch and shall be riveted or welded in place.

(4) Rails shall be supported at intervals of not more than ten feet.

(5) Rails shall extend not less than 45 inches above the roof or parapet line, except where such ladders are inside and pass through scuttles.

(6) When the travel is between the ladder and wall, the minimum clearance shall be 27 inches; and when on the outside, there shall be not less than six and one-half inches clearance between the center of the rungs and the wall.

(7) Ladders shall be vertical, or may be positively included. No negative incline shall be permitted.

3105.14 HEADROOM:

(a) Every stairway and landing shall have a head-room clearance of not less than 6'8".

(b) Such clearance shall be established by measuring vertically from the soffit and beam above at all points to a plane parallel and tangent to the stairway tread nosings.

3105.15 FLOOR IDENTIFICATION: Each floor level shall be numerically identified with a suitable permanently mounted or painted block numeral not less than four inches high which shall be plainly visible from the stairwell interior.

3106 RAMPS

3106.1 GENERAL: A ramp may be used as a component in a means of egress where the ramp complies with the general requirements of this Chapter and the specific requirements of this Section.

CLASSIFICATION: Ramps shall be classified as Class A or Class B in accordance with the following table:

RAMPS

	Class A	Class B
Width	44 inches and greater	30 to 44 inches
Slope	1 to 1 3/16 in 12	1 3/16 to 2 in 12
Maximum height between landings	No Limit	12 feet
Capacity in persons per unit of exit width (except as modified in Sections 3115 through 3122)		
Down	60	45
Up	45	45

3106.3 PROTECTIVE ENCLOSURE: Pedestrian ramps shall be enclosed and protected from openings in adjacent walls as set forth in Section 3108 herein for stairways.

3106.4 SLOPE:

(a) The slope of a ramp shall not vary between landings.

(b) Landings shall be level and changes in direction of travel, if any, shall be made only at landings.

3106.5 SAFEGUARDS:

(a) The open and glazed sides of all ramps from which there is a drop of 24 inches or more shall be safeguarded as set forth in Sub-section 3105.9 for stairways.

(b) Ramps shall have handrails as required in Sub-section 3105.8 except that handrails will not be required for Class A ramps and intermediate handrails will not be required for Class B ramps.

3106.6 SURFACE:

(a) A ramp shall have a non-slip surface.

(b) Broomed concrete is accepted as a non-slip surface.

3106.7 OTHER RAMPS: Vehicular ramps shall also comply with Sub-paragraph 3120.3(c)(1) herein except that vehicle ramps to truck wells, where clearly not a part of a means of egress, shall have an average slope not exceeding one in six.

3107 HORIZONTAL EXIT

3107.1 USED AS A REQUIRED MEANS OF EGRESS: If conforming to the provisions of this Chapter, a horizontal exit may be considered as a required means of egress.

3107.2 OPENINGS: All openings in a separation wall shall be protected by a fire assembly having a fire-resistive rating of not less than one and one-half hours.

3107.3 DISCHARGE AREAS:

(a) A horizontal exit shall lead into a floor area having capacity for an occupant load not less than the occupant load served by such an exit. Such capacity shall be determined by allowing three square feet of net clear floor area per ambulatory occupant and 20 square feet per non-ambulatory occupant.

(b) The area into which the horizontal exit leads shall be provided with at least one exit other than additional horizontal exits.

3108 EXIT ENCLOSURES

3108.1 GENERAL:

(a) Every interior stairway, ramp, or escalator shall be enclosed as specified in this Section.

(b) A single interior stairway serving an upper floor and/or not less than one-half of the required interior stairways serving upper floors shall be enclosed so that once inside enclosures, persons may go from any part

of the enclosure to an exit discharge without leaving the enclosure of a continuous path of egress.

(c)(1) Not more than one-half of the required interior stairways from the upper floors may discharge at a ground floor lobby or similar ground floor open space provided the number of units of exit width of the floor of convergence shall be as set forth in Sub-sections 3102.1 and 3102.2 and further provided such lobby or open space is protected with automatic sprinklers as set forth in Sub-section 3801.1(g) (h) (I) and any other areas adjacent to the lobby or open space are protected by automatic sprinklers or are separated therefrom.

(2) EXCEPTION: If the discharge area is a vestibule or foyer with no dimension exceeding 10 feet and separated from the remainder of the floor of discharge by construction providing protection at least the equivalent of wired glass in steel frames and serving only for means of egress including exits directly to the outside, the requirements of Sub-paragraph 3108.1(c)(1) may be waived.

(d) In other than Groups C, D, E and F-1 Occupancies, an enclosure will not be required where vertical openings are permitted in Paragraph 1807.1(b).

(e) For enclosures of escalators, see also Sub-section 3203.9.

(f) Stairs in Group I Occupancies or within a one-family tenancy of a Group H Occupancy need not be enclosed.

3108.2 ENCLOSURE CONSTRUCTION: Where required to be enclosed, the walls or partitions enclosing stairways and ramps shall be as follows:

(a) Buildings four stories or more in height, incombustible materials and minimum two-hour fire-resistive construction.

(b) Buildings less than four stories in height, minimum one-hour fire-resistive construction.

3108.3 OPENINGS INTO ENCLOSURES:

(a) There shall be no openings into exit enclosures except exit doorways and openings in exterior walls.

(b) All doors in an exit enclosure shall be protected as set forth herein for Type of Construction or Group of Occupancy.

3108.4 EXTENT OF ENCLOSURE:

(a) Stairway and ramp enclosures shall include landings and parts of floors connecting stairway flights and shall also include a corridor on the ground floor leading from the stairway to the exterior of the building.

(b) Enclosed corridors or passageways are not required from unenclosed stairways.

3108.5 USE OF SPACE UNDER STAIR: There shall be no enclosed usable space under stairways openings into an exit enclosure, nor shall the open space under such stairway be used for any purpose.

3108.6 EXIT COURTS:

(a) Where means of egress is through a court, such court shall be constructed as set forth in Section 3111.

(b) Where one or more sides of a court are open to a contiguous property line, the requirements set forth herein shall apply as though a building of maximum height and minimum distance allowable by this code or zoning regulations were constructed on such adjoining property.

(c) Where an exit-court unobstructed to the sky is bounded by wall on 50 percent or more of the perimeter and the height does not exceed more than three times the least horizontal dimension, as measured from exit-way to exit-way or from exit-way to a wall, all openings in the building wall shall be protected as set forth in Paragraph 1804.1(c) but separation between the exit-way and the court will not be required.

(d) Where an exit-court is as described in Paragraph (c) above but the height exceeds more than three times the least horizontal dimension, balconies, stairs and other facilities for means of egress shall be considered as and be enclosed as interior corridors or stairs and be separated from the court by fire-resistive walls as set forth in this Code.

(e) Where an exit-court is as described in Paragraph (c) above, but is bounded by walls on less than 50

percent of the perimeter, openings in the building walls and separation between the exit-way and the court shall be as otherwise set forth herein for an exterior exit-balcony or exterior stairway.

(f) Openings into an exit-court, where such openings are more than 10 feet above the floor of any means of egress, will not be required to be protected for the purposes of this Sub-section.

(g) An exit-court otherwise complying with the definition in Chapter 4 and with Paragraph (c) above may be covered over, as with a separate roof, if an unobstructed open area equal to the area of the court is provided between the main building roof and the separate roof.

3109 SMOKEPROOF ENCLOSURES

3109.1 GENERAL:

(a) A smokeproof enclosure shall consist of a continuous stairway enclosed from the highest point to the lowest point by walls of two-hour fire-resistive construction and shall provide a means of egress from the roof and all stories.

(b) The supporting structural frame shall be protected as set forth in Part V herein for Type of Construction.

3109.2 WHERE REQUIRED:

(a) In buildings exceeding 50 feet in height, all required exit stairways shall be smokeproof enclosures.

(b) In A and B Occupancies where only the main assembly area is a single story exceeding 50 feet in height, no smokeproof enclosure shall be required.

(c) The smokeproof enclosure egress at roof level shall provide access to any equipment or roof structures, and to all standpipe roof manifolds, and to any other stairway providing egress from the roof.

(d) Open-air parking garages and stadiums, without domes or enclosures, exceeding 50 feet in height shall be exempt from the requirements of Sec. 3109.

3109.3 CONSTRUCTION:

(a) Stairs in smokeproof enclosures shall be of incombustible construction.

(b) Treads shall be solid.

3109.4 DOORS:

(a) The openings from the building to the vestibule or balcony shall be protected with a self-closing fire assembly having a one-hour fire-resistive rating.

(b) The opening from the vestibule or balcony to the stair tower shall be protected by a self-closing fire assembly having a one and one-half hour fire-resistive rating.

(c)A clear wired glass panel of 100 square inches in area shall be provided in all doors giving access to the enclosure (See also Sec. 3706).

3109.5 EXIT DISCHARGE:

(a) A smokeproof enclosure shall discharge into a public way or into an exit passageway leading to a public way.

(b) The exit passageway shall be without other openings and shall have walls, floors and ceilings of two-hour fire resistance.

(c) Discharge doors from smokeproof enclosures shall be provided with panic hardware.

3109.6 OPENINGS AND ACCESS:

(a) There shall be no openings in smokeproof enclosures, except exit doorways, and openings for mechanical ventilation systems constructed according to Sec. 3109.9.

(b) There shall be no openings directly into the interior of the building.

(c) Access to the smokeproof enclosures at each story shall be through a vestibule or balcony of incombustible construction with an unobstructed width of not less than the required stairway width and a

minimum dimension of 72" in the direction of exit travel.

3109.7 VENTILATION OF SMOKEPROOF ENCLOSURES: Smokeproof enclosures shall be ventilated by natural or mechanical ventilation.

3109.8 NATURALLY VENTILATED SMOKEPROOF ENCLOSURES:

(a) The vestibule providing access to the smokeproof enclosures shall have one wall at least 50 percent open to the exterior and have an exit door from the interior of the building swinging so as not to block the flow of smoke to the outside opening and an exit door leading to the smokeproof enclosure. For the purpose of this paragraph, a court to be considered a vestibule opening to the exterior, shall have a least dimension of 30 feet.

(b) Where a balcony is used to provide access to the smokeproof enclosure, it shall be open to the exterior.

3109.9 MECHANICALLY VENTILATED SMOKEPROOF ENCLOSURES: The stair shaft and vestibule shall be provided with a mechanical ventilation system as specified herein that will automatically activate four or more floors in case of emergency. The mechanical ventilation system shall comply with the following requirements:

(a) OPERATION OF VENTILATING EQUIPMENT: Vestibule and stair shaft mechanical ventilation may be inactive or may operate at reduced levels for normal operations but when the detectors referred to herein either fail or are activated, the vestibule and stair shaft mechanical ventilation systems shall operate at the levels specified in Paragraphs (b) and (c) herein. The vestibule ventilation system shall be designed and activated in accordance with one of the following methods:

(1) TOTAL SYSTEM: Simultaneous operation of all vestibules. If the vestibule mechanical ventilation system is designed to provide the ventilation in the vestibules on all floors simultaneously, a products-of-combustion detector shall be located outside each vestibule so designed that activation or failure of any one of the detectors will simultaneously activate the vestibule ventilation system on all floors.

(2) ZONED SYSTEM: Simultaneous operation of vestibule ventilation on one or more floors per zone. If the vestibule ventilation system is designed as one or more zones to provide the simultaneous ventilation in the vestibules for at least a five floor zone, automatic supply and exhaust dampers shall be provided in all vestibules in order to obtain the zoned control of the ventilation as follows: A smoke detector shall be located outside each vestibule so designed to open the supply and exhaust duct dampers in the vestibules within the affected zone (five or more) and to activate the stair shaft ventilation system in case any detector in the affected zone either fails or is activated.

(b) VESTIBULE VENTILATION: The vestibule shall have an emergency ventilating system providing a supply of no less than one air change per minute. The exhaust shall be 150 percent of the supply. Supply air and exhaust air shall serve the vestibule through separate tightly constructed ducts used only for that purpose. Supply air shall enter the vestibule within 6" of the floor level. The top of the exhaust register shall be located within 6" of the vestibule ceiling and shall be entirely within the smoke trap area. Doors, when in the open position, shall not obstruct the duct openings. Duct openings may be provided with controlling dampers if required by Paragraph (a) herein, but these are not otherwise required. The vestibule ceiling shall be at least 20" higher than the door opening into the vestibule, to serve as a smoke trap and to provide an upward moving air column.

(c) STAIR SHAFT VENTILATION: The stair shaft shall be provided with emergency mechanical supply and exhaust air. There shall be a minimum of 2500 cubic feet per minute (cfm) discharge at the top of the shaft. The supply shall be sufficient to provide a minimum of five hundredths (.05) inches of water column pressure above atmospheric pressure with all doors closed and a minimum of ten-hundredths (.10) inch water column difference to a maximum of .40 between the stair shaft and the vestibule. Supply air shall be introduced at the level of exit discharge. A continually operating exhaust fan of not less than 700 cubic feet/min. shall be installed in the topmost area of the enclosure.

(d) EMERGENCY POWER: Mechanical vestibule and stair shaft ventilation systems and detector systems

shall be connected to an emergency power generator system complying with the provisions of Sec. 5109 herein in addition to the normal building power.

(e) EMERGENCY LIGHTING: The vestibule and stair shaft shall be provided with emergency lighting system complying with the provisions of Chapter 31 herein.

(f) FIRE PROTECTION INDICATOR PANEL: A fire protection indicator panel shall be required at the central control station. Said panel shall indicate the floor or floors having caused the alarm. Said panel shall have an over-riding manual switch capable of activating or deactivating the ventilation equipment.

(g) ACCEPTANCE AND TESTING: Before the foregoing equipment is accepted by the Building Official, it shall be tested by a Florida Registered Professional Engineer in his presence to confirm that equipment is operating in compliance with these requirements.

(h) BUILDING OWNERS' RESPONSIBILITY: The building owner shall test/or have tested all equipment referred to in these requirements at least once every 30 days and maintain a log attesting to the results. The log shall be available for inspection by the Building Official and the fire official.

(I) All mechanical ventilating systems required by this section shall be inspected by the Fire Department at least once every year and tests shall be made at the discretion of the fire inspector having jurisdiction.

3110 EXIT DISCHARGE

Every exit shall discharge into a public way, exit court, exit passageway, or yard area.

3111 EXIT COURTS, EXIT PASSAGEWAYS AND YARD AREAS

3111.1 DISCHARGE:

(a) Every exit court and exit passageway shall discharge into a public way.

(b) Passageways shall be without openings other than required doors and shall have walls, floors and ceilings of the same period of fire-resistance as the walls, floors and ceilings of the building but shall be not less than one-hour fire-resistive construction.

3111.2 WIDTH:

(a) Every exit court and exit passageway shall be at least as wide as the required total width of the tributary means of egress, such required width being based on the occupant load served.

(b) The required width of exit courts or exit passageways shall be unobstructed except as permitted in corridors. See Sub-section 3104.3.

(c) At any point where the width of an exit court is reduced for any cause, the reduction in width shall be effected gradually by a railing constructed as set forth in Paragraph 516.2(f) of this Code.

(d) The guardrail shall provide for gradual transition of reduced width by making an angle of not more than 30 degrees with the axis of the exit court.

3111.3 SLOPE:

(a) The slope of exit courts shall not exceed one in 10. The slope of exit passageways shall not exceed one in eight.

(b) For safeguard requirements, see Sub-section 3106.5 herein.

3111.4 NUMBER OF MEANS OF EGRESS: Every exit court shall be provided with the number of means of egress as required by Section 3102.

3111.5 ENCLOSURE AND OPENINGS:

(a) Exit-courts and openings therein shall be constructed to provide protection for paths of egress where required and as set forth in Sub-section 3108.6.

(b) Passageways shall be without openings other than required doors and shall have walls, floors and ceilings of not less than one-hour fire-resistive construction for buildings three or less stories in height and two-hour fire-resistive construction for buildings four or more stories in height.

3111.6 YARD AREAS: Yard areas may be fenced in and with gates equipped with locks provided safe dispersal areas located not less than 50 feet from buildings are available for persons between buildings and fence. Dispersal areas shall be based upon an area of not less than three square feet per occupant. Gates shall not be permitted across corridors or passageways leading to such dispersal areas unless such gates comply with exit requirements. (See the Standards as set forth in Paragraph 1502.3(a).

3112 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING AND SIGNS

3112.1 ILLUMINATION OF MEANS OF EGRESS:

(a) Illumination of means of egress shall be provided for every building and structure where artificial lighting is provided for normal use and occupancy of the building or structure. No artificial lighting for means of egress shall be required in any building or structure designed solely for daylight occupancy and where no artificial lighting is provided for purposes of general use and occupancy.

(b) (1) Every space common to multiple tenants of a building, corridors and stairways serving as a means of access to an exit and every exit shall be illuminated to facilitate egress.

(2) Such illumination shall be continuous during time that the conditions of occupancy require that the means of egress be available for use.

(3) Artificial lighting shall be employed at such places and for such periods of time as required to maintain the illumination to the minimum foot-candle values herein set forth.

(c) The floors of exits and of ways of exit access shall be illuminated at all points (such as angles and intersections of corridors and passageways, stairways, landings of stairs and doors) to values of not less than 1.0 foot-candle measured at the floor.

(d) In every auditorium or other place of assembly where pictures, motion pictures or other projections are made by means of directed light, the illumination of the floors of paths of egress may be reduced during such period of projection to values of not less than one-fifth foot-candle.

(e) Any required illumination shall be so arranged that the failure of any single lighting unit, such as the burning out of an electric bulb, will not leave any area in darkness.

(f) The same equipment or units installed to meet the requirements of Sub-section 3112.6 may also serve the function of illumination of means of egress provided that all applicable requirements of this section for such illumination are also met.

(g) Sources of Illumination shall be as follows:

(1) Illumination of means of egress shall be from a source of reasonable assured reliability, such as public utility service.

(2) Where electricity is used as a source of illumination of means of egress the installation shall be properly made in accordance with recognized good practice.

(3) No battery operated electric light nor any type of portable lamp or lantern shall be used for primary illumination of means of egress, but may be used as an emergency source to the extent set forth in Sub-section 3112.2.

(4) No luminescent or fluorescent or reflective material may be used as a substitute for any of the required illumination herein specified.

(5) In all Occupancies except I, enclosed main corridors and each enclosed stairwell shall be provided with at least one source of Type 1 emergency lighting.

3112.2 EMERGENCY LIGHTING:

(a) In places of assembly and in other Occupancies set forth in Sections 3115 through 3123, emergency lighting facilities shall be provided for exits and every space common to multiple tenants of buildings, corridors and stairways serving as means of access to an exit and so arranged that necessary illumination will be maintained in the event of failure of normal lighting of the building.

(b) Emergency lighting facilities shall be arranged to maintain the specified degrees of illumination in the event of failure of the normal lighting for a period of at least one-half hour, and for a period of at least one hour in hospitals and institutions.

(c) Type 1, 2, or 3 emergency lighting shall be provided as set forth in Sub-section 3112.3, 3112.4 or 3112.5 subject to the approval of the authority having jurisdiction as to the suitability of the equipment for its intended use and the conditions in the individual premises.

(d) Electric battery operated emergency lights shall use only reliable types of storage batteries, except as set forth in Sub-Paragraph 3112.3(a), (2) and (3), suitable for their intended use, and shall be provided with suitable facilities for maintenance in properly charged conditions.

(e) Required emergency lighting facilities shall be automatic, not requiring any manual action to put them into operation after failure of normal lighting.

(f) Where maintenance of illumination depends upon changing from one energy source to another, there shall be no appreciable interruption of illumination during the change-over except that in hospitals where emergency lighting is provided by a prime mover operated electric generator, a delay of not to exceed 10 seconds may be permitted.

3112.3 TYPE 1 EMERGENCY LIGHTING:

(a) Type 1 emergency lighting shall be so arranged as to provide the required illumination automatically in the event of any failure of normal lighting due to any other outside electric power supply, or any single manual act such as accidental opening of a switch controlling normal lighting facilities, and shall be either continuously in operation, or shall be capable of repeated automatic operation without manual intervention, subject to the approval of the authority having jurisdiction, may be provided by any method or combination of methods which will produce the desired results, such as:

(1) Two separate electric lighting systems with independent wiring, each adequate alone to provide the specified lighting of means of egress, one supplied from an outside source such as a public utility service and the other from an electric generator on the premises driven by an independent source of power, both sources of illumination being in regular simultaneous operation whenever the building is occupied during periods of darkness.

(2) (aa) An electric circuit or circuits used only for illumination of means of egress with two independent electric sources so arranged that on the failure of one the other will come automatically and immediately into operation.

(bb) One such source shall be a connection from a public utility or similar outside power source and the other an approved storage battery with suitable provision to keep it automatically charged.

(cc) Such battery shall also be so provided with automatic controls that after the battery comes into operation due to failure of the primary source of power, or due to turning off the primary electric source for the exit lights, it will be shut off after its specified period of operation and will be automatically recharged and ready for further service when the primary current source is again turned on.

(3) Unit devices with individual batteries providing for the same function as set forth in Sub-paragraph 3112.3(a)(2) above, except that the battery supplied light may be operated on a separate circuit at a voltage different from that of the primary light. Electric battery-operated emergency lights shall use only reliable types of storage batteries, provided with suitable facilities for maintenance in properly charged condition.

(4) Two separate sources of illumination, one electric and the other of the incandescent gas mantle type, supplied by city gas, propane or gasoline vapor, utilizing only approved gas lighting devices and with reliable arrangement acceptable to the authority having jurisdiction to assure that both gas and electric lighting sources will be in regular continuous operation during occupancy of the building in periods of darkness. Such gas lighting devices shall be so installed as not themselves to create a fire or explosion hazard within the building.

3112.4 TYPE 2 EMERGENCY LIGHTING:

(a) Type 2 emergency lighting shall be so arranged as to provide the required illumination automatically in the event of any failure of normal lighting due to any fault within the building, such as opening of a circuit breaker or melting of a fuse due to short circuit due to fire or other cause or due to overloading.

(b) Type 2 emergency lighting shall be either continuously in operation or shall be capable of repeated automatic operation without manual intervention.

(c) Type 2 emergency lighting may be provided by any method or combination of methods that will produce the desired results, subject to the approval of the authority having jurisdiction, such as an arrangement whereby emergency lights are on a separate electric circuit, used for no purpose other than emergency lights and signs, such circuit or circuits being connected to the electric service wires ahead of any circuit breakers or fuses controlling the normal electric supply to the building.

3112.5 TYPE 3 EMERGENCY LIGHTING:

(a) Type 3 emergency lighting shall be such as to maintain the required illumination automatically in the event of failure of public utility electric service or other source of energy.

(b) Type 3 emergency lighting shall either be continuously in operation while the building is occupied, or shall come into operation automatically and, where automatic, shall be capable of repeated operation without manual intervention.

(c) Type 3 emergency lighting may be provided by any method or combination of methods that will produce the desired results.

3112.6 EXIT SIGNS:

(a) MARKING:

(1) Every required exit shall be marked by a readily visible sign. Access to exits shall be marked by readily visible signs in all cases where the exit or way to reach it is not immediately visible to the occupants and in any case where required by the applicable provisions of Sections 3115 through 3123, for individual occupancies.

(2) Any door, passage, or stairway which is neither an exit nor a way of exit access, and which is so located or arranged as to be likely to be mistaken for a means of egress, shall be identified by a sign indicating its actual character, such as "TO BASEMENT," "STORE ROOM," "LINEN CLOSET" or the like.

(3) (aa) Every required sign designating an exit or way of exit access shall be so located and of such size, color and design as to be readily visible.

(bb) No decorations, furnishings, or equipment which impair visibility of an exit sign shall be permitted, nor shall there be any brightly illuminated sign (for other than exit purposes), display, or object in or near the line of vision to the required exit sign of such a character as to so detract attention from the exit sign that it may not be noticed.

(4) Every exit sign shall be distinctive in color and shall provide contrast with decorations interior finish, or other signs.

(5) A sign reading "TO EXIT," "TO STAIRWAY" or similar designation, with an arrow indicating the direction, shall be placed in every location where the direction of travel to reach the nearest exit or means of exit access is not immediately apparent, and near every elevator or escalator (not so arranged as to qualify as a required exit) where, in event of fire, persons accustomed to use only such elevators or escalators would have to use a stairway or other alternate exit, unless such stairway or alternate exit is near enough so that the way to reach it is unmistakable.

(b) ILLUMINATION OF SIGNS:

(1) (aa) Every exit sign shall be suitably illuminated by a reliable light source giving a value of not less than five foot candles on the illuminated surface and where an exit sign is required at an exit discharge, there shall be one source of Type I emergency lighting.

(bb) Such illumination shall be continuous as required under the provisions of Sec. 3112, Illumination

of Means of Egress, and where emergency lighting facilities are required, exit signs shall be illuminated from the same source. Where a fire alarm system is installed, a flashing strobe light shall be installed adjacent to each exit sign and in all common areas even though an exit sign may not be required, in such areas as public restrooms, etc.

(cc) Artificial lights giving illumination to exit signs other than the internally illuminated types shall have screens, discs, or lenses of not less than 25 square inches area made of translucent material to show red or other specified designating color on the side of the approach.

(dd) Where an early warning system is installed, a flashing light device shall be installed at each required exit sign location and shall be of an approved type connected to the fire alarm system for activation when the system is activated and shall have the words "FIRE" factory-imprinted on the lens.

(2) Each internally illuminated exit sign shall be so designed as to provide intensity of illumination at least equivalent in visibility to externally illuminated signs as set forth in Sub-paragraph 3112.6(b)(1).

(3) Each internally illuminated exit sign shall be provided in all occupancies where reduction of normal illumination is permitted, as in motion-picture theaters, and may be used in any occupancy.

(c) SIZE OF SIGNS: Every exit sign shall have the word "EXIT" in plainly legible letters not less than six inches high, with the principal strokes of letters not less than :-inch wide.

3113 AISLES

3113.1 GENERAL: Every portion of every building in which are installed seats, tables, merchandise, equipment or similar materials shall be provided with aisles leading to a means of egress.

3113.2 WIDTH:

(a) Every aisle shall be not less than three feet wide if serving only one side, and not less than three feet six inches wide if serving both sides, except aisles serving 60 seats or less may be not less than 30 inches in width.

(b) Such minimum width shall be measured at the point farthest from a means of egress, cross aisle, or foyer and shall be increased by one and one-half inches of each five feet in length toward the means of egress, cross-aisle, or foyer.

(c) With continental seating, as set forth in Paragraph 3114.1(c), side aisles shall be not less than forty-four inches in width.

3113.3 DISTANCE TO NEAREST EXIT: In areas occupied by seats, and in Groups A and B Occupancies without seats, the maximum travel distance to an exit by an aisle shall be not more than 150 feet.

3113.4 AISLE SPACING:

(a) With standard spacing, as set forth in Sub-section 3114.1 aisles shall be so located that there will be not more than six intervening seats between any seat and the nearest aisle.

(b) With continental spacing, as set forth in Sub-section 3114.1 the number of intervening seats may be increased to 49 where egress doors are provided along each side aisle of the row of seats at the rate of one pair of doors for each five rows of seats.

(c) Such doors shall provide a minimum clear width of 66 inches.

3113.5 CROSS AISLES:

(a) (1) Aisles shall terminate in a cross aisle, foyer, or exit.

(2) The width of the cross aisle shall be not less than the sum of the required width of the widest aisle plus 50 percent of the total required width of the remaining aisles leading thereto.

(b) In Groups A, B and C Occupancies, aisles shall not provide a dead end greater than twenty feet in length.

3113.6 VOMITORIES: Vomitories connecting the foyer or main means of egress with the cross aisles shall have a total width not less than the sum of the required width of the widest aisle leading thereto plus 50 percent of the total required width of the remaining aisles leading thereto.

3113.7 SLOPE:

(a) The slope portion of the aisles shall not exceed one foot fall in eight feet.

(b) Where steps are used in aisles such steps shall have a rise of not more than 72 inches and shall be illuminated.

3114 SEATS

3114.1 SEAT SPACING:

(a) With standard seating the spacing of rows of seats from back-to-back shall be not less than thirty-three inches not less than twenty-seven inches plus the sum of thickness of the back and inclination of the back. There shall be an unobstructed space of not less than 12 inches as measured between plumb lines passing through the top of the back of one seat and the front of the seat immediately behind.

(b) The spacing of rows of unoccupied seats shall provide a clear width measured horizontally between vertical planes as follows (automatic or self-rising seats shall be measured in the seat-up position, other seats shall be measured in the seat-down position).

(c) With continental seating the spacing of rows of unoccupied seats shall provide a clear width as follows:

Eighteen inches clear for rows of 18 seats or less
Twenty inches clear for rows of 35 seats or less
Twenty-one inches clear for rows of 45 seats or less
Twenty-two inches clear for rows of 46 seats or more.

3114.2 WIDTH: The width of any seat shall be not less than eighteen inches.

3114.3 BLEACHER SEATS:

(a) Seats used in grandstands, bleachers and reviewing stands shall conform to Paragraph 1502.3(a) herein.

3114.4 FASTENING OF SEATS:

(a) Permanent seats shall be securely fastened to the floor.

(b) Temporary or folding seats for assemblies of 500 or more persons where arranged to focus audience attention at a central point shall be fastened together in banks of six or more.

3115 GROUP A OCCUPANCIES

3115.1 WIDTH OF MEANS OF EGRESS:

(a) No individual unit of exit width other than ramps shall serve more than 100 persons.

(b) Ramps shall be Class A and the width of such ramp shall be based on 60 persons in down travel and 45 persons in up travel per unit of exit width.

(c) The width of doors leading outside the building at grade level, or not more than three risers above or below grade, and horizontal exits, shall be based on 100 persons per unit of exit width.

(d) The width of stairs or other types of means of egress not set forth in Sub-section 3115.1 above shall be based on 75 persons per unit of exit width.

3115.2 LOCATION OF EXITS:

(a) MAIN EXIT:

(1) Every assembly occupancy shall be provided with a main exit.

(2) The main exit shall be of sufficient width to accommodate one-half of the total occupant load, but shall be not less than the total required width of all aisles, passageways and stairways leading thereto, and shall connect to a stairway or ramp leading to a public space.

(3) A bowling alley shall have a main exit of sufficient capacity to accommodate 50 percent of the total occupant load, without regard to the number of aisles it serves.

(b) OTHER EXITS:

(1) Every level of an assembly occupancy shall have access to the main exit and in addition shall be provided with exits of sufficient width to accommodate two-thirds of the total occupant load served at that level.

(2) Such exits shall open directly to a street or into an exit court, enclosed stairway, or exit passageway leading to a street.

(3) Such exits shall be located as far apart and as far from the main exit as practicable.

(4) Such exits shall be accessible from a cross aisle or a side aisle.

3115.3 PANIC HARDWARE: Door serving an area having an occupant load of more than 100 shall not be provided with a latch or lock unless it is panic hardware.

3115.4 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING, AND EXIT SIGNS:

(a) All Group A Occupancy places of assembly shall have exit lighting as set forth in Section 3112 and exit signs as set forth in Sub-section 3112.6.

(b) All Group A Occupancy places of assembly shall be provided with Type I emergency lighting as set forth in Sub-section 3112.3.

3116 GROUP B OCCUPANCIES

3116.1 GENERAL:

(a) (1) Group B, Division 1 Occupancies shall have means of egress as required by Section 3115 except as otherwise set forth herein for ramps.

(2) Ramps shall comply with Section 3106 and may be Class A or Class B.

(b) Group B, Division 2 Occupancies shall have means of egress as set forth in Section 3121 and doors serving an area having an occupant load of more than 100 shall not be provided with a latch or lock unless it is panic hardware.

3116.2 SKATING RINKS: Skating rinks shall be located at or near the ground level and means of egress shall be by means of ramps.

3116.3 NUMBER OF MEANS OF EGRESS:

(a) Every Group B, Division 1 Occupancy having a capacity of from 300 to 500 persons shall have at least two separate means of egress as remote from each other as it practicable and, if of a capacity of over 500, at least three means of egress of not less than two units of exit width.

(b) Every Group B, Division 2 Occupancy having a capacity of from 100 to 300 persons shall have at least two means of egress consisting of separate facilities or doors leading to a corridor or other spaces giving access to different directions to separate and independent exits.

3116.4 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING AND EXIT SIGNS:

(a) In Group B Occupancy places of assembly with 300 or more persons shall be provided with Type 1, 2 or 3 emergency lighting as set forth in Section 3112. In any Group B Occupancy, enclosed main corridors and each enclosed stairwell shall be provided with at least one source of Type 1 emergency lighting arranged to prevent total darkness in the event of power failure.

(b) Exit signs shall be provided as set forth in Sub-section 3112.6.

3117 GROUP C OCCUPANCIES

3117.1 WIDTH OF MEANS OF EGRESS:

(a) The width of doors or horizontal exits leading to the outside of the building shall be based on 100 persons per unit of exit width.

(b)(1) The width of Class A ramps shall be based on 100 persons per unit of exit width and such ramps shall otherwise comply with Section 3106.

(2) The width of Class B ramps shall be based on 60 persons per unit of exit width and such ramps shall

otherwise comply with Section 3106.

(c) The width of stairs shall be based on 60 persons per unit of exit width.

(d) The same exit units or fraction thereof required for any individual floor may be counted as simultaneously serving all floors above the first story or floor of exit discharge.

3117.2 WINDOWS FOR RESCUE AND VENTILATION: Where occurring on exterior walls, every room or space used for classroom or other educational purposes or normally subject to student occupancy, unless having a door leading directly to the outside of the building, shall have at least one outside window which can readily be used for emergency rescue or ventilation purposes, and which meets all of the following provisions:

(a) Is readily openable from the inside without the use of tools.

(b) Bottom of window opening is not more than 36 inches above the floor.

(c) Storm windows, screens and burglar guards shall be provided with quick opening devices so that they may be readily opened from the inside for emergency egress, and shall be so attached that when opened they will not drop to the ground.

3117.3 CORRIDORS AND EXTERIOR BALCONIES:

(a) The width of a corridor in a Group C Occupancy shall be the width required by Section 3102 plus two feet but no corridor shall be less than six feet wide.

(b) Corridor walls and ceilings shall be not less than one-hour fire-resistive construction.

(c) There shall be no change of elevation of less than two feet in a corridor or exterior balcony serving as a means of egress unless ramps are used.

(d) (1) Any interior corridor more than 300 feet in length shall be divided into sections not to exceed 300 feet in length by smoke barriers consisting of partitions with smoke-stop doors.

(2) Such partitions shall be continuous through any concealed space such as between a hung ceiling and the floor or roof above.

(3) (aa) Doors in smoke barriers shall be at least the equivalent of metal, metal covered, 1 and :-inch solid bonded core wood or approved treated wood construction with clear wire-glass panels. Such doors shall be self-closing, and shall be either single or in pairs.

(bb) Such doors shall close the opening completely with only such clearance as is reasonably necessary for proper operation.

3117.4 MEANS OF EGRESS FROM AUDITORIUMS: Means of egress serving both an auditorium and other rooms need provide only for the capacity of whichever requires the greater width if the auditorium is not to be used simultaneously with the other rooms.

3117.5 STAIRS:

(a) Each floor above or below the ground floor level shall have not less than two stairs and the required units of exit width shall be equally divided between such stairs, provided that no stair serving an occupant load of more than 100 shall be less than five feet in clear width.

(b) EXCEPTION: This Sub-section does not apply to rooms used for maintenance, storage and similar purposes.

(c) Stairway enclosure will not be required where a stairway serves only one adjacent floor (except a basement) and is not connected with corridors or stairways serving other floors.

3117.6 DOORS:

(a) The width of doors from corridors, halls and stairs shall be not less than width required by Section 3102.

(b) Doors in school rooms having an occupant load of more than 50 shall swing in the direction of egress.

3117.7 ROOMS BELOW GRADE: One means of egress accessible to every room below grade shall lead

directly to the exterior at grade level.

3117.8 PANIC HARDWARE: Doors from rooms having an occupant load of more than 100 and from corridors shall not be provided with a latch unless it is panic hardware. (See also Sub-section 3103.3).

3117.9 FENCES AND GATES: School grounds may be fenced in and such yards equipped with gates and shall comply with Sub-section 3111.6 herein.

3117.10 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING, AND EXIT SIGNS:

(a)(1) All Group C Occupancy buildings shall have adequate illumination of means of egress in accordance with Section 3112.

(2) Buildings designed for night occupancy shall have Type 1 or Type 2 emergency illumination of means of egress as set forth in Sub-section 3112.3 or 3112.4.

(b) All Group C Occupancy buildings shall have signs designating the location of means of egress or the path of travel to reach them, as set forth in Section 3112.6.

(c) Signs are not required in situations where location of means of egress is otherwise obvious and familiar to all occupants, such as in small elementary school buildings.

3117.11 FIRE ALARM:

(a) A manually operated fire alarm system shall be provided as set forth in Section 3126.

(b) In buildings provided with automatic sprinkler systems, the operation of the sprinkler system shall automatically activate the fire alarm system.

3117.12 SMOKE DETECTORS:

(a) An approved smoke detection system shall be installed in schools, day care centers and group day care homes where sleeping facilities are provided, as set forth in sub-paragraph 3127.

(b) The individual smoke detectors shall be wired to the alarm system.

3118 GROUP D OCCUPANCIES

3118.1 WIDTH OF MEANS OF EGRESS:

(a) The width of means of egress providing travel without steps, such as doors and horizontal exits, shall be based on 30 persons per unit of exit width.

(b) The width of stairs shall be based on 22 persons per unit of exit width.

(c) Class A ramps in new buildings of Group D, Division 2 Occupancy shall comply with Section 3106 except that the vertical dimension between top and bottom floor elevations shall not exceed six feet and except that the width shall be as set forth in Paragraph 3118.1(a) and Sub-section 3118.5.

(d) Class B ramps in new buildings of Group D, Division 2 Occupancy shall comply with Section 3106 except that the height of the ramp shall not exceed one foot and except that the width shall be as set forth in Paragraph 3118.1(a) and Sub-section 3118.5.

(e) (1) Ramps in existing buildings of Group D, Division 2 Occupancy shall comply with Section 3106.

(2) Such ramp shall be not less than 48 inches in clear width when serving as means of egress from institutional rooms.

3118.2 SUB-DIVISION OF BUILDING SPACES:

(a) Each floor used for institutional sleeping rooms, unless provided with a horizontal exit, shall be divided into two compartments by a smoke stop partition.

(b) Corridor length between smokestop partitions, horizontal exits, or from either, to the end of corridor on any institutional sleeping floor shall not exceed 150 feet.

(c) (1) Smokestop partitions shall have a fire-resistive rating of at least one hour.

(2) Such partitions shall be continuous from outside wall to outside wall and from the floor slab to the

underside of the slab above, through any concealed spaces such as the hung ceiling and the floor or the roof above.

(3) Such partitions shall have openings only in a public room or corridor.

(4) At least 30 net square feet per institutional occupant for the total number of institutional occupants in adjoining compartments shall be provided on each side of the smokestop partition.

(d) (1) Any corridor opening in smokestop partitions in hospitals and nursing homes shall be protected by a pair of swinging doors, each leaf to be a minimum of 44 inches wide and swinging in opposite direction from each other.

(2) Any opening in smokestop partitions in residential-custodial care institutions shall be protected by a pair of swinging doors, each leaf a minimum of 32 inches and swinging in the opposite direction from each other.

(e) (1) Smokestop doors shall be at least 1 and :-inch solid core wood doors designed to close the opening completely with only such clearance as is reasonably necessary for proper operation.

(2) Rabbets, bevels or astragals are required at the meeting edges and stops are required on the head and sides.

(3) Positive latching hardware is not required.

(4) Center mullions shall not be used.

(f) Smokestop doors shall be self-closing and may be held in an open position only by an electrical device so arranged that:

(1) Upon release, the door becomes self-closing;

(2) Upon interruption of electric current, the door will be released.

(3) The electric current will be positively interrupted by:

(aa) The operation of an approved automatic sprinkler system which protects the entire building including both sides of any horizontal exit, the door of which is held open by any release so controlled or,

(bb) The operation of an approved automatic fire detecting system installed to protect the entire building and provide for actuation of the system so promptly as to preclude the generation of heat or smoke sufficient to interfere with egress before the system operates or,

(cc) The operation of approved smoke detectors in such a way as to detect smoke or other products of combustion on either side of the door opening.

(4) Any sprinkler or fire detection system or smoke detector provided has such supervision or safeguards as are necessary to assure complete reliability of operation in case of fire, and

(5) The release device may be instantly released manually, by some simple and readily obvious operation.

(g) In addition to the requirements of Paragraph (f), smokestop doors may be held in an open position if the doors shall be so arranged that the operation of one of the following will initiate the self-closing action:

(1) A manual alarm system as set forth in Section 3126.

(2) A local device designed to detect smoke or other products of combustion other than heat on either side of the opening.

(3) A required and approved automatic fire-extinguishing system or automatic fire-detection system.

(h) (1) Vision panels are required in all doors in smokestop partitions.

(2) Such panels shall be wired glass in approved metal frames not exceeding 720 square inches.

3118.3 SEPARATE ACCESS:

(a) Every room in a Group D Occupancy shall have access to at least two approved means of egress from the building without passage through intervening rooms other than corridors or lobbies.

(b) All required exterior exit doors shall open in direction of exit travel.

3118.4 MINIMUM SIZE OF MEANS OF EGRESS:

(a) Every egress opening through which patients are transported in wheelchairs, stretchers or beds shall be of sufficient width to permit the ready passage of such equipment, but shall have a clear width of not less than 44 inches.

(b) There shall be no projections within the 44 inch clear width.

3118.5 CORRIDORS:

(a) (1) Aisles, corridors and ramps required for means of egress in a hospital or nursing home shall be at least eight feet in clear and unobstructed width except that corridors and ramps in adjunct areas not intended for the housing, treatment, or use of in-patients, may be a minimum of six feet in clear and unobstructed width.

(2) Aisles, corridors and ramps required for means of egress in a residential-custodial care institution shall be at least six feet in unobstructed width.

(b) There shall be no change of elevation in a corridor serving non-ambulatory persons unless ramps are used.

(c)(1) In hospitals and nursing homes, the entrance door of every private room and every point in open wards, day rooms, dormitories, dining rooms and other spaces shall be not more than 100 feet along the line of travel from an exit.

(2) If such buildings are completely protected by automatic sprinkler systems, the distance along the line of travel to an exit may be 150 feet.

3118.6 MEANS OF EGRESS FROM BASEMENTS: One means of egress accessible to every room below grade where persons with restrictive liberties or non-ambulatory persons are housed shall lead directly to the exterior at grade level.

3118.7 RAMPS: Every portion of Group D, Division 2 Occupancies housing bedridden patients shall have access to a horizontal exit or ramp leading to the exterior of the building at the ground floor level.

3118.8 LOCKING DEVICES:

(a) It is recognized that in buildings housing various types of psychiatric patients, or used as penal institutions, it is necessary to maintain locked doors and barred windows that are equipped to confine and protect building inhabitants. Regarding this necessity, other sections of this Code requiring the keeping of exits unlocked may be waived by the Building Official. It is also recognized that some psychiatric patients are not capable of seeking safety without adequate guidance. In buildings where these conditions exist, reliable means of rapid release of occupants shall be provided, such as remote control of locks, or by keying all locks to keys commonly carried by or immediately available to attendants.

(b) If a lock is installed on an institutional sleeping room door, it shall be of such type that it can be locked only from the corridor side, provided that doors of rooms leading directly to the exterior of the building may be subject to locking from the room side. In any case, such locks except those installed in accordance with Paragraph 3118.8(a) shall be such as to be readily opened by the occupant from inside the room without the use of any key.

(c) EXCEPTION: Doors in homes for the aged and nursing homes may be lockable by the occupant, provided they are capable of being unlocked from the corridor side and keys are readily available to attendants.

3118.9 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING AND EXIT SIGNS:

(a) Illumination of means of egress and exit signs shall be as set forth in Section 3112 except as modified below.

(b) Paragraph 3112.1(b) shall apply.

(c) Each new hospital shall be provided with essential electrical systems as set forth in Sub-section 4502.10.

(d) Every nursing home and residential-custodial care facility shall have Type 1 or 2 emergency lighting as set forth in Section 3112, except for buildings converted to these uses in which Type 3 may be accepted by the

authority having jurisdiction.

3118.10 FIRE ALARMS:

(a) In every building operated as a nursing home, hospital, residential-custodial care facility such as a nursery, home for the aged or mentally retarded care institution, or as a residential-restrained care facility such as a penal institution, reformatory or jail, an electrically supervised, manually operated fire alarm system shall be provided as set forth in Section 3126 except that pre-signal alarms shall not be permitted in institutional occupancies.

(b) Audible alarm devices shall be used in all non-patient areas, but visible devices may be used in patient sleeping rooms.

(c) In buildings provided with automatic sprinkler systems, the operation of the sprinkler system shall automatically activate the fire alarm system.

3118.11 SMOKE DETECTORS:

(a) Every building operating as a hospital, nursing home, residential custodial care facility such as a nursery, home for the aged or mentally retarded care institution or as a residential-restrained care facility such as a penal institution, reformatory or jail building, as set forth in sub-paragraph 3127.

(b) The individual smoke detectors shall be wired to the alarm system.

3119 GROUP E OCCUPANCIES

3119.1 WIDTH OF MEANS OF EGRESS:

(a) (1) The width of means of egress leading outside of the building at grade, or not more than three risers above or below grade, shall be based on 100 persons per unit of exit width except as otherwise set forth herein.

(2) Horizontal exits may be used for not more than 50 percent of the required exit capacity.

(b) The width of stairs or escalators shall be based on 60 persons per unit of exit width.

(c) A ramp used as a component in a means of egress shall be Class A or Class B complying with Section 3106.

(d) The width of street floors means of egress shall be based on 100 persons per unit of exit width plus one and one-half units of exit width for each two units of exit width of stairways, ramps or escalators from upper or lower floors discharging through the street floor.

(e) The minimum width of any corridor or passageway serving as a required exit or means of travel to a required exit shall be 44 inches in the clear.

3119.2 MEANS OF EGRESS:

(a) From every point in every floor area there shall be at least two means of egress.

(b) Where floor areas are divided into rooms there shall be at least two means of egress from every room, however small, except toilet rooms so located that the points of access thereto are out of, or suitably shielded from, areas of high hazard.

3119.3 TRAVEL DISTANCE: Exits shall be provided and arranged so that the maximum travel distance to reach the nearest exit from any point shall not exceed 75 feet.

3119.4 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING AND EXIT SIGNS: Illumination of means of egress and exit signs shall be as set forth in Section 3112.

3120 GROUP F OCCUPANCIES

3120.1 WIDTH OF MEANS OF EGRESS:

(a) The width of means of egress shall be as set forth in Sub-section 3119.1 except as herein set forth for ramps.

(b)A ramp used as a component in means of egress shall be Class A or Class B complying with Section 3106 except that the width of ramps in Group F Division 2 Occupancy shall be based on 100 persons per unit of exit width for Class A ramps and 60 persons per unit of exit width for Class B ramps.

(c) The minimum width of any corridor or passageway serving as a required exit or means of travel to a required exit shall be 44 inches in the clear.

3120.2 STORAGE OF HAZARDOUS COMMODITIES: Every area used for the storage of hazardous commodities shall have an exit within 75 feet of any point in the area where persons may be present, or 100 feet where automatic sprinkler protection is provided.

3120.3 MEANS OF EGRESS:

(a) DIVISION 1, STORAGE:

(1) Every building or structure used for storage, and every section thereof considered separately, shall have access to at least one means of egress so arranged and located as to provide a suitable means of egress for all persons employed therein.

(2) Rooms and spaces exceeding 15,000 square feet gross area (occupant load of more than 10 persons) shall be provided with at least two separate means of egress.

(3) Where two means of egress are required, such means of egress shall be located as set forth in Paragraph 3102.3(a).

(b) DIVISION 1, AIRCRAFT HANGARS:

(1) (aa) Means of egress from aircraft storage or servicing areas shall be provided at intervals of not more than 150 feet on all exterior walls of aircraft hangars.

(bb) There shall be a minimum of two means of egress serving each aircraft storage of service area.

(cc) Horizontal exits through fire walls shall be provided at intervals of not more than 100 feet.

(dd) Dwarf of "smash" doors in doors accommodating aircraft may be used to comply with these requirements.

(ee) Doors designated as exit doors shall be kept unlocked in the direction of egress while the building or portion thereof is occupied.

(2) (aa) Means of egress from mezzanine floors in aircraft storage of servicing areas shall be arranged so that the maximum travel to reach the nearest exit from any point on the mezzanine shall not exceed 75 feet.

(bb) Such exits shall lead directly to the exterior, to a suitable cut off area, or to outside stairs.

(c) DIVISION 1, PARKING GARAGES:

(1) Ramps for vehicular egress from buildings:

(aa) Where discharging to a sidewalk or street grade from below grade, slope shall not exceed one in 20 for the last 20 feet to the point of discharge to such sidewalk or street grade.

(bb) Where discharging to sidewalk or street grade from above grade, slope shall not exceed one in 10 for the last 20 feet to the point of discharge to such sidewalk or street grade.

(cc) Where such ramps may be used by pedestrians as a means of egress, the provisions of Section 3106 shall also apply.

(dd) Vehicular ramps need not be enclosed.

(2) Where persons other than parking attendants are permitted, stairs and means of egress shall be as otherwise set forth in Chapter 31.

(3) (aa) Where no persons other than parking attendants are permitted and a ramp for transporting vehicles is constructed, or where cars are mechanically lifted and parked without attendants or passengers, there shall be not less than one stairway for each 10,000 square feet or fraction thereof.

(bb) Where cars are mechanically lifted and parked by attendants, such ramp may be omitted and one additional means of egress shall be provided.

(cc) Ramps used strictly by pedestrians as a means of egress shall comply with the provisions of Section 3106 and, where in paths provided for the handicapped, shall also comply with Section 515 of this Code.

(dd) Exits shall be remotely located so that maximum travel distance from any point to a floor exit shall not exceed 100 feet.

(4) (aa) Interior stairs shall be enclosed if the building is enclosed or if the structure exceeds three stories in height.

(bb)A building shall not be considered enclosed if 50 percent of the periphery is 75 percent open or if 75 percent of the wall area on opposite ends or sides of the building is open.

(cc) Wall area shall be taken from the inside from the floor to ceiling or ceiling structural members.

(5) Continuous belts or lifts without cage may be provided for attendant personnel but shall not be considered as required means of egress facilities.

(6) (aa) At least two separate means of egress shall be provided on the street floor except that any opening for the passage of automobiles may serve as a means of egress provided that no door or shutter is installed therein.

(bb) Means of egress from street floors in closed garages shall be so arranged that no point in the area is more than 100 feet from the nearest exit, or 150 feet in the case of garages protected by automatic sprinklers.

(cc) Means of egress from any point on any floor of an open-air parking garage shall be so arranged that no point in the area is more than 200 feet from the nearest exit.

(7) (aa) At least two means of egress shall be provided and from floors above the street floor, one such means of egress shall be a stairway, smokeproof tower, outside stair or horizontal exit and, for buildings not complying with the definition of an open-air parking garage, interior stairways shall be enclosed.

(bb) The other means of egress may be a second exit of any of the types permitted in (aa) above, or in a ramp-type garage with open ramps not subject to closure, the ramp may serve as the second exit.

3120.4 DIVISION 2, INDUSTRIAL OCCUPANCY:

(a) Buildings, rooms or areas having an occupant content of less than 25, having direct egress to the street or to an open area outside the building at grade, and having maximum travel distance from any point not exceeding 50 feet, may have a single means of egress.

(b) Such travel shall be at the same level or, if a stairway is required, there shall be a vertical travel of not more than 15 feet, and the stairway shall be exterior or completely enclosed from any other part of the building, and shall not have doors to any part of the building other than the area served by the stairway.

3120.5 ILLUMINATION OF MEANS OF EGRESS AND EXIT SIGNS:

(a) Illumination of means of egress shall be provided as set forth in Sub-section 3112.1.

(b) Exit signs shall be provided as set forth in Sub-section 3112.6, except that ramps and doors for automobiles need not have signs.

(c)EXCEPTION: In Group F Occupancy, the exit sign may be omitted if the following three conditions are met:

(1) Where gross area does not exceed 1500 square feet.

(2) The travel distance from any point does not exceed 50 feet.

(3) The exit is immediately apparent from all portions of the area.

3120.6 FIRE ALARM: A manually operated fire alarm system shall be provided as set forth in Section 3126 for any building not provided with automatic fire detection facilities or an automatic sprinkler system if the total occupant load of the building is more than 500 persons or if more than 25 persons are employed above or below

the street level except that such fire alarm system shall not be required in any one story building of any occupancy load where the fire division area is undivided and all parts thereof are clearly visible to all occupants.

3121 GROUP G OCCUPANCIES

3121.1 WIDTH OF MEANS OF EGRESS:

(a) DIVISION 1:

(1) The widths of doors leading outside of the building at grade, or not more than three risers above or below grade, or horizontal exits, shall be based on 100 persons per unit of exit width.

(2) The width of stairs or escalators shall be based on 60 persons per unit of exit width.

(3) The width of street floor doors shall be based on 100 persons per unit of exit width plus one and one-half units of exit width for each two units of exit width or stairways or escalators from upper or lower floors discharging through the street floor.

(4) The minimum width of any corridor or passageway serving as a required exit or means of travel to a required exit shall be 44 inches in the clear.

(b) DIVISION 2: The width of means of egress shall be as set forth in Sub-section 3119.1.

3121.2 MEANS OF EGRESS:

(a) DIVISION 1:

(1) Where floor areas are divided into rooms not used for sale purposes such as offices, restrooms or stock rooms, the travel distance may be measured from the room door provided the room is of such size and so arranged that the normal path of travel within the room to reach the room door does not exceed 50 feet.

(2) Stores having aggregate gross area of over 3,000 square feet and utilizing the floor above or below the street floor for sales purposes shall have at least two separate means of egress accessible from every part of every floor including basements provided:

(aa) Such means of egress are to be located as remotely from each other as practicable and so arranged as to be reached by different paths of travel in different directions.

(bb) Note: A common path of travel will be permitted from any point for the first 50 feet.

(3) If only one means of customer entrance is through one exterior wall of the building, two-thirds of the required exit width shall be located in this wall.

(4) At least one-half of the required means of egress shall be so located as to be reached without going through check-out stands provided:

(aa) That in no case shall check-out stands, associated railings or barriers obstruct means of egress, required aisles or approaches thereto.

(5) Stores not exceeding 3,000 square feet gross area employing only street level for sales purposes shall have two means of egress as set forth in Paragraph (2) above provided:

(aa) That a single balcony or mezzanine having an area less than one-half that of the floor below need not be included in the gross area computation.

(bb) That where two or more balconies or mezzanine occur, one-half of their combined area shall be included in the gross area computation.

(cc) EXCEPTION: A second means of egress shall not be required where no part of such a store is more than 50 feet from the street exit, a mall or an exit passageway measured along the natural path of travel provided that the total distance to an exit does not exceed that as set forth in Paragraph 3102.4(a).

(b) DIVISION 2:

(1) (aa) A single means of egress may be provided from rooms or areas having an occupancy load of less

than 100 persons provided such exit is directly to the street or to an open area outside the building at grade level and the total travel distance from any point does not exceed 100 feet.

(bb) Such travel may be on the same floor level or, if the traversing of stairs is required, they shall be not more than 15 feet in height.

(cc) Such stairs shall be completely enclosed to separate them from other parts of the building with no exit openings therein other than entrance and exit doors.

(2) Any three-story office building not exceeding 3,000 square feet gross floor area per floor may be provided with a single stairway to the third floor if:

(aa) The total travel distance to the outside of the building does not exceed 100 feet.

(bb) Such stairway does not provide any communication with the basement or the first or second floors.

(cc) The stairway is fully enclosed or is an outside stairway.

3121.3 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING AND EXIT SIGNS:

(a) Illumination of means of egress shall be provided as set forth in Sub-section 3112.1.

(b)(1) Group G Division 1 Occupancies having aggregate gross area of 30,000 square feet or more, or utilizing more than three floor levels for sales purposes shall be provided with Type 1 or Type 2 emergency lighting as set forth in Sub-sections 3112.3 and 3112.4.

(2) Group G Division 1 Occupancies having less than 30,000 square feet aggregate gross area, but over 3,000 square feet, or utilizing any floors above or below street floor level for sales purposes shall be provided with Type 1, Type 2, or Type 3 emergency lighting as set forth in Sub-sections 3112.3, 3112.4, or 3112.5.

(3) Group G Division 2 Occupancies having an occupant load of 1,000 or more persons shall be provided with Type 1, Type 2, or Type 3 emergency lighting as set forth in Sub-sections 3112.3, 3112.4, and 3112.5.

(4) In any Group G Occupancy, enclosed main corridors and each enclosed stairwell shall be provided with at least one source of Type 1 emergency lighting arranged to prevent total darkness in the event of power failure.

(c) (1) Exit signs shall be provided as set forth in Sub-section 3112.6.

(2) EXCEPTION: In Group G Occupancy, the exit sign may be omitted if the following three conditions are met:

(aa) Where gross area does not exceed 1500 square feet.

(bb) The travel distance from any point does not exceed 50 feet.

(cc) The exit is immediately apparent from all portion of the area.

3121.4 FIRE ALARM: A manually operated fire alarm system shall be provided as set forth in Section 3126 for any building not provided with automatic fire alarm facilities or an automatic sprinkler system if the total capacity of the building is more than 1,000 persons or it more than 200 persons are employed above or below the street level.

3122 GROUPS H AND I OCCUPANCIES

3122.1 WIDTH OF MEANS OF EGRESS:

(a) GROUP H OCCUPANCIES, GENERAL:

(1) The width of means of egress other than stairs or ramps, discharging outside of the building at grade, or not more than 24 inches or three risers above or below grade, and horizontal exits, shall be based on 100 persons per unit of exit width.

(2) The width of stairs shall be based on 75 persons per unit of exit width.

(3)A ramp used as a component in a means of egress shall be Class A or Class B complying with Section 3106.

(4) The minimum width of any way of exit access shall be not less than 29 inches.

(b) HOTELS:

(1) The width of means of egress shall be as set forth in Paragraph (a) above and as follows:

(aa) One unit of exit width for each 75 persons street floor occupancy for stairs or other means of egress requiring descent to ground level.

(bb) One and one-half units of exit width for each 2-unit required stair from upper or lower floors discharging through the street floor.

(c) APARTMENTS: The width of means of egress shall be as set forth in Paragraphs (a) and (b) above.

(d) DORMITORIES: The width of street floor means of egress shall be sufficient to provide one unit of exit width for each 50 persons street floor occupancy plus one unit of exit width for each unit of required stairway width discharging through the street floor.

(e) LODGING OR ROOMING HOUSES:

(1) Every sleeping room above the first floor shall have access to two separate means of egress, at least one of which shall be an enclosed interior, an exterior stairway, a fire escape or horizontal exit so arranged as to provide a safe path of travel to the outside of the building without traversing any corridor or space exposed to an unprotected vertical opening.

(2) EXCEPTION: Traversing unprotected vertical openings may be permitted in existing, sprinklered buildings.

3122.2 REQUIREMENTS FOR MEANS OF ESCAPE, GROUP H & I:

(a) PRIMARY MEANS OF ESCAPE: In any dwelling or living unit of two rooms or more, every bedroom and living area shall have at least two means of escape or alternate protection, at least one of which shall be a door or stairway providing a means of unobstructed travel to the outside of the dwelling at street or ground level. No bedroom or living area shall be accessible by only a ladder or folding stairs or through a trap door.

(b) SECOND MEANS OF ESCAPE: The second means of escape or alternate protection shall be one of the following:

(1) A door, stairway, passage or hall providing a way, independent of and remote from the primary means of escape, of unobstructed travel to the outside of the dwelling at street or ground level.

(2) A passage through adjacent nonlockable spaces independent of and remote from the primary means of escape to any approved means of escape.

(3) An outside window or door operable from the inside. The mode of operation shall not require the use of a key, tool, special knowledge or effort. Such clear opening shall be not less than 20" in width, 24" in height, 5.7 sq. ft. in area and shall also meet the provisions of Sec. 1305. The bottom of the opening shall not be more than 44" off the finished floor and no part of the operating mechanism shall be placed higher than 54" above finished floor. Such means of escape shall be acceptable if:

(aa) The window is within 20' of grade, or

(bb) The window is directly accessible to fire department rescue apparatus as approved by the Building and/or Fire Official, or

(cc) The window or door opens onto an exterior balcony.

EXCEPTIONS:

(1) A second means of escape or alternate protection is not required:

(aa) If the bedroom or living area has a door leading directly to the outside of the building, at or to

grade level; or

(bb) If the dwelling unit is protected throughout by an approved automatic sprinkler system in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, or NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes, or NFPA 13R, Sprinkler Systems in Residential Occupancies up to four stories in height as applicable.

(c) ARRANGEMENT OF MEANS OF ESCAPE:

No required path of travel to the outside from any room shall be through another room or apartment not under the immediate control of the occupant of the first room or his family, nor through a bathroom or other space subject to locking.

(d) COMPONENTS OF MEANS OF ESCAPE:

(1) DOORS:

(aa) No door in the path of travel of a means of escape shall be less than 28" wide.

EXCEPTION: Bathroom doors may be 24" wide.

(bb) Every closet door latch shall be such that children can open the door from inside the closet.

(cc) Every bathroom door lock shall be designed to permit the opening of the locked door from the outside in an emergency.

(dd) Doors may be swinging or sliding.

(ee) No door in any means of escape shall be locked against egress when the building is occupied. All locking devices which impede or prohibit egress or which cannot be easily disengaged shall be prohibited.

3122.3 STAIRS: All stairs and exits of Group H Occupancies, other than as set forth in Sub-section 3108.1 shall discharge directly onto a street or public space or into a yard or court not less than four feet in width directly connected to a street or public space by means of a passageway not less in width than the means of egress facility opening into such passageway and not less than seven feet in height.

3122.4 TRANSOMS: Buildings more than one story in height shall have no transoms or ventilating openings from guest rooms to enclosed public corridors.

3122.5 APARTMENTS: Exits and means of access thereto shall be so located that it will not be necessary to travel more than 50 feet from a door of a room nor to traverse more than one flight of stairs, within any individual living unit to reach the nearest exit, or to reach an entrance door of the apartment.

3122.6 DORMITORIES: Dormitories shall be so arranged that from any sleeping room or open dormitory sleeping area there shall be access to two separate and distinct means of egress in different directions with no common path of travel unless the room or space is subject to occupancy by not more than 10 persons and has a door opening directly to the outside of the building at street or grade level, or to an outside stairway in which case one exit may be accepted.

3122.7 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING, EXIT SIGNS AND FIRE ALARMS:

(a) HOTELS:

(1) Illumination of means of egress shall be provided as set forth in Sub-section 3112.1.

(2) Access to exits shall be continuously illuminated at all times.

(3) Any hotel with over 500 rooms shall have Type 1 emergency exit lighting; a hotel with 25 to 500 rooms shall have Type 2 emergency exit lighting, provided that where each guest room has a direct means of egress to the outside of the building (as in motels) no emergency exit lighting shall be required.

(4) Every means of egress from common space hallways, or passageways on floors with sleeping accommodations, shall have an illuminated sign as set forth in Section 3112.

(5) Where means of egress are not visible from every point in a hallway or passageway, illuminated signs

shall be provided to indicate the direction to means of egress as set forth in Sub-section 3112.6.

(b) APARTMENT BUILDINGS:

(1) Illumination of means of egress shall be provided as set forth in Sub-section 3112.1.

(2) Any apartment building with more than 25 living units shall have Type 1 or 2 emergency exit lighting. In any Group H Occupancy, enclosed main corridors and in each enclosed stairwell shall be provided at least one source of Type 1 emergency lighting arranged to prevent total darkness in the event of power failure.

(3) Exit signs in all apartment buildings having more than eight living units in any one building or fire section shall be provided as set forth in Sub-section 3112.6.

(c) DORMITORIES:

(1) Every dormitory shall have illumination of means of egress as set forth in Section 3112.

(2) Any dormitory, subject to occupancy by more than 100 persons, shall have Type 1 or Type 2 emergency lighting and exit signs as set forth in Sub-section 3112.2 and 3112.4.

3122.8 FIRE ALARMS:

(a) Every apartment building, unless provided with an automatic sprinkler system or automatic fire alarm system shall have a manual fire alarm system as set forth in Section 3126 if such building is of more than three stories in height and more than 12 apartment units and where the primary means of egress and ingress for such buildings is through an open balcony, or if such building is three or more stories in height or more than 12 apartment units and where the primary means of egress and ingress for such building is through an enclosed hallway and/or corridor.

(b) Every dormitory, unless provided with an automatic sprinkler system or automatic fire alarm system, shall have a manual fire alarm system as set forth in Section 3126.

(c) Every lodging or rooming house having sleeping accommodations for six or more persons, unless provided with an automatic sprinkler system or automatic fire alarm system, shall have a manual fire alarm system as set forth in Section 3126.

(d) Every hotel having accommodations for 15 or more persons, except where each guest room has direct means of egress to the outside of the building and is not over three stories in height, shall have a manual fire alarm system as set forth in Section 3126 and as follows:

(1) Every sounding device shall be of such character and so located as to arouse all occupants of the building or section thereof endangered by fire.

(2) An alarm sounding station shall be provided at the hotel desk or other convenient central control point under continuous supervision of responsible employees. Additional alarm sending stations as set forth in Section 3126 may be waived where there are other effective means for notification of fire such as an automatic sprinkler system or automatic fire detection system.

(3) Suitable facilities shall be provided for immediate notification of the public fire department in event of fire.

3122.9 SMOKE DETECTORS:

(a)(1) An approved single station smoke detector, continuously powered by the electrical distribution panel shall be installed in an approved manner in every living unit within an apartment building as set forth in Sub-paragraph 3127.

(2) In addition to (a)(1) above, in apartment buildings of three or more stories in height or more than twelve units, interior common areas and interior corridors shall be equipped with a full smoke detector system.

(3) Individual smoke detectors shall be wired to the alarm system, except that detectors in individual apartments may be single station type.

(b) (1) Every rooming house and dormitory shall have approved single station smoke detector continuously

powered by the electrical distribution panel and installed in every sleeping room as set forth in Sub-paragraph 3127.

(2) Every dormitory with more than six people and rooming house with more than four people shall have approved smoke detectors installed on each floor level by using single station smoke detectors in all habitable rooms and using corridor detector system connected to the building fire alarm system. Detectors shall be installed as set forth in sub-paragraph 3127.

(c) (1) Hotels and Time Shares shall install single station smoke detectors in each habitable unit.

(2) Hotels or Time Shares three stories or more in height or having accommodation for more than 15 persons, in addition to the requirement of (d)(1), shall have an approved smoke detection system in all interior common areas and corridors. Detectors shall be wired to the fire alarm system and shall sound the building fire alarm when activated.

(d) In Group I Occupancies, at least one approved smoke detector powered by the electrical distribution panel shall be installed as set forth in Sub-paragraph 3127.

3123 GROUP J OCCUPANCIES

3123.1 DIVISION 3:

(a) Enclosed stadiums, reviewing stands, grandstands, enclosed grandstands, arenas and enclosed domes shall have means of egress facilities as set forth herein and in the Standard set forth in Sub-paragraph 1502.3(a)(1).

(b) In open grandstands and similar open structures, the travel distance along the lines of usual travel from any seat to the nearest exit access for the seating area, shall not exceed 150 feet.

(c) In enclosed grandstands and similar enclosed structures, the travel distance along the lines of usual travel from any seat to the nearest access to an exit for the seating area shall not exceed 150 feet; at which point persons shall be out of the threatened area and there shall be a choice of two or more directions to an exit or the area shall be protected by an automatic sprinkler system. The remaining distance to an exit shall then be within 150 feet of that point.

(d) In enclosed structures the open or sporting area in front of tiered seating may not be considered a way of exit access from the seating area.

(e) The space under or behind the assembly seating (except vomitories or passageways) may be considered a means of egress where not less than 75 percent open to the exterior and where separated from the seating area.

(f) In multi-tiered structures where the means of egress from upper tiers is through the lower floors or levels, the width of means of egress from the lower levels shall be computed on the total accumulated required widths exiting there through.

(g) Panic hardware may be waived on gates surrounding stadiums when gates are under constant immediate supervision while the public is present and provided safe dispersal areas based upon three square feet per occupant are located between the stadium and the fence.

(h) The required dispersal area shall be located not less than 50 feet from the stadium.

3123.2 DIVISION 6: Structures or areas located on the roof of any Group D, F, or H Occupancy shall have means of egress as set forth in this Chapter except that where the gross floor area does not exceed 1,000 square feet, one enclosed interior stairway or smokeproof tower which has a width of not less than 44 inches may serve as the required means of egress.

3123.3 MINIMUM WIDTH OF ACCESS:

(a) Except as otherwise set forth in Sub-sections 3123.1 and 3123.2, the minimum width of any way or exit access shall be as set forth in Chapter 31 but not less than 29 inches.

(b) Ramps used as a component in a means of egress shall be Class A or Class B complying with section 3106.

3123.4 ILLUMINATION OF MEANS OF EGRESS, EMERGENCY LIGHTING AND EXIT SIGNS:

(a) Illumination of means of egress and emergency lighting shall be provided as set forth in Sub-section 3112.1.

(b) Exit signs shall be provided as set forth in Sub-section 3112.6.

3124 COVERED MALLS, WALKWAYS AND PASSAGEWAYS

3124.1 SCOPE: This section shall apply to connections between buildings such as covered malls, walkways and passageways located at above or below grade level, that are used as a means of egress.

3124.2 DEFINITIONS:

(a) COVERED MALL: A covered or roofed interior area having a minimum horizontal dimension of 30 feet used as a pedestrian walkway and connecting buildings and/or groups of buildings housing individual or multiple tenants.

(b) COVERED WALKWAY: A roofed, unobstructed walkway, where the least horizontal dimension is less than 30 feet, connecting buildings and used as a means of egress by persons and where less than 50 percent of the perimeter is enclosed.

(c) ENCLOSED PASSAGEWAY: A roofed, unobstructed walkway, where the least horizontal dimension is less than 30 feet, connecting buildings and used as a means of egress by persons and where 50 percent or more of the perimeter is enclosed.

3124.3 CONSTRUCTION:

(a) COVERED MALLS:

(1) The roof construction and supporting members of a covered mall shall be required to be of a type of construction permitted for the building connected and shall provide not less than one hour fire resistance.

(2) All unprotected walls and openings separating another occupancy area from the mall area shall be provided with a water curtain unless the other occupancy area is provided with a complete automatic sprinkler system.

(3) Where there is an occupied area above the mall, the occupancy separation provisions of this code shall apply.

(4) Concealed spaces in a mall roof assembly and concealed spaces in the roof assembly of buildings adjoining the mall shall be separated from the mall and the roof assembly area of adjoining buildings by not less than one-hour fire-resistive construction.

(5)EXCEPTION: Where an approved combined fire sprinkler and Class I standpipe system with Class I hose cabinets are provided for each 200 feet of mall length, openings between tenants and the mall may be unprotected.

(b) COVERED WALKWAY: A covered walkway shall be of any type of construction permitted by this code, provided the walls and openings at the point of connection to the building shall be protected as required by Paragraph 1804.1(c).

(c) ENCLOSED PASSAGEWAYS: An enclosed passageway shall be required to be of a type of construction permitted for the buildings connected. Separation between the enclosed passageway and the building to which it is connected, except when used as an exit outlet, shall be of not less than one-hour resistant construction, and openings therein shall be protected in accordance with the requirements of this Code.

3124.4 ALLOWABLE AREAS: When complying with the provisions of this code, covered malls of Types I, II, and III Protected, construction may be unlimited in area. For all other types of construction the basic allowable area for covered malls shall be 12,000 square feet. The area of covered malls may be increased:

(a) 200 percent when the covered mall is provided with a complete automatic sprinkler system and,

(b) At the rate of 25 percent for each side of the building provided with at least 30 foot width of mall leading

to a public place or street not less than 30 feet in width, but not to exceed 100 percent.

3124.5 MEANS OF EGRESS: Means of egress shall be as otherwise set forth in this Chapter.

3124.6 VENTILATION: Smoke and heat venting shall be provided for covered malls and enclosed passageways. Such venting systems shall conform to the Guide for Smoke and Heat Ventilating, NFPA 204, or Guide for Smoke Management Systems in Malls, Atria and Large Areas, NFPA 92B, as set forth in Section 402.

3125 SPECIAL HAZARDS

3125.1 BOILER ROOMS:

(a) Except in Group 1 Occupancies, every room containing an incinerator or open-flame fuel-fired equipment, shall be provided with at least two remote means of egress.

(b) All interior openings shall be protected as set forth in Table 31-C.

(c)EXCEPTION: Rooms should be designed of sufficient size to allow two doors. (Refer to Sec. 4006.3).

3126 FIRE ALARMS

3126.1 FIRE ALARMS REQUIRED: A manual fire alarm system shall be installed in all the following buildings unless the building is equipped with an automatic fire alarm system or an automatic sprinkler system.

(a) Buildings of Group C Occupancy as set forth in Sub-section 3117.11.

(b) Buildings of Group D Occupancy as set forth in Sub-section 3118.10.

(c) Buildings of Group F Division 2 Occupancy as set forth in Sub-section 3120.6.

(d) Buildings of Group G Division 2 Occupancy as set forth in Sub-section 3121.4.

(e) Buildings of Group H Occupancy as set forth in Sub-section 3122.8.

3126.2 FIRE ALARM INSTALLATIONS:

(a) Manually operated fire alarm equipment shall be provided as set forth in Sections 3117 through 3122.

(b) Where a building is divided by fire walls into separate fire sections with adequate safeguards against the spread of fire from one section to another, each section may be considered a separate building for the purposes of fire alarm system requirements based on size of buildings or occupant load.

(c) Every alarm system and its equipment shall be a standard approved type suitable for the purpose for which installed.

(d) Every alarm shall be under the supervision of a qualified person who shall cause proper tests to be made at specified intervals except as otherwise set forth.

(e) Each system shall be tested at not less than weekly intervals, except as otherwise set forth.

(f) Fire alarms signaling equipment shall be restored to service as promptly as possible after each test or alarm, and shall be kept in normal condition for operation. Equipment requiring rewinding or replenishment shall be rewound or replenished as promptly as possible after each test or alarm.

(g) Each manually operated sending station and alarm sounding device in a single system shall be of the same general type.

(h) A manually operated sending station shall be provided near each main path of egress and in the natural path of escape from fire, at readily accessible and visible points which are not likely to be obstructed.

(i) Each sending station shall be so located that from any part of the building not more than 200 feet will have to be traversed in order to reach a sending station on the same floor, or 100 feet and one flight of stairs to reach a sending station on another floor located in a natural path of escape from fire.

(j) The arrangement of sending stations and the manner of connection to sounding devices shall be such that there will be no difference between the sounding of actual alarms and drill systems.

(k) A required sounding device shall be used for fire alarm purposes only.

(l) Alarm sounding devices shall be provided of such character and so distributed as to be effectively heard

in every room above all other sounds. Visual alarm devices may be used in lieu of audible devices where specifically permitted for institutional occupancies and places of assembly.

(m) Every alarm sounding device shall be distinctive in pitch and quality from all other sounding devices.

(n)A code signal indicating where the alarm originates shall not be used except to such extent as herein set forth or as specifically authorized by the Building Official.

(o) Each system shall be so arranged that no manual intervention will be required, following the activation of a sending station, for causing effective response of all required sounding devices. No facilities shall be provided whereby such response can be controlled or modified except those otherwise specifically set forth herein.

TABLE 31-C

Fire Rated Door Requirements (1,2,3,4 footnotes)

Doors to One-Hour Fire-Rated Means of Egress (Corridors)

Occupancy	Rating (hours)	Label (6)	Maximum Glazing per leaf. sq. in.	Closing Device (see footnote)
A	3/4	C	1200	A or B
B-1, B-2	3/4 (8)		1200	C
C	3/4 (8)		1200	C
D-1	3/4 (5)	C	1200	C
D-2	3/4 (8)		1200	C
E-1, E-2	1	B	100	A or D
F-1	3/4	C	1200	C
F-2	3/4 (8)		1200	C
G-1, G-2	3/4 (8)		1200	C
H	3/4 (8)		1200	E

Exit Enclosure Doors
(In accordance with Section 3108)

Occupancy	Less than 4 stories	4 stories and over	Label (6)	Maximum Glazing per leaf, sq.in.	Closing Device (footnote)
All except Group I	1	1-1/2	B	100	A or B
I		no requirement			

Doors for Openings in Occupancy Separation and Fire Division Walls

Wall Rating (hours)	Door Rating (hours)	Label (6) (footnote)
4	3	A
3	3	A
2	1-1/2	A
1	3/4	C(7)

A: Self closing.

B: Automatic closing: shall close when released by activation of a detector set to operate when smoke reduces the intensity of a one-foot long beam of white light by four percent, or any other detection device which will

operate within that limitation.

C: None required except doors from enclosed corridors to rooms of hazardous uses such as linen rooms, trash rooms, mechanical repair rooms, etc.

D: Automatic closure at 165 degrees F, fusible link or equal.

E: Self-closing, rising butt hinge or closer.

1: For hardware requirements see Sub-section 3706.4.

2: For glazing see Sub-sections 3706.5 and 3706.7.

3: For boiler room doors see Sub-sections 4006.3 and 4006.4.

4: For laundry and trash chute openings see Sub-sections 1807.4 and 1807.5.

5: Except jails, prisons, etc. where open barred cells are provided.

6: Ratings of 3, 12, 1, :, 2, or 1/3 hours indicate the duration of the test exposure. Such numbers are followed by letters A, B, C, D, or E to indicate the classification of wall opening.

7: For doors connecting residences to attached garages, see Sub-paragraph 1507.2(2) (3).

8: Tight fitting 1:" thick solid wood core door in solid 2" x 4" rabbeted wood frame.

3127 SMOKE DETECTORS AND SMOKE DETECTION SYSTEMS

3127.1 Smoke detectors required: Smoke detectors or smoke detection systems shall be installed in all the following buildings:

(a) Buildings of Group C Occupancy as set forth in sub-paragraph 3117.12.

(b) Buildings of Group D Occupancy as set forth in sub-paragraph 3118.11.

(c) Buildings of Group H Occupancy as set forth in sub-paragraph 3122.9.

(d) Buildings of Group I Occupancy as set forth in sub-paragraph 3122.9.

3127.2

Smoke detector and smoke detection systems installation shall be as follows:

(a) Standards: The following standards are hereby adopted as set forth in Section 402:

(1)NFPA 72B Standard for installation and maintenance and use of auxiliary protective signaling systems for fire alarm service.

(2) NFPA 72E Standard for automatic fire detectors.

(3) NFPA 74 Standard for installation, maintenance and use of household fire warning equipment.

(b) Smoke detector spacing shall be in accordance with the above codes and manufacturers' recommendations.

(c) Only detectors approved or listed by a nationally recognized testing organization shall be used.

(d) Smoke detectors installed in dwelling units must be installed in such a manner as to be audible in all of the sleeping rooms of that unit. This is usually in the hall area(s) giving access to the sleeping rooms.

(e) Smoke detectors shall be located on the ceiling or on the wall within 12 inches of, but no closer than 4 inches to the ceiling. Where unusual factors, such as room configuration, air movement, stagnant air pockets, etc. exist, consideration of the authority having jurisdiction or the designer should determine the placement of the detectors.

(f) Smoke detectors shall be placed remotely from the cooking area.

(g) In multilevel living units a detector shall be located in the stairway entrance at each floor level.

(h) All detector installations in Group H & I Occupancy, shall be hard wired to the electrical distribution system, and all such detectors shall be Battery Backup. All such detectors in new construction shall be interconnected within individual living units.

EXCEPTION: Detectors wired to circuits protected by emergency generators are not required to be Battery

Backup.

(i) In generator rooms, trash rooms, and cooking areas, rate-of-rise heat detectors may be utilized in lieu of smoke detectors.

CHAPTER 32

ELEVATORS AND ESCALATORS

3201 STANDARDS
3202 DEFINITIONS
3203 GENERAL
3204 ELEVATORS
3205 ESCALATORS, DUMBWAITERS, AND MOVING STAIRWAYS
3206 TRANSPORTING ASSEMBLIES

3201 STANDARDS

3201.1 SCOPE:

(a) Elevators, dumbwaiters, escalators and transporting assemblies shall be designed and constructed of the material, proportions and strength admitting to rational analysis based on established principles of mechanics and shall be maintained and operated in a manner to insure public safety.

(b) Elevators, dumbwaiters, escalators and transporting assemblies shall comply with the requirements of the standard specified in Sub-section 3201.2 except as they may be modified herein.

(c) Elevators and escalators shall also comply with the applicable requirements of the Florida Industrial Commission and the State of Florida Bureau of Elevator Inspection.

3201.2 STANDARDS:

(a) Elevators, dumbwaiters and escalators shall conform to the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks, hereinafter referred to as "The Elevator Safety Code", ANSI A17.1, as set forth in Section 402.

(b) Manlifts shall conform to the American Standard Safety Code for Manlifts, ANSI A90.1, as set forth in Section 402.

(c) The Building Official may promulgate and specifically set forth in writing such rules applicable to transporting assemblies as are not inconsistent with the standards of Paragraph (a) and which, in his opinion, are necessary to provide for safety and to protect public welfare.

3202 DEFINITIONS

Definitions of terms shall be set forth in Chapter 4 or in "The Elevator Safety Code" or as follows:

ALTERATION: Shall mean any change to existing installation other than repair or replacement of worn or broken parts necessary for normal operation.

TRANSPORTING ASSEMBLIES: Shall mean any permanent or semi-permanent device, manually or power-operated, other than elevators, dumbwaiters or escalators used for transporting material or persons in any horizontal, inclined or vertical direction, and such assemblies shall include but shall not be confined to the following:

(a) Amusement devices used to convey persons as a form of amusement.

(b) Inclined devices, with or without seats, but not considered as escalators.

(c) Man hoists, stage and orchestra lifts, tiering and piling machines, skip hoists and wharf ramps.

(d) Belt, bucket, scoop, roller or similarly inclined or vertical freight conveyors.

(e) Hoists which are used for handling material during construction of buildings and structures.

3203 GENERAL

3203.1 PERMITS:

(a) For the installation, relocation or alteration of an elevator, escalator or transporting assembly, an application for the proposed work shall be filed with the following exceptions:

(1) Servicing and repairs and replacements necessary for normal maintenance, which are made with part of equivalent materials, strength and design to those replaced shall not require a permit.

(2) Installation or alteration of several amusement devices shall be considered for the purposes of a permit as one installation.

(3) Material hoists for construction operations shall be exempted from the paying of a fee, but such exemption shall not relieve the owners thereof from the provisions herein nor from the responsibility of requesting inspection and securing approval of such device from the State of Florida Bureau of Elevator Inspections before its use or service.

(4) Nothing in this section shall exempt the above from complying with safety requirements.

(b) Application for permit will be accepted from only qualified persons or firms. Qualifications of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradesmen.

3203.2 RESPONSIBILITY: Responsibility for the care, operation and maintenance of elevators, dumbwaiters, escalators, transporting assemblies and amusement devices, shall be as follows:

(a) EQUIPMENT MANUFACTURER: The manufacturer of the elevator, dumbwaiter, escalator, transporting assembly or amusement device shall be responsible for the failure of the equipment or any part thereof, until the installation has been approved, but shall not be responsible for the safe operation or proper maintenance of elevators, dumbwaiters and escalators during the time when any limited certificate, as defined in Sub-paragraph 3203.4(e)(3) shall be in effect. The manufacturer also shall be responsible for all tests of new and altered equipment until the installation has been approved.

(b) THE OWNER: The owner or his duly appointed agent shall be responsible for the safe operation and proper maintenance of the elevators, dumbwaiters, escalators, transporting assemblies and amusement devices after the installation has been approved, and also during the period of effectiveness of any limited certificate as defined in Sub-paragraph 3203.4(e)(3). The owner shall also make and be responsible for all routine tests, which may be required in accordance with Sub-section 3203.5.

3203.3 ACCIDENTS: The owner or his duly authorized agent shall promptly notify the State of Florida Bureau of Elevator Inspections of each and every accident involving the equipment wherein any person is injured to the extent of requiring the services of a physician or disability exceeding one day, or damage exceeding one hundred dollars or more has been done to the equipment, and shall afford access for inspection of damages or cause of damage and shall prevent the use of such equipment or assembly until its use is approved by the State of Florida Bureau of Elevator Inspections.

3203.4 INSPECTION:

(a) INSPECTION: The Building Official shall accept the inspection of a regular employee of any legally constituted governmental authority, but such acceptance shall not abridge the duty of the Building Official from requiring that such inspection be made or Certificate posted by the State of Florida Bureau of Elevator Inspections.

(b) TESTS AND CERTIFICATES REQUIRED: Any new, altered or moved elevator, dumbwaiter, escalator, transporting assembly or amusement device shall not be placed in operation until such equipment has been tested, inspected and approved as required by this section and a certificate so stating has been issued as set forth in Paragraph 3203.4(e).

(c) ELEVATORS, DUMBWAITERS AND ESCALATORS: The permit holder installing, moving or altering elevators, dumbwaiters or escalators shall notify the State of Florida Bureau of Elevator Inspections and have a certificate of inspections posted and then notify the Building Official.

(d) TRANSPORTING ASSEMBLIES AND AMUSEMENT DEVICES: The permit holder installing, moving or altering transporting assemblies or amusement devices shall have a certificate of inspection posted on site.

(e) CERTIFICATES OF INSPECTION:

(1) (aa) ISSUING OF CERTIFICATES: The Building Official or his representative shall confirm that the equipment has been inspected and approved by the State of Florida Bureau of Elevator Inspection, and the certificate of inspection is conspicuously posted.

(bb) No passenger elevator, freight elevator, dumbwaiter, escalator, building hoist or other lifting apparatus may be operated without this certificate first having been conspicuously posted.

(cc)A new certificate shall be issued or an endorsement made on the existing certificate by the State of Florida Bureau of Elevator Inspection following each inspection period.

(2) POSTING OF CERTIFICATES: The required certificate shall be posted in a conspicuous location in the elevator car, and on, near or plainly visible from the dumbwaiter, escalator, amusement device or transporting assembly. The certificate shall be suitably framed with a glass cover.

(3) LIMITED CERTIFICATES:

(aa) The temporary use of any elevator, dumbwaiter or escalator for passenger or freight service may be approved during the installation or alteration, under the authority of a limited certificate, issued for each class of service. Such limited elevator certificate shall be issued by the State of Florida Bureau of Elevator Inspections.

(bb) POSTING OF LIMITED CERTIFICATES: When a limited certificate is issued, a notice bearing the information that the equipment has not been finally approved shall be conspicuously posted on, near, or visible from each entrance to such elevator, dumbwaiter or escalator.

3203.5 ROUTINE INSPECTIONS, TESTS AND MAINTENANCE:

(a) ELEVATORS, DUMBWAITERS, AND ESCALATORS: Elevators, dumbwaiters and escalators shall be inspected as provided in paragraph 3203.4(a) and tested by the owner or his agent in accordance with the requirements set forth in "The Elevator Safety Code", ANSI A17.7 as set forth in Section 402.

(b) AMUSEMENT DEVICES AND SPECIAL EQUIPMENT: Amusement devices and special equipment shall be tested and inspected on a semiannual schedule in accordance with such rules and procedures as required by the State of Florida Bureau of Elevator Inspection.

3203.6 EXISTING INSTALLATIONS:

(a) Existing installations of elevators, dumbwaiters, escalators and man hoists, legally installed before the adoption of this code, may be used with the approval off the State of Florida Bureau of Elevator Inspection.

(b) Existing installations may be altered to obtain the advantage of any provisions of the Elevator Safety Code, provided the safety requirements covering such provisions are met and permit secured from the State of Florida Bureau of Elevator Inspection.

3203.7 REPAIRS AND REPLACEMENTS: Ordinary repairs and replacements of damaged, broken or worn parts, necessary for normal maintenance, may be made with parts of equivalent material, strength and design, except that replacement of wood overhead beams, guide rails and wood carframes shall be made with metal, meeting the requirements of the Elevator Safety Code. Broken or damaged parts subject to tension, torsion or bending of parts on which the support of the elevator car depends, shall not be repaired by welding.

3203.8 UNSAFE EQUIPMENT:

(a) Whenever an elevator, dumbwaiter, escalator or transporting assembly is, in the opinion of the Building Official or Local Fire Authority in an unsafe condition, he shall have the authority to order the discontinuance of use of such assembly until repaired, replaced or tested, or he may order demolition.

(b) For the consideration of unsafe equipment, Section 202 herein, as it pertains to building, shall be applied

to elevator and escalator installations, based on the total cost of such installation exclusive of the hoist way.

3203.9 ENCLOSURES:

(a) Elevators, escalators and other transporting assemblies shall be enclosed as required in Section 1807, Section 3108, and in this Sub-section except as follows:

(1) The walls of an elevator shaft may be open to the exterior of the building where complying with Section 1804 herein.

(2) An elevator, escalator or other transporting assembly connecting only one floor and a mezzanine common to that floor need not be enclosed.

(3) An escalator need not be enclosed where protected in accordance with the Standards for such escalators as provided in the Life Safety Code, NFPA 101, as set forth in Section 402.

3204 ELEVATORS

3204.1 Elevators shall not be included in the calculation of required stairways.

3204.2

(a) (1) All elevators having automatic operation shall be arranged for Fire Department emergency use, as set forth in the Standard provided in Paragraph 3201.2(a) herein.

(2) There shall be a legible and permanent sign affixed to the wall in a conspicuous location at such elevators at each floor reading:

IN CASE OF FIRE DO NOT USE ELEVATORS
USE STAIRWAYS.

(b) (1) The electric service for all elevators shall be connected on the line side of the main disconnect except such elevators that are provided with automatic secondary Type 1 emergency power from an electric generator on the premises.

(2) Building of Groups A, B, C, or D Occupancy exceeding three stories in height and buildings of other Occupancies exceeding six stories in height shall have at least one elevator, or if necessary to serve floors not accessible by means of ramps shall have more than one elevator, having Type 1 power, as provided for emergency lighting, adequate in capacity to supply power and service.

(3) EXCEPTION: Where access from multiple floors is by open exterior balcony walkways, the requirement for standby power for elevators will not be required in building six or less stories above grade.

3205 ESCALATORS, DUMBWAITERS AND MOVING STAIRS

3205.1 Escalators, dumbwaiters, and moving stairways moved from one shaft or location to another shall conform to the requirement of Sub-section 3201.2.

3205.2 An escalator may be accepted as means of egress where such escalator conforms to the applicable requirements for exit-stairs as set forth in Chapter 31 and as follows:

(a) No escalator capable of being operated in the direction contrary to normal exit travel shall be used as a means of egress.

(b) An exit-escalator shall be of a horizontal tread type and shall be of incombustible construction throughout except for step-tread-surfaces, grip-rails and step-wheels.

(c) Treads shall be not less than 22 inches in length.

(d) A single escalator shall be given credit for only one 22-inch unit of exit-width, regardless of width.

(e) There shall be an unobstructed space of at least four inches outside the grip-rail and above the grip-rail for the full length of the escalator.

(f) No single exit-escalator shall have uninterrupted vertical travel of more than one story.

3206 TRANSPORTING ASSEMBLIES

3206.1 TEMPORARY MATERIAL LIFTS:

(a) Temporary material lifts for construction work on multiple story buildings having a hoist way and platform may be constructed without a permit therefore, but shall not be assembled or constructed without the written approval of the State of Florida Bureau of Elevator Inspection.

(b) All temporary material lifts for the work of construction shall be as set forth in this chapter and in Chapter 33, "Precautions During Building Operations".

(c) Service and inspection shall be each three months, as for elevators.

3206.2 AMUSEMENT DEVICES:

(a) Amusement devices shall not be placed in operation until the design, materials of construction and operation are approved by the Building Official in accordance with such regulations or requirements as he may deem necessary in the interest of public safety.

(b) Amusement devices shall be equipped with safety clutches. The cars or receptacles which persons are permitted to occupy shall have handrails of sufficient number and height, or other approved appliances or safeguards, to prevent persons from being thrown therefrom or from coming in contact with structural members.

3206.3 OTHER DEVICES: Other devices shall be serviced and inspected not less frequently than annually, or at such periods as may be required by the State of Florida Bureau of Elevator Inspection.

CHAPTER 33
PRECAUTIONS DURING BUILDING OPERATIONS

3301 GENERAL
3302 DEMOLITION
3303 EXCAVATION
3304 SIDEWALK SHEDS AND FENCES
3305 STORAGE OF MATERIAL
3306 HOISTING MACHINERY
3307 DERRICKS AND CRANES
3308 CABLES, ROPES, CHAINS AND BLOCKS
3309 PLATFORM HOISTS
3310 HOIST TOWERS
3311 TEMPORARY FLOORING
3312 FLOOR COVERINGS
3313 RUNWAYS AND RAMPS
3314 TEMPORARY STAIRS
3315 LADDERS
3316 SCAFFOLDS
3317 SAFEGUARDS
3318 TEMPORARY LIGHT AND POWER
3319 FIRST AID
3320 SANITATION
3321 WELDING AND CUTTING
3322 OPEN FIRES
3323 FIRE PROTECTION
3324 SPECIAL HURRICANE PRECAUTIONS

3301 STANDARDS

The provisions of this Chapter shall apply to all work in connection with the erection, alteration, repair, removal or demolition of buildings and structures.

The construction, erection, alteration and removal of scaffolds and the application, installation and setting up of safeguards and equipment devices shall be done by skilled workmen under the supervision of a person qualified by experience or training for such work.

A safeguard, device or piece of equipment which is unsafe shall be reported to the superintendent or foreman, who shall take immediate steps to remedy such conditions or remove such safeguard, device or equipment.

Scaffolds, ladders, stairs, fuel gas tanks and other devices or equipment regulated by this chapter shall be maintained in a good, safe and usable condition as long as in use.

No ladders, scaffold, railing or other devices or equipment required or regulated by this chapter, or any part thereof, shall be removed, altered or weakened when required by the work, unless so ordered by the superintendent or foreman in charge.

Scaffolds, temporary floors, ramps, stairway landings, stair treads, and all other walkway surfaces shall be kept free from protruding nails and splinters. They shall be kept free from unnecessary obstructions so that the workers may move about safely.

Protruding nails and tie wire ends shall be removed, hammered in or bent in a safe condition.

Electric lines, moving ropes and cable gears, or similar hazards with which a worker might come in contact, shall be encased or guarded.

Prior to making an excavation, drilling or otherwise disturbing the ground, the person doing the work, or causing such work to be done, shall contact all public utility organizations to determine the possible location of underground facilities, to avoid the hazard to public safety, health and welfare caused by the inadvertent disruption of such facilities.

No person, firm or corporation, either personally or through an employee or agent of another, shall operate or move any machinery, equipment, material, scaffolds or assembly-to-be closer than six feet to any energized high-voltage overhead electrical facilities except with the approval of the electrical inspector.

3302 DEMOLITION

Before commencing the work of demolition of a building or structure, all gas, electric, water and other meters shall be removed and the supply lines disconnected, except such as are especially provided or required for use in connection with the work of demolition.

Glazed sashes and glazed doors shall be removed before the start of demolition operations.

No wall, chimney or other construction shall be allowed to fall in mass, except under competent supervision. Scaffolds or stagings shall be erected for workers if walls or other elements of the structure are too thin or too weak to work on. Heavy structural members, such as beams or columns, shall be carefully lowered and not allowed to fall freely.

Chutes for the removal of materials and debris shall be provided in all parts of demolition operations which are more than 20 feet above the point from which material is to be removed.

Chutes shall be completely enclosed and shall be equipped, at intervals of 25 feet or less, with substantial stops to prevent descending material from attaining dangerous speeds.

The bottom of each chute shall be equipped with an adjustable gate or stop for regulating the flow of materials; a danger sign shall be placed at the discharge end of every chute; and except for the discharge of materials, the gate or stop shall be kept closed.

Proper tools shall be provided and kept available to loosen material or debris jammed in the chute.

Chutes, floors, stairways and other places shall be effectively wet down, at frequent intervals, when the dust from such operations would cause a menace or hardship to adjoining buildings or premises.

Stairs and stair railings shall be kept in place and in usable condition as long as is practicable, and step and landing hall be kept free from debris.

Floor openings, unless covered or otherwise protected, shall be provided with guard rails and toe boards, as specified in Section 3317.

All areas of danger in demolition operations shall be properly enclosed and danger signs posted. Sufficient watchmen shall be provided to warn workers of impending dangers, and all unauthorized persons shall be excluded from places where demolition is in progress.

3303 EXCAVATION

The sides of every excavation in connection with building operations, including trenches for pipes or any other purposes, shall be sheet-piled, braced or shored when necessary to prevent the soil from caving in on persons engaged in work within such excavation.

Where workers are employed adjacent to an excavation on work other than that directly connected with the excavation, substantial railings or fences shall be provided to prevent such workers from falling into the excavation.

Every trench, five feet or more in depth, shall have suitable means of exit or escape at least every 25 feet of its length.

3304 SIDEWALK SHEDS AND FENCES

3304.1 SIDEWALK SHEDS: Where buildings, which exceed 45 feet in height, are to be erected or demolished closer than ten feet, or buildings which exceed 25 feet in height are to be erected or demolished closer than five feet, to a street line, there shall be erected and maintained, during such work adjacent to the street line, a shed of sufficient strength and stability to sustain safely the weight of materials that may be placed thereon, and to withstand the shocks incident to the handling of such materials or their preparation for use, and accidental jars from trucks passing or delivering materials.

When the roof of such shed is used for the storage of materials or for the performance of work of any kind, substantial railings not less than three feet high and solid toe boards not less than six inches high shall be placed along the open sides and ends of such roof.

Such sheds shall be constructed to afford unobstructed walkways, not less than eight feet high and five feet wide. The street side shall be kept open for a height of not less than seven feet above the curb, and the sheds shall be properly lighted at night with not less than one 100-watt bulb every 20 feet of its length and at each change of grade or elevation of the sidewalk surface.

Such shed shall remain in place until the building is enclosed, or if being demolished, until the building is reduced to 20 feet in height.

3304.2 CONSTRUCTION FENCES: Buildings which are erected or demolished closer than five feet to a street line and which are not required to have a sidewalk shed shall be provided with protection on the street sides in the form of a substantial fence not less than eight feet high. Such fence shall not restrict the sidewalk to less than five feet in width and shall be built solid for its full length, except for such openings as may be necessary for a proper execution of the work.

EXCEPTIONS: The Building Official may waive, or may vary, any or all of the provisions of Section 3304 where the safety of the public may otherwise be protected.

3305 STORAGE OF MATERIAL

Materials to be stored at or near locations where workers are employed or on any public property shall be piled or stacked in an orderly manner to avoid topping over or being otherwise displaced.

No materials shall be piled or stacked to a greater height than six feet, except in yards or sheds intended especially for storage. When piles exceed four feet in height, the material shall be so placed that the sides and ends of the piles taper back.

The placing of construction materials in a building or structure during building operations shall be done with due consideration of the effect of such loads on the structural members, and such loads shall, in general, be placed as near to the points of support of the structural members as possible. Such loading shall not cause stresses in any structural member beyond the design stresses.

Waste material rubbish resulting from building operations shall be removed as rapidly as possible and shall not be allowed to accumulate on the premises or adjacent thereto.

3306 HOISTING MACHINERY

Every hoisting engine shall be provided with adequate brakes, capable of holding the maximum load at any point of travel.

Guards shall be provided for exposed gears and other moving parts and around hoisting cables at all points to prevent workers from tripping or getting clothing caught.

Ample room shall be provided around hoisting engines, motors or other machinery or apparatus for the free and safe movement of those who operate or otherwise attend such engines, motors or other machinery apparatus.

Hoisting machinery shall be enclosed to exclude unauthorized persons, and if placed outside the building, further protection against falling objects shall be provided.

When hoisting machinery is set on an elevated platform, such platform shall be of substantial construction, and guard rails and toe boards shall be provided along all open sides of such platform.

Electrical machinery and equipment to be used in connection with building construction shall be installed as specified in Part XI.

Steam boilers used in connection with building construction shall be installed, equipped and maintained as specified in Section 4006 herein, and operators in charge of such boilers shall be acceptable to the Building Official.

3307 DERRICKS AND CRANES

3307.1 GENERAL:

(a) (1) Derricks shall be so designed and assembled that no part shall be stressed beyond the safe-working stress for the material, as specified in this Code, under maximum-rated load in any possible position.

(2) Such maximum-rated load shall be conspicuously posted on each derrick.

(b) The foot-block of every derrick shall be firmly secured against motion in any direction.

(c) Guy derricks shall have the top of the mast held by not less than six steel guy cables secured by firm anchorages and so placed that the angle of the guy with the mast shall be as large as possible.

(d) The moving parts of derricks and cranes shall be kept well lubricated, and all parts shall be inspected at least every other day.

3307.2 VISIBILITY: Masts and booms of derricks and cranes, where higher than 150 feet above ground, shall have installed.

(a) At the top in a manner to insure unobstructed visibility of at least one beacon and one flag from any angle:

(1) One or more flashing 300 mm Electric Code beacons, each equipped with two lamps and aviation-red color filters and,

(2) Rectangular flag markers of solid color aviation-surface-orange not less than two feet on a side.

(b) Along the height of the mast or boom:

(1) A pair of lamps of at least 100 watts each, enclosed in aviation-red obstruction light globes, on opposite side or corners at regular intervals not to exceed 50 feet and,

(2) Rectangular flag markers of solid color aviation-surface-orange, not less than two feet on a side at regular intervals not to exceed 50 feet.

(c) All such lights shall turn on when the north sky illuminance falls to a level of 35 foot-candles and shall turn off when the north sky illuminance rises to a level of 58 foot-candles, or may be on continuously.

(d) Such lights and flags may be replaced by a single high-intensity white obstruction light of not less than 100,000 candles when the north sky illuminance exceeds three foot-candles and an intensity of 1,000 candles when the north sky illuminance is less than one-half foot-candle.

(e) Where masts and booms are within 50 feet, measured horizontally, of existing buildings which exceed the maximum heights of such masts or booms, lights and flags may be omitted.

3308 CABLES, ROPES, CHAINS AND BLOCKS

Cables, ropes, chains and blocks shall be of such size the maximum load supported by them will not exceed one sixth of their breaking strength.

Blocks designed for use with manila ropes shall not be used for steel cables. Blocks used at or near floors or in other exposed places to change the direction of cables shall be enclosed or otherwise effectively guarded.

All ropes and cables used in connection with scaffolds, derricks, and hoisting apparatus shall be tested before being put to use and at least once every 30 days while in use, to insure their safety and suitability for the purpose to which they are to put. Any rope or cable found to be unsafe or unfit shall not be used.

Chains shall not be used for slings, bridles or other similar purposes, but shall be restricted to only such purposes as require a straight pull.

Hooks shall not be used for hoisting buckets, cages or skips.

3309 PLATFORM HOISTS

No person shall be permitted to ride on any platform hoist unless it has been designed and constructed for passenger service, as specified in Chapter 32. Elevators used for the transportation of workers during construction shall comply with the requirements of Chapter 32.

Platform hoists for the handling of materials within buildings under construction shall have the car substantially constructed and provided with covers, either solid or wire mesh. Sections of the cover may be arranged to swing upward for the handling of bulky materials, or the covers may be omitted if suitable overhead protection is provided.

Hoists shall be equipped with a broken-rope safety device.

Where wheelbarrows or buggies are used for handling material on platform hoists, cleats shall be nailed to the platform to fix the proper position so that handles shall not project beyond platform edges.

Supports for the overhead sheave shall be designed to carry, within the allowable stresses, as specified in this Code, two times the weight of the hoist and its maximum load.

3310 HOIST TOWERS

Hoist towers, erected in connection with building construction shall be substantially constructed, and all members shall be so proportioned that the stresses shall not exceed those specified for that material, when carrying the dead load of the tower plus two times the weight of the platform or bucket or its maximum load.

Every hoist tower shall rest on a sufficiently solid foundation to prevent injurious settlement or distortion of its framework.

Every hoist tower shall be secured in not less than four directions against swaying or tipping, at intervals of not more than 32 feet in its height, by steel cable guys adequately anchored or by other satisfactory means. Such towers which are constructed adjacent to buildings shall be secured to the buildings frame at each floor as the building progresses.

Landing platforms in hoist towers or platforms connecting a hoist tower to a building or other structure shall be provided with guard rails and toe boards.

The bottom of every hoist tower shall be screened or otherwise protected on all sides to height of not less than six feet.

Hoist towers erected within the building, but not occupying the entire opening through which they pass, shall be completely enclosed on all sides and shall be provided with doors at the unloading points unless the platform hoist is solidly enclosed on all sides to the height to which material is to be loaded or unloaded.

3311 TEMPORARY FLOORING

In buildings of skeleton construction, the permanent floor, except for necessary hoist way openings, shall, when possible, be constructed as the building progresses. There shall be not more than three unfilled floors above the highest permanent floor.

In buildings of skeleton construction, the entire working floor shall be planked over, except spaces required for construction work, for raising or lowering materials, and for stairways or ladders. Planks shall be placed so that they cannot tip under the weight of a worker at any point and secured so that they cannot slip out of place.

In buildings of wood joist construction, the underfloor shall be laid for each floor as the building progresses.

3312 FLOOR OPENINGS

All floor openings, used as hoist ways or elevator shaftways, shall be guarded on all sides, except the side being used for loading or unloading. Guards shall be barricades not less than four feet high along or near the

edges of such openings, or guard rails not less than three feet high, placed not less than two feet distant at all points from the edges of such openings. If guard rails are used, toe boards shall be provided along the edges of the openings. Sides left open for loading or unloading shall be guarded by similar solid doors or gates.

All floor openings used as stairways, or the accommodations of ladders or runways, shall be guarded by railings and toe boards.

All other floor openings shall be guarded on all sides by solid barriers not less than three feet high, or by railings and toe boards or shall be planked over or otherwise covered over by temporary construction capable of sustaining safely such loads as are likely to come thereon.

Barriers for the guarding of openings used as hoist ways or for elevators shall be constructed so that workers cannot thrust head, arms or legs through them, and loose material cannot fall or be pushed into the shaftway.

Barriers and guard rails around floor openings shall remain in place until permanent enclosures or protection are otherwise provided.

3313 RUNWAYS AND RAMPS

Runways and ramps in connection with scaffolds or extending from story to story or otherwise located and maintained for an extended period of time or for the transfer of bulky material shall be constructed of at least three 10-inch planks laid closely side by side and substantially supported and braced to prevent unequal deflection and springing action.

Runways and ramps shall have a slope not steeper than one in three, and the total rise of a runway or ramp between landing shall not exceed 12 feet.

When the rise is steeper than one in six, or when the rise is more than six feet and steeper than one in eight, runways or ramps shall be provided with cleats spaced not more than eight inches apart.

Runways and ramps, having a total rise of more than six feet, or passing over or near floor openings, high-tension wires or other dangerous places, shall be provided with guard rails and toe boards.

3314 TEMPORARY STAIRWAYS

In all buildings, the permanent stairways shall be installed as soon as conditions will permit. When the work on a building has progressed to a height in excess of 60 feet and it has not been practicable to install the permanent stairways, at least one temporary stairway shall be provided for the full height and continued upward as rapidly as the work progresses.

Stairs and stairways shall be of sufficient strength to support a load of least 100 pounds per square foot, and all stairways shall be guarded on all open sides with hand rails and toe boards.

Temporary stairs shall be constructed so that treads and risers are uniform in width and height in any one flight. The sum of the height of the two risers and the width of one tread shall be not less than 24 or more than 26 inches. Temporary stairways shall be not less than 36 inches wide. Landings shall be not less than 30 inches long.

No flight of stairs of temporary stairway shall have a vertical rise in excess of 12 feet, and, when necessary, intermediate landings shall be provided.

Temporary and permanent stairways shall be adequately lighted as set forth in Section 3318.

No door shall open directly onto a flight of stairs, but a landing equal to at least the width of the door shall be provided between the door and the stairs. Temporary doors higher than four feet and six inches shall be fitted with wire glass panels.

Permanent stairs that are to be used during construction and on which treads are to be filled in later shall have wooden treads firmly fitted in place for the full area of the tread. The top surfaces of the temporary treads shall be maintained above the tops of the risers or nosings.

The storage of materials on stairs or in stairways or adjacent to stair openings shall not be permitted.

3315 LADDERS

(a) Except where either permanent or temporary stairways or runways are required, ladders shall be provided to give access to all floors, stagings or platforms where work is being done more than five stories above a permanent or temporary floor.

(b) Ladders required by this Code shall be left in place until the permanent stairways are ready for use or until temporary stairways are installed, and stairways shall be erected as soon as the buildings exceeds 60 feet in height.

(c) All ladders shall be substantial in construction and shall conform to the Florida Industrial Commission regulations for Portable and Fixed Ladders, LAD, as set forth in Section 402.

(d) All ladders, when in use, shall be set up in a manner to be secure and to prevent slipping; and ladders, except stepladders or other self-supporting ladders, shall be securely fastened to a permanent support at the top, and if necessary, at the bottom, and braced to prevent swaying, bending or shaking.

(e) Ladders, leading to floors, stagings or platforms, shall extend at least three feet above the level of such floors, stagings or platforms.

(f) No single ladder shall exceed 20 feet in length. When greater heights are to be reached, intermediate platforms shall be erected. Ladder landings shall be at least four feet square and equipped with handrails and toe boards.

(g) Ladder rungs shall be spaced uniformly and as near to 12 inches as is practicable.

(h) When used temporarily, in place of stairways or runways, ladders serving traffic in both directions simultaneously shall be at least 40 inches wide. If separate ladders are provided for going up and coming down, they shall be marked **"UP"** and **"DOWN"** respectively at each floor and platform level.

(i) Ladders, other than sectional or extension ladders, shall not be extended by joining two or more together.

(j) Ladders shall not be placed or used in shafts of operative elevators or hoists except by workers engaged in the erection, construction, alteration or repair of any such shafts, hoist ways or equipment.

(k) Ladders shall not be painted, but may be oiled or otherwise treated with preservative so as to permit the detection of faults. Every ladder shall be inspected by the superintendent or foreman in charge before being put to use on a building operation and thereafter at least once every 30 days while continued in use. Broken or weak ladders, or ladders with weak or missing rungs, shall not be used or permitted to remain on the site of the building operations, but shall be repaired and made safe or destroyed.

3316 SCAFFOLDS

Properly constructed scaffolds shall be provided for all work which cannot be done safely by workmen standing on permanent or solid construction, except when such work can be done safely from ladders. All such scaffolds shall be substantially constructed, to support at least four times the maximum load, and shall be secured to prevent swaying.

Planks used in the construction of stationary scaffolds shall be not less than two inches nominal thickness. Where such planks overlap at the ends, the overlap shall be not less than six inches. Planks shall be so placed that they cannot tip under the weight of the worker at any point. Nails used in the construction of scaffolds shall be of ample size and length to carry the loads they are intended to support, and all nails shall be driven full length. No nails shall be subject to direct pull.

Ropes, cables and blocks used in the support of swinging scaffolds shall be of sufficient size and strength to sustain at least six times the maximum loads to which they will be subjected. Where acids are likely to come into contact with them, ropes shall not be used in the support of scaffolds, but steel cables properly protected by grease or oil or other effective method shall be used instead.

Every scaffold, the platform level of which is more than six feet above the ground or above a permanent or

temporary floor, other than iron workers' scaffolds and carpenters' bracket scaffolds, shall be provided with guard rails and toe boards extending the full length of the scaffold and along the ends except where ramps or runways connect with them, unless otherwise enclosed or guarded. On suspended, swinging and pole scaffolds, the space between guard rails and toe boards shall be fitted with wire mesh screens securely attached.

Where objects are likely to fall on a scaffold from above, a substantial overhead protection shall be provided; not more than ten feet above the scaffold platform, and at doorways, passageways or other points where workers must pass under scaffolds, a substantial overhead protection shall be provided. No materials or equipment, other than required by the workers, shall be placed on scaffold platforms.

Roof brackets, roof scantling, crawling boards and similar forms of support shall be substantial in construction and securely fastened in place when in use.

Barrels, boxes or other similar unstable objects shall not be used as supports for planking intended as scaffolds or places of work.

When used over public sidewalks or other places of public use, scaffolds, used for minor building repairs, alterations, or painting, shall be equipped with drop cloths to effectively prevent the falling of paint or debris.

Scaffolds used for sandblasting and guniting operations shall be entirely and effectively enclosed, and the determination of effective enclosure shall be the complete absence of particles of material of operation in the air at a horizontal distance of 50 feet from the point of operation.

3317 SAFEGUARDS

3317.1 RAILINGS:

(a) Railings, where required during construction, shall comply with the Standards of the Occupational Safety and Health Administration (OSHA), Part 1926, as set forth in Section 402 of this Code, and as provided herein.

(b) The top rail of such railings shall be not less than 42 inches above walking surfaces.

(c) Such railings shall be provided with an intermediate rail midway between the walking surface and the top rail and shall be constructed, as set forth in Sub-section 2305.3 of this Code, to resist a load of 50 pounds per lineal foot at the top rail.

3317.2 TOE BOARDS: Toe boards, where required during construction, shall comply with the Standards referenced in Paragraph 3317.1(a) herein, or any approved alternate design.

3318 TEMPORARY LIGHT AND POWER

All parts of buildings under construction, or other operations covered by the general provision of this Chapter, and all sheds, scaffolds, covered walks, other work or storage areas, and equipment in connection with such operations shall have sufficient light to insure safety and protection of life and property. In passageways, stairways and corridors, the average light intensity measured at the floor level shall be not less than two foot candles.

At locations where tools and/or machinery are used, the average light intensity measured at the floor level shall be not less than five foot candles. Natural or artificial illumination shall be provided in such a manner that glare and shadows will not adversely affect the safety and protection of workers and property.

Temporary wiring for light, heat and/or power shall be adequately protected against mechanical or overcurrent failures. All conductive materials enclosing fixed or portable electric equipment, or forming a part of such equipment, shall be grounded by one or more of the methods permitted by this Code.

Temporary electric service poles shall be self-supporting or adequately braced or guyed at all times.

3319 FIRST AID

On every building operation, arrangements shall be made for prompt medical attention in case of accident, and ample supply of iodine or mercurochrome and sterile gauze bandages shall be provided and maintained in a clean, sanitary cabinet, at all times available under the direction of the superintendent or a person designated

by him. Unless competent medical attention is otherwise quickly available, where more than 200 workers are employed, a properly equipped first-aid room or field hospital shall be provided, and a physician or competent nurse shall be in constant attendance.

3320 SANITATION

Adequate toilet facilities, maintained in a clean, sanitary condition, shall be provided as set forth in Sub-section 4603.21 herein.

An adequate supply of pure, cool drinking water shall be provided for workers during hours of employment, and adequate, sanitary washing facilities shall be provided for workers within reasonable access.

3321 WELDING AND CUTTING

Gas welding and cutting and arc welding in building construction and demolition operations shall be restricted to experienced workers acceptable to the Building Official. Suitable goggles or helmets and gloves shall be provided for and worn by workers engaged in gas welding or cutting or arc welding.

Incombustible shields shall be provided to protect the worker when exposed to falling hot metal or oxide.

Unless unavoidable, gas welding or cutting or arc welding shall not be done above other workers. When unavoidable, an incombustible shield shall be provided between the work and the workers below; or a watchman shall be stationed to give warning at places where workers, in the course of their employment are likely to pass under a gas welding or cutting or an arc welding operation.

Unless unavoidable, gas welding or cutting shall not be carried on in any place where ample ventilation is not provided, or from which quick escape is difficult. When unavoidable, workers engaged in such work in confined spaces shall be allowed frequent access to fresh air and a relief worker shall be stationed close at hand to assist the worker in case of accident and to shut off the gases.

Tanks of fuel gas shall not be moved or allowed to stand for any extended period when not in use unless the caps of such tanks are in place. Suitable cradles shall be used for lifting or lowering oxygen or fuel tanks, to reduce to a minimum the possibility of dropping tanks. Ordinary rope slings shall not be used.

Tanks supplying gases for welding or cutting shall be located at no greater distance from the work than is necessary for safety. Such tanks shall be secured fastened in place and in an upright position. They shall be stored, or set in place for use, so that they are not exposed to the direct rays of the sun or to high temperature.

Before steel beams or other structural shapes or elements of construction are cut by means of a gas flame, they shall be secured by cables or chains to prevent dropping or swinging.

3322 OPEN FIRES

Open fires, for the purpose of disposing of waste materials, the heating of roofing or other materials, or for any other purpose whatsoever, shall not be allowed except with the permission of the Chief of the Fire Department.

In Fire Zones Nos. 1 and 2, only heaters with enclosed flames shall be used for the heating of any roofing or other similar material.

Wherever any enclosed flame heaters or open fires are used, there shall be a workman in constant attendance, whose duty it shall be to have such heater or fire under proper control at all times.

3323 FIRE PROTECTION

Storage of combustible material shall not be permitted under or near welding operations. No part of the building shall be used for the storage of combustible materials until such fireproofing of the part has been installed.

In every building of reinforced concrete construction, forms of combustible materials shall be stripped from the concrete and removed from the building as soon as practicable. No part of the buildings shall be used for the storage of combustible materials until such forms have been removed in that part of the building.

In all buildings in which stand pipes are required, such stand pipes shall be installed as the construction progresses, and installations shall be in such a manner that they are always ready for Fire Department use, to the topmost constructed floor. Such stand pipes shall be provided with a Fire Department connection on the outside of the building at the street level and with one outlet at each floor.

In every building operation wherever a tool house, storeroom or other shanty is placed, or a room or space is used for storage, dressing room or workshop, at least one approved handpump, tank or portable chemical extinguisher shall be provided and maintained in an accessible location.

During building operations, free access from the street to fire hydrants and to outside connections for stand pipes, sprinklers or other fire-extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times.

No material or construction equipment shall be placed within ten feet of such hydrant or connection, nor between it and the central line of the street.

3324 SPECIAL HURRICANE PRECAUTIONS

During such periods of time as are designated by the United States Weather Bureau as being a hurricane warning or alert, all construction materials or equipment shall be secured against displacement by wind forces; provided that where a full complement of personnel is employed or otherwise in attendance, or engaged for such protection purposes, normal construction procedures or uses of materials or equipment may continue allowing such reasonable time as may be necessary to secure such materials or equipment before winds of hurricane force are anticipated. Construction materials and equipment shall be secured by guying and shoring, by tying down loose materials, equipment and construction sheds.

CHAPTER 34
ROOF COVERING AND APPLICATION

3401 ROOF COVERINGS
3402 BUILT-UP AND PREPARED ROOF COVERING APPLICATION
3403 CEMENT AND CLAY TILE
3404 METAL SHINGLES
3405 WOOD SHINGLES AND SHAKES
3406 ROOF INSULATION
3407 ROOFING ACCESSORIES
3408 OTHER ROOF COVERING MATERIALS
3409 ROOF MOUNTED EQUIPMENT
3410 SINGLE PLY SYSTEMS
3411 METAL MEMBRANE ROOFS

3401 ROOF COVERINGS

3401.1 GENERAL:

This chapter sets forth requirements for Roofing Components and Roof System Assemblies and their installations.

(a) Roof coverings for all buildings shall be Fire Retardant, Ordinary, or Prepared, as defined herein.

(b) Prescriptive roof systems may be applied on buildings and structures located outside the coastal construction zone and westward of the coastal construction line on buildings less than forty feet (40') mean roof height as defined in Chapter 4. Such systems shall be installed in accordance with this chapter.

(c) Roof systems other than prescriptive shall be applied in accordance with the documentation submitted for permit in accordance with Table 34-A.

(d) INSPECTION: The Building Official shall be notified by the permit holder as specified in Sec. 305.2(d) for mandatory inspections to be made as follows:

(1) At the time the anchor sheet is being mopped to non-nailable decks.

(2) At the completion of mechanically fastening the anchor sheet to nailable decks and before mopping.

Exception: Reroofing buildings with slopes less than 2/12 shall have a daily in-progress inspection during the installation of the roof system.

(3) A daily in-progress at the time insulation is being mopped or fastened to decks and a base ply or plies is/are being mopped.

(4) During the operation of shingling or tiling.

(5) Upon completion of the roof covering.

(6) RENAILING: Mandatory in-progress inspection for the renailing of roof sheathing shall be required. However, if the Building Department cannot make said inspection a letter submitted by the qualifier, in the form of a notarized affidavit, (see sample form,) shall be submitted to the Building Official, attesting to the fact that the nailing of the sheathing has been brought up to the standards of this Code. See Paragraphs 3401.7(h) and 2909.2(e). For the purpose of validating the qualifier's request for an inspection from a Building Department, a system of inspection request verification may be established by each Building Official listing the time and date of each inspection request, said inspection requests shall be numbered and vocally issued to the caller and shall be indicated on the affidavit.

(aa) This affidavit must be submitted prior to Final Inspection.

(bb) This affidavit is not required if an inspector sees a portion of the renailing, the contractor has complied with the In Progress Inspection".

(cc) The use of existing fasteners of any type or size such as , but not limited to, T-nails, staples, etc., may be used to achieve the spacing as specified. Only additional nails installed must meet the minimum size specified. Sheathing such as, but not limited to, wood based structural use panels, 1 x 8 or 1 x 6, in which the existing fasteners comply with the minimum spacing specified, does not require additional nails installed, as referenced in Sections 3401.7(h) and 2909.2(e).

Renailing Affidavit

Department Having Jurisdiction: _____
(Municipality or Unincorporated Broward County)

Permit Number: _____

Job Address: _____

Legal: _____
Subdivision Lot Block

Name of Company: _____

Company Address: _____
City State Zip

Name of Qualifier (Printed): _____

Certificate of Competency #: _____ State Registration #: _____

I, _____ Do Hereby Affirm:

That I have personally inspected the renailing of roof sheathing for the area covered by the roofing permit referenced above, and further state that the renailing of the sheathing meets the requirements of the Broward County Edition of the South Florida Building Code, Sections 3401.1(d)(6) and 3401.7(h).

3401.1(d)(6) RENAILING: Mandatory in-progress inspection for the renailing of roof sheathing shall be required. However, if the Building Department cannot make said inspection a letter submitted by the qualifier, in the form of a notarized affidavit, (see sample form,) shall be submitted to the Building Official, attesting to the fact that the nailing of the sheathing has been brought up to the standards of this Code. See Paragraphs 3401.7(h) and 2909.2(e). For the purpose of validating the qualifier's request for an inspection from a Building Department, a system of inspection request verification may be established by each Building Official listing the time and date of each inspection request, said inspection requests shall be numbered and vocally issued to the caller and shall be indicated on the affidavit.

3401.7(h) When existing roofs are reroofed to the point that the existing roofing is removed down to the sheathing, the existing roof sheathing shall be renailed with 8d common nails (0.131" diameter by 2-½" long, with a 0.281 diameter full round head). Nail spacing shall be six inches (6") on center at panel edges, six inches (6") on center at intermediate supports, and where applicable, four inches (4") on center over gable ends and subfacia. Existing fasteners may be utilized to achieve such minimum spacing. See Sub-paragraph 3401(d)(6) and Paragraph 2909.2(e) of this Code.

_____
Qualifier/Contractor Signature*

_____ , Having first been duly sworn, does affirm the statement
(Name of Qualifier/Contractor - Printed)

above to be true and correct by his or her own personal knowledge.

Notary: _____ Date: _____

[ ] Personally known to me
[ ] Produced Photo ID _____ Type of ID:
*An Owner/Builder acting as contractor is considered the qualifier for this Code Section.

(e) DRAINAGE: Roof coverings shall not be applied where it is apparent that the provisions of Sub-section 1806.4 of this Code have not been met.

EXCEPTION: See Sub-Section 3401.7(f).

(f) VENTING:

(1) All deck systems shall be capable of venting excess water vapor.

(2) The manufacturers of vapor retarders, poured concrete substrates, metal roofing, etc. shall provide approved instructions on how to prevent such water vapor pressure build-up.

(g) PERMITS AND APPROVALS:

(1) Prior to the use of any roofing product as a roofing system or coating, it shall have been evaluated for compliance with applicable standards by certified laboratory testing procedures as outlined in section 3401.2 herein, or shall be of type specifically described in this chapter and acceptable to the building official, and a permit for the installation shall have been obtained.

(2) Permit applications for the installation of any type of roof covering system shall have two sets of the required documents as noted in Table 34-A, one copy shall be attached to the permit card and the second copy shall be retained as specified in section 305.4.

(3) Permits issued for the installation of any roof covering shall be reviewed and approved by a structural plans examiner prior to issuance.

(4) The Broward County Board of Rules and Appeals will supply each building department with a list of Broward County approved tile manufacturers, composition shingle manufacturers, mortar manufacturers and adhesive manufacturers. Each building department will retain the list for the purpose of issuing permits for prescriptive roof systems.

TABLE 34-A

Documents Required to be Submitted With Permit Application

To Install a Roof According To The Following Method:	Submittals Required
Code Prescriptive Up to 40 Feet Above Grade	A [1,3,5,6]
Tested Assembly Up to 40 Feet Above Grade	B [1,2,5,8]
Tested Assembly Over 40 Feet Above Grade or in Coastal Building Zone	C [4,7]
Designed by Architect or Engineer (Site Specific)	D [4,7]
Product Approval Alternate 1	E
Product Approval Alternate 2 (Site Specific)	F [4] or D [4,7]

Documents Required:

A. None.

B. Manufacturer's printed specifications and installation instructions.

C. Manufacturer's printed specifications and installation instructions reviewed and approved or modified by the Architect or Engineer of Record or Specialty Architect/Engineer for compliance with the required design pressure or other special requirements. Sets must be signed and sealed by the Registered Architect or Professional Engineer who reviewed or modified them.

D. Construction documents prepared by the Architect or Engineer of Record or Specialty Architect/Engineer designed specifically for that roof and containing sufficient detail to allow the Building Inspector to determine compliance with the installation instructions. Sets must be signed and sealed by the Registered Architect or Professional Engineer who prepared them.

E. A complete copy of the Dade County Product Approval.

F. Product approval in accordance with Chapter 204.

Footnotes:

1. Permit application must specify height, slope and area of roof.
2. Permit application must have source of test, designation in a tested system (UL, FM, etc.)
3. Manufacturers specifications still required if so noted in code.
4. Permit application must be accompanied by a Statement of Required Design Pressure signed and sealed by the Architect or Professional Engineer of Record or Specialty Architect/Engineer.
5. Tile applications must include profile and manufacturer. System three (3) must specify adhesive.
6. Prepared Roof Covering applications must specify type and manufacturer.
7. Where applicable, the Architect or Engineer of Record shall review construction submittals as specified in C or D when prepared by a Specialty Architect or Engineer.
8. Manufacturer's printed specifications and installation instructions must indicate through some method, compliance with the design pressure required for the specific site, or footnote four (4) applies.

3401.2 STANDARDS: The following adopted Standards, set forth in Section 402 of this Code, shall supplement the provisions of this Chapter.

(a) Built-up Roof Covering Materials, UL-55A.

(b) Test Methods for Fire Resistance of Roof Covering Materials, UL-790.

(c)UL Roofing Materials and Systems Directory

(d)UL Fire Resistive Directory, Vol. 1 and 1A.

(e) All roof covering products components of any roof covering system shall meet the standards of the corresponding ASTM designation. All such products, coatings and components shall be imprinted with the A.S.T.M. designation to which it complies.

EXCEPTION: Polymer Modified Bitumen

3401.3 DEFINITIONS: For the purpose of this Chapter, certain items are defined as follows:

(a) ANCHOR SHEET: The first sheet applied to a roof deck by nailing, mopping, or other approved attachment, often called a "base sheet."

(b) BASE SHEET: One or more layers of organic, inorganic, or glass-fibered felt over which additional roofing materials are applied, often called an "anchor sheet".

(c) BUILT-UP ROOF COVERING: Three or more layers of roofing material surfaced with gravel or slag aggregate, or a cap sheet of mineral surfaced roofing, or other approved surfacing.

(d) CAP SHEET: Also called cap-surfacing is roofing made of organic or inorganic fiber, including Polymer Modified Bitumen, saturated and coated both sides with a bituminous compound, or modified compound, and surfaced with mineral granules, mica, talc, or other inorganic fiber, or similar materials.

(e) CLASS A ROOF COVERING: Roof coverings which are effective against SEVERE fire exposure such as brick, concrete, slate, tile and built-up or prepared roof covering assemblies listed and identified as "Class A" by an approved testing agency have a re-examination service.

(f) CLASS B ROOF COVERING: Roof coverings which are effective against MEDIUM fire exposure such as corrugated iron sheets, galvanized iron shingles, sheet copper, galvanized iron and built-up or prepared roof covering assemblies listed and identified as "Class B" by an approved testing agency having a re-examination service.

(g) CLASS C ROOF COVERING: Roof coverings which are effective against LIGHT fire exposure shall as asphalt rag-felt smooth surfaced roll roofing laid with two inch (2") or more side laps in single thickness, aluminum .019 inch in thickness and built-up or prepared roof covering assemblies listed and identified as "Class C" by an approved testing agency having a re-examination service.

(h) COMBINATION SHEET: A ply sheet integrally attached to kraft paper.

(i) COMPOSITION ROOFING: Any asphaltic, prepared roofing material.

(j) COPING: The protective cover at the top of a parapet.

(k) FIRE-RETARDANT ROOF COVERING: Any Class A, B, or C roof covering as defined herein.

(l) FLASHING: The system used, such as pieces of metal, rolled roofing or prepared roof covering to seal membrane edges at walls, eaves, vent pipes, tie-ins from one roofing system to another, chimneys, dormers and any other places where the membrane is interrupted or terminated. Base flashing covers the edge of the membrane, cap flashing or counter flashing shields the upper edges of the base flashing.

(m) FLAT PROFILE TILE: Those tile without a designed curved profile.

(n) HIGH PROFILE TILE: High profile shaped tile are defined as those tile having a rise to width ratio greater than 1:5.

(o) LIQUID APPLIED MEMBRANE: Shall include all coatings which are in a liquid or wet state when applied by spray, brush, roller, squeegee or other methods and which when cured or dried, form a mechanically stable coating which is intended to prevent moisture from entering the structure to which it is applied. Liquid applied membrane shall have product approval.

(p) MEDIUM PROFILE TILE: Medium profile tile are defined as those tile having a rise to width equal to or less than 1:5.

(q) MINIMUM ROOF COVERING: A roof covering less than Class C or Ordinary roof coverings, as defined herein.

(r) ORDINARY ROOF COVERING: Any roof covering complying with Sub-section 3401.5 herein.

(s) POLYMER MODIFIED BITUMEN: Used as a roofing system as set forth in 3402.2(h)(4)(aa) and (bb), or as a cap-surfacing as set forth in 3402.2(m)(2).

(t) PREPARED ROOF COVERING: Any manufactured or processed roofing material as distinguished from Built-Up roof coverings.

(u) RE-COVER: The addition of a new roof membrane over an existing roof system.

(v) REROOF: Tearing off and replacing an existing roof system.

(w) ROOF COATING: Any and all paint, paint type, or maintenance type products applied primarily to change the color, reflectively or other cosmetic aspects of the roof covering, but which have little or no measurable bearing on the prevention of water entry into the structure to which it is applied. These products are distinct from roof coverings in that they cannot be used alone, but instead must be applied over or in conjunction with an approved roof covering system.

(x) ROOFING SQUARE: 100 square feet of roofing surface.

(y) SINGLE PLY COVER: Is one (1) or two (2) sheet(s) of a synthetic rubber, plastic or modified bitumen adhered or mechanically fastened to the insulation and/or structural roof deck.

(z) SPOT OR STRIP MOPPING: A discontinuous application of that achieves not less than 50% and not more than 70% attachment.

(aa) UNDERLAYMENT: One or more layers of felt applied as required for a base, over which finish roofing is applied.

(bb) VALLEYS: The internal angle formed by the intersection of two (2) sloping roof planes.

(cc) WEIGHT: The manufacturers' shipping weight in pounds per roofing square.

(dd) WOOD SHAKES: Tapered or non-tapered pieces of red cedar or redwood of random widths ranging from four inches (4") to fourteen inches (14") in width and of the following four types:

(1) Hand-spilt and resawn; tapped and having one sawn and one split face 15, 18 or 24 inches in length.

(2) Taper-split; tapered and having both faces split 24 inches in length.

(3) Straight-split; non-tapered and with both faces split 18 or 24 inches in length.

(4) Taper-sawn; both faces sawn, edges sawn or split with edge variation not exceeding one-half inch (1/2") per side, butt thickness not less than five-eighths inch (5/8"). Tolerance of one-eighth inch (1/8") is permitted in thickness in lengths 24 inches or longer.

(ee) WOOD SHINGLES: Tapered pieces of red cedar or redwood sawn both faces, of random widths ranging from three (3) to 14 inches and in lengths of 16, 18 and 24 inches.

3401.4 FIRE-RETARDANT ROOF COVERINGS: Fire-retardant roof coverings, as defined herein, shall be provided where required by fire rated assemblies.

3401.5 ORDINARY ROOF COVERINGS: Ordinary roof coverings shall be provided where fire-retardant roof coverings are not required or specified, where a minimum roof covering is not permitted and may be any of the following:

(a) Mineral-surfaced roof covering as provided in Sub-paragraph 3402.2(m)(1) herein.

(b) Common cap surfacing as provided in Sub-paragraph 3402.2(m)(2) herein.

(c) Any prepared roof covering, as defined herein, applied in accordance with the manufacturer's approved printed instructions or as provided in Sub-section 3402.3 herein, or

(d) Wood shingles or wood shakes, as defined herein, applied as set forth in Section 3405 herein.

3401.6 SELF SUPPORTING ROOF COVERINGS: Roof intended to be self supporting between structural members shall be designed and constructed as follows:

(a) STEEL: Steel decking and roofing shall comply with Section 3411 and Chapter 28 of this Code.

(b) ALUMINUM: Aluminum roof sheathing shall comply with Chapter 30 of this Code.

(c) PLASTIC: Plastics used for roofing shall comply with Section 3505 of this Code.

3401.7 EXISTING ROOFS:

(a) Not more than 25 percent of the roof system of any existing building or structure shall be replaced in any 12 month period unless the entire roof system is made to conform to the requirements of this Code. In no case shall more than two roof systems be installed on any roof unless structure is capable of supporting additional roofing as certified by a professional engineer.

(b) Roof systems shall not be applied over existing roofs where the roof sheathing will not permit effective fastening or where old roofing is water-soaked or deteriorated so that effective bond for additional plies is not possible.

(c) Additional materials shall not be applied over existing roofs until the following conditions have been met:

(1) Delaminated plies shall be repaired.

(2) Existing gravel shall be completely removed or the existing surface shall be swept clean of all loose gravel. A flood coat of hot asphalt shall cover such cleaned surface, a minimum of one-half inch (1/2") of recovery board shall be fully embedded in such hot asphalt and the new roof covering shall be applied as set forth in Section 3402 herein.

EXCEPTION: Recovery board may be omitted if manufacturer's specifications permit a new roof system to be applied directly onto an existing surface.

(3) Where the existing roofing is over spaced sheathing, the shingles shall be removed and the roof shall be solid sheathed as set forth in Sub-section 2909.2 of this Code and filler strips between such spaced sheathing shall not be permitted.

(4) No roofing felts, roll-slate roofing or wood shingles or shakes or any other existing surface more uneven than solid wood sheathing.

(5) Asphalt shingles may be applied over existing asphalt shingles having not more than one-eighth inch (1/8") difference in level.

(d) Where existing roofing is deemed insufficiently anchored, the entire roof shall be tin-capped according to Table 34-B before additional roof coverings are applied, unless otherwise approved by the Building Official.

(e) Within any area re-roofed, roof mounted equipment shall be made to comply with Section 3409.

(f) The provisions of Sec. 1806.4 as referenced in Sec. 3401.1(e) shall apply to the reroofing of existing structures. **Exception: Sec. 1806.4(d).**

(g) Sprayed Polyurethane Foam (PUF), Elastomeric Coating or any other liquid or foam product applied over Built-Up Roofs (BUR) shall be installed in accordance with the product approval, the manufacturers specifications and the following provision:

(1) Where Elastomeric Coatings of Vinyl-Acrylic or CSPE are used, roofs shall have a minimum pitch of 1 2/12 and must not contain any areas where ponding will occur.

(h) When existing roofs are reroofed to the point that the existing roofing is removed down to the sheathing, the existing roof sheathing shall be renailed with 8d common nails (0.131 diameter by 22" long with a 0.281 diameter full-round head). Nail spacing shall be a maximum six inches (6") on center at panel edges, six inches (6") on center at intermediate supports and where applicable four inches (4") on center over gable ends and sub-facia. Existing fasteners may be utilized to achieve such spacing. See Sub-paragraph 3401.1(d)(6) and Paragraph 2909.2(e) of this Code.

(i) APPEARANCE: Where the architectural appearance is to be preserved from below, roofing nails or other fasteners may not be driven through the sheathing between supports. In such cases, fasteners must be installed per Table 34-B mean roof height 40' perimeter edge.

(j) Only roofing systems specifically designed may be installed over corrugated or standing seam metal.

3402 BUILT-UP AND PREPARED ROOF COVERING APPLICATION

3402.1 GENERAL:

(a) DECK PREPARATION: Before starting the roof covering:

(1) All roof decks shall be broom-cleaned and dry.

(2) Where practicable, eaves; parapet walls; vertical walls; penthouses and similar structures above the roof level shall have been completed.

(3) Cant strips, where provided, shall extend at least three inches (3") up vertical surfaces.

(4) All eaves shall provide firm, nailable backing for the secure attachment of gravel stops and eave and gable drip.

(5) All pre-cast and prestressed concrete roof components shall be provided with insulation, or other leveling fill, where such component edges are more than one-half inch (1/2") from being flush.

(b) ATTACHMENT: All roof coverings shall be attached to the various types of decks by mopped-on adhesives or by mechanical fastening as set forth herein, or by other approved materials or methods.

(c) ADHESIVES:

(1) Bituminous compounds shall be asphalt (ASTM D-312), coal tar pitch (ASTM D-450, modified bitumen, or cold-applied roofing cement (ASTM D-4586).

(2) Hot asphalt shall be applied in a quantity not less than 25 pounds plus or minus 15% per roofing square per ply and 60 pounds plus or minus 20% per square for flood coats and at a temperature recommended by the manufacturer for the system being installed. However, kettle or tanker temperatures should not exceed the following:

Type I Asphalt: ..... 475 degrees Fahrenheit

Type III & IV Asphalt: ..... 525 degrees Fahrenheit

NOTE: Asphalt can be heated to within 25 degrees F. below the actual flash point, but this temperature limitation should never be exceeded.

(3) Coal tar pitch shall be applied in a quantity not less than 25 pounds plus or minus 15% per roofing square per ply and 70 pounds plus or minus 20% per square for flood coats and at a temperature of not less than 275 nor more than 350 degrees Fahrenheit (350 to 400 degrees in the kettle).

(4) Where roof incline exceeds two inches (2") per foot, bituminous compounds shall be steep asphalt Type III or Type IV.

NOTE: Coal tar pitch not to exceed a slope of one half inch (1/2") per foot with organic felts, if using glass felts or tar coated felts, slope not to exceed one quarter inch (1/4") per foot.

(5) Adhesive compounds other than bitumen may be applied subject to manufacturer's specifications.

3402.2 BUILT-UP ROOF COVERING:

(a) MATERIALS: All materials used in the assembly of fire-retardant and ordinary built-up roof coverings shall bear the label of the Underwriter's Laboratories, Inc. for Class A, Class B, or Class C roofing and shall be delivered in original packaging bearing the manufacturer's labels.

(b) ANCHOR SHEET: The anchor sheet, as defined herein, shall be a minimum one #30 felt lapped two inches (2") and turned up vertical surfaces a minimum of four inches (4") and secured as set forth herein.

(c) WOOD DECKS:

(1) Fasteners securing the anchor sheet to nominal one inch (1") lumber or to wood based structural-use panels three-quarters inch (3/4") or more in thickness shall be non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gauge, heads not less than three-eighths inches (3/8") (0.375) diameter and not less than one inch (1") in length; or non-corrosive 12 gage wire ring-shanked nails having not less than 20 rings per inch, not less than one inch (1") in length with heads not less than three-eighths inch (3/8") in diameter.

(2) Fasteners securing the anchor sheet to wood based structural-use panels less than three-quarters inch (3/4") in thickness shall be non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or eleven (11) gauge, heads not less than three-eighths inch (3/8") (0.375") diameter and not less in length than will penetrate such wood based structural-use panels plus three-sixteenths inch (3/16"); or non-corrosive 12 gage wire ring-shanked nails having not less than 20 rings per inch, heads not less than three-eighths inch (3/8") diameter and not less in length than will penetrate such wood based structural-use panels plus three-sixteenths inch (3/16").

(3) Such fasteners shall be applied through tin-caps not less than one and five-eighths inches (1-5/8") nor more than two inches (2") in diameter and of not less than 32 gage sheet metal.

(4) Spacing of such fasteners along the laps of sheets and both ways in the field between laps shall comply with Table 34-B, based upon height above grade.

TABLE 34-B [3]

FOR MINIMUM BASE SHEET [5]
1 LAYER, TYPE #30, ASTM D-226 - TYPE II

Mean Roof Height (Ft.)	Fastening Pattern [1]	
	Perimeter Edge [2]	Field [4]
0 - 30	6" @ laps, 2 rows @ 6" midsheet	6" @ laps, 2 rows @ 12" midsheet
40	6" @ laps, 2 rows @ 6" midsheet	6" @ laps, 2 rows @ 9" midsheet

FOR MINIMUM BASE SHEET [6]
1 LAYER, TYPE #43, ASTM D-2626 - TYPE I

Mean Roof Height (Ft.)	Fastening Pattern [1]	
	Perimeter Edge [2]	Field [4]
0 - 30	12" @ laps, 2 rows @ 15" midsheet	12" @ laps, 2 rows @ 18" midsheet
40	12" @ laps, 2 rows @ 12" midsheet	12" @ laps, 2 rows @ 18" midsheet

FOOTNOTES:

[1] See Section 3402.2 for fasteners

[2] Perimeter edge is measured from all roof edges and each side of ridge as follows:
The smaller of 0.10 x minimum building width or
0.40 x mean roof height, but not less than
0.04 x minimum building width or three (3) feet.

[3] Above table applies to roof slopes up to three inches (3") per twelve inches (12") (Maximum)

[4] Rows of fasteners, midsheet, shall be evenly spaced across width of sheet and staggered along length of sheet.

[5] Patterns shown require a minimum withdrawal capacity of 34 lb. per fastener (unfactored.)

[6] Patterns shown require a minimum withdrawal capacity of 67 lb. per fastener (unfactored.)

(5) Where the architectural appearance is to be preserved from below, anchor sheet shall be secured in accordance with 3401.7(i)

Other sub-deck systems may use the spacing shown in Table 34-B provided each fastener has the required withdrawal load in the particular substrate for which the fastener is designed.

(7) Sheathing paper shall be applied on such decks where anchor sheets are pitch-tarred felts only and shall not be required under asphalt felts.

(d) OTHER NAILABLE DECKS: Poured gypsum, precast gypsum planks, poured Vermiculite and Perlite (light-weight, insulating concrete), as well as foamed cellular concrete and structural wood-fiber used as roof decking are considered nailable and anchor sheets shall be attached as follows:

(1) Poured gypsum and pre-cast gypsum planks: Use mechanical fasteners providing equal withdrawal resistance when spaced as set forth in Table 34-B of this Code.

(2) Poured Vermiculite, Perlite, foamed cellular concrete, and other light-weight, insulating concrete: Use only mechanical fasteners providing resistance to uplift not less than those shown in Table 34-B.

(3) Structural wood fiber units: Use mechanical fasteners specified by the deck manufacturer, or after all joints have been stripped with six inch (6") wide felt applied with approved cold adhesive, the anchor sheet may be solid mopped to such decks.

(e) NON-NAILABLE DECKS: Poured concrete and precast deck units are considered non-nailable and anchor sheets shall be fastened as follows:

(1) Such decks shall be primed with asphalt primer applied at the rate of one and one third (1-1/3) gallons per roofing square, solidly on poured decks but held back four inches (4") from precast unit joints.

(2) Strip or solid mop, holding back four inches (4") from precast unit joints, using dead level asphalt or coal tar pitch as the adhesive unless otherwise specified on the plans and permit and embed anchor sheet firmly in the hot bitumen lapping each sheet four inches (4").

(3) Where the incline of such decks exceeds three inches (3") per foot, anchor sheets shall, in addition to mopping, be mechanically fastened to wood strips spaced not more than 24 inches apart, cast into such decks.

(4) Such wood strips shall be not less than a nominal one by two inches (1" x 2"), pressure treated with approved preservative, chamfered or otherwise secured flush with the deck surface.

(5) Anchor sheets shall be attached to such wood strips with three-quarter inch (3/4") long fasteners applied through tin caps and spaced as set forth herein.

(6) Anchor sheet attachment shall satisfy the resistance to uplift requirements of Sub-paragraph 3402.2(c)(6) herein.

(f) METAL DECKS: Metal decks shall be covered with mechanically fastened roof insulation.

(g) OTHER DECKS: Attachment of the anchor sheet to decks other than those specifically provided for herein shall be as approved by the Building Official.

(h) ADDITIONAL SHEETS:

(1) Each additional sheet above the anchor sheet shall be lapped a minimum of two inches (2") over the preceding sheet and shall be thoroughly mopped between sheets with a bituminous compound, or other approved adhesive providing equivalent bond, so that in no place felt touches felt.

(2) Sheets shall be embedded without wrinkles or buckles.

(3) Each sheet, like the anchor sheet, shall be turned up vertical surfaces a minimum of four inches (4") .

(4) (aa) Polymer modified bitumen membranes may be applied as a single ply over a mechanically fastened anchor sheet without additional plies where slopes exceed one eighth inch (1/8") per foot. An additional ply is required for slopes less than 1/8" per foot. Slope requirement applies to new roofs, re-cover roofs and reroofs.

(bb) Polymer modified bitumen membranes shall not be applied to slopes exceeding three inches (3") per foot. At slopes exceeding one inch (1") per foot, they shall be backnailed four inches (4") from the upper edge at maximum twenty four inches (24") on center.

(i) FELT FLASHINGS:

(1) Flashing used in the construction of built-up roof coverings shall be carried over cant strips, where provided, and turned up all walls and other vertical surfaces a minimum of eight inches (8") and maximum of twenty four inches (24").

(2) Each layer of flashing shall be uniformly mopped with hot asphalt applied in a quantity not less than 25 pounds plus or minus 15% per roofing square for each mopping, or attached with approved cold adhesive providing equivalent bond.

(3) Flashing turned up vertical surfaces shall be not less than one #30 felt starting four inches (4") out from the cant strip and carried up such vertical surfaces not less than six inches (6"), and one mineral surfaced felt starting six inches (6") out from the cant strip and carried up a minimum of ~~four~~ eight inches (8") above the top of the cant.

(4) Such flashing shall be fastened to the wall one and one-half inches (1-1/2") down from the upper edge every six inches (6") after which the top edge shall be finished with a three inch (3") strip of membrane set in roofing cement (ASTM D-4586).

(j) VALLEYS:

(1) Valleys shall be metal, as set forth in Sub-section 3407.4 herein.

(k) PARAPET WALLS: Built-up roof covering felts shall not wrap over walls more than 24" in height above the deck and, where wrapped, shall be applied as follows:

(1) Flashing turned up vertical surfaces shall be not less than one #30 felt starting four inches (4") out from the cant strip and carried up the face over the top of the parapet, and one mineral surfaced rolled roofing (ASTM D-249) starting six inches (6") out from the cant strip and carried up and over the parapet to within three inches (3") of the outside edge and fastened six inches (6") on center.

(2) The resulting edge shall then be finished with either a three inch (3") strip of membrane set in roofing cement (ASTM D-4586) and painted with aluminum paint or coping installed in accordance with Sec. 3407.12

(l) INSULATION: Roof insulation may be applied under or over an anchor sheet and, where provided shall be attached as set forth in Section 3406 herein.

(m) SURFACING:

(1) Mineral surfaced roofing shall not be applied on inclines one-half inch (1/2") or less per foot and, where used, shall be applied only over anchor sheets and mopped in as provided in Paragraph 3402.2(h) herein, and on inclines five inches (5") or more per foot, such caps shall be backnailed 18 inches on centers.

(2) Cap-surfacing with smooth or mineral surfaced felts of glass, or modified bitumen of SBS shall not be limited to slope requirements and may be:

(aa) One layer of mineral surfaced fiberglass felt.

(3) COATINGS:

(aa) Coatings shall be applied no later than 60 days after installation of membrane. Surface shall be clean and dry when coating is applied. Roof to be coated shall not be glaze coated. Coatings shall be applied in a uniform coverage with no asphalt showing through.

(bb) Aluminum pigmented coatings conforming to ASTM D-2824 Type I or III shall be applied at a minimum rate of 1.5 gallons per 100 square feet.

(cc) Emulsion coatings conforming to ASTM D-1227 Type III or IV shall be applied at the minimum rate of 3 gallons per 100 square feet.

(dd) Acrylic coatings shall not be applied on slopes less than 1/4" per foot, and when used, shall be applied at the rate recommended by the coating manufacturer.

3402.3 PREPARED ROOF COVERINGS:

(a) MATERIALS:

(1) Prepared roof covering materials shall be as set forth in Paragraph 3402.2(a) and are, in general, limited to roof decks capable of receiving and retaining mechanical fasteners.

(2) This Sub-section is limited to shingles of Slate and Composition. Slate shingles shall be applied in accordance with manufacturer's instructions and supplemented by this chapter.

(3) Other prepared roofing materials such as Concrete Tile, Clay Tile, Metal Shingles; and Wood Shingles require more detailed application control, as set forth in subsequent Sections of this Chapter.

(b) APPLICATION: Unless otherwise specified herein, such prepared roof covering materials shall be applied only to inclines specified by the manufacturers.

(c) SLATE SHINGLES:

(1) Slate shingles shall not be applied on roofs having an incline of less than three and one-half inches (3-1/2") per foot.

(2) Slate shingles shall be applied only to solid-sheathed wood, or other nailable decks, with underlayment of one #30 ASTM 226 Type II felt anchor sheet secured as set forth in Paragraph 3402.2(c) herein, and one #30 ASTM 226 Type II felt base sheet mopped in with hot, steep asphalt except for inclines five inches (5") or more per foot such mopping may be omitted.

(3) Slate shingles shall be fastened with not less than two (2) noncorrosive nails penetrating the deck not less than three-quarters inch (3/4").

(4) The edges of sheathing at eaves and gable ends shall be covered and protected from water infiltration and all intersections shall be flashed with metal as provided in Section 3407 herein.

(d) COMPOSITION SHINGLES:

(1) Composition shingles, as defined herein, shall not be applied to roofs having an incline of less than two (2) inches per foot and shall be applied only to solid sheathed wood.

(2) (aa) Composition shingles shall meet UL Modified 3161 in accordance with ASCE 7 as defined in Chapter 23 of this Code and ASTM D-3462 and ASTM D-3018.

(bb) Prior to the use of a product within the scope of the prescriptive composition shingle installation section of this chapter, the composition shingle manufacturer shall delegate to an approved independent testing lab, the inspection and independent testing of the physical properties and wind load capability of their composition shingle to verify minimum requirements of this chapter. The manufacturer shall submit testing lab reports, manufacturer's documentation and a summary report prepared by an independent Florida Registered Engineer (signed and sealed) to the Board of Rules and Appeals Roofing Committee for review and recommendation to the Board of Rules and Appeals for approval. Such approval may be valid for three years from date of acceptance.

(3) UNDERLAYMENT:

(aa) A base sheet #30 ASTM 226 Type II shall be installed starting at the eave edge, applied horizontally along the roof line, lapping the end joints a minimum of six inches (6"). Secure with tin caps and nails (Nails shall be non-corrosive ring-shank with not less than 12 gage and not less

than one inch (1") in length with heads not less than three-eighths inch (3/8") in diameter; or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than three eighths inch (3/8") [0.375] diameter and less than one inch (1") in length. Except as provided in 3401.7(i)) a maximum of twelve inches (12") O.C. in field and six inches (6") O.C. on all headlaps with a weave pattern at all valleys. Each succeeding course shall be applied in the same manner, allowing a minimum two inch (2") head lap. All hips and ridges shall be overlapped a minimum of six inches (6").

(4) METAL ACCESSORIES

(aa) Accessories shall be not less than 26 gage steel galvanized a minimum of 0.9 ounce per square foot, sixteen (16) ounce copper, 0.025 inches thick aluminum, 0.012 inches thick soft flashing stainless steel, or approved equivalent non-corrosive materials.

(bb)(1) Eave and gable drip metal shall have a roof flange not less than one and one-half inch (1-1/2") wide, one and one-half inch (1-1/2") in depth but no less than one-half inch (1/2") below the sheathing and shall be designed so that the bottom of the drip edge shall have a minimum of one-half inch (1/2") clearance from the structure. Metal shall be nailed (Nails shall be non-corrosive ring-shank with not less than 12 gage and not less than one inch (1") in length with heads not less than three-eighths inch (3/8") in diameter; or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or eleven (11) gage, heads not less than three eighths inch (3/8") (0.375) diameter and less than one (1") in length. Except as provided in 3401.7(i) directly on top of the base sheet, fastened four inches (4") O.C. near edge of metal, and at no point shall nail head extend beyond edge. All joints shall be lapped a minimum of three inches (3"). Metal shall continue from eave up rake/gable in same manner.

(2) All eave and gable drip edge having an overall height of the face dimension exceeding three inches (3") when fabricated from 26 gage, and four inches (4") when fabricated from 24 gage, shall require the installation of a continuous cleat fastened at 12 inches on center or clips at 12 inches on center. The continuous cleat or clips shall be fabricated from material one gage greater than that of the drip edge.

(cc) Valley metal shall be sixteen inches (16") in width and shall be nailed a maximum of six inches (6") O.C. (Nails shall be non-corrosive ring-shank with not less than 12 gage and not less than one inch (1") in length with heads not less than 3/8" in diameter; or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than 3/8 inches (0.375) diameter and less than one inch (1") in length). Except as provided in 3401.7(i) near the edge, and at no point shall nail head extend beyond edge). Joints shall be lapped a minimum of six inches (6"); roofing cement (ASTM D-4586) shall be applied between the laps. The entire edge of the metal flange shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane.

(dd) Flashing and counter flashing at wall abutments: "L" metal flashing minimum of four inches (4") by five inches (5") shall be installed flush to base of wall over the underlayment, nailed near edge of metal, and at no point shall nail head extend beyond edge. The horizontal flange shall be nailed a maximum six inches (6") O.C. Joints shall be lapped a minimum four inches (4") and roofing cement (ASTM D-4586) applied between laps. Flashing shall start at the lower portion and work up the roof to insure water shedding capabilities of all metal laps. The entire edge of the metal flange shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane. If counter flashing is installed, the top flange of base flashing shall be lapped a minimum of three inches (3"). Metal shall be nailed near edge of metal and at no point shall nail head extend beyond edge, a maximum of six inches (6") O.C. or set into reglets and thoroughly caulked. Joints

shall be lapped a minimum of three inches (3") with roofing cement (ASTM D-4586) applied between laps. All head/apron flashing shall be installed on top of the underlayment, conforming to the pitch of the roof and extending a minimum of four inches (4") onto the deck. Metal edge shall be sealed with roofing cement (ASTM D-4586) and membrane.

(ee) Pipes, turbines, vents, etc.: Plastic roofing cement shall be applied around the base of protrusion and on the bottom side of the metal flange, sealing the unit base to the underlayment. All sides of the base flashing shall be nailed near edge of metal, and at no point shall nail head extend beyond edge. Base shall be flush to the deck. The edge of the metal flanges shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane.

(5) INSTALLATION: At all eaves, rakes, valleys, and gable ends the shingles and starter strips shall be set in an eight inch (8") wide strip of ASTM D 4586 flashing cement.

(aa) STARTER STRIPS:

(1) Self-sealing shingles: Remove the tab portion of each shingle and position the remaining strip with the factory-applied adhesive face up along the eaves. Trim material from the end of the first shingle in the starter strip to ensure that the cutouts of the first course of the shingles are not placed over the starter strip joints. Nail starter strips parallel to the eaves. Position nails to insure they will not be exposed under the cutouts in the first row of shingles.

(2)Shingles without a self-sealing strip: The tabs shall be removed and ASTM D 4586 flashing cement shall be applied in spots approximately the size of a quarter at the corner of each tab of the first course. Starter shingles shall be nailed along a line not greater than four inches (4") above the eave line nailing not greater than six inches (6") O.C. Trim at least three inches (3") from the end of the first shingle to ensure that the cutouts of the first course of shingles are not placed over the starter strip joints.

(3) Roll roofing starter strips: Nail along a line not greater than four inches (4") above the eave line nailing not greater than twelve inches (12") O.C. ASTM D 4586 flashing cement shall be applied as noted above for non-sealing shingle starter. If more than one piece of roll roofing must be used, the end joint shall be butted. Joints shall be staggered with succeeding shingle joints.

(bb) SHINGLES:

(1) Be sure the first course is laid straight, checking it regularly during application against a horizontal chalk line. A few vertical chalk lines aligned with the end of shingles in the first course will ensure proper alignment of course. A shingle hatchet is an acceptable alternative to the use of succeeding chalk lines. The first course starts with a full shingle, while succeeding courses start with six inches (6") removed relative to the preceding course, (Laminated shingles may be staggered with a combination of four (4), five (5), six (6), or seven (7) inches removed relative to the preceding course) rake and valley courses shall be terminated with shingle not less than twelve inches (12") wide. To obtain the correct exposure align butts with the top of the cutouts in the course below. Use six (6) nails (Nails shall be non-corrosive ring-shank with not less than 12 gage and not less than 1-1/4" in length with heads not less than 3/8" in diameter; or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than 3/8 inches [0.375] diameter and less than 1-1/4" in length). Except as provided in 3401.7(i)) per shingle. Place the nails approximately one inch (1") on either side of the cutouts and approximately one inch (1") from each side of the shingle, nail above the cutouts and below the factory applied adhesive. Do not nail into or above factory applied adhesives. (Laminated shingles shall have six (6) nails evenly spaced across the shingle approximately 3/16 of an inch above the cutouts with the two end nails approximately one inch (1") from each side.) Ensure no cutouts or end joints are less than two inches (2") from a nail in the underlaying course. Start nailing from the end nearest the shingle just laid and

proceed across. Align the shingles properly to avoid exposing the nail heads in the course below. Nails shall penetrate through the sheathing or wood plank a minimum of 3/16 of an inch (Except as provided in 3401.7(i)) or penetrate a one inch (1") or greater thickness of lumber a minimum of one inch (1"). Drive the nails straight and do not break the shingle surface with the nail head.

(cc) VALLEYS:

(1) Open Valley: Snap two (2) chalk lines, one on each side of the valley centerline over the full length of the valley flashing. Locate the upper ends of the chalk lines six inches (6") apart at the ridge (i.e., three inches (3") to either side of the valley centerline). The lower ends should diverge from each other 1/8 inch per foot. Thus, for an eight (8) foot-long valley, the chalk lines should be seven inches (7") apart at the eaves, etc. As shingles are applied toward the valley, trim the last shingle in each course to fit on the chalk line. Never use a shingle trimmed to less than 12 inches in length to finish a course running into a valley. If necessary, trim a tab off the adjacent shingle in the course to allow a longer portion to be used. Clip an one inch (1") from the upper corner of the shingle on a 45 degree angle to direct water into the valley and prevent it from penetrating between the courses. Finally, to form a tight seal, cement the shingle to the valley lining with a three inch (3") width of asphalt plastic roof cement conforming to ASTM D 4586, Type II. There should be no exposed nails along the valley flashing.

(2) Closed Cut Valley: With valley flashing already in place, apply the first course of shingles along the eaves of one of the intersecting roof planes and across the valley. For proper flow of water over the trimmed shingle, always start applying the shingles on the roof plane that has the lower slope or lesser height. Extend the end shingle at least twelve inches (12") onto the adjoining roof. Do not make a joint in the valley. If a shingle falls short, add in a one (1) or two(2) tab section so that the joint occurs outside the line of the valley. Apply succeeding courses in the same manner, extending them across the valley and onto the adjoining roof. Press the shingle tightly into the valley. Use normal shingle fastening methods except that no nails should be within six inches (6") of the valley centerline and two (2) nails should be placed at the end of each shingle crossing the valley. Snap a chalk line two inches (2") from the centerline of the valley on the under-shingled side. Then apply shingles on the under-shingled side. Trim the shingles as they are being installed to the chalk lines to ensure a neat installation. Trim one inch (1") on a 45-degree angle from the upper corner of each shingle upon installation. This will direct water into the valley. Finally, embed each end shingle in a three inch (3") wide strip of ASTM D 4586 Type II plastic roof cement.

(3)Woven Valley: The valley flashing should already be in place as described earlier. Shingles on the intersecting roof surfaces may be applied toward the valley from both roof areas simultaneously or each roof area may be worked separately up to a point about three feet (3') from the center of the valley and the gap closed later. Regardless of which procedure is followed, apply the first course along the eaves of one roof area up to and over the valley with the last shingle extending at least 12 inches onto the intersecting roof. Then apply the first course of the intersecting roof along the eaves and extend it across the valley over the top of the shingle already crossing the valley and at least 12 inches onto the other surface. Apply successive courses alternately from the adjoining areas, weaving the valley shingle over each other. Press each shingle tightly into the valley and follow the same nailing procedures as the closed cut valley.

(dd) Flashing: Shingles that butt against wall flashing shall be step bulled in using ASTM 4586 flashing cement, a minimum of eight inches (8") wide.

(ee) Stacks and Pipes: Apply shingles up to the vent pipe flashing. Cut a hole in the shingle to go over the pipe and set the shingle in ASTM 4586 flashing cement.

(ff) Install ridge vents before installing the hip and ridge shingles. (If required by this Code).

(gg) Hips and Ridges: Hip and ridge should be self-sealing, if they are not self-sealing then two (2) spots about the size of a quarter of ASTM 4586 flashing cement shall be applied so as the succeeding hip and ridge will seal to it. Apply premanufactured hip and ridge shingle components or cut hip and ridge shingles from manufacturer's shingles. Hip and ridge shall have two (2) nails (Nails shall be non-corrosive ring-shank with not less than 12 gage and not less than 1-1/4" in length with heads not less than 3/8" in diameter; or non-corrosive smooth shank nails with a shank diameter of a minimum of 1.118 inches or 11 gage, heads not less than 3/8 inches (0.375) diameter and less than 1-1/4" in length, except as provided in 3401.7(i)) in each hip and ridge. Exposure should not exceed five inches (5") unless the premanufactured hip and ridge specifically allows for greater exposure. Taper the lap portion of each hip and ridge shingle slightly so that it is narrower than the exposed portion.

EXCEPTION: Nails securing composition shingles applied per Sub-paragraph 3401.7(c)(5) of this Code shall have a shank of not less than 1-1/2 inch in length.

(6) NON SELF-SEALING SHINGLES:

(aa) The tabs of each strip of such composition shingles, unless provided with self-sealing adhesive applied at the factory, shall be further secured under the center of each tab with not less than a two by four inch (2"x 4") spot of ASTM 4586 flashing cement and the tab shall be pressed firmly into such cement.

(bb) Mansard or steep slopes exceeding 60 degrees or 21 inches per foot, shall have 3 spots of ASTM 4586 flashing cement approximately the size of a quarter placed under each shingle tab immediately upon installation.

3403 CONCRETE AND CLAY ROOF TILE SYSTEMS

CONTENTS

3403.1 General
3403.2 Test Requirements for Tile
3403.3 Materials
3403.4 Underlayment and Flashing Application
(a) System 1: Mechanically fastened top ply non-sealed system for mechanically fastened tile 4:12 and greater.
(b) System 2: Mechanically fastened top ply system, minimum 4:12 pitch for mechanically fastened tile.
(c) System 3: Called 30-90 fully adhered system; pitches 2:12 and greater for mortar and adhesive set tile, pitches 3:12 and greater for mechanically fastened tile.
3403.5 Mortar and Adhesive Set Tile Installation for Flat, Medium and High Profile Tile (for pitches 2:12 and greater).
3403.6 Mechanically Fastened Tile Installation for Flat, Medium and High Profile Tile (for pitches 2:12 and greater)

3403.1 GENERAL

(a) Each roof tile shall have a permanent manufacturer's identification mark and meet the following testing and installation specifications:

(1) Physical test requirements as per 3403.2.

(2) Tested attachment values for tile installed over a solid deck to meet the design wind loads calculated using ASCE-7-93 and modified as specified in the South Florida Building Code, Broward County Edition, Section 2309, To reflect the air permeable nature of tile.

(3) Installation as per Chapter 34 of this Code.

(b) Prior to the use of a product within the scope of the prescriptive tile installation section of this chapter, the tile manufacturer, mortar manufacturer or adhesive manufacturer for adhesive set tile shall delegate to an approved independent testing lab, the inspection and independent testing of the physical properties and wind load capability of their tile, mortar or adhesive to verify minimum requirements of this chapter. The manufacturer shall submit testing lab reports, manufacturer's documentation and a summary report prepared by an independent Florida Registered Engineer (signed and sealed) to the Board of Rules and Appeals Roofing Committee for review and recommendation to the Board of Rules and Appeals for approval. Such approval may be valid for three (3) years from date of acceptance.

3403.2 TEST REQUIREMENTS FOR TILE

(a) Concrete and clay roof tile shall be of Portland cement concrete or of clay of various sizes and shapes categorized generally as flat, medium or high profile.

(b) Clay roof tile shall be in compliance with ASTM Standard C 1167.

(c) Roof tile shall comply with the physical test requirements as follows:

(1) Framework break strength as described in ASTM C 1167 Section 5.3.

(2) The breaking loads shall be not less than:

	Individual Tile	Average of Five Tiles
High Profile	350 pounds	400 pounds
Medium Profile	260 pounds	300 pounds
Flat Profile	215 pounds	250 pounds

(3) Roof tiles shall absorb not more than 12 percent of the dry weight of the tile during a 24 hour immersion test.

3403.3 MATERIALS

(a) Underlayment material used shall be in accordance with the following minimum standards:

(1) Base sheet shall be:

(aa) #30 ASTM 226 Type II minimum

(2) Top ply shall be:

(aa) Organic Type I (#43 base sheet ASTM D 2626).

(bb) Mineral surface roll roofing ASTM D 249.

(cc) Modified bitumen, minimum 40 mil.

(b) Membrane materials shall comply with the following minimum standards:

(1) Organic conforming to ASTM D 173, asphalt impregnated membrane, a minimum of four inches (4") wide.

(2) Inorganic conforming to ASTM D 1668, asphalt impregnated fiberglass membrane, a minimum of four inches (4") wide.

(c) Fasteners and clips shall be in accordance with the following minimums:

(1) Roofing nails/screws - corrosion resistant meeting ASTM A 641 Class I of sufficient length to properly penetrate the deck a minimum 3/4 inch.

Tile nails are 10d located in holes at the head of tiles and shall meet one of the following.

(aa) Ring Shank Nails: Three inches (3") long, 0.28 inch diameter full round head, 0.121 ring shank diameter.

(bb) Smooth Shank Nails: Three inches (3") long, 0.28 inch diameter full round head, 0.131 smooth shank diameter.

(cc) Screw Shank Nails: Three inches (3") long, 0.28 inch diameter full round head, 0.128 screw shank diameter.

(3) Tile screws: Screws shall be #8 x 2-1/2" long, coarse thread wood screws installed 1-1/2" from the head of the tile. Screw dimensions shall be 0.335" head diameter, 0.131" shank diameter, and 0.175" screw thread diameter.

(4) Tile clips: When using clips, attachment of the tiles is accomplished by a combination of nails and clips. Tiles are nailed to the sheathing or battens with one (1) or two (2) 10d galvanized nails (conforming to the requirements above). Additionally, each tile is secured with a clip which is secured to sheathing or batten, as appropriate, with one (1) nail per clip. Clips shall be designated as rigid clip (directly anchored to the roof deck or batten). Clips shall be corrosion resistant, 0.060" thick by 0.5" wide with a single nail per clip. The following clip/nail combinations are permitted:

(aa) Aluminum alloy clip with 1.25 inch galvanized roofing nail (0.128 inch shank diameter) or one inch (1") aluminum alloy nail (minimum 0.118 inch shank diameter.

(bb) Galvanized steel storm clip integral batten nail.

(cc) Stainless steel clip with 1.25 inch galvanized roofing nail or stainless steel roofing nail (0.128 inch shank).

(dd) Brass deck clip with copper nail.

(ee) Galvanized steel deck clip with 1.25 inch galvanized roofing nail (0.128" shank diameter).

(5) One inch (1") round cap nails

(6) Tin caps shall be not less than 1-5/8 inch nor more than two inches (2") in diameter and a minimum 32 gauge sheet metal.

(d) Accessories shall be not less than 26 gage steel galvanized a minimum of 0.9 ounce per square foot, 16 ounce copper, 0.025 inches thick aluminum, 0.012 inches thick soft flashing stainless steel, or approved equivalent non-corrosive materials. Lead shall be minimum 2.5 pounds per square foot for soil stacks. Use Lead Association recommendation for lead counter flashing requirements.

(e) Asphaltic adhesive shall be in accordance with the following:

(1) Asphalt plastic roof cement shall conform to ASTM D 4586 Type II non-asbestos: Non-running, heavy body material composed of asphalt and other mineral ingredients.

(2) Cold process liquid roof coating shall conform to ASTM D 3019 Type II.

(3) Hot, steep asphalt shall conform to ASTM D 312.

(f) Structural bonding adhesive shall conform to ASTM C 557 or ASTM 3498.

(g) Mortar shall be a tested and approved bagged premixed unit consisting of ASTM C-91 type "M" masonry cement, or equivalent, in combination with ASTM C-332 lightweight aggregate or ASTM C-144 sand.

(h) Adhesive:

(1) For use with adhesive set tile systems shall be in compliance with 3403.1 (B).

(2) Polyurethane adhesive shall be tested in accordance with ASTM D 1622, ASTM D 1621, ASTM D 1623, ASTM D 2127, ASTM E 96, ASTM D 2126, and ASTM D 2856.

(i) Eave closure shall be one of the following:

(1) Prefabricated EPDM synthetic rubber conforming to ASTM C 1056.

(2) Prefabricated minimum 26 gauge corrosion resistant metal eave closure conforming to ASTM A 525 and A 90 or equal.

(3) Mortar for mineral surface roll roofing.

(4) Prefabricated clay or concrete closures.

(j) Valleys shall be one of the following:

(1) Standard valley metal 16 inches in width.

(2) Pre-formed closed valley metal a minimum 16 inches in width with a minimum 2-1/2 inch high center diverter and with or without a minimum one inch (1") metal edge returns.

(3) Pre-formed open valley metal a minimum 16 inches in width with a minimum one inch (1") high twin center diverter and with or without a minimum one inch (1") metal edge returns.

(k) Lumber shall be in accordance with the following:

(1) Battens shall be pressure treated and conform to minimum Wood Preservative Institute LP-2. When horizontal battens are used alone they shall be nominal one inch (1") by two inch (2") minimum. When horizontal battens are used with vertical or counter battens not less than one inch

(1") by four inch (4"), they shall be one inch (1") by four inch (4") or two inch (2") by two inch (2").

(2) Nailer boards and curbs shall be pressure treated wood.

3403.4 UNDERLAYMENT AND FLASHING APPLICATION

(a) Roof tile shall be applied to deck as described in Section 3403.5 and 3403.6. The substrate to which the underlayment is to be installed shall be uniform, smooth, clean and dry. Neither underlayment nor tile shall be installed on wet surfaces.

(b) A base sheet shall be installed on all tile systems.(see 3403.3 (A)(1)(a).

(c) Base sheet (see 3403.3 (A)(1)(a). shall be installed starting at the eave edge, applied horizontally along the roof line, lapping the end joints a minimum of six inches (6"). Secure with tin caps and nails a maximum of 12 inches O.C. in field and six inches (6") O.C. on all headlaps with a weave pattern at all valleys. Each succeeding course shall be applied in the same manner, allowing a minimum two inch (2") head lap. All hips and ridges shall be overlapped a minimum of six inches (6"). On unsealed systems extend base sheet up the wall a minimum of four inches (4"). Underlayment shall be fastened a minimum of 12 inches O.C. at eaves.

(d) Top ply underlayments shall be applied in accordance with the following minimum standards:

(1) System 1: Mechanically fastened top ply non-sealed system for mechanically fastened tile 4:12 pitch and greater. (see 3403.6 for tile installation). This method utilizes pre-formed metal flashing with metal edge returns. Minimum three inch (3") tile head lap (unless restricted by manufacturer's product design). For batten system, a minimum #43 base sheet must be used. Direct deck system, a minimum mineral surfaced roll roofing (ASTM D 249) must be used.

(aa)(1) Eave drip metal shall be nailed directly on top of the base sheet fastened four inches (4") O.C. near edge of metal, and at no point shall nail head extend beyond edge. All joints shall be lapped a minimum of three inches (3").

(2) The drip or face flange shall be a minimum of one and one-half inches (1-1/2") in depth but not less than one-half inch (1/2") below the sheathing and shall be nailed thereto with non-corrosive three-quarter inch (3/4") long 12 gage ring-shanked nails, or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than three-eights inch (0.375) and not less than three-quarter inch (3/4") in length, or equivalent approved fasteners, four inches (4") on centers.

(3) Eave and gable drip shall be designed so that the bottom of the drip edge shall have a minimum of one-half inch (1/2") clearance from the structure.

(4) All eave and gable drip having an overall height of the face dimension exceeding three inches (3") when fabricated from 26 gage, and four inches (4") when fabricated from 24 gage, shall require the installation of a continuous cleat fastened at 12 inches on center or clips at 12 inches on center. The continuous cleat or clips shall be fabricated from material one gage greater than that of the drip edge.

(bb) Top ply starting at the eave edge, first course should be applied horizontally along roof line with end joints lapped a minimum of six inches (6"), tin capped and fastened with nails, or caphead nails a maximum 36 inches O.C. along top edge of sheet. Each succeeding course shall be applied in same manner, allowing a minimum two inch (2") head lap, tin capped and fastened with nails or capnails approximately 12 inches O.C. at the head lap with a weave pattern at all valleys. All hips and ridges shall be overlapped a minimum of six inches (6").

(cc) Rake treatment: Eave drip metal shall be nailed along and directly on top of underlayment four inches (4") O.C. near edge of metal, and at no point shall nail head extend beyond edge. All joints shall be lapped a minimum of three inches (3"). Metal shall continue from the eave up the rake.

(dd) Valleys shall be in accordance with the following:

(1) Pre-formed closed valley with metal edge returns: All joints shall be lapped a minimum of six inches (6"). A coating or separator sheet for corrosion resistance shall be installed when using any ferrous metals.

(2) Pre-formed open valley with metal edge returns: All joints shall be lapped a minimum of six inches (6"). A coating or separator sheet for corrosion resistance shall be installed when using any ferrous metals.

(3) Valley metal shall be secured with clips fabricated from the same material 24 inches O.C. one inch (1") metal edge returns shall be clipped to either deck or batten strip with roofing nails through a metal strip. Metal shall be trimmed and a lead soaker installed at all valley/ridge junctions. Lead should be turned up one inch (1") to create water diverter.

(4) Valleys terminating onto the roof plane shall be installed in accordance with regular valley flashing installation procedures. A lead soaker skirt shall be applied underneath the eave end of the valley to carry water off of the valley back onto the field tile.

(ee) Flashing and counter flashing at wall abutments: Pre-formed metal wall tray shall be installed flush to base of wall over underlayment. Work shall be started at lower portion to insure water tightness. Flashing shall be secured with clips on the horizontal metal flange 24 inches O.C. A one inch (1") metal edge diverter shall be clipped to the deck/batten strip with a roofing nail through a metal strap. The vertical metal flange shall be nailed within one inch (1") of the metal edge. Joints shall be lapped a minimum of four inches (4") and a coating or separator sheet for corrosion resistance applied when using ferrous metals. The entire edge of the vertical metal flange shall be sealed. Where counter flashing is installed, the top flange of base flashing shall be lapped a minimum of three inches (3"). Metal shall be nailed a minimum of six inches (6") O.C. or set into reglets and thoroughly caulked. Joints shall be lapped a minimum of three inches (3") and plastic roof cement/sealant applied between laps. All head/apron flashing shall be installed on top of the tile. The deck flange shall conform to the pitch of the roof and extend a minimum of four inches (4") on the field tile. Flashing shall be installed to either channel water to the eave under the tile or redirect water back on top of the field tile.

(ff) Curb mounted skylights, hood vents, turbines: A cricket shall be installed on the ridge side of any curb greater than 48 inches wide. A minimum 12 inches width of lead shall be installed at the eave end of curb, trimmed as necessary to insure water shedding capabilities on top of the field tile. It shall be secured with roofing nails six inches (6") O.C., with nails covered by the skylight/hood vent flange. Lead shall be continued on both sides of the curb working up toward ridge, trimmed as necessary to insure water shedding capabilities onto the field tile. It shall be secured with roofing nails six inches (6") O.C. The ridge end of the curb shall be installed with a minimum of 24 inches width of lead extending over the course of tile abutting the top of the curb and under the second course of tile at the top of the curb or lead shall be extended under both courses of tile at the top of curb. Lead shall be folded to create a one inch (1") water diverter at the top and sides of the 24 inch lead saddle. All nail penetrations, lead/skylight or hood vent joints shall be sealed with sealant or caulk.

(gg) Prefabricated curbed skylights shall be installed in accordance with skylight manufacturer's recommendations for nail-on tile system skylights.

(hh) Chimneys and wall abutments terminating onto roof plane: A minimum 12 inch width of lead shall be installed at the eave end of the protrusion, trimmed as necessary to insure water shedding capabilities on top of the field tile. It shall be secured with roofing nails a maximum six inches (6") O.C. near the edge of the flange. A wall pan flashing with a minimum one inch (1") water diverter along sides of chimney/wall abutments shall be installed, trimmed and folded at the ridge end of side flashing. The wall pan flashing shall terminate a minimum of eight inches (8") from the eave end of the protrusion. Prior to securement, a lead saddle to carry water from wall pan flashing on top of the field tile shall be applied. The pan flashing shall be sealed to the lead saddle and secured with roofing nails a maximum six inches (6") O.C. near the edge, and at no point shall the nail head extend beyond the edge of the flange. A metal saddle shall be installed at the ridge end of the chimney, trimmed and folded to insure water shedding capabilities onto the side pan flashing. It shall be secured with roofing nails a maximum six inches (6") O.C. near the edge, and at no point shall the nail head extend beyond the edge of the flange. The vertical flange shall be sealed with roofing cement (ASTM D-4586)/sealant. On flat tile installations, rigid corrosion resistant metal shall be permitted to be substituted for lead flashing at the chimney/wall abutment and eave end.

(ii) Pipe stacks shall be sealed with roofing cement (ASTM D-4586). An 18 inch skirt lead shall be installed over the last field tile cut, previously installed. The lead shall extend under the course of tile above the pipe stack course and be sealed with a sealant/caulk. On flat tile installations, rigid corrosion resistant metal shall be permitted to be substituted for lead.

(2) System 2: Mechanically fastened top ply system, minimum 4:12 pitch for mechanically fastened tile. (see 3403.6 for tile installation). This system utilizes standard metal flashings or pre-formed flashing without metal edge returns, a minimum mineral surface roll roofing (ASTM D 249) top ply with a sealed minimum two inch (2") paper head lap, sealed six inch (6") side lap, and minimum three inch (3") tile head lap (unless restricted by manufacturer's product design). All tile nail penetrations shall be sealed with roofing cement (ASTM D-4586).

(aa)(1) Eave drip metal shall be nailed directly on top of the base sheet, fastened four inches (4") O.C. near edge of metal, and at no point shall nail head extend beyond edge. All joints shall be lapped a minimum of three inches (3") and sealed along the entire length of the top edge of eave drip with roofing cement (ASTM D-4586).

(2) The drip or face flange shall be a minimum of one and one-half inches (1-1/2") in depth but not less than one-half inch (1/2") below the sheathing and shall be nailed thereto with non-corrosive three-quarter inch (3/4") long 12 gage ring-shanked nails, or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than three-eighths inch (0.375) and not less than three-quarter inch (3/4") in length, or equivalent approved fasteners, four inches (4") on centers.

(3) Eave and gable drip shall be designed so that the bottom of the drip edge shall have a minimum of one-half inch (1/2") clearance from the structure.

(4) All eave and gable drip having an overall height of the face dimension exceeding three inches (3") when fabricated from 26 gage, and four inches (4") when fabricated from 24 gage, shall require the installation of a continuous cleat fastened at 12 inches on center or clips at 12 inches on center. The continuous cleat or clips shall be fabricated from material one gage greater than that of the drip edge.

(bb) Top ply mineral surface roll roofing (ASTM D 249) starting at the eave edge, first course should be applied horizontally along roof line with end joints lapped a minimum of six inches (6"). End laps shall be sealed with roofing cement (ASTM D-4586). Underlayment shall be tin capped and secured with nails, or caphead nails a maximum 12 inches O.C. along the top edge of sheet. The entire length of top edge of underlayment shall be sealed, covering all tin caps or caphead

nails with roofing cement (ASTM D-4586). Each succeeding course shall be applied in the same manner, allowing a minimum two inch (2") head lap, insuring a weave pattern at all valleys, hip and ridges shall be overlapped a minimum of six inches (6"). Underlayment shall be trimmed at all wall bases.

(cc) Rake treatment: Eave drip metal should be nailed along and directly on top of the mineral surface roll roofing (ASTM D 249), fastened four inches (4") O.C. near edge of metal, and at no point shall nail head extend beyond edge. All joints shall be lapped a minimum of three inches (3"). Metal shall continue from eave up rake/gable. The entire edge of the metal flange shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane.

(dd) Valleys shall be nailed along and directly on top the mineral surface roll roofing (ASTM D 249) four inches (4") O.C. near edge of metal, and at no point shall nail head extend beyond edge. Metal joints shall be lapped a minimum of six inches (6") with roofing cement (ASTM D-4586) applied between laps. The entire edge of the metal flange shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane. Valleys shall be one of the following:

(1) Standard valley metal.

(2) Pre-formed closed valley metal without metal edge returns.

(3) Pre-formed open valley metal without metal edge returns.

(ee) Flashing and counter flashing at wall abutments: "L" metal flashing minimum four inches (4") by five inches (5") shall be installed flush to base of wall over the mineral surface roll roofing (ASTM D 249), nailed near edge of metal, and at no point shall nail head extend beyond edge. The horizontal flange shall be nailed a maximum six inches (6") O.C. Joints shall be lapped a minimum four inches (4") and roofing cement (ASTM D-4586) applied between laps. Flashing shall start at the lower portion and work up the roof to insure water shedding capabilities of all metal laps. The entire edge of the metal flange shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane. If counter flashing is installed, the top flange of base flashing shall be lapped a minimum of three inches (3"). Metal shall be nailed near edge of metal and at no point shall nail head extend beyond edge, a maximum of six inches (6") O.C. or set into reglets and thoroughly caulked. Joints shall be lapped a minimum of three inches (3") with roofing cement (ASTM D-4586) applied between laps. All head/apron flashing shall be installed on top of the mineral surface roll roofing (ASTM D 249), conforming to the pitch of the roof and extending a minimum of four inches (4") onto the deck. Metal edge shall be sealed with roofing cement (ASTM D-4586) and membrane.

(ff) Standard skylights, chimneys, etc. shall be installed in accordance with regular flashing installation procedures.

(gg) Pipes, turbines, vents, etc.: Roofing cement (ASTM D-4586) shall be applied around the base of protrusion and on the bottom side of the metal flange, sealing the unit base to the underlayment. All sides of the base flashing shall be nailed near edge of metal, and at no point shall nail head extend beyond edge. Base shall be flush to the deck. The edge of the metal flanges shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane.

(3) System 3: Called 30-90 fully adhered system; pitches 2:12 and greater for mortar and adhesive set tile, (see 3403.5 for tile installation). pitches 3:12 and greater for mechanically fastened tile. (see 3403.6 for tile installation). This system utilizes standard metal flashing and hot or cold applied asphaltic adhesive to a minimum mineral surfaced roll roofing (ASTM D 249). The tile head lap shall be a minimum two inches (2") for mortar and adhesive set tile, and a minimum three inches (3") for mechanically fastened tile (unless restricted by manufacturer's product design). Roofing

cement (ASTM D-4586) shall be applied at all tile nail penetrations.

(aa)(1) Eave drip metal shall be nailed directly on top of the base sheet, fastened four inches (4") O.C. near edge of metal, and at no point shall nail head extend beyond edge. All joints shall be lapped a minimum of three inches (3"). Metal shall continue from eave up rake/gable in the same manner.

(2) The drip or face flange shall be a minimum of one and one-half inches (1-1/2") in depth but not less than one-half inch (1/2") below the sheathing and shall be nailed thereto with non-corrosive three-quarter inch (3/4") long 12 gage ring-shanked nails, or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than three-eighths inch (0.375) and not less than three-quarter inch (3/4") in length, or equivalent approved fasteners, four inches (4") on centers.

(3) Eave and gable drip shall be designed so that the bottom of the drip edge shall have a minimum of one-half inch (1/2") clearance from the structure.

(4) All eave and gable drip having an overall height of the face dimension exceeding three inches (3") when fabricated from 26 gage, and four inches (4") when fabricated from 24 gage, shall require the installation of a continuous cleat fastened at 12 inches on center or clips at 12 inches on center. The continuous cleat or clips shall be fabricated from material one gage greater than that of the drip edge.

(bb) Valleys shall be nailed near the edge, and at no point shall nail head extend beyond edge. Valleys shall be nailed a maximum of six inches (6") O.C. Joints shall be lapped a minimum of six inches (6"); roofing cement (ASTM D-4586) shall be applied between the laps. Valleys shall be one of the following:

(1) Standard valley metal.

(2) Pre-formed closed valley metal without metal edge returns.

(3) Pre-formed open valley metal without metal edge returns.

(cc) Flashing and counter flashing at the wall abutments: "L" metal minimum four inches (4") by five inches (5") shall be installed flush to the base of the walls over the base sheet and nailed six inches (6") O.C. near edge of metal, and at no point shall nail head extend beyond edge. Joints shall be lapped a minimum of four inches (4") and roofing cement (ASTM D-4586) shall be applied between the laps. Work shall start at the lower portion and work upward to insure water tightness. The top edge of the vertical flange shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane. If counter flashing is to be installed, the top flange of the base flashing shall be lapped a minimum of three inches (3"). The metal shall be nailed six inches (6") O.C. near edge of metal and at no point shall nail head extend beyond edge or set into reglets and thoroughly caulked. Joints shall be lapped a minimum of three inches (3") and roofing cement (ASTM D-4586) applied between laps. All head/apron flashing shall be installed on top of the base sheet. Above 7:12 head/apron flashing may be installed on top of the mineral surface roll roofing (ASTM D-249). The edge of the metal flange shall be sealed, covering all nail penetrations with roofing cement (ASTM D-4586) and membrane. The deck flange should conform to the pitch of the roof and extend a minimum of four inches (4") onto the deck.

(dd) Standard skylights, chimneys, etc. shall be installed in accordance with regular flashing installation procedures.

(ee) Pipes, turbines, vents, etc.: Roofing cement (ASTM D-4586) shall be applied around the base of protrusion and on the bottom side of the metal flange, sealing the unit base to the #30. All sides of the base flashing shall be nailed near edge of metal, and at no point shall nail head extend beyond edge. Base shall be flush to the deck. The edge of the metal flange shall be sealed, covering

all nail penetrations with roofing cement (ASTM D-4586) and membrane.

(ff) Top ply: Starting at the eave edge, mineral surface roll roofing (ASTM D 249) shall be applied horizontally along the roof line over the base sheet, lapping the end joints a minimum of six inches (6"). Hot or cold asphaltic adhesive shall be applied between the plies of roofing felts. The top ply shall then be backnailed, using tin cap and roofing nails or caphead nails, a maximum of 12 inches O.C. near the edge and minimum 2 inch from edge of the felt. Each succeeding course shall be applied in the same manner, allowing a minimum two inch (2") head lap. Hips and ridges shall be lapped a minimum of six inches (6"), insuring a weave pattern in the valley. When pre-formed valley metal is used, the edge of the mineral surface roll roofing (ASTM D 249) felt shall be sealed with roofing cement (ASTM D-4586) and membrane. Any felt overhanging at eave and gable shall be trimmed. Fishmouths shall be cut and sealed with roofing cement (ASTM D-4586) and membrane. Roofing cement (ASTM D-4586) or hot asphalt shall be applied along the edge of the felt wherever it meets wall bases.

3403.5 MORTAR AND ADHESIVE SET TILE INSTALLATION FOR FLAT, MEDIUM AND HIGH PROFILE TILE (FOR PITCHES 2:12 AND GREATER)

(a) Eave treatment shall be one of the following:

(1) Prefabricated eave closure. Closure strips shall be installed along the eave with 3 fasteners.

(2) Metal eave closure. Closure strips shall be installed along the eave 18 inches O.C. with roofing nails.

(3) Thickbutt tile. Thickbutt tile shall be installed along the eave.

(4) Prefabricated clay or concrete closure.

(5) Mortar eave closure. The first course of tile shall be installed with the eave edge of tile elevated with mortar, pointed and provided with a minimum three-eighths inch (3/8") weephole flush with the deck.

(6) Fascia. Raised fascia/wood starter strip. Base sheet shall be installed in accordance with this chapter. Fascia board shall be installed approximately 1-1/2 inch above the roof deck or a 2x2 wood starter strip installed at the roof edge. A tapered cant strip or anti-ponding metal flashing of sufficient width to insure positive drainage shall be installed over fascia/starter strip. The top edge of flange shall be nailed to the roof.

(b) Flat, medium and high profile tile: Adhesive should be applied in a 2"X10" minimum length bead. Mortar should be applied with a minimum of a full 10" mason's trowel. Both mortar and adhesive shall be installed vertically under the pan/flat portion of tile. When the tile has more than 1 pan/flat portion, the mortar or adhesive shall be placed under the pan closest to the underlock of the previously installed tile. For flat tile, mortar or adhesive shall be placed from the head of the tile in the previous course to within two to four inches (2-4") of the head of the tile being set. Mortar and adhesive shall not be placed under the lugs, the head of the tile, nor onto the underlock of the adjacent tile. The first course of tile shall be installed starting at the lower left hand corner (facing down the roof). All tile shall overhand the eave drip not less than 3/4 inch or more than two inches (2") evenly along entire course and at same height when using mortar to elevate first course. A half starter/finisher tile shall be used for proper staggering of the tile courses when using the staggered/cross bond method of installation. Tile shall be set in stepped course fashion or in a horizontal and/or vertical fashion when utilizing the straight bond method. Succeeding courses of field tile shall be laid in the same manner. The bed of mortar or adhesive shall make contact with the head of the lower course of tile and the underside of the tile being set.

(c) Two (2) piece barrel tile: A ten inch (10") minimum length mason's trowel full of mortar or a 2" X !0" minimum length bead of adhesive shall be applied vertically over the chalk line and under the center of each pan with the narrow end facing down the roof. Mortar shall be placed so as to make a two-tile bond between the pan being set and the pan below in the previous course. A bed of mortar shall be placed along the inside edges of the pans and covers set with the wide end facing down the roof. Succeeding courses of field tile shall be laid in the same manner. The bed of mortar shall make contact with the head of the lower course of tile and the underside of the tile being set.

(d) Fastening shall be in accordance with the following:

Steep roof pitch installation. For pitches 4:12 and above, the eave course shall be fastened with 1 nail in each tile in addition to the mortar/adhesive. For pitches 6:12 up to and including 7:12, every third tile in every fifth course shall be fastened with 1 nail in addition to the mortar/adhesive. Plastic roof cement shall be applied to seal all nail penetrations. For pitches above 7:12, every tile shall be nailed in addition to the application of mortar/adhesive.

(e) Hip and ridge tiles shall be set in continuous bed of mortar lapping the tile a minimum of one inch (1"). Hip starter tile shall be one of the following:

(1) Prefabricated hip starter.

(2) Mitered tile as hip starter to match eave lines.

(3) Standard hip tile as starter.

(f) Pressure treated nailer boards shall be installed for use with hip and ridge tile and/or 2 piece barrel covers for pitches above 7:12. Fastened with nails or screws of sufficient length to penetrate minimum of 3/4 inch into each truss except for 2 piece barrel covers.

(g) Rake treatment shall be one of the following methods:

(1) Rake tile. The first rake tile shall be installed to the exposed length of the first course of field tile. The factory finish end of the tile should be installed toward the eave. The rake tile shall be nailed with a minimum of 2 hot dipped galvanized nails of sufficient length to penetrate the framing a minimum of 3/4 inch. Each succeeding rake tile shall be abutted to the nose of the field tile above.

(2) Flush finish. A mortar bed shall be placed along the roof edge and the field tile shall be set in the mortar flush with the edge and pointed smooth to a straight edge finish.

(h) At wall abutments, tile shall be installed adjacent to the wall and voids filled with mortar.

(i) Valley shall be one of the following:

(1) Closed valley. Tile shall be mitered to meet at the center of the valley.

(2) Open valley. Tile shall be cut and set in a bed of mortar to form a straight border.

(j) Tile shall be installed to accommodate all roof penetrations. Voids shall be filled with mortar.

3403.6 MECHANICALLY FASTENED TILE INSTALLATION FOR FLAT, MEDIUM AND HIGH PROFILE TILE (FOR PITCHES 2:12 AND GREATER)

(a) Installation shall be in accordance with one of the following systems:

(1) Batten installation. Both vertical and horizontal battens are required from 2:12 up to 3:12 pitch. Horizontal battens are optional from 4:12 up to 7:12 pitch. For pitches above 7:12 battens are required unless restricted by manufacturer's product design. four foot (4') battens are required, fastening a maximum of 24 inches O.C. using a minimum 8d corrosion resistant nail. 2 inch space shall be between the batten ends and between the battens and metal edges. Vertical battens shall be placed over the top cord of the roof trusses. Alternatively, they may be installed with a minimum #8 diameter corrosion resistant screw fasteners.

(2) Direct deck installation (for use only on pitches 3:12 and greater).

(b) Eave treatment shall be one of the following:

(1) Prefabricated eave closure. Closure strips shall be installed along the eave with 3 fasteners.

(2) Metal eave closure. Closure strips shall be installed along the eave 18 inches O.C. with roofing nails.

(3) Thickbutt tile. Thickbutt tile shall be installed along the eave.

(4) Prefabricated clay or concrete closure.

(5) Mortar eave closure. The first course of tile shall be installed with the eave edge of tile elevated with mortar, with a minimum 3/8 inch weephole flush with the deck.

(6) Fascia. Raised fascia/wood starter strip. Anchor sheet shall be installed in accordance with this chapter. Fascia board shall be installed approximately 1-1/2 inch above the roof deck or a 2x2 wood starter strip installed at the roof edge. A tapered cant strip/anti-ponding metal flashing of sufficient width to insure positive drainage over fascia/starter strip shall be installed. The top edge of flange shall be nailed to the roof.

(c) Tile fastening (nail, screws and/or clips) shall be as tested to comply with wind uplift criteria set forth by code. If one fastener is used, it shall be placed on the overlock side of the tile. Clips can be anchored directly to the roof deck or batten.

Tables 34-C - One through Four

How to Use Tables:

1. Determine Height and Pitch of Roof. Go to Table One.
2. Select Required Uplift Value from Table One that relates to the height and pitch.
3. Select Table Two or Table Three, based on the thickness of the decking, if tiles will be attached directly to the deck, or Table Four if tiles will be attached to battens.
4. Select a fastening method where the Uplift Capacity from Table Two, Table Three or Table Four is greater than or equal to the Required Uplift Value in Table One.
5. See Sec. 3403.3 for Nail, Screw and Clip specifications.
6. Location of holes for all Nails and Screws is 1-2" from Head of Tile unless otherwise noted in Table.

Table One	**Required Uplift Table**				
	-M_a- (Required Minimum ft-lbs) Mean Roof Height in Feet				
Pitch of Roof	**15'**	**20'**	**25'**	**30'**	**40'**
2:12	30.7	33.4	35.7	37.7	40.7
3:12	28.7	31.3	33.4	35.2	38.1
4:12	26.6	28.9	30.9	32.6	35.2
5:12	24.5	26.7	28.5	30.0	32.5
6:12	22.5	24.5	26.2	27.6	29.8
7:12	20.8	22.6	24.1	25.4	27.5

Required Ma formula is from Section 2309.8 Rigid Tile:

$$M_a = q_h C_L b L L_a [1.0 - G C_p]$$

Table Two	15/32" Minimum Decking. Direct to Deck	Uplift Capacity
Flat Profile	2-10d Ringshank Nails	39.1
Medium Profile	2-10d Ringshank Nails	36.1
High Profile	2-10d Ringshank Nails	-
Flat Profile	2-10d Ringshank Nails at 2-2" from Head	58.8
Medium Profile	2-10d Ringshank Nails at 2-2" from Head	51.2
High Profile	2-10d Ringshank Nails at 2-2" from Head	41.0
Flat Profile	1-#8 Screw	39.1
Medium Profile	1-#8 Screw	33.2
High Profile	1-#8 Screw	28.7
Flat Profile	2-#8 Screws	60.2
Medium Profile	2-#8 Screws	55.5
High Profile	2-#8 Screws	51.3
Flat Profile	1-10d Smooth or Screw Shank, 1 Clip	25.2
Medium Profile	1-10d Smooth or Screw Shank, 1 Clip	25.2
High Profile	1-10d Smooth or Screw Shank, 1 Clip	35.5
Flat Profile	2-10d Smooth or Screw Shank, 1 Clip	38.1
Medium Profile	2-10d Smooth or Screw Shank, 1 Clip	38.1
High Profile	2-10d Smooth or Screw Shank, 1 Clip	44.3

Table Three	19/32" Minimum Decking. Direct to Deck	Uplift Capacity
Flat Profile	2-10d Ringshank Nails	46.4
Medium Profile	2-10d Ringshank Nails	45.5
High Profile	2-10d Ringshank Nails	-
Flat Profile	2-10d Ringshank Nails at 2-2" from Head	74.1
Medium Profile	2-10d Ringshank Nails at 2-2" from Head	75.9
High Profile	2-10d Ringshank Nails at 2-2" from Head	55.9

Table Four	15/32" Decking. With Battens	Uplift Capacity
Flat Profile	2-10d Ringshank Nails	-
Medium Profile	2-10d Ringshank Nails	-
High Profile	2-10d Ringshank Nails	-
Flat Profile	2-10d Ringshank Nails at 2-2" from Head	56.0
Medium Profile	2-10d Ringshank Nails at 2-2" from Head	58.4
High Profile	2-10d Ringshank Nails at 2-2" from Head	52.6
Flat Profile	1-#8 Screw	25.6
Medium Profile	1-#8 Screw	30.1
High Profile	1-#8 Screw	25.5
Flat Profile	2-#8 Screws	36.1
Medium Profile	2-#8 Screws	56.4
High Profile	2-#8 Screws	37.1
Flat Profile	1-10d Smooth or Screw Shank, 1 Clip	27.5
Medium Profile	1-10d Smooth or Screw Shank, 1 Clip	27.5
High Profile	1-10d Smooth or Screw Shank, 1 Clip	29.4
Flat Profile	2-10d Smooth or Screw Shank, 1 Clip	37.6
Medium Profile	2-10d Smooth or Screw Shank, 1 Clip	37.6
High Profile	2-10d Smooth or Screw Shank, 1 Clip	47.2

(d) The first course of tile shall be installed starting at the lower left hand corner (facing down the roof). All tile shall overhand the eave drip not less than 3/4 inch or more than two inches (2") evenly along entire course and at same height when using mortar to elevate first course. The tile shall be cut/broken for proper staggering of tile courses when using the staggered/cross method of installation. Tile shall be set in stepped course fashion or in a horizontal and/or vertical fashion when the straight bond method is used. Succeeding courses of field tile shall be laid in the same manner. Field tile shall be cut/broken to form a straight edge at the center of the hip/ridge and valley. Tile pieces that can not be attached with mechanical fasteners shall be secured with mortar or adhesive. For pitches 6:12 and less, plastic roof cement shall be applied at all nail penetrations.

(e) Hip and ridge tiles shall be set in a continuous bed of mortar, lapping tile a minimum of one inch (1"). The bed of mortar shall not protrude into the center of the hip or ridge junction. Approximately one inch (1") of the field tile shall extend beyond bed of mortar. A three inch (3") long bead of adhesive or sealant shall be applied between the laps at the ridge only. Mortar shall be pointed and finished to match the tile surface. Hip and ridge shall be one of the following:

(1) Prefabricated hip starter.

(2) Tile shall be mitered as a hip starter to match the eave line.

(3) Standard hip tiles may be used as a starter.

(f) Pressure treated nailer boards shall be installed for use with hip and ridge and/or 2 piece barrel for pitches above 6:12. Fastened with nails or screws of sufficient length to penetrate minimum of 3/4 inch into each truss.

(g) The first rake tile shall be installed to the exposed length of the first course of field tile. The factory finish end of the tile should be installed toward the eave. The rake tile shall be nailed with a minimum of 2 hot dipped galvanized nails of sufficient length to penetrate the framing a minimum of 3/4 inch. Each succeeding rake tile shall be abutted to the nose of the field tile above, maintaining a constant head lap.

(h) Flush finish shall be one of the following:

(1) Metal finish. A prefabricated gable metal with one inch (1") water return shall be installed, fastened by clipping 24 inches O.C.

(2) Mortar finish. (For use only with 2 ply sealed underlayment systems.) A mortar bed shall be placed along the roof edge and pointed smooth to a straight edge finish.

(i) For rake tile, application at finishing end may require special consideration to provide proper drainage.

(j) At wall abutments, tile shall be cut to fit approximately 3/4 inch to base of walls. Point up mortar is not recommended.

(k) Valleys shall be one of the following:

(1) Closed valley. Tile shall be mitered to meet at the center of the valley and to form a straight border on either side of the water diverter.

(2) Open valley. Tile shall be mitered to form straight border on either side of two water diverters. For roll valley metal installation only, a bed of mortar shall be placed a minimum of two inches (2") on both sides of the center of the valley. Tile shall be mitered to form a straight border and pointed to match the tile surface.

(l) Tile shall be cut to fit close to plumbing stack. Voids should be filled with mortar and pointed to match tile surface.

3404 METAL SHINGLES

3404.1 MATERIALS: Ferrous shingles shall be a minimum thickness of 0.0149 inch (0.378 mm), aluminum shingles shall be a minimum thickness of .019 and all other metal shingles shall be of equivalent weight.

3404.2 APPLICATION:

(a) Metal shingles shall be installed in accordance with the manufactures directions supplemented with the provisions of this Sub-section.

(b) Metal shingles shall be applied to solid sheathed wood or other nailable decks having a minimum incline in accordance with the manufacturers

(c) Metal shingles shall be secured to the deck to resist uplift forces as set forth in Chapters 23 and 34 of this code.

(d) Metal shingles shall be applied over an anchor sheet as set forth in Paragraph 3402.2(b) herein.

(e) Metal shingles shall be applied in course to a chalk line running horizontally as from gable to gable, and such shingles shall extend not more than one inch (1") at the eaves.

(f) Each metal shingle shall be applied with fasteners of the type, quantity and size recommended by the shingle manufacturers for the specific deck application.

(g) All intersections shall be flashed with metal as provided in Section 3407 herein.

3405 WOOD SHINGLES AND SHAKES

3405.1 MATERIALS: The materials for and the types and sizes of wood shingles and shakes are provided in Paragraphs 3401.3(v) and (w), herein.

3405.2 APPLICATION: Wood shingles and shakes may be applied to roofs sheathed with space boards, solid boarding or wood based structural-use panels as follows:

(a) (1) Spaced sheathing shall not be applied where the roof incline is less than four inches (4") per foot. Spaced sheathing shall be not less than a normal one by three inch (1" x 3") board for shingles, spaced not more than the width of such board, and a nominal one by four inch (4") board for shakes, no spacing for either to exceed four inches (4") clear.

(b) (1) Wood shingles may be applied to roofs having an incline not less than three inches (3") per foot provided the deck is solid sheathed.

(2) Wood shakes shall not be applied where the roof incline is less than four inches (4") per foot.

(3) Where shingles or shakes are applied over solid sheathing, a layer of felt may be applied and may be secured only sufficiently to hold in place until the shingles or shakes are applied, at which time this felt must be removed, prior to the installation of the shingles or shakes.

(c) Maximum weather exposure of shingles and shakes shall be as set forth in Table 34-B herein.

(d) (1) Shingles shall be laid with side lap of not less than one and one-half inches (1-1/2") between joints in adjacent course and one-half inch (1/2") in alternate courses.

(2) Spacing between shingles shall be not more than one-half inch (1/2") and not less than three-eighths inch (3/8") .

(e) (1) Shakes may be laid in straight or staggered courses.

(2) Shakes shall be laid with a side lap of not less than one and one-half inches (1-1/2") between joints in adjacent courses.

(3) The edges of shakes shall be parallel within one inch (1") .

(4) Spacing between shakes shall be not more than one-half inch (1/2").

(5) Strips of minimum #30 felt not less than 18 inches wide shall be shingled between each course of shakes so that no felt is exposed below the shake butts.

3405.3 FASTENING:

(a) Each shingle or shake shall be attached to the sheathing with at least two fasteners ~~only~~.

(b) Fasteners shall be copper, galvanized or stainless steel, or aluminum long enough to penetrate at least 1/2" into the sheathing.

TABLE 34-D

Maximum Exposure to Weather

Grade	Roof Incline	Shingle Length 16 inch	18 inch	24 inch
		Wood Shingles		
#1	3" to less than 4" per foot	3 3/4"	4 1/4"	5 3/4"
#2	3" to less than 4" per foot	3 1/2"	4"	5 1/2"
	4" or more per foot4"		4 1/2"	6 1/2"
#3	3" to less than 4" per foot	3"	3 1/2"	5"
	4" or more per foot	3 1/2"	4"	5 1/2"
		Shakes		
#1	4" or more per foot	8"		10"

3405.4 FLASHING: All intersections shall be flashed with metal, as set forth in Section 3407 herein.

3406 ROOF INSULATION

3406.1 APPLICATION: Roof insulation shall provide an acceptable base for built-up, polymer modified bitumen, or single ply roof coverings, or shall become a part of such roof coverings as follows:

(a) OVER WOOD DECKS: Roof insulation shall be mechanically fastened directly to wood decks or shall be solidly mopped over an anchor sheet as set forth in Paragraph 3402.2(b) herein.

(b) OVER OTHER NAILABLE DECKS: To reduce moisture absorption from the deck and preserve the insulating effectiveness, roof insulation shall be applied over an anchor sheet.

(1) Insulation may be fully mopped to an anchor sheet on a nailable deck without any fasteners in the insulation.

(c) OVER NON-NAILABLE DECKS:

(1) Roof insulation shall be solid-mopped as provided in Paragraph 3402.2(e) herein for anchor sheet attachment to non-nailable roof decks.

(2) Insulation used over structural or precast concrete deck shall be a maximum of 4' x 4' and fully mopped to the deck.

(d) Over metal decks, roof insulation shall be mechanically attached per Table 34-D.

TABLE 34-E

MECHANICALLY FASTENED INSULATION

FOR BUILDINGS 40 FEET OR LESS IN HEIGHT

	FASTENERS PER BOARD		
BOARD SIZE	**FIELD**	**PERIMETER**	**CORNERS**
WOOD FIBERBOARD			
2 x 4 1 inch minimum	2	3	4[4]
4 x 4 1 inch minimum	4	6	8[4]
4 x 8 1 inch minimum	8	12	16[4]
FIBERGLASS			
4 x 4 3/4 inch minimum	5	8	11
4 x 4 1.5 inch minimum	4	6	8
PERLITE			
2 x 4 1 inch minimum	4	6	8[4]
ISOCYANURATE			
4 x 4 1.3 inch minimum	5	8	11
4 x 4 1.5 inch minimum	4	6	8

FOOTNOTES

[1] Minimum 3 inch plates must be used.

[2] Perimeter: Defined as the first board or a minimum of four feet (4') from the roof edge.

[3] Corners: Defined as eight feet (8') in from each side.

[4] If the building has parapet walls 36 inches or higher around the entire roof perimeter, use the number of fasteners for the perimeter.

[5] Wood and Steel decks use a minimum #12 screw and penetrate through the deck a minimum of 2 inch.

[6] The installation of Polymer Modified Bitumen as a single ply directly applied over mechanically fastened insulation requires **DOUBLE** the amount of fasteners in the field, perimeter and corners.

(e)OVER ANCHOR SHEET: Roof insulation applied over anchor sheets attached as set forth in Sub-section 3402.2 herein shall be solid-mopped in as provided in Sub-section 3406.3

(f) UNDER ANCHOR SHEET:

(1) Where more than one layer of roof insulation is provided, each successive layer shall be solid-mopped in and all joints shall be staggered.

(2) Anchor sheets applied over such insulation shall be solid-mopped thereto, or mechanically fastened through the insulation to nailable decks with approved fasteners spaced as set forth in Table 34-B and the mechanical fastening of the insulation may be omitted.

(3) Additional built-up roofing above the anchor sheet shall be mopped in place as provided in Paragraph 3402.2(h) herein.

(4) Attachment of other roof coverings over roof insulation shall comply with the specific provisions set forth in this Chapter.

(g) ROOF INCLINE:

(1) Roof insulation applied to roof with inclines of three (3) or more inches per foot (one inch (1") per foot on steel decks) shall be nailed, screwed or bolted through tin-caps spaced not more than 12 inches on centers both ways.

(2) Only ASTM D-312 Type III or IV asphalt shall be used on such applications.

3406.2 VAPOR RETARDERS: Where vapor retarders are specified, they shall be as follows:

(a) (1) Over wood and other nailable decks, vapor retarders shall be not less than two #15 felts lapped 19 inches, or one #30 felt lapped four inches (4"), solidly mopped to anchor sheet.

(2) Over non-nailable decks, vapor retarders shall be not less than two #15 pound felts, lapped 19 inches, shingled in and solidly mopped with hot bitumen.

3406.3 MOPPING: Solid mopping shall be hot bitumen applied in a quantity of not less than 25 pounds per roofing square at temperatures as set forth in Paragraph 3402.1(c), and roof insulation shall be laid with staggered joints and pressed firmly into position while such mopping is hot.

3406.4 SPRAY APPLIED POLYURETHANE FOAM ROOFING:

(a) MATERIAL:

(1) Urethane, sprayed-on, is a complete system of roof insulation and covering.

(2) The system consists of a closed-cell plastic foam having a minimum apparent density of three pounds per cubic foot and shall be applied on roof decks to a minimum thickness of one and one-half inches (1-1/2") and followed by a protective coating not less than 25 mils thick, or as tested.

(3) Materials and methods used in the application shall be as tested by Underwriter's Laboratories, Inc. for Class A, Class B and Class C roof coverings.

(b) APPLICATION:

(1) Application shall be in accordance with the requirements specified by one of the following:

(aa) Tested Assembly.

(bb) Designed by Architect or Engineer (site specific).

(cc) Product Approval.

NOTE: See Table 34-A.

3407 ROOF ACCESSORIES

3407.1 GENERAL:

(a) Except where specifically addressed within a prescriptive roof system section, the minimum criteria for the fabrication and attachment of roof accessories for the prescriptive roof systems specific in Chapter 34 shall be as set forth in this section. All other systems shall be in accordance with the manufacturer's published requirements or as designed by a Registered Architect or Professional Engineer.

(b) Accessories for roofs shall be not less than 26 gage steel galvanized a minimum of 0.9 ounce per square foot, 16 ounce copper, 0.025 inches thick aluminum, 0.012 inches thick soft flashing stainless steel, or approved equivalent non-corrosive materials.

3407.2 GRAVEL STOP: Gravel stop for gravel surfaced roofs shall be as follows:

(a) The deck flange shall be not less than three inches (3") in width.

(b) The face flange, where provided, shall be a minimum of one and one half inches (1-1/2") in height and shall extend down not less than one-half inch (1/2") below the sheathing, or other member immediately contiguous thereto.

(c) Gravel stop shall be designed so that the bottom of the drip edge shall have a minimum of one-half inch (1/2") clearance from the structure.

(d) Gravel stop shall be attached to the sheathing or nailing strip with non-corrosive 12 gage ring-shanked nails, or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than three-eighths inch (0.375") and not less than one inch (1") in length, or other approved non-corrosive fasteners, one inch (1") long spaced four inches (4") on centers.

(e) Gravel stop shall be installed after all roof felts have been applied and shall provide for expansion and contraction.

(f) The deck flange shall be covered with one six inch (6") wide strip of membrane applied in a bed of approved plastic compound covering all nail heads and extending on to mopped felts, or shall be stripped with one (1) six inch (6") and one (1) nine inch (9") #15 felt mopped in with hot bitumen or approved cold adhesive.

(g) Gravel stop shall be joined by one of the following methods:

(1) Lapped a minimum of six inches (6") and the entire interior of the joint where metal covers metal shall be coated with roofing cement (ASTM D-4586).

(2) At gables, where the incline is one inch (1") or more per foot, only lap joints shall be used with a minimum lap of two inches (2").

(3) Butted, not lapped, with a minimum one eighth inch (1/8") gap bridged with a six inch (6") long plate profiled to precisely fit over the gravel stop, coated with roofing cement (ASTM D-4586) where metal covers metal and centered over the gap.

(4) Cover plates shall be of the same material and thickness.

(h) All drip edge/gravel stop having an overall height of the face dimension exceeding three inches (3") when fabricated from 26 gage, and four inches (4") when fabricated from 24 gage, shall require the installation of a continuous cleat fastened at 12 inches on center or clips at 12 inches on center. The continuous cleat or clips shall be fabricated from material one gage greater than that of the drip edge/gravel stop.

3407.3 EAVE AND GABLE DRIP:

(a) Eave and gable drip shall have a roof flange not less than one and one-half inches (1-1/2") wide.

(b) The drip or face flange shall be a minimum of one and one-half inches (1-1/2") in depth but not less than one-half inch (1/2") below the sheathing and shall be nailed thereto with non-corrosive three-quarter inch

(3/4") long 12 gage ring-shanked nails, or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than three-eighths inch (0.375") and not less than three-quarter inch (3/4") in length, or equivalent approved fasteners, four inches (4") on centers.

(c) Eave and gable drip shall be designed so that the bottom of the drip edge shall have a minimum of one-half inch (1/2") clearance from the structure.

(d) The roof flange shall be installed between layers of felt with joints lapped not less than three inches (3").

(e) Eaves Drip Flashing on Low Slope Under 2:12.

(1) The deck flange shall be not less than two inches (2") in width.

(2) The drip or face flange shall be a minimum of two inches (2") in depth, but not less than one-half inch (1/2") below the sheathing and shall be nailed thereto with non-corrosive 12 gauge ring shanked nails or non-corrosive smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gauge, heads not less than three-eighths inch (0.375) and not less than one inch (1") in length, spaced four inches (4") on center.

(3) Eaves drip shall be lapped a minimum of six inches (6") and the interior of the joint where metal touches metal shall be coated with roofing cement (ASTM D-4586).

(4) On multi-ply built up roof systems, eaves drip shall be installed after all roof felts have been applied and the deck flange shall be covered with one strip of membrane applied in a bed of approved plastic compound, or shall be stripped with one (1) six inch (6") and one (1) nine inch (9") #15 felt mopped in with hot bitumen covering all nail heads and extending a minimum of four inches (4") on to mopped felts.

(5) On single ply modified roof systems, the eaves drip shall be installed between the layers of the anchor sheet and the modified top sheet.

(f) All eave and gable drip having an overall height of the face dimension exceeding three inches (3") when fabricated from 26 gage and four inches (4") when fabricated from 24 gage shall require the installation of a continuous cleat fastened at 12 inches on center or clips at 12 inches on center. The continuous cleat or clips shall be fabricated from material one gage greater than that of the eave and gable drip.

3407.4 VALLEYS:

(a) Valley metal shall be installed in conjunction with all roofing systems over the anchor sheet.

(b) Valley metal shall be of the material as set forth in Sub-section 3407.1 of this Code.

(c) Valley metal shall be a minimum of 16" width.

(d) Valley metal shall be nailed at metal edge six inches (6") on center with three-quarter inch (3/4") long ring-shanked nails, or equivalent approved fasteners.

(e) In other than hot bituminous roof systems, the edges of valley metal shall be stripped in with bituminous cement covered with a layer of four-inch (4") #15 felt or membrane.

3407.5 RAKE AND CAP FLASHING: Rake and cap flashing shall be installed in the same manner as metal counter flashings as set forth in Sub-section 3407.8 herein.

3407.6 CRICKETS AND SADDLES: Crickets and saddles shall be stripped with not less than two layers of #15 felt sealed with roofing cement (ASTM D-4586) and, where such crickets and saddles join vertical surfaces, the flashing shall be as provided in Sub-section 3407.8 herein.

3407.7 METAL BASE FLASHING:

(a) Metal base flashings on roofs having a slope of 2" per foot or greater, shall be installed over the anchor sheet and extend not less than 5" up the vertical surface and 4" on the deck and shall be attached to the deck and stripped as set fourth in Paragraph 3407.7(c) of this Code.

(b) Metal base flashing on roofs having a slope of less than 2" per foot shall be installed to extend not less than 8" up the vertical surfaces and 4" on the deck and shall be fastened to the deck and stripped as set forth in Paragraph 3407.7(c) of this Code.

(c) The deck flange shall be nailed with non-corrosive 12 gage ring-shanked nails or smooth shank nails with a shank diameter of a minimum of 0.118 inches or 11 gage, heads not less than three-eighths inch (0.375) diameter and less than one inch (1") in length and spaced six inches (6") on center and shall be covered with one (1) four inch (4") wide strip of membrane applied in a bed of. roofing cement (ASTM D-4586) covering all nail heads and extending on to mopped felts, or shall be stripped with one (1) six inch (6") and one (1) nine inch (9") #15 felt mopped in with hot bitumen or approved cold adhesive.

(d) Rake flashings shall be lapped 4" and the entire interior of the joint where metal covers metal shall be coated with roofing cement (ASTM D-4586) .

3407.8 METAL COUNTERFLASHING:

(a) Metal counterflashings shall be built into walls, set in reglets or applied as stucco shoulder-type and shall be turned down over base flashings not less than three inches (3").

(b) Metal counterflashings shall be lapped a minimum of three inches (3") and the laps shall be sealed with roofing cement (ASTM D-4586).

(c) Metal counterflashings, where set in reglets or surface mounted, shall be thoroughly sealed with an elastomeric sealant.

(d) Metal counterflashings may be surface mounted to precast concrete walls.

(e) Metal base flashing may be counterflashed by shingles, metal membranes or other roof facia cladding at the intersection of a mansard roof and an inclined or horizontal surface.

3407.9 ROOF PENETRATION FLASHINGS:

(a) All pipes shall be flashed with approved lead sleeve-type flashing, pitch pans or other approved methods.

(b) Other roof penetrations shall be suitably flashed with curbs, collars, pitch pans, metal, membranes with plastic roof cement, or other approved weather-tight methods.

3407.10 OVERFLOW SCUPPERS AND OUTLETS: Overflow scuppers and roof outlets shall be lined with metal or other approved materials and shall comply with the requirements of Sub-sections 1806.4, 3401.7(f) and Section 4611 of the Code.

3407.11 GUTTERS AND DOWNSPOUTS:

(a) Permit issued for gutters and downspouts installed on buildings or structures other than H and I occupancy or gutters and downspouts installed on buildings of H and I occupancy located within the areas designated as the coastal Building Zone or for buildings of H and I occupancy in excess of 40 feet in height shall have:

(1) Statement of required design pressure prepared by the Architect or Professional Engineer of Record or Specialty Architect/Engineer.

(2) Documents specified in either (aa) or (bb) below:

(aa) Two sets of manufacturer's printed specification and installation instructions reviewed, approved, and/or modified by the Architect or Professional Engineer of Record or Specialty Architect/Engineer for compliance with the required design pressure or other special requirements.

(bb) Construction documents prepared by the Architect or Engineer of Record or Specialty Architect/Engineer designed site specific..

(3) Where applicable the Architect or Professional Engineer of Record shall review construction submittal as specified in (aa) and (bb) above when prepared by a Specialty Architect/Engineer

(b) Permits issued for gutters and downspouts installed on buildings of H or I occupancy not located within the areas designated as the Coastal Building Zone and less than 40 feet in height shall have:

(1) Two sets of manufacturer's printed specification and installation instructions based on a minimum of 45 pounds per square foot uplift with a safety factor of two.

Exception: No permit shall be required for Gutters and downspouts installed on buildings as specified in section 3407.11(b) above that are not installed behind any part of the roof eave drip metal or in such a manor as not to interfere with such eave drip during periods of high winds.

(c) The minimum size of gutters shall be in accordance with section 4611.2.

3407.12 COPINGS: Metal copings shall be as follows:

(a) Minimum thickness of coping shall be according to Table 34-F, or as designed by a Registered Architect or Professional Engineer.

TABLE 34-F

For Parapet Width:	Up to 6 Inches	6 - 12 Inches	Over 12 Inches
Minimum Gage For Coping Materials			
Galvanized Steel	26 gage	24 gage	22 gage
Aluminum	.025"	.032"	.040"
Copper	16 oz.	16 oz.	20 oz.
Stainless Steel	.015"	.018"	.023"

(b) Coping shall be installed on the exterior face over a continuous cleat fastened at 12 inches on center or clips at 12 inches on center to the vertical face of wood blocking or as designed by a Registered Architect or Professional Engineer. Interior face of the coping shall be fastened through slotted holes in the vertical face of the coping at not greater than 24 inches on center. Continuous cleat or clip shall be fabricated from the same material as the coping, one gage thicker than coping material.

(c) Face flange of coping shall extend no less than one inch (1") below the wood blocking.

(d) Coping may be joined by one of the following methods:

(1) Lapped four inches (4") and sealed with an elastomeric sealant.

(2) Butted and bridged with a six inch (6") wide plate profiled to precisely fit over the coping and sealed with an elastomeric sealant.

(3) Installed with a drive cleat.

(4) Installed with a standing seam.

(e) Top of coping shall be sloped to shed water.

3408 OTHER ROOFING MATERIALS

3408.1 Alternate roofing materials such as elastomeric binders and membranes, but not limited thereto, may be approved and other methods of attachment and application may be permitted as provided in Section 204 of this Code.

3409 ROOF MOUNTED EQUIPMENT

3409.1 Machinery, piping, conduit, ductwork, signs and similar equipment may be mounted on roofs subject to the following:

(a) Permanently mounted rooftop equipment shall be installed with clearances equal to one-half the dimension of the shortest side of the rooftop unit with a maximum required height of forty (40") inches and a minimum clearance between the roof surface and support frame of twelve (12") inches.

EXCEPTION: Group I Occupancy single family detached residences only.

(b) Equipment supports, signs and all anchorages shall be designed and constructed to comply with the provisions of Chapter 23 and 42 of this Code.

(c) Penetrations through and attachment to roofs,

required for the support of such equipment, shall comply with Sub-section 3407.9 herein.

3410 SINGLE PLY SYSTEMS

3410.1 SINGLE PLY ROOF COVERINGS CLASSIFICATIONS:

	Abbreviation
(a) Thermoplastics' Group	
(1) Copolymer Alloy	CPA
(2) Chlorinated Polyethylene	CPE
(3) Ethylene Interpolymer	EIP
(4) Nitrile Butadiene Polymer Blend	CPA
(5) Polyisobutylene	PIB
(6) Polyvinyl Chloride	PVC
(b) Thermoset Group	
(1) Neoprene	CR
(2) Chlorosulfonated Polyethylene	CSPE
(3) Ethylene Propylene Diene Monomer	EPDM

(c) The above systems shall be applied in accordance with the Manufacturer's Specification, and approved by a recognized testing laboratory.

3411 METAL MEMBRANE ROOFS

3411.1 Metal membrane roofs such as, but not limited to, standing seam roof sheets, installed on buildings or structures of any height shall be designed by the Registered Architect or Professional Engineer of Record or designated Specialty Architect/Engineer site specific, for compliance with Chapter 23 and 28 of this Code.

CHAPTER 35
CLADDING AND GLAZING

3501 GENERAL
3502 LATHING
3503 PLASTER
3504 STUCCO
3505 PLASTICS
3506 RESERVED FOR FUTURE USE
3507 TILE
3508 WINDOWS, DOORS, GLASS AND GLAZING
3509 GLASS VENEER
3510 GYPSUM BOARD PRODUCTS AND ACCESSORY ITEMS
3511 SUSPENDED AND FURRED CEILINGS
3512 OTHER MATERIALS
3513 STORM SHUTTERS
3514 CURTAIN WALLS
3515 STRUCTURAL GLAZING SYSTEMS

3501 GENERAL

3501.1 SCOPE:

(a) Exterior wall cladding, surfacing and glazing, where provided, shall be as set forth in this Chapter and shall be fire-resistive where required by Chapter 37 of this Code.

(b) Interior walls, partitions, soffits, ceilings, glazing, plaster stucco and drywall construction shall be as set forth in this Chapter and shall be fire-resistive where required by Chapter 37 of this Code.

(c) Exterior wall cladding, surfacing and glazing shall be designed and constructed so as to sufficiently resist the full pressurization from the wind loads prescribed in Chapter 23 of this Code and the concentrated loads that result from hurricane generated wind-borne debris.

(1) Exterior wall cladding, surfacing and glazing, within the lowest 30 feet of the exterior building walls and roofs, shall be deemed to comply upon representation of acceptable test data or is shown by acceptable engineering analysis to be of sufficient strength to resist large missile impacts as outlined in Sub-paragraph 2315 of this Code.

(2) Exterior wall cladding, surfacing and glazing, located above the lowest 30 feet of the exterior building walls and roofs, shall be deemed to comply upon presentation of acceptable test data or is shown by acceptable engineering analysis to be of sufficient strength to resist small missile impacts as outlined in Sub-paragraph 2315 of this Code.

EXCEPTION:

(aa) Exterior wall cladding, surfacing and glazing when protected by fixed, operable or portable shutters or screens, which have product approval or are shown by acceptable test data or analysis to be of sufficient strength to resist full pressurization from the wind loads as well as large and small missile impacts as outlined in Chapter 23 of this Code, without deforming to the point where the substrate being protected is invariably compromised.

(d) All exterior wall cladding, surfacing, garage doors, passage doors, skylights, operative and inoperative windows, shall have prior product approval at the time of permit application.

3501.2 INTERIOR FINISHES: Interior finishes shall be as set forth in Section 3708 of this Code.

3501.3 EXISTING BUILDINGS: The Building Official shall inspect existing buildings having wood-stud exterior walls for which application for a permit for exterior wall coverings is made, shall have the authority to order the uncovering of structural elements for inspection and require necessary repairs as a part of such approval for a permit, or may order demolition as set forth in Part I herein.

3502 LATHING

3502.1 GENERAL: Lath shall be gypsum, metal or wire lath, as set forth herein, and shall conform to the Standard Specification for Interior Lathing and Furring, ANSI A42.4 as set forth in Section 402.

3502.2 GYPSUM LATH:

(a) Gypsum lath shall conform to the Standard Specification for Gypsum Lath, ASTM C37, as set forth in Section 402.

(b)(1) Gypsum lath shall be nailed to wood supports, at intervals not to exceed five inches, with 13-gage galvanized or blued nails having 19/64-inch diameter flat heads. Nails shall be not less than one and one-eighth inches long for three-eighths-inch lath, not less than one and one-fourth inches long for one-half-inch lath. Each 16-inch width of lath shall be secured to each support with not less than five nails; except that where fire-resistive-rated construction is not acquired, there shall be not less than four nails.

(2) Lath shall be secured to horizontal or vertical metal supports by means of approved special clips.

(c) (1) The center-to-center spacing of wood supports shall not exceed 16 inches for 3/8-inch gypsum lath and shall not exceed 24 inches for 2-inch gypsum lath.

(2) The center-to-center spacing for gypsum lath applied to metal studs shall not exceed that set forth herein above for wood supports except that 3/8-inch gypsum lath may be applied to metal studs spaced 24 inches on centers where a minimum of : -inch, 3-coat plaster is applied over the lath.

(d) Lath shall be applied with face side out and with the long dimension at right angles to the framing members. Joints shall be broken in each course, except that end joints may fall on one support when such joints are covered with three-inch-wide strips of metal lath. Lath shall be butted together.

(e) Corner bead and inside angle reinforcing shall not be required.

(f) No interior lath shall be applied until the roof is on and the building is dried in.

3502.3 METAL AND WIRE LATH:

(a) Metal and wire lath and metal accessories embedded in the plaster shall be galvanized or otherwise rust-resistant by approved means. Weight tags shall be left on all metal or wire lath until approved by the Building Official.

(b) The weight of metal and wire lath and the spacing of supports shall conform to the requirements set forth in Table 35-A.

TABLE 35-A
WEIGHTS OF METAL AND WIRE LATH

Type of Lath	Minimum Weight (Lbs. per sq. yd.)	Maximum Spacing of Supports For Walls	For Ceilings
Flat Expanded Metal Lath	2.5	16"	0"
Flat Expanded Metal Lath	3.4	16"	16"
Flat Rib Metal Lath	2.75	16"	12"
Flat Rib Metal Lath	3.4	19"	19"
3/8" Rib Metal Lath	3.4	24"	24"
Sheet-Metal Lath	4.5	24"	24"
Wire Lath	2.48	16"	12"
Wire Fabric		16"	16"

V-stiffened flat expanded metal lath of equal rigidity and weight is permissible on the same spacings as 3/8" rib metal lath.

Paper backed wire fabric, No. 16-gage wire, 2" x 2" mesh, with stiffener.

(c) All metal lath shall be lapped 1 inch minimum.

(d) All attachments for securing metal lath, wire lath and wire fabric to supports shall be spaced not more than six inches apart, and side laps shall be secured to supports and be tied between supports at not to exceed nine-inch intervals.

(e) Metal and wire lath shall be attached to vertical wood supports with the equivalent of 4d-galvanized or blue common nails driven to a penetration of at least three-quarters inch and bent over to engage not less than three strands of lath. Metal and wire lath shall be attached to ceiling joists or other horizontal wood supports with the equivalent of No. 11-gage, barbed, galvanized or blued nails one and one-half inches long having a head not less than three-eighths inch in diameter.

(f) Metal and wire lath shall be attached to horizontal and vertical metal supports with the equivalent to No. 8 galvanized sheet-metal screws.

3502.4 NONBEARING LATH AND PLASTER PARTITIONS:

(a) Where reinforced plaster or pneumatically-placed plaster partitions are used, they shall have vertical steel or iron channels with a depth of not less than one-third the thickness of the partition and spaced not more than 24 inches on centers. The thickness of metal in the channels shall not be less than 16 U.S. standard gauge or light gauge steel studs as set forth in Paragraph 2809.3(c).

(b) Hollow non-bearing partitions of reinforced plaster or pneumatically-placed plaster shall have a shell thickness of not less than three-fourths inch (3/4".)

(c) Metal reinforcing shall be as set forth in Table 35-A, and gypsum lath shall not be less than three-eighths inch in thickness. The minimum thickness of metal lath and plaster partitions shall be not less than two inches or one-eighty-fourth of the distance between supports.

3502.5 SUSPENDED AND FURRED PLASTER CEILINGS:

(a) GENERAL: Suspended or furred plaster ceilings shall be designed and constructed as set forth herein.

(b) MAIN RUNNERS: Main runners or carriers shall be rolled steel channels not less than the sizes and weights set forth in Table 35-B.

TABLE 35-B
SPANS AND SPACINGS OF MAIN RUNNERS

Minimum Size and Type	Maximum Span Between Hangers or Supports	Maximum Center-to-Center Spacing of Runners
3/4 in.-0.3 lb. per ft.	2 ft. 9 in.	3 ft. 9 in.
1 2 in.-0.475 lb. per ft.	3 ft. 0 in.	4 ft. 0 in.
1 2 in.-0.475 lb. per ft.	3 ft. 6 in.	3 ft. 6 in.
1 1/2in.-0.475 lb. per ft.	4 ft. 0 in.	3 ft. 0 in.
1 1/2in.-1.12 lb. per ft.	4 ft. 0 in.	5 ft. 0 in.
2 in.-1.26 lb. per ft.	5 ft. 0 in.	5 ft. 0 in.
1 2 x 1 2 x 3/16 angle	5 ft. 0 in.	5 ft. 0 in.

A main runner shall be located not more than six inches from parallel walls to support the ends of cross furring. The ends of main runners at walls shall be supported by hangers located not more than 12 inches from such ends. Splices in main runners shall be lapped 12 inches and tied, each end, with double loops of No. 16-gage wire.

(c) CROSS FURRING: Cross furring, or spacers, for various spacing of main runners or other support shall be not less than as set forth in Table 35-C.

TABLE 35-C
SIZES OF CROSS FURRING IN SUSPENDED AND FURRED CEILINGS

Size and Type	Maximum Span Between Supports	Maximum Spacing
1/4" pencil rods	Up to 2 feet	12"
3/4" channels	Up to 3 feet	24"
3/4" channels	Up to 4 feet	16"

Cross furring shall be securely saddle-tied to the main runners by not less than two strands of No. 16 W. and M. gage galvanized wire or equivalent approved attachments. Cross furring shall be attached to joists or beams with double No. 14 W. and M. gage galvanized wire or equivalent approved attachments. Splices in cross furring shall be lapped eight inches and tied, each end, with double loops of No. 16-gage wire.

(d) HANGERS: Hangers supporting suspended ceilings shall be not less than the following minimums:

Ceiling Area Supported Square Feet	Minimum Size of Hangar
12.5	8-gage wire
15.5	6-gage wire
18.5	3/16" rod
22.5	1/4" rod
25.5	1" x 3/16" flat bar

Hangers shall be saddle-tied or wrapped around main runners to develop the full strength of the hangers. Hangers shall be fastened to, or embedded in, the structural framing, masonry or concrete. Lower ends of flat-strap hangers shall be bolted to the main part of the hanger. Where the area of a plastered ceiling exceeds 100 square feet, suitable methods to resist uplift forces shall be provided for each 64 square feet of ceiling.

3503 PLASTER

3503.1 GENERAL:

(a) Gypsum plastering shall conform to the Standard Specification for Gypsum Plastering, ANSI A42.1, as set forth in Section 402.

(b) Plastering with gypsum, hardwall, lime or cement plaster shall be three-coat work when applied over metal and wire lath and shall be not less than two-coat work when applied over gypsum lath or gypsum block.

(c) Portland cement plaster shall not be applied directly to gypsum lath.

(d) In no case shall a brush coat be accepted as a required coat where three-coat work is required by this section.

Grounds shall be installed to provide to provide for the thickness of plaster, as set forth in Table 35-D.

TABLE 35-D

REQUIRED THICKNESS OF INTERIOR PLASTER

Type of Lath	Thickness of Plaster
Metal or wire lath	5/8" minimum
Gypsum lath	2" minimum

(f) If monolithic-concrete ceiling surfaces require more than three-eighths inch of plaster to produce desired lines or surfaces, metal lath or wire lath shall be attached thereto; except that special bonding agents approved by the Building Official may be used.

(g) The Building Official may require test holes to be made for the purpose of determining the thickness of plaster.

3503.2 MATERIALS:

(a) AGGREGATES:

(1) Inorganic aggregates used for plaster and stucco shall conform to the Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster, ASTM C35, as set forth in Section 402, except that gradation of locally produced sand shall be such that the fineness modulus is between 1.20 and 2.35.

(2) Aggregates shall be quarried or washed in fresh water and shall contain not more than one-twentieth of one percent salt, by weight.

(b) GYPSUM: Gypsum plaster shall conform to the Standard Specification for Gypsum Plaster, ASTM C 28, as set forth in Section 402.

(c) LIME: Lime shall conform to the Standard Specification for Quicklime for Structural Purposes, ASTM C5, and the Standard Specification for Special Finish Hydrated Lime, ASTM C206, as set forth in Section 402.

(d) KEENE'S CEMENT: Keene's Cement shall conform to the Standard Specification for Keene's Cement, ASTM C61, as set forth in Section 402.

(e) PORTLAND CEMENT:

(1) Portland cement shall conform to the Standard Specification for Portland Cement, ASTM C150, as set forth in Section 402.

(2) Approved types of plasticity agents may be added to Portland cement in the manufacturing process or when mixing the plaster, but in no case shall the amount of the plasticity agent exceed ten percent of the volume of cement in the plaster mixture.

(f) MASONRY CEMENT: Masonry cement shall be Type II and shall conform to the Standard Specification for Masonry Cement, ASTM C91, as set forth in Section 402.

3503.3 PROPORTIONING AND MIXING:

(a) BASE COATS: The proportions of sand, vermiculite or perlite to 100 pounds of gypsum neat plaster shall not exceed the following:

(1) GYPSUM OR HARDWALL PLASTER:

	Pounds, Damp Loose Sand	Cubic Foot Vermiculite or Perlite
TWO COAT WORK (DOUBLE-UP METHOD)		
(1) Over gypsum lath	250	2 2
(2) Over Masonry*	300	3
THREE-COAT WORK		
(1) First (scratch) coat over lath	200†	2†
(2) First (scratch) coat over masonry	300	3
(3) All second (brown) coats	300†	3†

* Except over monolithic concrete.

† In lieu of the proportioning specified, the proportions may be 100 pounds of gypsum neat plaster to not more than 250 pounds of damp, loose sand or 2 cubic feet of Vermiculite or Perlite, provided this proportioning is used for both scratch and brown coats.

(2) WOOD-FIBRE GYPSUM PLASTER: Wood-fibre gypsum plaster for use on all types of lath, shall be mixed with water only and shall be mixed in the proportion of one part of plaster to one part of sand, by weight, for use on masonry.

(3) READY-MIXED PLASTER: Gypsum ready-mixed plaster shall be in the proportion of 100 pounds of gypsum neat plaster to not more than 250 pounds of sand; or when vermiculite or perlite is used as an aggregate, the proportions shall be 100 pounds of gypsum neat plaster to not more than two and one-half cubic fee of vermiculite or perlite.

(4) PORTLAND-CEMENT PLASTER: For three-coat work, the first two coats shall be as required for the first two coats of exterior stucco, Section 3504.

(5) MASONRY CEMENT PLASTER: For 2 or 3 coat work all work shall be as set forth in Section 3504 herein.

(b) FINISH COATS FOR GYPSUM OR LIME PLASTER: The finish coats shall be mixed and proportioned in accordance with the following procedures:

(1) Smooth white finish, mixed in the proportion of not less than one part gypsum gaging plaster to three parts lime putty, by volume, or an approved prepared gypsum trowel finish.

(2) Sand-float finish, mixed in the proportion of one-half part of Keene's cement to two parts of lime putty and not more than four and one-half parts of sand, by volume, or an approved gypsum sandfloat finish.

(3) Keene's-cement finish, mixed in the proportion of three parts Keene's cement to one part lime putty, by volume.

(4) Lime sand-float finish, mixed in the proportion of three parts lime putty to three parts sand, by volume.

(5) Finish coat for perlite or vermiculite aggregate plasters, mixed in the proportion of one cubic foot of aggregate to 100 pounds of unfibered gypsum plaster, or mixed according to manufacturer's specifications.

(c) FINISH COAT FOR PORTLAND-CEMENT PLASTER: Finish coats for interior Portland cement plaster shall be one of the following:

(1) As required for the third coat of exterior stucco, Section 3504.

(2) A gaged cement plaster, mixed in proportion of one part Portland cement to not more than 15 percent lime putty and not more than four parts of sand, by volume.

(d) FINISH COAT FOR MASONRY CEMENT PLASTER: Finish coat for masonry cement plaster shall be as set forth in Sub-paragraph 3503.4(b)(3) herein.

3503.4 APPLICATION:

(a) BASE COATS:

(1) GYPSUM PLASTER: The scratch coat shall be applied with sufficient material and pressure to form a full key or bond.

(aa) For two-coat work it shall be doubled back to bring the plaster out to grounds and straightened to a true surface and left rough to receive the finish coat.

(bb) For three-coat-work, the scratch (first) coat shall be scratched to a rough surface. The brown (second) coat shall be applied after the scratch coat has set firm and hard, brought out to grounds, straightened to a true surface with rod and darby and left rough, ready to receive the finish (third) coat.

(cc) The finish coat shall be applied to a practically dry base coat or to a thoroughly dry base coat which has been evenly wetted by brushing or spraying. The use of excessive water shall be avoided in the application of all types of finish coat plastering.

(2) PORTLAND-CEMENT PLASTER: The first two coats shall be as required for the first two coats of exterior stucco, except that the interval between the first and second coats shall be not less than 24 hours.

(3) MASONRY CEMENT PLASTER: Where masonry cement is the only cementituous material, the second coat may be applied to the base coat as soon as the base coat has attained sufficient strength and rigidity to support the second (finish) coat.

(b) FINISH COATS:

(1) Smooth white finish shall be applied over the base coat which has set for a period of not less than 24 hours and is surface-dry. Thickness shall be from one-sixteenth inch to one-eighth inch.

(2) Sand-float finish shall be applied over the set base coat which is not quite dry.

(3) Keene's-cement finish shall be applied over the set base coat which is not quite dry. Thickness shall be from one-sixteenth inch to one-eighth inch, unless finish coat is marked off or is jointed; in which case, the thickness may be increased as required by depth of marking or jointing.

(4) The finish coat for interior Portland-cement plastering shall be applied in the same manner as required for the third coat of exterior stucco, except that other types of finish coat may be applied as specified in Section 3504.

(5) The finish coat for light-weight aggregate plastering shall be applied over a base coat which is not quite dry. The thickness shall be from one-sixteenth inch to one-eighth inch.

(c) PLASTER OR CONCRETE:

(1) Monolithic-concrete surfaces shall be clean, free from efflorescence, damp, and sufficiently rough to insure adequate bond.

(2) Gypsum plaster applied to monolithic concrete ceilings shall be specially prepared bond plaster for use on concrete, to which only water shall be added. Gypsum plaster on monolithic walls and columns shall be applied over a scratch coat of bond plaster, or other bonding material, before it has set. The brown coat shall be brought out to grounds, straightened to a true surface and left rough, ready to receive the finish coat.

(3) Portland-cement plaster applied to interior concrete walls or ceilings shall conform to requirements for application to exterior concrete walls as specified in Section 3504

3504 STUCCO

3504.1 STUCCO ON CONCRETE OR MASONRY:

(a) GENERAL:

(1) Stucco base and finish coats, where required to meet fire-resistive requirements, shall be mixed on the proportion of at least one part Portland cement to a maximum of two and one-half parts sand by volume.

(2) Approved manufactured products may be used for base and finish coats.

(b) MATERIALS: The materials of stucco shall conform with the Standards set forth in Section 3503 of this Chapter.

(c) ADMIXTURES:

(1) Plasticity agents shall be of approved types and amounts and, where added to Portland cement in the manufacturing process, or additions shall later be made.

(2) Color may be added to finish coat in approved amounts.

(d) APPLICATION:

(1) Stucco applied to concrete or masonry to meet fire-resistive requirements shall consist of at least two coats, and the total thickness shall be not less than one-half inch.

(2) (aa) Masonry surfaces on which all stucco is applied shall be clean, free from efflorescence, damp and sufficiently rough, or coated with an approved bonding agent, to insure proper bond.

(bb) All concrete surfaces shall be coated with an approved bonding agent or shall be effectively roughened.

(3) (aa) The first coat shall be well forced into the pores of the masonry, shall be brought out to grounds, straightened to a true surface and left rough to receive the finish coat.

(bb) The first coat of two-coat work shall be rodded and waterfloated to a true surface approximately one-half the total thickness.

(4) (aa) The base coat shall be damp cured for a period of not less than 24 hours.

(bb) In lieu thereof, the finish coat where containing appropriate waterproofing or curing admixtures, may be applied as soon as the base coat has attained initial set and is sufficiently firm to receive the finish coat.

(5) The finish coat shall be applied over uniformly damp but surface-dry base.

(6) (aa) Stucco shall be kept damp for a period of not less than 48 hours after application of the finish coat.

(bb) In lieu thereof, the finish coat may contain appropriate approved waterproofing or curing agents.

3504.2 STUCCO ON WALLS OTHER THAN CONCRETE OR MASONRY:

(a) GENERAL: Stucco shall be as set forth in Sub-section 3504.1 of this Chapter.

(b) MOISTURE BARRIER: Wood shall be covered with 15 pound roofing felt, or other approved equally moisture-resisting layer, and metal reinforcement as set forth herein.

(c) METAL REINFORCEMENT:

(1) (aa) Stucco shall be reinforced with galvanized expanded metal weighing no less than 1.8 pounds per square yard, or galvanized welded or woven wire-fabric weighing no less than one pound per square yard.

(bb) All metal lathing shall be lapped not less than one inch.

(2) (aa) Metal reinforcement shall be furred out from the backing by an approved method.

(bb) Fastenings into wood sheathing or wood framing shall be by galvanized nails, with heads not less than three-eighths inch in diameter, driven to full penetration, using a minimum of two nails per square foot, or by approved staples having equal resistance to withdrawal.

(cc) The fastening of rib-lath to metal members shall be by #8 galvanized sheet-metal screws, using a minimum of two screws per square foot.

(d) APPLICATION:

(1) Stucco applied on metal lath shall be three-coat work applied to a total thickness of not less than one-half inch in thickness except as required by Chapter 37 of this Code.

(2) The first coat shall be forced through all openings in the reinforcement to fill all spaces and scored horizontally.

(3) The second coat shall be applied after the first coat has set sufficiently to provide a rigid backing.

(4) The third coat may be applied as soon as the second coat has attained initial set.

3504.3 PNEUMATICALLY-PLACED STUCCO:

(a) Pneumatically-placed stucco shall consist of a mixture of one part Portland cement to not more than five parts sand, conveyed through a pipe or flexible tube and deposited by pressure in its final position.

(b) Rebound material may be screened and re-used as sand in an amount not greater than 25 percent of the total sand in any batch.

(c) Plasticity agents may be used as specified in Paragraph 3504.1(c) of this Chapter.

3505 PLASTICS

3505.1 GENERAL:

(a) Plastic materials used as structural elements shall be designed by methods admitting of rational analysis according to established principles of mechanics.

(b) Plastic materials may be permitted as set forth herein. The physical properties, such as, but not limited to weather resistance, fire resistance, and flame spread characteristics, shall comply with the requirements of this Code.

(c) Application and plans submitted for proposed construction shall identify the plastic material intended for use and such material shall be stamped or otherwise marked so as to be readily identifiable in the field.

(d) Plastic structural elements, other than sheets, shall be designed by a Registered Professional Engineer, or a Registered Architect.

3505.2 DEFINITIONS:

APPROVED FOAM PLASTIC: An approved foam plastic shall be any thermo plastic, thermosetting or reinforced thermosetting plastic material which has a minimum self-ignition temperature of 650 degrees Fahrenheit or greater when tested in accordance with ASTM Standard D1929. It shall have a smoke density rating not greater than 450 and a flame spread of 75 or less when tested in accordance with ASTM Standard E-84.

APPROVED PLASTIC: An approved plastic shall be any thermoplastic, thermosetting, or reinforced thermosetting plastic material which has a self-ignition temperature of six hundred fifty degrees F. or greater when tested in accordance with ASTM D1929, a smoke density rating no greater than four hundred fifty (450) when tested in the way intended for use by ASTM E84 or a smoke density rating no greater than seventy-five (75) when tested in the thickness intended for use according to ASTM D3843 and which meets one of the following combustibility classifications:

CLASS C-1: Plastic materials which have a burning extent of one inch per minute or less when tested in nominal .060 inch thickness, or in the thickness intended for use by ASTM D635.

CLASS C-2: Plastic materials which have a burning rate of 2 inches per minute or less when tested in nominal .060 inch thickness, or in the thickness intended for use by ASTM D635.

FINISH RATING: The time, as determined in accordance with ASTM E-119, at which a thermal barrier reaches a temperature rise of 250 degrees Fahrenheit above ambient or an individual temperature rise of 325 degrees Fahrenheit above Fahrenheit above ambient as measured on the plant of the thermal barrier nearest to foam plastic.

FLAME SPREAD RATING: The measurement of flame spread on the surface of materials or their assemblies as determined in accordance with ASTM E-84.

GLASS FIBER REINFORCED PLASTIC: Plastic reinforced with glass fibers having not less than 20 percent of glass fibers by weight.

LIGHT-DIFFUSING SYSTEM: A suspended construction consisting in whole or part of lenses, panels, grids, or baffles suspended below independently mounted electrical lighting sources.

PLASTIC GLAZING: Plastic materials which are glazed or set in frame or sash and not held by mechanical fasteners which pass through the glazing material.

PLASTIC ROOF PANELS: Plastic materials which are fastened to structural members or to structural panels or sheathing and which are used as light transmitting media in the plane of the roof.

PLASTIC SANDWICH PANELS: Panels of foam plastic sandwiched between incombustible skins.

PLASTIC WALL PANELS: Plastic materials which are fastened to structural members or to structural panels or sheathing and which are used as light transmitting media in exterior walls.

SKYLIGHT: An assembly which includes plastic materials used as light transmitting media and which is located above the plane of the roof.

SMOKE DENSITY: A numerical value of smoke development, determined by measuring the area under the curve of light absorption versus time, in accordance with ASTM E-84 or ASTM D-2843.

THERMOPLASTIC MATERIAL: A plastic material which is capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature.

THERMOSETTING MATERIALS: A plastic material which is capable of being changed into a substantially non-reformable product when cured.

3505.3 FOAM PLASTICS:

(a) GENERAL:

(1) Except as otherwise provided herein, all foam plastics or foam plastic cores in manufactured assemblies used in building construction shall have a flame spread rating of not more than 75 and shall have a smoke-developed rating of not more than 75 and shall have a smoke-developed rating of not more than 450 when tested in the maximum thickness intended for use in accordance with ASTM E-84.

(2) Except as otherwise provided herein, foam plastics shall be separated from the interior walls, floors and ceilings herein of a building by an approved thermal barrier of 2 inch gypsum wallboard or equivalent thermal barrier material which will limit the average temperature rise of the unexposed surface to not more than 250 degrees F. after 15 minutes of fire exposure complying with the ASTM E-119 standard time-temperature curve.

(3) Foam plastics which are used as interior finish shall also meet the flame-spread requirements for interior finish.

(4) Foam plastic not meeting the requirements of this Section may be specifically approved on the basis of approved tests such as, but not limited to, a tunnel test in accordance with ASTM E-84, FM Procedure 4880, UL Subject 1040, ASTM E-152 or the room test procedure described in SPI Bulletin PPICC 401 or fire tests related to actual end-use configuration. The specific approval may be based on the end use, quantity, location

and similar considerations where such tests would not be applicable or practical.

(b) SPECIFIC REQUIREMENTS: The following requirements shall apply to all uses of foam plastics unless otherwise permitted in this Code:

(1) COLD STORAGE BUILDINGS:

(aa) Foam plastics, when tested in a thickness of 4 inches, may be used in a thickness up to 10 inches when the building is equipped with an approved automatic fire suppression system.

(bb) Such approved automatic fire suppression system shall be provided in both the cold storage room and that part of the building in which the room is located.

(cc) For all roof applications, the smoke developed rating shall not be limited.

(2) WALK-IN COOLERS:

(aa) Foam plastic having a maximum flame spread of 75 may be used in a thickness up to 4 inches in free standing walk-in cooler or freezer units less than 400 square feet in floor area without a thermal barrier and without an automatic fire suppression system when the foam plastic is covered by a metal facing not less than 0.032 inch-thick aluminum or corrosion-resistant steel having a minimum base metal thickness of 0.016 inch.

(bb) When protected by a thermal barrier, the foam plastic may be used in a thickness up to 10 inches.

(3) EXTERIOR WALLS OF ONE STORY BUILDINGS:

(aa) EXCEPTION:

Foam plastic insulation having a flame spread of 25 or less may be used without thermal barriers in or on exterior fire resistive incombustible walls in a thickness of not more than 4 inches when the foam plastic is covered by a thickness of not less than 0.032 inch aluminum or corrosion-resistant sheet steel having a minimum base metal thickness of 0.0160 inch, and the insulated interior area is protected with automatic sprinklers.

(bb) Foam plastics may be used without the thermal barrier described herein when it is protected by a minimum of one inch thickness of masonry or concrete.

(4) EXTERIOR WALLS OF MULTI-STORY BUILDINGS:

(aa) EXCEPTION: Where walls face a street or permanent open space of 30 feet or more, foam plastic insulation may be used in a non-fire rated exterior wall assembly.

(bb) Where a separation of less than 30 feet exists, foam plastic may be used within exterior walls, provided the wall assembly affords the required fire resistivity.

(cc) Foam plastic insulation shall be separated from the building interior by a thermal barrier having an index of 15 unless a specific approval is obtained on the basis of Paragraph (a)(4) herein.

(dd) The amount of foam plastic in any portion of the wall or panel shall not exceed 6000 BTU/square foot of projected area as determined by tests conducted in accordance with NFPA 259.

(ee) The foam plastic core, coatings and facings shall have a flame-spread rating of 25 or less and smoke-developed rating of 450 or less as determined in accordance with ASTM E-84.

(ff) Facing, coating, and core materials shall be mechanically or adhesively fastened to each other and to building members to prohibit failure in bond as a result of temperatures which may be experienced in a building fire from wind loads or other conditions.

(gg) Results of diversified or full scale tests reflecting an end-use configuration shall be submitted to the building official demonstrating the assembly in its final form does not propagate flame over the surface or through the core when exposed on the exterior face to a fire source.

(5) ROOFING:

(aa) Foam plastic may be used in a roof covering assembly without the thermal barrier when the foam

is separated from the interior of the building by plywood sheathing not less than 2 inch in thickness bonded with exterior glue, with edge supported by blocking, tongue-and-groove joints or other approved type of edge support, or an equivalent or better material or system.

(bb) Foam plastic roof insulation which complies with Factory Mutual Standard 4450 or Underwriters Laboratories Subject 1256 need not meet the requirements of Paragraph (a)(2).

(cc) For all roof applications, the smoke developed rating shall not be limited.

(6) ATTICS AND CRAWL SPACES:

(aa) Within an attic or crawl space where entry is made for service of utilities, exposed foam plastics shall be protected against ignition by 1 inch thick mineral fiber insulation, 3 inch thick plywood, particleboard or hardboard or 3/8 inch gypsum wallboard, corrosion-resistant steel having a base metal thickness of 0.0160 inch, or other equivalent material installed in such a manner that the foam plastic is not exposed.

(bb) The protective covering shall also meet the requirements for the type of construction.

(7) DOORS:

(aa) Where doors are permitted without a fire-resistive rating, foam plastic having a flame-spread rating of 75 or less may be used as a core material when the door facing is metal having a minimum thickness of 0.032-inch aluminum or sheet steel having a minimum thickness of 0.0160 inch.

(bb) There shall be no thermal barrier requirement for these doors.

3505.4 LIGHT TRANSMITTING PLASTICS:

(a) GENERAL:

(1) The provisions of this Sub-section shall govern the quality and methods of application of plastics for use as light transmitting media within buildings and structures.

(2) All plastics to be used according to the provisions of this Sub-section shall be approved plastic and conform to Sub-sections 3505.1 and 3505.2 of this Code.

(b) EXCEPTIONS:

(1) Buildings of Group J Occupancy shall be exempt from the requirements of this Sub-section.

(2) Roof coverings over terraces and patios of one and two family dwellings shall be permitted with approved plastics.

(c) GLAZING OF OPENINGS IN NON-FIRE RATED WALLS:

(1) Doors, sash and framed openings which are not required to be fire rated may be glazed with approved plastic materials in buildings of Type V construction.

(2) In all other types of construction, openings not required to be fire rated may be glazed or equipped with approved plastic materials subject to the requirement listed below:

(aa) The area of such glazing shall not exceed 25 percent of the wall face of the story in which it is installed.

(bb) The area of a unit or pane of glazing installed above the first story shall not exceed 16 square feet and the vertical dimension of a unit or pane shall not exceed 4 feet. There shall be a minimum 3 feet vertical spandrel wall between stories.

(cc) Approved plastics shall not be installed more than 75 feet above grade level except as provided in Sub-sub-paragraph 3505.4(c)(2)(dd).

(dd) Approved thermoplastic materials may be installed in areas up to 50 percent of the wall area of each story in structures less than 150 feet in height if continuous architectural projections constitute an effective fire barrier extending at least 3 feet from the surface of the wall on which the glazing is installed and are provided

on each floor above the first floor. The size and the dimensions of individual units shall not be limited in such installations except as required to meet structural loading requirements.

(3) Automatic fire extinguishing system: Where a complete approved automatic fire extinguishing system is provided in the building, the area of glazing permitted by Sub-sub-paragraph 3505.4(c)(2)(aa) may be increased by 100 percent.

(d) EXTERIOR NON-FIRE RATED WALL PANELS:

(1) GENERAL: Approved plastic materials may be used as wall panels in exterior walls not required to have a fire rating subject to the following requirements:

(aa) INSTALLATION: Exterior wall panels installed as provided herein shall not alter the type of construction classification of the building.

(bb) HEIGHT LIMITATION: Approved plastics shall not be installed more than 75 feet above grade level except as permitted by Sub-sub-paragraph 3505.4(d)(2)(cc).

(cc) AREA LIMITATION AND SEPARATION: Area limitation and separation requirements of exterior wall panels shall be as provided in Table 35-D.1.

(dd) COMBINATIONS OF GLAZING AND WALLPANELS: Combinations of plastic glazing and plastic wall panels shall be subject to the area, height and percentage limitations, and separation requirements applicable to the class of plastics as prescribed for wall panel installations.

TABLE 35-D.1
AREA LIMITATION AND SEPARATION REQUIREMENTS FOR PLASTIC WALL PANELS IN NON-FIRE RATED WALLS

Fire separation (feet)	Class of Plastic	Maximum aggregate area (% of exterior wall)	Maximum separated panel area sq. ft.	Minimum separation of panels (feet) Vertical	Horizontal
10 ft. up to and	C1	25	90	6	4
including 30 ft.	C2	15	70	8	4
Over 30	C1	50	no limit	31	0
	C2	50	100	61	3

Note 1. See Sub-sub-paragraph 3505.4(d)(2)(aa).

(2) EXCEPTIONS:

(aa) Structures which provide continuous architectural projections extending at least 36 inches from the surface of the wall in which plastic wall panels are installed, shall not be required to provide vertical separation at that floor.

(bb) Automatic fire extinguishing systems: When a complete approved automatic fire extinguishing system is provided in the building, the maximum percent area of plastic panels in exterior walls and the maximum square feet of separate panel area given in Table 35 D.1 may be increased 100 percent but the area of plastic wall panels shall not exceed 50 percent of the wall area.

(cc) Approved thermoplastic materials may be installed in areas up to 50 percent of the wall area of each story in structures less than 150 feet in height if continuous architectural projections constitute an effective fire barrier extending at least 3 feet from the surface of the wall on which the panels are installed and are provided on each floor above the first floor.

(dd) The use of plastics shall not be permitted in exterior walls in Group Occupancies A, B, D and E.

(e) ROOF PANELS:

(1) GENERAL: Approved plastic roof panels may be installed as follows:

(aa) Where the roof is not required to have a fire rating;

(bb) Where the roof panels meet the requirements for roof coverings of the particular occupancy;

(cc) In roofs of buildings protected by an approved automatic fire extinguishing system;

(dd) EXCEPTION: The use of plastics shall not be permitted in roofs of Group A, B, D and E Occupancies.

(2) SEPARATIONS: Individual roof panels shall be separated from each other by a distance of not less than 4 feet measured in a horizontal plane.

(3) LOCATION: Where exterior wall openings are required to be fire rated, a roof panel or unit shall not be installed within 6 feet of such exterior wall.

(4) AREA LIMITATIONS: Roof panels or units shall be limited in area, according to provisions set forth in Table 35-D.2.

TABLE 35-D.2

AREA LIMITATIONS FOR ROOF PANELS

Maximum Separated Class of plastic	Maximum aggregate area panel area (sq. ft.)	(% of floor area)
C1	300	30
C2	100	25

(f) SKYLIGHT ASSEMBLIES: Skylight assemblies may be glazed with approved plastic materials in accordance with the following provisions:

(1) MOUNTING:

(aa) The plastic shall be mounted a minimum of 4 inches above the plane of the roof on a curb constructed in accordance with requirements for types of construction.

(bb) Dome-shape skylights shall rise above the mounting flange a minimum distance equal to 10 percent of the maximum span of the dome, but not less than four inches.

(cc) The edges of the skylights shall be protected by incombustible materials in Types I, II, III protected, and IV construction.

(2) MAXIMUM AREA OF SKYLIGHT UNITS: Each skylight unit shall have a maximum area within the curb of 100 square feet for Class C-2 material and 200 square feet for Class C-1 material.

(3) AGGREGATE AREA OF SKYLIGHTS: The aggregate area of skylights shall not exceed 33 percent when Class C-1 materials are used, and 25 percent when Class C-2 materials are used, of the floor area of the room or space sheltered by the roof in which they are installed.

(4) SEPARATION: Skylights shall be separated from each other by a distance of not less than 4 feet measured in a horizontal plane.

(5) LOCATION: Where exterior wall openings are required to be fire rated, a skylight shall not be installed within 6 feet of such exterior wall.

(6) EXCEPTIONS:

(aa) Skylight assemblies shall not be permitted to be glazed with approved plastic materials in buildings of Group D and E Occupancies.

(bb) The aggregate area of approved plastic skylights may be increased 100 percent beyond the limitations set forth herein if the skylights are used as an automatic fire venting system or if the building is equipped with an automatic fire extinguishing system.

(cc) When a building is not more than one story in height, has a minimum distance of separation from other buildings of 30 feet and is not used as an enclosed means of egress, skylights in such a building need not comply with the requirements set forth in this Paragraph.

(dd) When skylights used in a building are made of approved plastic materials that meet the fire rated requirements of the roof of the building, such skylight assemblies need not comply with the requirements set forth in this Paragraph.

(ee) Skylights installed in Detached Buildings of Group I Occupancy, Type III Unprotected and Type V Unprotected need not comply with this section.

(g) LIGHT DIFFUSING SYSTEMS:

(1) GENERAL:

(aa) Light diffusing systems shall not be installed in Group D and E Occupancies nor in the exitways unless they are protected with an approved automatic fire extinguishing system.

(bb) Approved plastic diffusers shall comply with Section 3708, Interior Finishes, unless the individual plastic panels will fall from their mountings before igniting at an ambient temperature of at least 200 degrees F. below their ignition temperature. The panels must, however, remain in place at an ambient room temperature of 175 degrees F. for a period of not less than 15 minutes.

(cc) LOCATION: Where fire rated ceiling assemblies are required, plastic diffusers, if used, shall be located below such assemblies.

(2) INSTALLATION: Plastic diffuser shall be supported directly from ceiling or roof construction by use of incombustible hangers. Hangers shall be at least No. 12 Steel Wire Gage (0.106 inch) galvanized wire or equivalent.

(3) SIZE LIMITATIONS: Individual panels or units shall not exceed 10 feet in length or 30 square feet in area.

(4) When buildings are protected by an automatic fire extinguishing system, the following provisions shall apply to light diffusing systems within such buildings:

(aa) Fire extinguishing systems shall be located above and below the light diffusing system unless specifically approved for above such system only.

(bb) Areas of light diffusing system protected by a fire extinguishing system shall not have to comply with the size limitations set forth in this Sub-paragraph.

(5) ELECTRICAL LIGHTING FIXTURES:

(aa) Plastic light-transmitting panels and light-diffuser panels installed in approved electric lighting fixtures shall comply with Section 3708 and Sub-section 3703.6.

(bb) The area of approved plastic materials when used in required fire exits or corridors shall not exceed 30 percent of the aggregate area of the ceiling in which they are installed, unless the occupancy is protected by an approved fire extinguishing system.

(h) PARTITIONS:

(1) GENERAL: Approved light-transmitting plastics may be used in or as partitions provided the requirements of the types of construction as set forth in Chapters 18 through 22 are met.

(i) BATHROOM ACCESSORIES:

(1) USE OF PLASTICS: Approved plastics shall be permitted as glazing in shower stalls, shower doors,

bathtub enclosures and similar accessory units, and shall conform to the Safety Standard for Architectural Glazing Materials set forth in Chapter 4.

(j) AWNINGS AND SIMILAR STRUCTURES:

(1) GENERAL: Approved light-transmitting plastics may be used on or as awnings and similar structures when in conformance with provisions as set forth in other sections of this Code.

3506 RESERVED FOR FUTURE USE

3507 TILE

3507.1 Ceramic and Portland cement floor tile shall be set on a concrete slab or on wood sheathing on wood joists as set forth in Sub-section 2005.1 and protected by a waterproof membrane.

3507.2

(a) Floor tile shall be set in a mortar bed of one part Portland cement to 3 parts aggregate or otherwise bedded in an approved adhesive material.

(b) Ceramic and Portland cement wall tile used in areas subject to frequent wetting shall be backed with masonry, stucco on wire lath or approved tile backer board.

(c) Wall tile used in areas not subject to frequent wetting shall be backed by a cladding having the rigidity of stucco on wire lath and shall be bedded in cement mortar or other approved adhesive material.

3507.3 Portland cement or other porous tile shall be soaked in water not less than one hour before placing.

3507.4 Built-in-tubs with overhead showers shall have waterproof joints between the tub and the wall floor.

3508 WINDOWS, DOORS, GLASS AND GLAZING

3508.1 GENERAL:

(a) Windows, doors, glass and glazing shall be as set forth in this Section and, where required to be fire-resistive for the protection of openings, shall also comply with Chapter 37 of this Code.

(b) Glass shall comply with the Standard for Glass, Flat and Corrugated, For Glazing Mirrors and Other Uses, GSA, DD-G-451c, as set forth in Section 402.

(c) Transparent and obscure safety-glazing materials shall conform to the Performance Specifications and Methods of Test for Transparent Safety Glazing Materials Used in Buildings, ANSI Z97.1, as set forth in Section 402.

(d) Installed glass shall not be less than Single Strength, B quality unless otherwise approved by the Building Official and where edges are exposed they shall be seamed or fine polished.

(e) Where a lite of glass is of such height above grade that the top 50 percent or more is in a zone of greater wind load, the area of the entire lite shall be limited as for the greater height above grade.

(f) (1) Replacement of any glazing or part thereof shall be designed and constructed in accordance with Sections 104.3(c)(2), 104.3(d) and (e) of this Code.

(2) In accordance with Sec. 104.3(c)(2), the minimum pressures shall be as outlined in Table 35-H.

TABLE 35-H

Height above Ground (in feet) plus or minus	Minimum Design Pressure (in Pounds per square foot)
0 to 5	30
5 to 1	37
15 to 25	45
25 to 35	50
35 to 55	56
55 to 75	63
75 to 100	68
100 to 150	75
150 to 250	86
250 to 350	96
350 to 550	108
550 to 750	121
750 to 1000	131
over 1000	135

1) All heights shall be to top of opening

2) Section 2315 shall not apply to the above openings

3508.2 FIXED GLASS IN EXTERIOR WALLS:

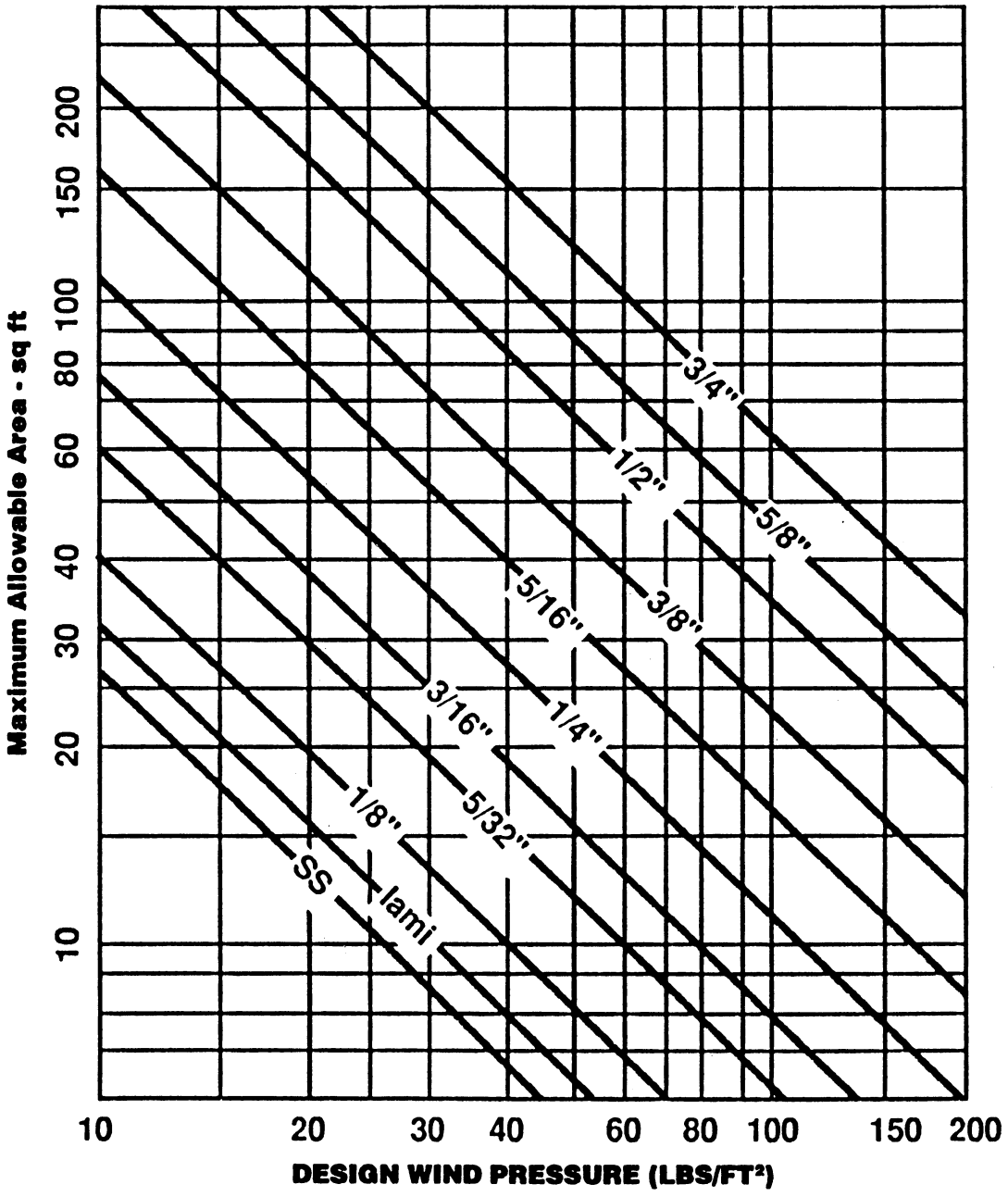
(a) LIMITS OF SIZE OF GLASS:

(1) The minimum thickness of annealed float glazing materials, with four sided support, used in exterior walls shall be determined and shall not be less than as set forth in Table 35-E. The table applies for width-to-length ratios from 1:1 to 1:5.

(2) For glazing materials other than annealed float, the design wind pressure used with Table 35-E shall first be divided by the applicable glazing material resistance factor set forth in Table 35-F.

TABLE 35-E

Minimum thickness of vertical glass as a function of area and wind pressure (based on width-to-length ratios of 1:1 to 1:5)



(3) Corrugated glass and other special glass shall be limited to spans determined by analysis and test to resist the loads set forth in Chapter 23 based on fiber stresses not exceeding 4000 psi.

(4) Glass block shall be limited as set forth in Sub-section 2704.10.

TABLE 35-F
RESISTANCE FACTORS FOR GLAZING MATERIALS
VERTICAL GLASS

GLASS TYPE	FACTOR
Single Glass:	
Regular (Annealed)	1.0
Heat Strengthened	2.0
Fully Tempered	4.0
Wired	0.5
Patterned	1.0
Sandblasted	0.5
Laminated-regular plies	0.75
Laminated-heat strengthen plies	1.5
Laminated-fully tempered plies	3.0
Insulating Glass:	
Regular (Annealed)	1.8
Heat Strengthen	3.6
Fully Tempered	7.2
Laminated-regular plies	1.4
Laminated-heat strengthen plies	2.7
Laminated-fully tempered plies	5.4

(1) For laminated glass, use line in Table 35-E for total glass thickness after adjusting the loads by factor determined in Table 35-F.

(2) For laminated glass, the values are based on two plies of the same thickness and type.

(3) For insulating glass, the values are based on two panes of identical thickness and type. Use thickness for one pane.

(4) Values for patterned glass are based on the thinnest part of the pattern. Interpolation between line of Table 35-F might be necessary.

(5) Value for sandblasted glass is a minimum and depends on severity and depth of the sandblast.

(6) The resistance factors outlined herein may be utilized for sloped glazing, where symmetrical lites are to be used inside and out and the glazing will not be subjected to sustained loads. In all other cases the applicable resistance factors for sloped glazing shall be determined by way of engineering analysis or shall be based on acceptable test data.

(b) CONSTRUCTION DETAILS:

(1) Each lite of fixed glass more than 3 feet in width shall have 2 setting blocks or suspension clamps made of lead or other approved material.

(2) Fixed glass lites shall be set in non-corrosive metal frames or in frames of other non-corrosive material where substantiated by load test, except that glass not exceeding 32 square feet in area in one or two story buildings of Group G, H and I Occupancy and glass not exceeding 15 square feet in area in buildings of other

Occupancies, may be set in wood members provided the adequacy and durability of such wood setting members are demonstrated to the satisfaction of the Building Official.

(3) Wood shall have been treated with an approved preservative as set forth in Paragraph 2913.2(a).

(4) Attachment shall be as set forth in Section 2309 and shall be corrosion-resistant.

(5) Glass in fixed lites shall be securely and continuously supported at the perimeter of each sheet unless the design is based on one or more unsupported edges. Supporting members such as division bars and mullions shall be designed by national analysis to support the wind pressures set forth in Chapter 23. Supporting bars shall be attached at the ends to resist the loads set forth in Section 2309.

(6) The depth of the glazing rabbet and depth of engagement in the rabbet, for fixed glass, shall be based on consideration of the dimensional reduction due to deflection and the dimensional changes due to temperature, but shall be not less than the minimum values indicated in Table 35-G.

EXCEPTION: SKYLIGHTS

TABLE 35-G

MINIMUM GLAZING REQUIREMENTS

Operative/Inoperative Windows, except Horizontal Sliding

Glass Area	<6 S.F.	6-14 S.F.	14-32 S.F.	32-50 S.F.	>50 S.F.
1) Minimum Frame Lap	1/4"	1/4"	5/16"	3/8"	2"
2) Minimum Glass Edge[3] Clearance	1/8"	1/8"	5/16"	1/4"	1/4"
3) Continuous Glazing[3] Rabbet and Retainer	Required				
4) Resilient Setting[4] Material	Not Req'd	Required			

Sliding Doors and Horizontal Sliding Windows

Glass Area	<14 S.F.	14-32 S.F.	32-50 S.F.	>50 S.F.
5) Minimum Glass Frame Lamp	1/4"	5/16"	3/8"	2"
6) Minimum Glass Edge[3] Clearance	1/8"	3/16"	1/4"	1/4"
7) Continuous Glazing[3] Rabbet and Retainer	Required			
8) Resilient Setting Material[4]	Not Req'd		Required	

(1) Table 35-G does not apply to skylights

(2) Glass edge clearance at all sides of pane shall be a minimum of 3/16" where height of glass exceeds three feet.

(3) Glass retainers such as metal, wood, or vinyl face stops, glazing beads, gaskets, glazing clips and glazing channels shall be of sufficient strength and fixation to serve this purpose.

(c) SAFEGUARDS:

(1) Where there is a drop of more than 4' on the far side of a fixed glazed panel (24" or more in width)

the bottom of which is less than 30" above the near side walking surface, safeguards as set forth in Section 516 of this Code shall be provided. In other than "H" and "I" Occupancies, fixed glazed panels if less than 24" wide shall be tempered glass, but may be without safeguards.

(2) Where there is a drop of four feet or less on opposite sides of a fixed glazed panel 24 inches or more in width, safeguards shall be provided where persons might walk into or through such glazing, as follows:

(aa) Glazing which is etched, translucent or otherwise made apparent.

(bb) An opaque bulkhead not less than 18 inches higher than the upper level.

(cc) A planter with plantings not less than 18 inches higher than the upper level.

(dd) Safety glazing or a single horizontal bar of handrail strength requirements located 36 inches above the upper level.

(3) Glazed panels located adjacent to, or in doors, shall be of safety-glazing, as follows:

(aa) All glazed panels in a door through which a three-inch diameter sphere is able to pass.

(bb) In residential, H and I Occupancies, all glazing materials adjacent to door within 12 inches of the door in a closed position and below the top of the door.

(cc) In all Occupancies other than residential, any glazing material adjacent to door within 48 inches of the door in a closed position and below the top of the door.

(dd) EXCEPTIONS:

(1) Wired glass in fire doors.

(2) Leaded glass of area 30 square inches or less.

(3) Curved glass panels in revolving doors.

(4) Commercial refrigerated cabinet doors.

(4) A solar screen may serve as a safeguard where such screen complies with the strength requirements of a railing.

3508.3 DOORS AND OPERATIVE WINDOWS IN EXTERIOR WALLS:

(a) DESIGN AND APPROVAL:

(1) The design and approval of sliding doors, swinging doors and operative windows in exterior walls, including the supporting members, shall be based on the proposed use-height above grade in accordance with Chapter 23 of this Code.

(2) Where more than one-half of the area of such doors and windows is glazed, the design and approval shall be supported by tests simulating, as nearly as practicable, the conditions of use at the proposed height above grade.

(3) Maximum glass sizes shall comply with Table 35-E herein.

(4) Swinging doors of glass, in exterior walls, without continuous frames shall be of fully tempered glass only, and shall be not less than one-half inch in thickness.

(5) Doors shall be designed to be readily operative without contact with the glass.

(6) Garage doors, passage doors, skylights, operative and inoperative windows, including their supporting framework, in exterior building surfaces, shall be rated for wind pressure resistance, in pounds per square foot. Said rating shall be determined in accordance with the test methods outlined in ASTM E 330-84 "Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference: or by comparative analysis as provided for in Sub-paragraph 3508.3(b)(5). The respective door, window and glazing shall then be permanently identified with its respective wind resistance rating at the point of manufacturer. This wind resistance rating is not intended to preempt any other ratings that might be required

of the respective assembly, such as fire resistivity."

(7) The Architect or Professional Engineer of Record shall be required to specify the design wind pressure, determined in accordance with Chapter 23 of this Code, for all garage doors, exterior doors, skylights and operative and inoperative windows. The design wind pressure for each component of the exterior building surface, shall be incorporated into the building design drawing so as to allow the respective manufacturer to size their prefabricated assembly for the proper wind pressures.

(8) Exterior garage doors shall be designed and constructed to actively or passively lock in the closed position when closed and when subjected to a uniform lateral pressure in excess of 50 percent of the design wind pressure as prescribed in Chapter 23 of this Code over its entire face. Exterior garage door assemblies shall be deemed in compliance with this requirement upon presentation of acceptable test data or engineering analysis.

EXCEPTION: **(aa)** Exterior garage doors when protected by fixed, operable or portable shutters or screens, which are shown to be in conformance with Paragraph 3501.1(c) of this Code.

(9) The Architect or Professional Engineer of Record shall be required to detail, on the drawings submitted for permit, rough opening dimensions, supporting framework, method of attachment and waterproofing procedures for all garage doors, passage doors, skylights, operative and inoperative windows in exterior walls. Said framework and method of attachment shall be designed and constructed so as to sufficiently resist the design wind pressures as outlined in Chapter 23 of this Code.

EXCEPTION: **(aa)** When detailed engineered shop drawings and product literature, produced by the manufacturer's specialty engineer and approved by an Architect or Professional Engineer of Record, are submitted at the time of permit application, which completely identifies rough openings, supporting framework, method of attachment, and waterproofing procedures, and are prepared by and bear the signature and seal of a Professional Engineer.

(b) TESTS:

(1) Operative window and door assemblies shall be tested in accordance with Section 3 of the American National Standards Institute (ANSI) specifications A134.1 for aluminum windows, and A134.2, for aluminum sliding glass doors, and the forced entry requirements of the Architectural Aluminum Manufacturers Association (AAMA) Standards 1302.3 and 1303.3, as set forth in Section 402 of this Code and as set forth herein.

(2) Such assemblies with permanent muntin bars shall be tested with muntin bars in place.

(3) Such assemblies shall be installed in accordance with the conditions of test and approval.

(4) Test load shall be one and one-half (1.5) times the design positive or negative pressure, expressed in pounds per square foot, as determined in accordance with Chapter 23 for components and cladding, of this Code

(5) Comparative analysis of operative windows and glazed doors may be made provided the proposed unit:

(aa) Shall always be compared with a tested and currently approved unit.

(bb) Varies only in width, height and/or load requirements.

(cc) Shall not exceed 100 percent of the proportional deflection or fiber stress of the intermediate members of the approved unit.

(dd) Shall conform as to extruded members, reinforcement and in all other ways with the tested approved unit.

(ee) Shall not exceed 100 percent of the concentrated load at the juncture of the intermediate members and the frame of the approved unit.

(ff) Shall not permit more air and water infiltration than the approved unit based on the height above grade.

(6) Pass-through windows for serving from a single-family kitchen, where protected by a roof overhang of five feet or more, shall be excepted from the requirements of the water infiltration test.

(c) SAFEGUARDS: Operative windows shall be protected as follows:

(1) In other than H and I Occupancies, where there is a drop of more than 4' on the far side of such windows and the window opening is less than 36" above the near side walking surface; or in H and I Occupancies where there is a drop of more than 4' on the far side of such windows and the window opening is less than 30" above the near side walking surface, safeguards shall be provided to prevent the fall of persons when such windows are open, as set forth in Section 516 of this Code, except:

(aa) Where awning window vent openings are of tempered glass and restricted in operation to reject objects as required for safeguards in Paragraphs 516.2(d) and (e) of this Code.

(bb) Slats or grill work constructed to comply with the Standard OSHA-1910, set forth in Sub-section 516.1 of this Code, or other construction approved by the Building Official, may be provided in lieu of other safeguards.

(cc) Where the near side of such window is less than four inches above the floor and falling objects could present a hazard, toeboards may be required as provided in the Standard OSHA-1910 set forth in Sub-section 516.1 of this Code, or an approved alternate design.

(2) Where the drop from such windows is four feet or less, the following may be used in lieu of other safeguards:

(aa) A barrier such as a planter, fixed bench or similar construction arrangement not less than 18" higher than the upper level.

(bb) A single-family residence, a natural barrier such as shrubbery.

3508.4 INTERIOR LOCATIONS:

(a) Swinging or sliding doors of glass without a continuous frame shall be of only fully tempered glass not less than 3/8 inch in thickness.

(b) (1) The glazing in sliding and swinging doors, including shower or tub enclosures, shall be safety glazing.

(2) Glass or mirrors immediately surrounding a bathtub or shower enclosure shall be safety glazing where the glass or mirrors are less than 60" above the floor of the tub or shower.

(c) The glazing in fixed panels adjacent to paths of egress shall comply with Paragraph 3508.2(c)(3) herein.

(d) Glass shall not be solid painted or otherwise concealed where such painted glass may be mistaken for other construction materials.

(e) Mirrors more than 9 square feet in area shall be directly secured to supports and shall not be hung.

3508.5 SAFETY GLAZING:

(a) Safety-glazing, where required, shall be as set forth in this Sub-section.

(b) Safety-glazing shall comply with the standard set forth in Paragraph 3508.1(c) for transparent and obscure safety-glazing materials and plastic glazing shall in addition comply with the specifications of Paragraph 3508.5(c).

(c) Plastics, with or without reinforcing or acrylic modifiers shall comply with Section 3505 herein and consideration of dimension reduction caused by deflection and/or dimensional instability of the materials shall be given in the determination of the depth of the glazing rabbet and engagement of the plastic in the rabbet. Plastics shall be limited to spans determined by analysis and test to resist the loads set forth in Chapter 23.

(d) Glass louvered doors need not be safety-glazed.

3508.6 SLOPED GLAZING:

(a) Sloped glazing includes any installation of glass or other transparent, translucent, or opaque glazing material installed at a slope of 15 degrees or more from the vertical plane. Glazing materials in skylights, roofs and sloped walls are included within this definition.

(b) Allowable Glazing Materials:

(1) Sloped glazing shall be any of the following materials subject to the limitations specified in 3508.5(c) and the exceptions specified in 3508.6(d):

(aa) For monolithic glazing systems, the glazing material of the single lite or layer shall be laminated glass with a minimum 30 mil polyvinyl butyryl (or equivalent) interlayer, wired glass, approved plastic material meeting the requirements of Chapter 35, heat-strengthened glass, or fully-tempered glass.

(bb) For multiple glazing systems, each lite or layer shall consist of any of the glazing materials specified in (aa) above.

(cc) See 3505 for additional requirements for plastic skylights.

(c) LIMITATIONS:

Heat-strengthened glass and fully-tempered glass when used in monolithic glazing system shall have screens installed below the glazing material, subject to exceptions in 3508.6(d) to protect building occupants from falling glass should breakage occur. The screens shall be capable of supporting the weight of the glass and shall be substantially supported below and installed within 4" of the glass. They shall be constructed of a noncombustible material not thinner than 0.0808" (12 B and S ga) diameter with a mesh not larger than 1" x 1". In a corrosive atmosphere structurally equivalent noncorrosive screening materials shall be used. Heat-strengthened glass, fully-tempered glass, and wire glass, when used in multiple layer glazing systems as the bottom glass layer over the walking surface, shall be equipped with screening meeting the requirements specified for monolithic glazing systems.

(d) EXCEPTIONS: In monolithic and multiple layer sloped glazing systems, the following exceptions apply:

(1) Fully-tempered glass may be installed without required protective screens when glazing between intervening floors at a slope of 30 degrees or less from the vertical plane if the highest point of the glass is 10' or less above the walking surface.

(2) Any glazing material, including annealed glass, may be installed without required screens if the walking surface below the glazing material is permanently protected from the risk of falling glass or if the area below the glazing material is not a walking surface.

(3) Any glazing material, including annealed glass, may be installed in the sloped glazing systems of greenhouses (structures used primarily for growing plants) without screens provided the height of the greenhouse at the ridge does not exceed 20' above grade. Frames may be of wood construction in greenhouses located outside the Fire District if the height of the sloped glazing does not exceed 20' above grade. In other cases, noncombustible frames shall be used.

(e) SLOPED GLAZING FRAMING:

In other than types III, IV and V construction, all sloped glazing and skylight frames shall be constructed of noncombustible materials. In foundries or buildings where acid fumes deleterious to metal are incidental to the use of the building, approved pressure-treated woods or other approved noncombustible material shall be permitted for sash and frames. All sloped glazing and skylights shall be designed for the roof and wind loads in Chapter 23 of this Code. All skylights set at an angle of less than 45 degrees from the horizontal plane shall be mounted at least 4" above the plane of roof on a curb construction as required for the frame. Sloped glazing may be installed in the plane of the roof where the roof pitch is greater than 45 degrees from horizontal.

3509 GLASS VENEER

Glass veneer shall be as set forth in this Section.

3509.1 DIMENSION: Glass-veneer units shall be not less than 11/32 inch in thickness. No unit shall be larger in area than ten square feet where 15 feet or less above the grade directly below, nor larger than six square feet where more than 15 feet above the grade directly below.

3509.2 ATTACHMENT: Every glass-veneer unit shall be attached to the backing with approved mastic cement and corrosion-resistant ties and shall be supported upon shelf angles.

(a) Where more than six feet above grade, veneer shall be supported by shelf angles; and ties shall be used in both horizontal and vertical joints.

(b) Below a point six feet above grade, glass veneer shall rest on shelf angles. Veneering shall not be supported on construction which is not an integral part of the wall, and over sidewalks shall be supported on a shelf angle not less than one-fourth inch above grade.

(c) All edges of glass veneer shall be ground.

3509.3 MASTIC:

(a) The mastic shall cover not less than one-half of the area of the unit after the unit has been set in place and shall be neither less than one-fourth inch or more than one-half inch in thickness.

(b) The mastic shall be insoluble in water and shall not lose its adhesive qualities when dry.

(c) Absorbent surfaces shall be sealed by a bonding coat before mastic is applied. The bonding coat shall be cohesive with the mastic.

(d) Glass-veneer surfaces to which mastic is applied shall be clean and uncoated.

(e) Space between edges of glass veneer shall be filled uniformly with an approved type pointing compound.

3509.4 SHELF ANGLES AND TIES:

(a) Shelf angles shall be of corrosion-resistant material capable of supporting four times the weight of the supported veneer. The shelf angles shall be spaced vertically in alternate horizontal joints, but not more than three feet apart. Shelf angles shall be secured to the wall at intervals not exceeding two feet with corrosion-resistive bolts not less than one-fourth-inch diameter. Bolts shall be set in masonry and secured by lead shields.

(b) Ties shall be of corrosion-resistant metal as manufactured especially for holding glass-veneer sheets to masonry surfaces. There shall be not less than one such approved tie for each two square feet of veneer surface.

3509.5 BACKING: Exterior glass veneer shall be applied only upon masonry, concrete or stucco.

3509.6 EXPANSION JOINTS: Glass veneer units shall be separated from each other and from adjoining materials by an expansion joint at least one-sixteenth in thickness. There shall be at least one-sixty-fourth-inch clearance between bolts and the adjacent glass.

3510 GYPSUM BOARD PRODUCTS AND ACCESSORY ITEMS

3510.1 GENERAL:

(a) Gypsum wallboard products and related items and accessories, to be used with or without the addition of plaster for partitions, walls and ceilings, shall be as set forth in this Section.

(b) Where required to be fire-resistive such assemblies shall also comply with Chapter 37.

3510.2 STANDARDS: The following Standards are adopted as set forth in Section 402:

(a) Standard Specification for the Application and Finishing of Gypsum Wallboard, ANSI A97.1.

(b) Specifications for Gypsum Wallboard, ASTM C36.

(c) Specification for General Requirements for Zinc-Coated (galvanized) Steel Sheets by the Hot-Dip Process, ASTM A525.

(d) Specification for Light-Gage Steel Studs, Runners, and Rigid Furring Channels, ASTM C645.

(e) Specifications for Joint Treatment Materials for Gypsum Wallboard Construction, ASTM C475.

3510.3 GYPSUM WALLBOARD:

(a) The gypsum wallboard shall comply with the standard set forth in Paragraph 3510.2(a) and single or multiple system combination shall be not less than one-half inch in thickness.

(b) The span between supports for gypsum wallboard shall be not more than 24 inches for 1/2-inch thick and 5/8-inch thick wallboard.

(c) Gypsum wallboard used in fire-rated assemblies shall be a type for which test ratings are available.

3510.4 WOOD STUDS AND WOOD CEILING SUPPORTS: Wood studs and wood ceiling supports shall comply with Chapter 29 herein.

3510.5 STEEL STUDS, CEILING SUPPORTS, TRACK RUNNERS:

(a) Steel studs and runners shall be of channel or "c" shape type, not less than 25 gauge and hot dipped galvanized.

(b) The unsupported height of partitions shall comply with the loads and deflections set forth in Sub-section 2305.5 and where wallboard is suitably attached, the composite action may be accounted for in the design.

(c) Steel ceiling supports shall comply with Sub-section 3502.5 herein.

(d) Steel studs, track runners and ceiling supports shall comply with the Standard set forth in Paragraph 3510.2(c) herein and where required for fire resistance, shall conform to the materials and conditions of approval based on standard tests as set forth in Chapter 37 herein.

3510.6 ATTACHMENTS:

(a) Attachment shall be as set forth herein and for fire-rated assemblies shall also conform to the material and conditions of the assembly tested.

(b)(1) Attachment to wood supporting members shall conform to the Standard set forth in Paragraph 3510.2(a) herein.

(2) Nails and screws attaching gypsum wallboard shall, without substantially fracturing the surface paper, be driven below the surface and spotted with finishing joint compound.

(c) Attachment to metal members shall be as follows:

(1) Gypsum wallboard shall be attached to metal members by self-drilling, self-tapping sheet metal screws.

(2) The spacing of screws attaching gypsum wallboard to metal studs and runners shall be not more than 12 inches on centers.

(3) Screws for attaching gypsum wallboard to metal studs shall be not less than inches long for 2-inch wallboard or one inch long for 5/8-inch wallboard.

(4) Screws attaching gypsum wallboard shall be driven below the surface and spotted with finishing compound.

(5) Runners shall be fastened to the ceiling, contiguous walls and partitions and to the floor at intervals not exceeding 24 inches on centers. Such attachment may be by nails penetrating the base material not less than -inch or self-drilling, self-tapping sheet metal screws attaching metal to metal.

3511 SUSPENDED AND FURRED CEILINGS

3511.1 Lath and plaster ceilings shall be as set forth in this Chapter.

3511.2 Suspended and furred ceilings, other than lath and plaster, where providing fire protection shall comply with Sub-section 3705.5 of this Code.

3511.3 Suspended and furred ceilings other than lath and plaster shall be suspended and supported in conformance with the conditions of fire-tests or, if not tested, as recommended by the manufacturer or as required for structural stability.

3512 OTHER MATERIALS

3512.1 WOOD:

(a) Wood and wood-products used for wall claddings shall comply with Chapter 29 of this Code.

(b) Wood and wood-products used for wall cladding as nonstructural exterior trim, fascia and soffits on buildings of Type I, Type II and Type III Construction May be used provided such materials comply with Sub-section 1812.5 of this Code.

3512.2 ASPHALT SHINGLES: Asphalt shingles shall be applied only to solid wood sheathing and shall be tin-capped and spot-stuck, as set forth in Chapter 34 of this Code.

3512.3 ROLL SLATE OR FELT: Roll slate or felt shall be applied only to solid wood sheathing and shall be secured by nailing, as set forth in Chapter 34 of this Code.

3512.4 METAL SHINGLES: Metal shingles shall be applied only to solid wood sheathing and shall be secured as set forth in Chapter 34 of this Code.

3512.5 STEEL SIDING: Steel siding shall be designed and applied as set forth in Sub-section 2809.5 of this Code.

3512.6 ALUMINUM SIDING: Aluminum siding shall be designed and applied as set forth in Chapter 30 of this Code.

3512.7 VENEERS: Masonry veneers shall be applied as set forth in Chapter 27 of this Code.

3512.8 COMBUSTIBLE MATERIALS: Combustible materials and fire-resistive characteristics of all materials shall be regulated as otherwise required by this Code for the "Group of Occupancy" or "Type of Construction" or as "Interior Finishes" in Section 3708 of this Code.

3512.9 OTHER MATERIALS: Other materials and assemblies shall be classified by the Building Official as one described in this Code and shall comply with the requirements of loading or fire resistance herein required.

3513 STORM SHUTTERS

3513.1 Storm shutters shall have product approval, or are shown by acceptable test data or analysis to be of sufficient strength to resist full pressurization from wind loads as well as large and small missile impacts as outlined in Chapter 23 of this Code, without deforming to the point where the substrate being protected is invariably compromised.

3514 CURTAIN WALLS

3514.1 SCOPE: This section prescribes requirements for curtain walls of buildings or structures regulated by this Code.

3514.2 APPLICATION:

(a) Curtain walls as defined in Section 401 of this Code, shall be designed and constructed in accordance with the requirements of this section.

(b) Structural glazing in curtain walls shall also comply with the requirements of Section 3515 of this Code.

3514.3 DEFINITIONS: The terms used in this section shall be defined as set forth in Section 401.

3514.4 STANDARDS: No requirements.

3514.5 DESIGN:

(a) GENERAL:

(1) All structural elements of curtain wall systems shall be reviewed and approved by, and bear the seal of, a Florida Registered Professional Engineer.

(2) Curtain wall systems, the design of which is based on support from more than two adjacent floors, shall be designed to withstand all imposed loads without exceeding allowable stresses in the event of destruction or failure of any single span within the system.

(3) Individual mullions acting as a continuous member shall transfer loads through supports from no more than three adjacent floors.

(4) When subjected to design loads, the framework shall provide adequate coverage and restraint of the glass at all perimeter edges, regardless of the location of the glass within the framework.

(b) MATERIALS: The materials used in any curtain wall shall comply with the applicable provisions of this Code.

3514.6 FIRE PROTECTION:

(a) Curtain wall supports, spandrel panels, anchors, and the connections at the intersection of the floor and wall shall be fire protected based on building distance separation as required by Section 1804.1(c).

(b) Irrespective of distance separation, anchors, embedded hardware, connections at the intersection of the wall and floor and other connectors used to attach the curtain wall framing system to the building frame shall be provided with fire protection from the floor below with fire resistant materials having a fire rating equivalent to that of the floor.

EXCEPTION: Connections within openings protected as set forth in (d) below.

(c) Where fire safing is used to achieve such protection it shall be installed in such a manner that it will remain in place for at least a duration of one hour.

(d) Openings between curtain wall systems and fire resistive floors shall be protected against the passage of fire and smoke in accordance with 3705.2.

3514.7 INSPECTION: Curtain wall systems for threshold buildings shall be inspected by a Special Inspector at both the point of assembly and installation in accordance with Sub-section 305.2 and 305.3.

3515 STRUCTURAL GLAZING SYSTEMS

3515.1 SCOPE: This section prescribes requirements for structural glazing systems of buildings or structures regulated by this Code.

3515.2 APPLICATION:

(a) Structural glazing, as defined in Section 401 of this Code, shall be designed and constructed in accordance with the requirements of this Section.

(b) Structural glazing systems used in curtain walls shall also comply with the requirements of Section 3514 of this Code.

3515.3 DEFINITIONS: The terms used in this section shall be defined as set forth in Section 401 of this Code.

3515.4 STANDARDS: Adhesives and sealants used in structural glazing systems shall comply with the following standards and adopted in Section 402.

(a) ASTM C-794, Test Method for Adhesion-In-Peel of Elastomeric Joint Sealant.

(b) ASTM C920, Specification for Elastomeric Joint Sealants.

(c) ASTM D412, Test Methods for Rubber Properties in Tension.

(d) ASTM D624, Test Method for Rubber Property-Tear Resistance.

(e) ASTM D2240, Test Method for Rubber Property-Durometer Hardness.

(f) Federal Specifications TT-S-001543A and TT-S-00230D.

(g) ASTM E331, Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors.

(h)ASTM E330, Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors.

3515.5 DESIGN:

(a) GENERAL:

(1) Structural glazing systems shall be reviewed and approved by, and bear the seal of, a Florida Registered Professional Engineer.

(b) MATERIALS:

(1) IDENTIFICATION: All materials shall be clearly identified as to manufacturer and manufacturer's product number.

(2) ADHESIVES AND SEALANTS:

(aa) Only approved silicone elastomer adhesives and sealants shall be used for fastening glass lites and other panels to curtain wall framing.

(bb) Such adhesive and sealants shall be of a polymer which is 100 percent silicone.

(cc) Adhesives and sealants shall have been tested in accordance with the standards set forth in Sub-section 3515.4.

(c) MANUFACTURER'S TESTING RECOMMENDATION AND APPROVAL:

(1) Compatibility of all components and fabrication procedures of structural glazing systems shall be tested, approved and recommended in writing by the manufacturer of the adhesive; the manufacturer on the coating, whether it is anodized, baked, or otherwise applied; and the manufacturer of the glass panel.

(2) Such testing, recommendation and approval shall address, but shall not be limited in scope to:

(aa) The compatibility of the sealant with metal, glazing materials, shims, spacers, setting blocks, backer rods, gaskets, and other materials;

(bb) Adhesion to the designated substrates; adhesion of the substrates to the base metal; and

(cc) The design and structural capability of silicone joints and cross sections.

(d) STRUCTURAL REQUIREMENTS:

(1) DESIGN OF STRUCTURAL SEALS:

(aa) The design stress of the structural silicone shall not exceed 20 psi for materials having a minimum strength of 100 psi at the weakest element in the line of stress.

(bb) Such design stress shall provide for a safety factor of not less than 5.0.

(cc) Safety factors greater than 5.0 shall be specified by the Engineer when required or recommended by the manufacturer.

(dd) The silicone structural seal shall have a maximum modulus of elasticity to allow no more than 25% movement of the joint width at 20 psi stress.

(ee) In insulating glass units, the secondary silicone seal shall be designed to withstand a minimum of one-half the design negative wind load applicable to the outboard lites.

(2) BONDING LIMITS: Structural glazing shall be limited to adhesive bonding of one side or on two opposing sides of an infill glass lite or panel.

EXCEPTION: Three or four side bonding shall be permitted only when structural glazing units are shop fabricated and shop glazed.

(3) JOBSITE REGLAZING:

(aa) Jobsite replacement reglazing shall be permitted only when performed following a procedure approved in writing by the applicable structural silicone manufacturer.

(bb) Replacement shall be performed only by individuals or firms approved or certified by the silicone manufacturer.

3515.6 FIRE PROTECTION: Structural glazing in curtain walls shall be fire protected as required by Sub-section 3514.6.

3515.7 INSPECTIONS, TESTING AND RECERTIFICATION:

(a) A minimum of 1 percent of the structurally glazed panels shall be tested for load carrying capacity and sealant adhesion in accordance with Section 2314 of this Code and ASTM E330.

(b) Structural glazed panels shall be inspected by a Special Inspector for conformance with the approved design and installation procedures in accordance with Sub-section 305.3 prior to the erection of such panels and after the seal-curing period established by the silicone manufacturer.

(c) It shall be the responsibility of the Contractor to verify the adhesion of the cured sealant periodically throughout the application to assure compliance with the manufacturer's specifications and quality of application.

(d) Structural glazing systems on threshold buildings shall be recertified by the owner in accordance with Sub-section 305.3 one year after initial inspection. Subsequently, such systems shall be recertified every five (5) years at regular intervals.

CHAPTER 36
OCCUPANCY OF PUBLIC AND RESTRICTED PROPERTY

3601 GENERAL
3602 TEMPORARY OCCUPANCY
3603 PERMANENT OCCUPANCY
3604 RESTRICTED AREAS

3601 GENERAL

The occupancy of public and restricted property shall be permitted only in conformity with the provisions of this Chapter, and the right to occupy public property shall be subject to revocation on 30-days' notice to the owner of any building accessory which in any way occupies such property. The owner shall be responsible for the maintenance of or damage caused by projections over public property.

3602 TEMPORARY OCCUPANCY

3602.1 GENERAL: No building materials, equipment, machinery, storage sheds, job offices, debris or any other temporary requirements or results of building operations or demolition shall be placed upon any streets, alleys, or sidewalks, except as provided in this Section and in Chapter 33.

3602.2 STREETS:

(a) Building materials, equipment, debris, and job offices, in connection with new construction or demolition, may be placed upon the street in front of a building in the course of construction, alteration or demolition, as provided in Paragraph 301.2(a). The maximum width of such occupied space shall not exceed one-third of the width of the street, measured between curbs, except as temporary closing of streets may be otherwise permitted.

(b) Materials, placed on streets, shall not obstruct fire-hydrant, fire-alarm box, manhole or catch basin and shall be so placed, or such arrangements shall be made, that the flow of water in gutters shall not be restricted.

3602.3 SIDEWALKS: Sidewalks may be occupied for purposes in connection with construction, alterations, or demolition, provided that there shall be a temporary sidewalk, properly guarded and not less than five feet wide, constructed in the outer portion of the street area permitted for such occupancy in Paragraph 3602.2(a), and provided further that sidewalks shall be protected by sheds or fences as specified in Chapter 33.

3602.4 ALLEYS: Alleys, or any portion thereof, shall not be occupied for purposes in connection with construction, alterations or demolition; except that the use of all or a portion of any alley may be permitted for limited periods of time as provided in Paragraph 301.2(a).

3602.5 MISCELLANEOUS REQUIREMENTS: Public property such as sidewalks and pavements shall be protected from damage incident to construction work or shall be repaired or replaced as required in Section 306.

3603 PERMANENT OCCUPANCY

3603.1 SIGNS: Signs shall not be permitted to extend over public property except as specified in Chapter 42.

3603.2 AWNINGS: Awnings shall not be permitted to extend over public property except as specified in Chapter 43 and 44.

3603.3 MARQUEES: Marquees shall not be permitted to extend over public property except as follows:

(b) Marquees shall be supported entirely from the building and shall not be used for human occupancy.

(c) No part of a marquee or appendage thereto shall project more than nine feet over public property, nor be less than nine feet above the sidewalk, nor extend closer than 18 inches to the curb line, nor shall the vertical overall depth exceed 5 feet.

(d) The roof of a marquee shall be sloped to downspouts which shall conduct the water under the sidewalk to the gutter.

(e) Marquees shall be designed for unit loads as specified in Chapter 23.

3603.4 DOORS AND WINDOWS: Ground floor doors and windows, including screen doors, either fully opened or when opening, shall not project over public property. Doors required to swing in the direction of egress from a building shall be recessed to comply with this limitation.

3603.5 PIPES AND SERVICE EQUIPMENT:

(a) Pipes shall not project over public property except as follows:

(1) The downspout from a marquee shall project not more than four inches.

(2) A service conduit and a weatherhead more than ten feet above a sidewalk may project a reasonable distance.

(3) Meters and piping shall not extend over public property.

3603.6 ARCHITECTURAL ORNAMENTATIONS AND OTHER PROJECTIONS:

Architectural ornamentations and other projections not otherwise specifically regulated herein may occupy public property when complying with all of the following requirements:

(a) Such projections shall comply with all applicable zoning regulations.

(b) Such projections shall be not less than 9 feet above the grade below.

(c) Such projections shall not extend closer than 18 inches to the curb line.

(d) Such projections shall be constructed of incombustible materials or may be of fire retardant wood properly protected.

(e) Drainage of a projection of two feet or more shall be carried in downspouts under the sidewalk to the curb gutter except that where the roof of such projection is not more than 12 feet above the sidewalk nor more than four feet projection the drainage may be back to the building and off then end projection adjacent to the building but shall not be drained off the street edge thereof.

3603.7 FOUNDATIONS: Foundations of buildings may project on public property, provided such projections shall not exceed six inches into a public street nor six inches into an alley.

3603.8 EXCEPTION: Where, in this Code, reference is made to a required or minimum vertical distance above public property, such distance is measured from the sidewalk immediately below the projection. Where no such sidewalk is intended and vehicular traffic permitted adjacent to the building, the minimum vertical clearance shall be not less than 14 feet at any point.

3604 RESTRICTED AREAS

3604.1 GENERAL: Where there is conflict between the set back areas required by zoning regulations and court areas required by this code for light, ventilation, fire protection, or paths of egress, the more restrictive provision shall apply.

3604.2 COURT AREAS:

(a) EXIT COURTS: Court areas, for the purpose of providing paths of egress, shall be unobstructed for their required width to a height of eight feet.

(b) LIGHT AND VENTILATION: Court areas, for the purposes of light and ventilation, shall be unobstructed for their required width from the lowest required point to the sky; except that sills, belt courses, cornices, eaves and similar horizontal projections may extend into such required widths not to exceed 12 inches for buildings which are three stories or more in height nor more than 18 inches for buildings less than three stories in height.

PART VIII
FIRE-RESISTIVE STANDARDS AND PROTECTION
CHAPTER 37
FIRE RESISTIVE STANDARDS

3701 GENERAL
3702 FIRE-RESISTIVE MATERIALS
3703 PROTECTION FOR STRUCTURAL MEMBERS
3704 WALLS AND PARTITIONS
3705 FLOORS AND ROOFS
3706 FIRE-RESISTIVE ASSEMBLIES FOR PROTECTION OF OPENINGS
3707 FIRE-RETARDANT ROOF COVERINGS
3708 INTERIOR FINISHES
3709 INSULATING MATERIALS
3710 CALCULATED FIRE RESISTANCE

3701 GENERAL

3701.1 GENERAL:

(a) Materials of construction and assemblies or combination thereof shall be classified for fire-resistive, fire-retardant or flame-spread purposes in terms of performance in authoritative tests made by a recognized laboratory in accordance with the Standards set forth herein.

(b) (1) For the purpose of determining the degree of fire resistance afforded, some materials and assemblies are listed in this Chapter and shall be assumed to have the fire resistance set forth herein.

(2) Other material and assemblies not listed herein and for which results of standard tests are available shall be given the rating based on such tests.

(3) Other materials or assemblies not listed herein and for which standard tests are not available shall be given ratings by the Building Official based on reasonable interpolation or interpretation of ratings herein set forth in Sec. 3710 Calculated Fire Resistance and/or performance in standard tests.

(4) Where no previous fire-resistive standard has been established and where the Building Official is unable to make an interpolation or interpretation of fire-resistivity, the assembly shall be submitted to the Board of Rules and Appeals for interpretation.

(5) Fire-resistance ratings of materials and assemblies may be calculated by a Registered Engineer or Architect. The following Standards shall be used to calculate this fire-resistivity:

(aa) Reinforced Concrete Fire Resistance, CRSI

(bb) Design for Fire Resistance of Precast Prestressed Concrete, PCI

(cc) Analytical Methods of Determining Fire Endurance of Concrete and Concrete Masonry Members – Model Code Approval Procedures, CMIFC

(dd) Calculated Fire Resistance for Concrete and Concrete Masonry – Florida Code Approved Procedures, FC & PA

(ee) Increasing the Fire Resistance of Concrete Masonry, TEK 80A, NCMA

(c) The architect shall be responsible for the design of fire resistive walls, floor/ceiling assemblies, roof/ceiling assemblies and horizontal and vertical smoke barriers.

The architect shall show the necessary horizontal and vertical fire separations and the hourly requirements of the fire separation of the floor plans and in the building sections. Fire-resistive assemblies, such as shown in the UL Fire Resistance Directory or Chapter 37 of this Code, shall be identified by its design number or specification as well as by its hourly rating.

3701.2 STANDARDS: The following Standards are hereby adopted as set forth in Section 402.

(a) Standard for the Installation of Air Conditioning and Ventilating Systems (Non-residential), NFPA 90A.

(b) Standard Methods of Fire Tests of Building Construction Materials, ASTM E119, also referred to as: "Standard Fire Test."

(c) Standard Method of Fire Tests for Door Assemblies, ASTM E152.

(d) Standard for Tin-Clad Doors and Shutters, UL 10A.

(e) Standard Specification for Fire Tests of Window Assemblies, ASTM E163.

(f) Standard for Fire Doors and Windows, NFPA 80.

(g) Standard for Smoke Detectors for Fire Protective Signaling Systems, UL 168.

(h) Fire Protection Equipment List of UL Inc.

(i) Building Materials List of UL Inc.

(j) Standard Method of Test for Surface Burning Characteristics of Building Materials, ASTM E84.

(k) Method of Test for Determining Non-combustibility of Elementary Materials, ASTM E136.

(l) Design Data – Fire Resistance/Sound Control, GA, but for the fire-resistive values only of assemblies to supplement Tables 37-A, 37-B and 37-C.

(m) Factory Mutual System Approved Guide but only that portion entitled Building Materials and Construction, FMEC.

(n) Fire Resistive Index of UL, Inc.

(o) Fire-resistance ratings of materials and assemblies may be calculated by a Registered Engineer or Architect. The following Standards shall be used to calculate this fire-resistivity:

(1) Reinforced Concrete Fire-Resistive Requirements, AC1216, R-81 and/or, 1980.

(2) Design for Fire-Resistance of Precast Prestressed Concrete, PCI

(3) Analytical Methods of Determining Fire Endurance of Concrete and Concrete Masonry Members Model Code Approved Procedures, CMIFC

(4) Calculated Fire Resistance for Concrete and Concrete Masonry – Florida Code Approved Procedures, FC & PA

(5) Increasing the Fire Resistance of Concrete Masonry, TEK 80A, NCMA

(p) Warnock Hersey International Inc., 539 Benfield Road, Severna Park, MD 21146.

(q) Fire Resistance Design Manual Eleventh Edition Gypsum Association – GA 600-84

(r) Southwest Research Institute

(s) Standard method of fire tests of through penetration fire stops, A.S.T.M. E-814-83.

3701.3 DEFINITIONS:

Carbonate Aggregate Concrete – concrete made with aggregates consisting mainly of calcium or magnesium carbonate, e.g. limestone or dolomite.

Lightweight Aggregate Concrete – concrete made with aggregates of expanded clay, shale, slag, or slate or sintered fly ash, and weighing 85 to 115 pcf.

Sand-Lightweight Concrete – concrete made with a combination of expanded clay, shale, slag, or slate or sintered fly ash and natural sand. Its unit weight is generally between 105 and 120 pcf.

Siliceous Aggregate Concrete – concrete made with normal weight aggregates consisting mainly of silica or compounds other than calcium or magnesium carbonate.

3701.4 CONSTRUCTION CLASSIFICATION, RESTRAINED AND UNRESTRAINED:

I. Wall bearing	
A. Single span and simply supported end spans of multiple bays[1]	
1. Open-web steel joists or steel beams supporting concrete slab, precast units, or metal decking	Unrestrained
2. Concrete slabs, precast units, or metal decking	Unrestrained
B. Interior spans of multiple bays	
1. Open-web steel joists, steel beams or metal decking supporting continuous concrete slab	Restrained
2. Open-web steel joists, steel beams, supporting precast units or metal decking	Unrestrained
3. Cast-in-place concrete slab systems	Restrained
4. Precast concrete where the potential thermal expansion is resisted by adjacent construction[2]	Restrained
II. Steel Framing	
A. Steel beams welded, riveted, or bolted to the framing members	Restrained
B. All types of cast-in-place floor and roof systems (such as beam-and-slabs, flat slabs, pan joists, and waffle slabs) where the floor or roof system is secured to the framing members	Restrained
C. All types of prefabricated floor or roof systems where the structural members are secured to the framing members and the potential thermal expansion of the floor or roof system is resisted by the framing system or the adjoining floor or roof construction[2]	Restrained
III. Concrete framing	
A. Beams securely fastened to the framing members	Restrained
B. All types of cast-in-place floor or roof systems (such as beam-and-slabs, flat slabs, pan joists, and waffle slabs) where the floor system is cast with the framing members	Restrained
C. Interior and exterior spans of precast systems with cast-in-place joints resulting in restraint equivalent to that which would exist in condition III A	Restrained
D. All types of prefabricated floor or roof systems where the structural members are secured to such systems and the potential thermal expansion of the floor or roof systems is resisted by the framing system or the adjoining floor or roof construction[2]	Restrained
IV. Wood construction	
All types	Unrestrained

[1]Floor and roof systems can be considered restrained when they are tied into walls with or without tie beams, the walls being designed and detailed to resist thermal thrust from the floor or roof system.

[2]For example, resistance to potential thermal expansion is considered to be achieved when:

1. Continuous structural concrete topping is used.
2. The spaces between ends of precast units or between the ends of units and the vertical face of supports is filled with concrete or mortar, or
3. The space between the ends of precast units and the vertical faces of supports or between the ends of solid or hollow-core slab units does not exceed 0.25 percent of the length for normal weight concrete members or 0.1 percent of the length for structural lightweight concrete members.

3702 FIRE-RESISTIVE MATERIALS

3702.1 GENERAL: The fire resistivity of materials of construction or assemblies shall be as set forth in this Chapter or acceptable under the provisions or Standards set forth in Section 3701.

3702.2 CONCRETE:

(a) Concrete shall be as set forth in Chapter 25 and have a 28-day strength of not less than 2500 psi.

(b) Grade A concrete is made with aggregates such as limestone, calcareous gravel, trap rock, slag, expanded clay, shale, slate or any other aggregates possessing equivalent fire-resistive properties.

(c) Grade B concrete is all concrete other than Grade A concrete and includes concrete made with aggregates containing more than 40 percent quartz, chert, or flint.

(d) Pneumatically-placed concrete without coarse aggregate shall be classified as Grade A or B concrete in accordance with the aggregate used.

3702.3 MASONRY: Masonry shall be as set forth in Chapter 27 and shall be laid in Portland cement-lime or masonry cement mortar, except gypsum tile shall, and clay tile may, be laid in gypsum mortar when not exposed to the weather. Masonry shall be bonded by breaking joints in successive courses.

3702.4 LATH:

(a) Gypsum lath shall be as set forth herein and in Chapter 35.

(b) Metal lath shall be as set forth herein and in Chapter 35.

3702.5 PLASTER:

(a) Plaster shall be as set forth herein and in Chapter 35. Thickness of plaster is measured from the face of the plaster base; except that with metal lath, it is measured from the back of the lath unless otherwise stated. The usual one-sixteenth-inch white or finish coat may be included in the required plaster thickness.

(b) Pneumatically-placed stucco shall be rated as Portland-cement plaster.

3703 PROTECTION FOR STRUCTURAL MEMBERS

3703.1 THICKNESS OF PROTECTION:

(a) Fire-resistive structural members shall have the ratings set forth in Table 37-A and as further provided in this Section or shall be rated as set forth in Sub-section 3701.1.

(b) The figures shown shall be net thickness of the protecting materials and shall not include any hollow space, back of the protection.

3703.2 UNIT-MASONRY PROTECTION: Unit masonry for the protection of girders and columns shall have metal ties embedded in each transverse joint, where joints are more than 16 inches apart, and shall be spaced not more than 16 inches in other cases. Soffit-tile protecting beam and girder flanges shall be tied to the flange. Ties shall have a cross-sectional area equal to that of No. 8-gage wire.

3703.3 REINFORCEMENT FOR CAST-IN-PLACE PROTECTION: Cast-in-place concrete protection for steel columns shall be reinforced at the edges of such members with wire ties of not less than 0.18 inch in diameter wound spirally around the columns on a pitch of not more than eight inches.

3703.4 EMBEDMENT OF PIPES: Conduits and pipes shall not be embedded in required fire protection of structural members.

3703.5 COLUMN JACKETING: Where the fire-resistive covering on columns and other exposed structural members is exposed to injury from moving vehicles, the handling of materials, or by other means, corners shall be jacketed with an adequate covering to a minimum height of six feet above the floor except, that where headroom is physically limited to seven feet six inches, such jacketing shall extend to a minimum height of two feet six inches above the floor.

3703.6 CEILING PROTECTION:

(a) (1) Where a ceiling is used as part of a fire-rated assembly to provide fire protection for floors or roofs of incombustible construction, the construction, supporting beams, girders and columns need not be individually fire protected above the ceiling.

(2) EXCEPTION: Where such beams, girders and columns support loads from more than one floor, roof, or contributory area exceeding 2,000 square feet, such members shall be individually protected.

(b) (1) Such ceilings as described in 3703.6(a)(1) shall be continuous, but may have openings for incombustible pipes, and electrical outlets providing the aggregate area of such pipes, and electrical outlets shall comply with requirements of the UL listing or other approved laboratories, or if fire-rated assembly is not listed by an approved laboratory, but only by this Code, the aggregate area shall not exceed 100 square inches in each 100 square feet, and providing the spaces above such ceilings are divided into areas not exceeding 10,000 square feet. Where a mechanical smoke evacuation system is provided and such 10,000 square feet subdivisions would hamper the operation of that control system, the 10,000 square foot division may be eliminated.

(aa) Openings in ceilings for ducts and ceiling diffusers shall be protected according to Section 4806.12(c).

(2) Plenums and other ceilings shall comply with the requirements of Sub-Section 1805.3.

(c) All openings for light fixtures or other devices in ceilings where the aggregate area of all openings exceeds that set forth in Paragraph(b) above shall be protected in a manner that will provide the same rating as the ceiling and the manner of protection shall be based on the results of fire tests.

(d) The material of construction of draft stops shall be as set forth in Type of Construction.

3703.7 ATTACHED METAL MEMBERS: The edges of lugs, brackets, rivets, and bolt heads attached to structural members may extend to within one inch of the surface of the fire protection.

3703.8 REINFORCED CONCRETE: Thickness of protection for concrete reinforcement shall be measured to the outside of the reinforcement, except that stirrups and ties may project not more than one-half inch into the protection.

3703.9 STEEL STUDS AND JOISTS: Steel studs and joists are not required to have individual protection when part of an assembly which has a fire-resistive rating.

3703.10 PRESTRESSED CONCRETE MEMBERS:

(a) For members having a single tendon or more than one tendon installed with equal concrete cover measured from the nearest surface, the cover shall be not less than that set forth in Table No. 37-A.

(b) For members having multiple tendons installed with variable concrete cover, the average tendon cover shall be not less than that set forth in Table No. 37-A provided:

(1) The clearance from each tendon to the nearest exposed surface is used to determine the average cover.

(2) In no case can the clear cover for individual tendons be less than one-half of that set forth in Table No. 37-A. A minimum cover of three-fourths inch for slabs and one inch for beams is required for any aggregate concrete.

(3) For the purpose of establishing a fire-resistive rating, tendons having a clear cover less than set forth in Table No. 37-A shall not contribute more than 50 percent of the required ultimate moment capacity of the member. For structural design purposes, however, tendons having a reduced cover are assumed to be fully effective.

3703.11 PIPE COLUMNS: In buildings not exceeding one story in height and 10,000 square feet in area where fire-resistive protection not exceeding one hour is required, concrete-filled pipe columns will be accepted in lieu of the required one-hour rating provided such pipes are filled with 2500 psi concrete, have wall thickness not less than 0.237 inch, are a minimum 4 inch inside diameter and are provided with pressure relief holes as set forth in Section 2806.

3703.12 STRUCTURAL STEEL COLUMNS:

(a) Fire protection may be omitted from the bottom flange of lintels spanning not over six feet, shelf angles, or plates that are not a part of the structural frame.

(b) Where structural steel columns required by this Code to be fire-protected are enclosed within walls or partitions, the required fire resistive protection for such steel columns shall be provided for the full vertical length of such columns.

(c) Where structural steel, concrete filled pipe columns are enclosed within a wall or partition of one-hour fire-resistive rating which is of incombustible materials, the assembly will be accepted as one hour fire protection for the structural pipe column.

3703.13 CONCRETE WALLS WITH GYPSUM WALLBOARD OR PLASTER FINISHES:

The fire resistance rating of cast-in-place or precast concrete walls with finishes or gypsum wallboard or plaster applied to one or both sides may be calculated in accordance with the provisions of this section.

(a) Where the finish of gypsum wallboard or plaster is applied to the non-fire-exposed side of the wall, the contribution of the finish to the total fire resistance rating shall be determined as follows: The thickness of the finish shall first be corrected by multiplying the actual thickness of the finish by the applicable factor determined from Table 37-D based on the type of aggregate in the concrete. The corrected thickness of finish shall then be added to the actual thickness or equivalent thickness of concrete and the fire resistance rating of the concrete and finish determined from Table 37-B (32-35).

(b) Where gypsum wallboard or plaster is applied to the fire-exposed side of the wall, the contribution of the finish to the total fire resistance rating shall be determined as follows: The time assigned to the finish as established by Table 37-E shall be added to the fire resistance rating determined from Table 37-B (32-35) for the concrete alone, or to the rating determined in 3703.13(a) for the concrete and finish on the non-fire-exposed side.

(c) For a wall having no finish on one side or having different types of thicknesses of finish on each side, the calculation procedures of 3703.13(a) and 3703.13(b) shall be performed twice, i.e. assume that either side of the wall may be the fire-exposed side. The fire resistance rating of the wall shall not exceed the lower of the two values calculated.

EXCEPTION: For exterior wall with more than 5 feet or horizontal separation, the fire shall be assumed to occur on the interior side only.

(d) When the finish applied to a concrete wall contributes to the fire resistance rating, the concrete alone shall provide not less than one-half the total required fire resistance rating.

(e) Finishes on concrete walls which are assumed to contribute to the total fire resistance rating of the wall shall comply with the installation requirements of 3703.14(f).

3703.14 CONCRETE MASONRY WALLS:

(a) The fire resistance rating of walls and partitions constructed of concrete masonry units shall be determined from Table 37-B (27-31). The rating shall be based on the equivalent thickness of the masonry and type of aggregate used.

(b) Where plaster or gypsum wallboard is applied to the non-fire-exposed side of wall, the contribution of the finish to the total fire resistance rating shall be determined as follows: The thickness of gypsum wallboard or plaster shall be corrected by multiplying the actual thickness of the finish by the applicable factor determined from Table 37-D. This corrected thickness of finish shall be added to the equivalent thickness of masonry and the fire resistance rating of the masonry and finish determined from Table 37-B (27-31).

(c) Where plaster or gypsum wallboard is applied to the fire-exposed side of the wall, the contribution of the total fire resistance rating shall be determined as follows: The time assigned to the finish as established by Table 37-E shall be added to the fire resistance rating determined in 3703.14(a) for the masonry alone, or in 3703.14(b) for the masonry and finish on the non-fire-exposed side.

(d) For a wall having no finish on one side or having different types of thicknesses of finish on each side, the calculation procedures of this section shall be performed twice, i.e. assume that either side may be the fire-exposed side of the wall. The fire resistance rating of the wall shall not exceed the lower of the two values calculated.

EXCEPTION: For exterior walls with more than 5 feet of horizontal separation, the fire shall be assumed to occur on the interior side only.

(e) When the finish applied to a concrete masonry wall contributes to the fire resistance rating the masonry alone shall provide not less than one-half the total required fire resistance rating.

(f) Installation of finishes shall be as follows:

(1) Gypsum wallboard and gypsum lath applied to concrete masonry or concrete walls shall be secured to wood or steel furring members spaced not more than 16 in o.c.

(2) Gypsum wallboard shall be installed with the long dimension parallel to the furring members and shall have all joints finished.

(3) Other aspects of the installation of finishes shall comply with the applicable provisions of Chapter 35.

3703.15 JOINTS BETWEEN PRECAST CONCRETE WALL PANELS:

Joints between precast concrete wall panels which are not protected as required by this section shall be considered as openings in walls. These unprotected joints shall be included in determining the percentage of openings permitted by Part V, Types of Construction. Where such openings are not permitted or are required by this Code to be protected, the provisions of this section may be used to determine the amount of joint insulation required. Table 37-F shows thicknesses of ceramic fiber blankets to be used to protect joints between precast concrete wall panels for various panel thicknesses and for joint widths of 3/8-inch and 1-inch for fire-resistance rating of 1 hour to 4 hours. For joint widths between 3/8-inch and 1-inch, the thickness of ceramic fiber blanket may be determined by direct interpolation. Other tested and labeled materials may be used in place of ceramic fiber blankets.

3704 WALLS AND PARTITIONS

3704.1 GENERAL: Fire resistive walls and partitions shall have the ratings as set forth in Table 37-B or shall be rated as set forth in Sub-section 3701.1. Penetrations of fire resistance rated walls and partitions for electrical, telephones, plumbing, ducts, intercommunication systems or similar facilities shall not be permitted, except as follows:

(a) (1) Penetrations which are included in assemblies tested in accordance with A.S.T.M. E-119.

(2) Penetrations by noncombustible pipe and conduit when all openings around the pipe or conduit are firestopped in accordance with Sub-section 3704.5.

(3) Penetrations by pipe, conduit and cables when the penetration is protected with a system which has a fire rating equal to or greater than the assembly in which the penetration occurs, when tested in accordance with A.S.T.M. E-814 conducted with a minimum positive pressure differential of 0.03 inches of water column.

(4) Ventilating ducts shall comply with Section 4806 of this Code and need not be enclosed provided the requirements set forth in Paragraph 1807.2(d) of this Code are met to prevent the passage of fire and smoke.

3704.2 COMBUSTIBLE MEMBERS:

(a) Combustible members framed into a wall shall be protected at their ends by not less than one-half the required fire-resistive thickness of such wall.

(b) Materials, other than combustible insulation, including pipe and conduit, may be attached to or placed between the studs under the required wall claddings and, where such wall or partition is required to be of incombustible materials or have a fire-resistive rating of more than one-hour, such material shall be incombustible.

(c) Combustible pipe and conduit, may penetrate a one-hour fire-rated wall or a two-hour fire-rated shaft when such penetration is protected with a system which has a fire rating equal to or greater than the assembly in which the penetration occurs, and tested in accordance with ASTM E-814.

3704.3 FIRE STOPS – NON-COMBUSTIBLE MEMBERS: Fire stops shall be provided in all walls and partitions to cut off all concealed draft openings between the area enclosed within the wall or partition and any area above the ceiling, and to form an effectual fire barrier between stories and/or floors and between the upper story of the roof space.

EXCEPTION: Fire stops may be omitted at the top of partitions enclosing rooms with a suspended ceiling below a concrete slab, providing the area above the suspended ceiling is completely enclosed around the perimeter by partitions extending to the underside of the concrete slab, and the area is within a single tenant and not exceeding 200 square feet.

(a) Interpolation of test results by a Registered Florida Professional Engineer on a fire stopping system, shall be acceptable with his seal and signature for 8" metal pipe or larger.

3704.4 PLUMBING, ELECTRICAL AND AIR HANDLING SYSTEM IN FIRE RATED ASSEMBLIES:

(a) In Type I and Type II construction, materials used for piping, conduit, raceways or duct systems which do not qualify as incombustible in accordance with the requirements of Part II of the definition of incombustible material contained in Section 401 shall neither:

(1) Penetrate any assembly which is required to have a fire resistance rating unless such materials and methods of penetration have been tested in accordance with this Code Section, nor

(2) Be concealed within any assembly which is required to have a fire resistance rating unless enclosed by or totally embedded within noncombustible materials or unless such materials and methods have been tested in accordance with A.S.T.M. E-119 or approved in accordance with Sub-section 3701.1 of this Code.

(b) For specific requirements relative to the use of duct and piping insulation material in plenum chambers, refer to Chapter 48 of this Code.

3704.5 FIRESTOPPING:

(a) All openings around noncombustible pipes, ducts and conduits shall be firestopped with approved noncombustible materials. Installed materials shall prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to A.S.T.M. E-119 time-temperature fire conditions and under a minimum positive pressure differential of 0.03 inches of water column for the time period equivalent to the fire resistance rating of the construction penetrated.

(b) All openings around combustible pipes, ducts, conduit and cables shall be firestopped in accordance with Section 2907 of this Code.

3705 FLOORS AND CEILINGS

3705.1 GENERAL: Fire-resistive floors or ceilings shall have the ratings set forth in Table 37-C and as further provided in this Section or as set forth in Sub-section 3701.1.

3705.2 FLOORS: Penetrations of fire resistance rated floors or floor/ceiling assemblies for electrical, telephone, plumbing, ducts, intercommunication systems, or similar facilities shall not be permitted, except by one of the following methods:

(a) (1) Pipes, and sleeves of approved materials may be installed within or through fire-resistive floor systems and through concrete slabs without enclosure provided the sealing requirements set forth in Paragraph 1807.2(c) of this Code are met to preserve the integrity of such systems and slabs.

(2) Penetrations which are included in assemblies tested in accordance with A.S.T.M. E-119.

(3) Penetrations by noncombustible pipe and conduit when all openings around the pipe or conduit are firestopped in accordance with Sub-section 3704.5.

(4) Penetrations by pipe, conduit and cables when the penetration is protected with a system which has a fire rating equal to or greater than the assembly in which the penetration occurs, when tested in accordance with A.S.T.M. E-814 conducted with a minimum positive pressure differential of 0.03 inches of water column. A temperature rating equal to one-half of the required fire resistance rating of floor shall be required for floor penetrations which are outside of a shaft enclosure.

(5) Ventilating ducts shall comply with Section 4806 of this Code and need not be enclosed provided the requirements set forth in Paragraph 1807.2(d) of this Code are met to prevent the passage of fire and smoke.

(6) Floor penetrations by pipe or conduit enclosed in shafts.

(7) Refrigerant piping see Section 4807.7(g)(5).

(b) Any openings between the edge of a floor deck and an exterior wall shall be sealed using an approved semirigid board formed from fire resistance material fibers, or equivalent noncombustible material designed for this purpose. The material shall remain in place, sealing the opening, for a time period at least equal to the required fire resistance rating of the floor deck.

3705.3 ROOFS: Fire-resistive roofs may have the same openings as set forth for floors and may contain other openings as otherwise set forth in this Code.

3705.4 CEILINGS:

(a) Where a ceiling of lath and plaster as approved for one-hour fire-resistive construction, as specified in this Chapter, is used below slabs or structural members not otherwise required to be protected by such a ceiling, the required thickness of slab and fire protection of structural members may be reduced one-half inch, but in no case shall the slab thickness be less than two inches.

(b) In one-hour fire-resistive construction, the ceiling may be omitted over unusable space and flooring may be omitted where unusable space occurs above.

(c) The rating of assemblies herein approved for floor assemblies will be accepted as ratings for roof construction assemblies where roofing is substituted for the finish floor of such tested assembly.

3705.5 OTHER FIRE-RESISTIVE AND SUSPENDED CEILINGS:

(a) Suspended ceiling tile or board shall comply with Section 3708 or be incombustible or fire-resistive as set forth herein.

(b) Suspended ceiling tile or board providing required fire protection shall be as follows:

(1) All tiles or boards or units shall be attached to the supporting runners to resist uplift except when not required by the fire-rated assembly.

3705.6 PLUMBING, ELECTRICAL AND AIR HANDLING SYSTEMS IN FIRE RATED ASSEMBLIES:

(a) In Type I and Type II construction, materials used for piping, conduit, raceways or duct systems which do not qualify as incombustible in accordance with the requirements of Part II of the definition of incombustible material contained in Section 401 shall neither:

(1) Penetrate any assembly which is required to have a fire resistance rating unless such materials and methods of penetration have been tested in accordance with this Code Section, nor

(2) Be concealed within any assembly which is required to have a fire resistance rating unless enclosed by or totally embedded within noncombustible materials or unless such materials and methods have been tested in accordance with A.S.T.M. E-119 or approved in accordance with Sub-section 3701.1 of this Code.

(b) For specific requirements relative to the use of duct and piping insulation material in plenum chambers, refer to Chapter 48 of this Code.

3705.7 FIRESTOPPING:

(a) All openings around noncombustible pipes, ducts and conduits shall be firestopped with approved noncombustible materials. Installed materials shall prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to A.S.T.M. E-119 time-temperature fire conditions and under a minimum positive pressure differential of 0.03 inches of water column for the time period equivalent to the fire resistance rating of the construction penetrated.

(b) All openings around combustible pipes, ducts, conduit and cables shall be firestopped in accordance with Section 2907 of this Code.

(c) All spaces between masonry chimneys and floors and ceilings through which the masonry chimney may pass shall be firestopped with noncombustible material. The firestopping of space between the masonry chimneys and wood joists, beams, or headers shall be to a depth of 1" only, placed on strips of metal or metal lath laid across the spaces between combustible materials and the masonry chimney.

TABLE NO. 37-A

MINIMUM PROTECTION OF STRUCTURAL PARTS BASED ON TIME PERIODS FOR VARIOUS INCOMBUSTIBLE INSULATING MATERIALS

Structural Parts To be Protected	Item Number	Minimum Thickness of Insulating Material for Following Fire-Resistive Periods (in inches) Insulating Material Used	4 Hr.	3 Hr.	2 Hr.	1 Hr.
Steel Columns and all Members of Primary Trusses	1	Grade A concrete, members 6" by 6" or greater (not including sandstone, granite and siliceous gravel.)[1]	2½	2	1½	1
	2	Grade A concrete, members 8" x 8" or greater (not including sandstone, granite and siliceous gravel).[1]	2	1½	1	—
	3	Grade A concrete, members 12" x 12" or greater (not including sandstone, granite and siliceous gravel)[1]	1½	1	—	—
	4	Grade B concrete and Grade A concrete excluded above, members 6" x 6" or greater.[1]	3	2	1½	1
	5	Grade B concrete and Grade A concrete excluded above, members 8' x 8' or greater.[1]	2½	2	1	—
	6	Grade B concrete and Grade A concrete excluded above, members 12" x 12" or greater.[1]	2	1	—	—
	7	Clay or shale brick with brick and mortar fill.[1]	3¼	—	—	2¼
	8	4'. Hollow clay tile in two 2" layers; ½" mortar between tile and columns; ⅜" metal mesh (wire diameter–.046") in horizontal joints; tile fill.[1]	4	—	—	—
	9	2" Hollow clay tile; ¾" mortar between tile and column; ⅜" metal mesh (.046" wire diameter) in horizontal joints; Grade A concrete fill[1]; plastered with ¾" gypsum plaster.	3	—	—	—
	10	2" Hollow clay tile with outside wire ties (.08" diameter) at each course of tile or ⅜" metal mesh (.046"' diameter wire) in horizontal joints; Grade A concrete fill[1] extending 1" outside column on all sides.	—	—	3	—

TABLE NO. 37-A (Continued

Steel members, and all members of primary trusses, (cont'd.)	11	2" Hollow clay tile with outside wire ties (.08" diameter) at each course of tile with or without Grade A concrete fill; ¾" mortar between tile and column.	—	—	—	
	12	Solid gypsum blocks with woven wire mesh[2] in horizontal joints, laid with 1" mortar on flanges[1] and plastered with ½" gypsum plaster.	2½	2½	—	
	13	Hollow gypsum blocks with ⅞" wide No. 12 gauge metal clamps and woven wire mesh[2] in horizontal joints. PL denotes ½" gypsum plaster.	3½ PL	3½ PL	3	
	14	Wood-fibered gypsum plaster poured solid (reentrant space filled), and reinforced with 4" x 4" x No. 14 gauge wire mesh.	2	1½	1	
	15	Portland cement plaster over metal lath wire tied to 3/4" cold-rolled vertical channels with No. 18 gauge wire ties spaced 3" to 6" on center. Plaster mixed 1:2½ by volume, cement to sand.	—	—	2½[3]	
	16	Vermiculite concrete, 1:4 mix by volume over paper backed wire fabric lath wrapped directly around column with additional 2" x 2" No. 16/16 gauge wire fabric placed ¾" from outer concrete surface. Wire fabric tied with No. 18 gauge wire spaced 6" on center for inner layer and 2" on center for outer layer.	2	—	—	—
	17	Perlite or vermiculite gypsum plaster over metal lath wrapped around column and furred 1¼" from column flanges. Sheets lapped at ends and tied at 6" intervals with No. 18 gauge tie wire. Plaster pushed through to flanges.	1½	1	—	—
	18	Perlite or vermiculite gypsum plaster over self-furring metal lath wrapped directly around column, lapped 1" and tied at 6" intervals with No. 18 gauge wire.	1¾	1⅜	1	—
	19	Perlite or vermiculite gypsum plaster on metal lath applied to 3/4" cold-rolled channels spaced 24" apart vertically and wrapped flat-wise around column.	1½	—	—	—

TABLE NO. 37-A (Continued

Steel members and all members of primary trusses, (cont'd.)	20	Perlite or vermiculite gypsum plaster over 2 layers of ½" plain full-length gypsum lath applied tight to column flanges. Lath wrapped with 1" hexagonal mesh of No. 20 gauge wire and tied with doubled No. 18 gauge wire ties spaced 23" on center. For three-coat work the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2½ cubic feet of aggregate for the three-hour system.	2½	2	—	—
	21	Perlite or vermiculite gypsum plaster over one layer of ½ plain full-length gypsum lath applied tight to column flanges. Lath tied with doubled No. 18 gauge wire ties spaced 23" on center and scratch coat wrapped with 1" hexagonal mesh No. 20 gauge wire fabric. For three-coat work the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2½ cubic feet of aggregate.	—	2	—	—
	22	Perlite or vermiculite gypsum plaster over 3/8" perforated gypsum lath applied tight to column flanges and tied with doubled No. 18 gauge wire ties spaced 15" on center. For three-coat work the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2½ cubic feet of aggregate for the two-hour system.	—	1¾	1*d*	—
	23	Gypsum plaster over *d*" perforated gypsum lath applied tight to column flanges and tied with doubled No. 18 gauge wire ties spaced 15" on center.	—	2*d*	1¾	*f*
	24	Multiple layers of ½" gypsum wallboard adhesively[4] secured to column flanges and successive layers. Wallboard applied without horizontal joints. Corner edges of each layer staggered. Wallboard layer below outer layer secured to column with doubled No. 18 gauge wire ties spaced 15" on center. Exposed corners taped and treated.	—	—	2	1

TABLE NO. 37-A (Continued

Steel members and all members of primary trusses, (cont'd.)	25	Three layers of ⅝" Type "X" gypsum wallboard. First and second layer held in place by ⅞" diameter by 1⅝" long ring shank nails with 5/16" diameter heads spaced 24" on center at corners. Middle layer also secured with metal straps at mid-height and 18" from each end, and by metal corner bead at each corner held by the metal straps. Third layer attached to corner bead with 1" long gypsum wallboard screws spaced 12" on center.	—	—	1[f]	—
	26	Three layers of ⅝" Type "X" gypsum wallboard each layer screw attached to 1⅝" steel studs (No. 25 gauge) at each corner of column. Middle layer also secured with No. 18 gauge double strand tie wire 24" on center. Screws are No. 6 by 1" spaced 24'. on center for inner layer. No. 6 by 1⅝" spaced 12" on center for middle layer and No. 8 by 2¼" spaced 12" on center for outer layer.	—	1[f]	—	—

Structural Parts To be Protected	Item Number	Periods (in inches) Insulating Material Used	Minimum Thickness of Insulating Material for Following Fire-Resistive 4 Hr.	3 Hr.	2 Hr.	1 Hr.
Webs or Flanges of Steel Beams and Girders	27	Grade A concrete (not including sandstone, granite and siliceous gravel) with 3" or finer metal mesh placed 1" from the finished surface anchored to the top flange and providing not less than .025 square inch of steel area per foot in each direction.	2	1½	1	1
	28	Grade B concrete and Grade A concrete excluded above with 3" or finer metal mesh placed 1" from the finished surface anchored to the top flange and providing not less than .025 square inch of steel area per foot in each direction.	2½	2	1½	1
	29	Portland cement plaster on metal lath attached to ¾" cold-rolled channels with No. 18 gauge wire ties spaced 3" to 6" on center. Plaster mixed 1:2½ by volume, cement to sand.	—	—	1½[3]	[f]

TABLE NO. 37-A (Continued

Tendons in Pretensioned and Post-Tensioned Concrete Beams or Girders[5],[8]	30	Restrained[6]	Carbonate or Siliceous	8" Beam Width[7]	2½	1¾	1½	—
				12" Beam Width[7]	1⅞	1½	—	—
			Sand-Lightweight	8" Beam Width[7]	2	1½	—	—
				12" Beam Width[7]	1⅝	1½	—	—
	31	Unrestrained	Carbonate or Siliceous	8" Beam Width[7]	—	5[9]	2½	1½
				12" Beam Width[7]	3	2½	1⅞	1½
			Sand-Lightweight	8" Beam Width[7]	—	1¾	¾	—
				12" Beam Width[7]	2½	2	1⅝	1½
Tendons in Pretensioned and Post-Tensioned Concrete Floor and Roof Slabs[8],[11]	32	Restrained	All aggregate types		—	¾	—	—
	33	Unrestrained	Siliceous		—	2⅜	1¾	1⅛
			Carbonate		—	2⅛	1⅝	1
			Sand-Lightweight		—	2	1½	1
			Lightweight		—	2	1½	1
Reinforcing Steel in Beams, Girders, Joist. and Trusses-All Aggregate Types[10]	34	Restrained[6]		5" Beam Width[7]	1¼	1	¾	—
				7" Beam Width[7]	¾	—	—	—
	35	Unrestrained		10" Beam Width[7]	¾	—	—	—
				5" Beam Width[7]	—	—	1¼	¾
				7" Beam Width[7]	3	1¾	¾	—
				10" Beam Width[7]	1¾	1	¾	¾
Reinforcing Steel in Floor and Roof Slabs[11]	36	Restrained	All aggregate types		—	¾	—	—
	38	Unrestrained	Siliceous		—	1¼	1	¾
			Carbonate, Sand-LW, LW		—	¾	—	—
Main Reinforcement in Columns	39		Siliceous		2	1½	—	—
			Carbonate, Sand-LW		1½	—	—	—

TABLE NO. 37-A — FOOTNOTES

1. Reentrant parts of protected members to be filled solidly.
2. Woven wire mesh consists of three-eighths-inch (⅜") mesh of No. 17 gauge wire.
3. Two layers of equal thickness with a three-fourths-inch (¾") air space between.
4. An approved adhesive qualified under the standard in Paragraph 3701.2(2).
5. Minimum cover to nonprestressed reinforcing in prestressed concrete beams shall be determined by values shown in lines 34 and 35.
6. Tabulated values for restrained assemblies apply to beams spaced more than 4 feet on center for restrained beams spaced 4 feet or less on centers, minimum cover ¾ inch is adequate for 4 hours or less.
7. For beam widths between the tabulated values, the minimum cover thickness can be determined by direct interpolation.
8. The cover for an individual tendon is the minimum thickness of concrete between the surface of the tendon and the fire-exposed surface of the beam, except that for ungrouted ducts the assumed cover thickness is the minimum thickness of concrete between the surface of the duct and the surface of the beam. For beams in which several tendons are used, the cover is assumed to be the average of the minimum cover of the individual tendons where the minimum cover for corner tendons used in the calculation shall be reduced to one-half (½) of the actual value. The cover for any individual tendon must be not less than one-half (½) of the value given nor less than one (1) inch.
9. Not practical for eight-inch (8") wide beam, but shown for purposes of interpolation.
10. The cover for an individual reinforcing bar is the minimum thickness of concrete between the surface of the bar and the fire-exposed surface of the beam. For beams in which several bars are used, the cover is assumed to be the average of the minimum cover of the individual bars where the minimum cover for corner bars used in the calculation shall be reduced to one-half (½) of the actual value. The cover for any individual bar must not be less than one-half (½) of the value given nor less than (¾) inch.
11. The minimum thickness of concrete cover given is to the positive moment reinforcement. Application is for solid or hollowcore one-way or two-way slabs with flat undersurfaces. For concrete not covered elsewhere in this code the procedures listed in references cited in subsection 3701.1(b)(5) shall be acceptable.

TABLE NO. 37-B
RATED FIRE-RESISTIVE PERIODS FOR VARIOUS WALLS AND PARTITIONS

Material	Item Number	Construction[1]	Minimum Finished Thickness Face-to-Face[2] (in inches) 4 Hr.	3 Hr.	2 Hr.	1 Hr.
Brick of Clay or Shale	1	Solid units (at least 75% solid)	8	–	6[3]	1
	2	Solid units plastered each side with ⅝" gypsum or Portland cement plaster. Portland cement plaster mixed 1:2½ by weight, cement to sand.	–	–	4¾[4]	–
	3	Hollow brick units[5] at least 71 percent solid.	–	8	–	–
	4	Hollow brick units at least 71 percent solid, plastered each side with ⅝" gypsum plaster.	8¾	–	–	–
	5	Hollow (rowlock[6])	12	–	8	–
	6	Hollow (rowlock[6]), plastered each side with ⅝" Gypsum or Portland cement plaster. Portland cement plaster mixed 1:2½ by weight, cement to sand.	9	–	–	–
	7	Hollow cavity wall consisting of two 4" nominal clay brick units with air space between.	10	–	–	–
Hollow Clay Tile, Non-Load-Bering (End or Side Construction)	8	One cell in wall thickness, units at least 50 percent plastered each side with ⅝" gypsum plaster.	–	–	–	4¼
	9	Two cells in wall thickness, units at least 45 percent	–	–	–	6
	10	Two cells in wall thickness, units at least 45 percent solid. Plastered each side with ⅝" gypsum plaster.	–	–	7	–
	11	Two cells in wall thickness, units at least 60 percent solid. Plastered each side with ⅝" gypsum plaster.	–	–	5	–
Hollow Clay Tile, Load-Bearing (End or Side Construction)	12	Two cells in wall thickness, units at least 40 percent solid	–	–	–	8
	13	Two cells in wall thickness, units at least 40 percent solid. Plastered one side with ⅝" gypsum plaster.	–	–	8½	–
	14	Two cells in wall thickness, units at least 49 percent solid.	–	–	8	–
	15	Three cells in wall thickness, units at least 40 percent solid.	–	–	12	–
	16	Two units and three cells in wall thickness, units at least 40 percent solid.	–	12	–	–
	17	Two units and four cells in wall thickness, units at least 45 percent solid.	12	–	–	–
	18	Two units and three cells in wall thickness, units at least 40 percent solid, plastered one side with ⅝" gypsum plaster.	12½	–	–	–
	19	Three cells in wall thickness, units at least 43 percent solid. Plastered one side with ⅝" gypsum plaster.	–	8½	–	–
	20	Two cells in wall thickness, units at least 40 percent solid. Plastered each side with ⅝" gypsum plaster.	–	9	–	–

TABLE NO. 37-B (Continued)

	21	Three cells in wall thickness, units at least 43 percent solid. Plastered each side with 5/8" gypsum plaster.	9	–	–	–
	22	Three cells in wall thickness, units at least 40 percent solid. Plastered each side with 5/8" gypsum plaster.	13	–	–	–
	23	Hollow cavity wall consisting of two 4" nominal clay tile wall units (at least 40 percent solid) with air space between. Plastered one side (exterior) with 3/4" Portland cement plaster and other side with 5/8" gypsum plaster. Portland cement plaster mixed 1:3 by volume, cement to sand.	10	–	–	–
Combination	24	4" brick and 8" tile	12	–	–	–
of Clay Brick	25	4" brick and 4" tile	–	8	–	–
and Load-	26	4" brick and 4" tile plastered on the tile side with 5/8"	8½	–	–	–
Bearing Hollow Clay Tile		gypsum plaster.				
Concrete	27	Expanded slag or pumice	4¾	4	3¼	2⅜
Masonry	28	Expanded clay or shale	5⅛	4½	3⅝	2⅞
units[7.13.14]	29	Limestone, cinders or air-cooled slag	6	5	4	2¼
	30	Calcareous gravel	6¼	5⅜	4¼	2⅞
	31	Siliceous gravel	6¾	5¾	4½	3
Solid	32	Siliceous aggregate	7	6¼	5	3½
Concrete	33	Carbonate aggregate	6½	5¾	4½	3⅝
	34	Sand-Lightweight aggregate	5½	4⅝	3⅞	2¾
	35	Lightweight aggregate	5¼	4½	3⅝	2½
Hollow	36	3" tile not less than 70 percent solid.	–	–	–	–
Gypsum	37	3" tile plastered one side with 5/8" gypsum plaster.	–	–	3⅝[4]	–
Tile	38	4" tile plastered one side with ½" gypsum plaster.	–	4½[4]	–	–
	39	3" tile plastered both sides with ½" gypsum plaster.	–	4[4]	–	–
	40	4" tile plastered both sides with ½" gypsum plaster.	5[4]	–	–	–
Glazed or	41	One 2" unit cored 15 percent maximum and one 4"	–	6⅜	–	–
Unglazed Nonload-bearing		unit cored Facing Tile, 25 percent maximum with 3/4" mortar filled collar joint. Unit position reversed in alternate courses.				
	42	One 2" unit cored 15 percent maximum and one 4" unit cored 40 percent maximum with 3/8" mortar filled collar joint. Plastered one side with 3/4" gypsum plaster. Two wythes tied together every fourth course with No. 22 gauge corrugated metal ties.	–	6¾	–	–
	43	One unit with three cells in wall thickness, cored 29 percent maximum.	–	–	6	–
	44	One 2" unit cored 22 percent maximum and one 4" unit cored 41 percent maximum with 1/4" mortar filled collar joint. Two wythes tied together every third course with No. 22 gauge corrugated metal ties.	–	–	6	–

TABLE NO. 37-B, (Continued)

	45	One 4" unit cored 25 percent maximum with ¾" gypsum plaster on one side.	–	–	4¾	–
	46	One 4" unit with two cells in wall thickness, cored 22 percent maximum.	–	–	–	4
	47	One 4" unit cored 30 percent maximum with ¾" vermiculite gypsum plaster on one side.	–	–	4½	–
	48	One 4" unit cored 39 percent maximum with ¾" gypsum plaster on one side.	–	–	–	4½
Solid Gypsum Plaster	49	¾" by No. 16 gauge vertical cold-rolled channels, 16" on center, with 2.5-pound flat metal lath applied to one face and tied with No. 18 gauge wire at 6" spacing. Gypsum plaster each side mixed 1:2 by weight, gypsum to sand aggregate.	–	–	–	2[4]
	50	Studless with ½" full-length plain gypsum lath and gypsum plaster each side. Plaster mixed 1:1 for scratch coat and 1:2 for brown coat, by weight, gypsum to sand aggregate.	–	–	–	2[4]
	51	¾" by No. 16 gauge vertical cold-rolled channels, 16" on center, with metal lath applied to one face and tied with No. 18 gauge wire at 6" spacing. Perlite or vermiculite gypsum plaster each side. For three-coat work the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2½ cubic feet of aggregate for the one-hour system.	–	–	2½[4]	2[4]
	52	Studless with ½" full-length plain gypsum lath and perlite or vermiculite gypsum plaster each side.	–	–	2½[4]	2[4]
Solid Gypsum Plaster (contd.)	53	Studless partition with ⅜" rib metal lath installed vertically, adjacent edges tied 6" on center with No. 18 gauge wire ties, gypsum plaster each side mixed 1:2 by weight, gypsum to sand aggregate	–	–	–	2[4]
Solid Perlite and Portland Cement	54	Perlite mixed in the ratio of 3 cubic feet to 100 pounds of Portland cement and machine applied to stud side of 1½" mesh by No. 17 gauge paper-backed woven wire lath nailed to 4" deep steel trussed wire[8] studs 16" on center with 1" long by No. 11 gauge by $^{7}/_{16}$" head annular ring shank nails.	–	–	3⅛[4]	–
Solid Neat Wood Fibered Gypsum Plaster	55	¾" by No. 16 gauge cold-rolled channels, 12" on center, with 2.5 pound flat metal lath applied to one face and tied with No. 18 gauge wire at 6" spacing. Neat gypsum plaster applied to each side.	–	–	2[4]	–
Solid Gypsum Wallboard Partition	56	One full-length layer ½" Type "X" gypsum wallboard laminated to each side of 1" full-length V-edge gypsum coreboard with approved laminating compound. Vertical joints of face layer and coreboard staggered at least 3".	–	–	2[4]	–

TABLE NO. 37-B (Continued)

Solid Gypsum Wallboard Partition (cont'd.)	57	One full-length layer ½" gypsum wallboard laminated to each side of 1" full-length interlocking factory laminated gypsum coreboard with approved laminating compound. Vertical joints of face layer and coreboard staggered.	–	–	2[4]	–
Hollow (Studless) Gypsum Wallboard Partition	58	One-full length layer of 5/8" Type "X" gypsum wallboard attached to both sides of wood or metal top laminated to each side of 1" x 6" full-length gypsum coreboard ribs spaced 24" on center with approved laminating compound. Ribs centered at vertical joints of face plies and joints staggered 24" in opposing faces. Ribs may be recessed 6" from the top and bottom.	–	–	–	2¼[4]
	59	1" regular gypsum "V" edge full-length backing board attached to both sides of wood or metal top and bottom runners with nails or 1⅝" drywall screws at 24" on center. Minimum width of runners 1⅝". Face layer of ½" regular full-length gypsum wallboard laminated to outer faces of backing board with approved laminating compound.	–	–	4⅝[4]	–
Incombus-tible Studs Interior Partition with Plaster each side	60	3¼" by No. 18 gauge steel studs spaced 24" on 5/8" gypsum plaster on metal lath each side, mixed 1:2 by weight, gypsum to sand aggregate.	–	–	–	4¾[4]
	61	3⅝" No. 16 gauge approved nailable[9] studs spaced 24" on center. 5/8" neat gypsum wood fibered plaster each side over3/8" rib metal lath nailed to studs with 6d common nails, 8" on center. Nails driven 1¼" and bent over.	–	–	5⅝	–
	62	2½" steel studs 16" on center formed with No 16 gauge angle flanges and No. 7 gauge wire diagonals. 3/8" perforated gypsum lath attached to the studs each side with No. 12 gauge wire clips at horizontal and vertical joints. ½" gypsum plaster applied each side mixed 1:2 by weight, gypsum to sand aggregate.	–	–	–	4¼[4]
	63	2 ½" steel studs 16" on center formed with No. 16 gauge angle flanges and No. 7 gauge wire diagonals. 3/8" perforated gypsum lath attached to the studs each side with No. 12 gauge approved steel wire clips. End joints of lath held by approved end joint clips. ¾" perlite or vermiculite gypsum plaster applied each side.	–	–	4¾[4]	–
	64	4" No. 18 gauge channel-shaped steel studs at 16" on center. On each side approved resilient clips pressed onto stud flange at 16" vertical spacing, ¼" pencil rods snapped into or wire-tied onto outer loop of clips, metal lath wire-tied to pencil rods at 6" intervals, 1" perlite gypsum plaster, each side.	–	7⅝[4]	–	–

TABLE NO. 37-B (Continued)

Wood Studs Interior Partition with Plaster Each Side	65	2" by 4" wood studs 16" on center with 5/8" gypsum plaster on metal lath. Lath attached by 4d common nails bent over or No. 14 gauge by 1¼" by ¾" crown width staples spaced 6" on center. Plaster mixed 1:1½ for scratch coat and 1:3 for brown coat, by weight, gypsum to sand aggregate.	–	–	–	5¼
	66	2" by 4" wood studs 16" on center with metal lath and 7/8" neat wood fibered gypsum plaster each side. Lath attached by 6d common nails, 7" on center. Nails driven 1¼" and bent over.	–	–	5⅝[4]	–
	67	2" by 4" wood studs 16" on center with 3/8" perforated or plain gypsum lath and ½" gypsum plaster each side. Lath nailed with 1⅛" by No. 13 gauge by $^{19}/_{64}$" head plasterboard blued nails, 4" on center. Plaster mixed 1:2 by weight, gypsum to sand aggregate.	–	–	–	5⅜[4]
	68	2" by 4" wood studs 16" on center with 3/8" Type "x" gypsum lath and ½" gypsum plaster each side. Lath nailed with 1⅛" inch by No. 13 gauge, by $^{19}/_{64}$" head plasterboard blued nails, 5" on center. Plaster mixed 1:2 by weight, gypsum to sand aggregate.	–	–	–	5⅜[4]
	69	2" by 4" wood studs 16" on center with 3/8" plain gypsum lath and ½" neat wood-fibered gypsum plaster each side. Lath nailed with 4d common wire nails, 5" on center.	–	–	–	5⅜[4]
	70	2" by 4" wood studs 16" on center with 3/8" perforated gypsum lath and ½" perlite or vermiculite gypsum plaster each side. Lath nailed with 1⅛" by No. 13 gauge by $^{19}/_{64}$" head plasterboard blued nails, 5" on center. For three-coat work the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2½ cubic feet of aggregate.	–	–	–	5⅜
	71	2" by 4" wood studs 16" on center with 3/8" perforated gypsum lath, 1" hexagonal mesh of No. 20 gauge wire furred out $^{5}/_{16}$" and with 1" perlite or vermiculite gypsum plaster each side. Lath nailed with 1⅛" by No. 13 gauge by $^{19}/_{64}$" head plasterboard blued nails spaced 5" on center. Mesh attached by 1¾" by No. 12 gauge by 3/8" head nails with 3/8" furring, spaced 8" on center. For three-coat work the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2½ cubic feet of aggregate.	–	–	6⅜	–

TABLE NO. 37-B (Continued)

Incombustible Studs —Interior with Gypsum Wallboard Each Side	72	No. 25 gauge channel-shaped studs 16"[12] on center with one full-length layer of 5/8" Type "X" gypsum wallboard applied vertically attached with 1" long No. 6 drywall screws to each side. Screws are 8" on center around the perimeter and 12" on center on the intermediate stud.	–	–	–	4 7/8[4]
	73	No. 25 gauge channel-shaped studs 24" on center with two full-length layers of 5/8" Type "X" gypsum wallboard applied vertically each side. First layer attached with 1" long, No. 6 drywall screws, 8" on center around the perimeter and 12" on center on the intermediate stud. Second layer applied with vertical joints offset one stud space from first layer using an approved adhesive.	–	–	6 1/8[4]	–
	74	No. 25 gauge channel-shaped studs 24" on center with two full- length layers of ½" Type "X" gypsum wallboard applied vertically each side. First layer attached with 1" long, No. 6 drywall screws, 8" on center around the perimeter and 12" on center on the intermediate stud. Second layer applied with vertical joints offset one stud space from first layer using 1 5/8" long, No. 6 drywall screws spaced 9" on center along vertical joints, 12" on center at intermediate studs and 24" on center along top and bottom runners.	–	–	5 5/8[4]	–
Incombustible Studs —Interior Partition with Gypsum Wallboard Each Side (contd.)	75	No. 16 gauge approved nailable metal studs[9] 16"[12] on center with full-length 5/8" Type "X" gypsum wallboard applied vertically and nailed 7" on center with 6d cooler nails. Approved metal fastener grips used with nails at vertical butt joints along studs.	–	–	–	4 7/8
Wood Studs —Interior Partition With Gypsum Wallboard Each Side	76	2" by 4" wood studs 16" on center with two layers – 3/8" regular gypsum wallboard each side, 4d cooler nails 8" on center first layer, 5d cooler nails 8" on center second layer with laminating compound between layers. Joints staggered. First layers applied full-length vertically. Second layer applied horizontally or vertically.	–	–	5 5/8	
	77	2" by 4" wood studs 16" on center with space between filled with mineral wool batts[10] nailed to stids amd full-length ½" regular gypsum wallboard applied vertically nailed with 5d cooler nails spaced 7" on center.	–	–	–	4 5/8

TABLE NO. 37-B (Continued)

Wood Studs —Interior Partition with Gypsum Wallboard Each Side (cont'd.)	78	2" by 4" wood studs 16" on center with two layers ½" regular gypsum wallboard applied vertically or horizontally each side, joints staggered. Nail base layer with 5d cooler nails at 8" on center, face layer with 8d cooler nails at 8" on center.	–	–	–	5⅝
	79	2" by 4" wood studs 16" on center with ⅝" Type "X" gypsum wallboard applied vertically or horizontally nailed with 6d cooler nails 7" on center with end joints on nailing members.	–	–	–	4⅞
	80	2" by 4" fire-retardant treated wood studs spaced 16"[12] on center with one layer of ⅝" thick Type "X" gypsum wallboard applied with face paper grain (long dimension) parallel to studs. Wallboard attached with 6d cooler nails spaced 7" on center.	–	–	–	4⅞[4]
	81	2" x 4" wood studs 16" on center with two layers ⅝" Type "X" gypsum wallboard each side. Base layers applied vertically and nailed with 6d cooler nails 9" on center. Face layer applied vertically or horizontally and nailed with 6d cooler nails 7" on center. For nail-adhesive application, base layers are nailed 6" on center. Face layers applied with coating of approved wallboard adhesive and nailed 12" on center.	–	–	6⅛	–
Exterior or Interior Walls	82	¾" drop siding or ⅜" exterior type plywood over ½" gypsum sheathing on 2" x 4" wood studs at 16" on center on exterior surface with interior surface treatment as required for one-hour rated exterior or interior 2" x 4" wood stud partitions. Gypsum sheathing nailed with 1¾" by No. 11 gauge by $^{7}/_{16}$" head galvanized nails at 8" on center. Siding nailed with 7d galvanized smooth box nails. Plywood nailed with 6d galvanized siding or casing nails, 6" on center around the perimeter and 12" on center elsewhere.	–	–	–	Varies
	83	2" by 4" wood studs 16" on center with metal lath and ¾" exterior cement plaster[11] on each side. Lath attached with 6d common nails 7" on center driven to 1" minimum penetration and bent over. Plaster mix 1:2 scratch coat and 1:3 brown coat, by weight, cement to sand.	–	–	–	5½
	84	2" by 4" wood studs 16" on center with ⅞" exterior cement plaster (measured from the face of the studs) on the exterior surface with interior surface treatment as required for interior wood stud partitions in this Table. Plaster mix 1:2 scratch coat and 1:3 brown coat, by weight, cement to sand.	–	–	–	Varies

TABLE NO. 37-B (Continued)

Exterior or Interior Walls (Contd.)	85	3⅝" No. 16 gauge incombustible studs 16" on center with ⅞" exterior cement plaster (measured from the face of the studs) on the exterior surface with interior surface treatment as required for interior, non-bearing, incombustible stud partitions in this Table. Plaster mix 1:2 scratch coat and 1:3 brown coat, by weight, cement to sand.	–	–	–	Varies[12]
	86	2¼" by 3¾" clay face brick with cored holes over ½" gypsum sheathing on exterior surface of 2" by 4" wood studs at 16" on center and two layers ⅝" Type "X" gypsum wallboard on interior surface. Sheathing placed horizontally or vertically with vertical joints over studs nailed 6" on center with 1¾" by No. 11 gauge by $^{7}/_{16}$" head galvanized nails. Inner layer of wallboard placed horizontally or vertically and nailed 8" on center with 6d cooler nails. All joints staggered with vertical joints over studs. Outer layer joints taped and finished with compound. Nailheads covered with joint compound. No. 20 gauge corrugated galvanized steel wall ties ¾" by 6⅝" attached to each stud with two 8d cooler nails, every sixth course of bricks.	–	–	10-⅛	–

Table 37-B Footnotes

1. Staples with equivalent holding power and penetration may be used as alternate fasteners to nails for attachment to wood framing.
2. Thicknesses shown for brick and clay tile are nominal thicknesses unless plastered, in which case thicknesses are net thicknesses.

Thicknesses shown for concrete masonry units and hollow-core are "equivalent thicknesses" defined as follows:

$$T_E = \frac{Vn}{LxH}$$

Where: T_E = Equivalent thickness in inches
VN = Net volume (gross volume less volume of voids) in cubic inches.
L = Length of unit in inches
H = Height of unit in inches.

See subsection 3703.13 and 3703.14 for contribution of finishes to fire resistance rating.

3. Single wythe brick.
4. Shall be used for nonbearing purposes only.
5. Hollow brick units four-inch by eight-inch by twelve-inch nominal with two interior cells having a one and one-half inch web thickness between cells and one and three-fourths inch thick face shells.
6. Rowlock design employs clay brick with all or part of bricks laid on edge with the bond broken vertically.
7. See also Footnote 2. The equivalent thickness may include the thickness of gypsum or Portland cement plaster applied in accordance with the requirements of Capter 35 of this code.
8. Studs are doubled trussed wire studs each with No. 3 gauge flange wires and No. 11 gauge truss wires, welded together.

9. Nailable metal studs consist of two channel studs spot welded back-to-back with a crimped web forming a nailing groove.
10. Mineral or slag wool batts shall weigh not less than 1 pound and glass wool batts not less than 0.6 pound per square foot of wall surface.
11. Reserved For Future Use.
12. Stud spacing has been limited to sixteen inches on center to correspond with the limits set forth in the Standard in Section 3502. The fire test specimen qualified at a twenty-four-inch stud spacing. In the case of item No. 76, the gypsum wallboard was applied horizontally when studs were twenty-four inches on center.
13. Where all the cores of hollow-core wall panels are filled with loose-fill materials such as expanded shale, clay or slag, or perlite, the fire-resistance rating of the wall is the same as that of a solid wall of the same concrete type and of the same overall thickness.
14. Standard nominal 8" wide hollow load bearing concrete masonry units of limestone, cinders or air-cooled slag and conforming to ASTM C90 shall meet the requirements for two (2) hour fire-resistive construction.

TABLE NO. 37-C

Floor or Roof Construction	Item Number	Ceiling Construction	Thickness of Floor or Roof Slab (in inches) 4 Hr.	3 Hr.	2 Hr.	1 Hr.	Minimum Thickness of Ceiling (in inches) 4 Hr.	3 Hr.	2 Hr.	1 Hr.
Concrete Slab Equivalent Thickness16 (No Ceiling Required)	1	Siliceous aggregate.	7	6¼	5	3½	—	—	—	—
	2	Carbonate aggregate	6½	5½	4½	3½	—	—	—	—
	3	Sand-Lightweight aggregate	5½	4	3	2¾	—	—	—	—
	4	Lightweight aggregate	5¼	4½	3	2½	—	—	—	—
Reinforced Concrete Joists	5	Slab with suspended ceiling of vermiculite plaster over metal lath attached to ¾" cold-rolled channels spaced 12" on center. Ceiling located 6" minimum below joists.	3	2	—	—	1	¾	—	—
Steel Joist Construction with a Reinforced Concrete Slab on Top Poured on a Metal Lath Form3	6	Gypsum plaster on metal lath attached to the bottom chord with single No. 16 gauge or doubled No. 18 gauge wire ties spaced 6" on center. Plaster mixed 1:2 for scratch coat, 1:3 for brown coat, by, weight gypsum to sand aggregate for two-hour system. For three-hour system plaster is neat.	—	2½	2¼	—	—	¾		—
	7	Vermiculite gypsum plaster on metal lath attached to the bottom chord with single No. 16 gauge or doubled No. 18 gauge wire ties 6" on center.	—	2	—	—	—		—	—
	8	Portland cement plaster over metal lath attached to the bottom chord of joists with single No. 16 gauge or dot/bled No. 18 gauge wire ties spaced 6" on center. Plaster mixed 1:2 for scratch coat, 1:3 for brown coat for one-hour system and 1:1 for scratch coat, 1:1-1/2" for brown coat for two-hour system, by weight, cement to sand.	—	—	2¼	2	—	—	—	—

TABLE NO. 37-C (Continued)

9	Perlite or vermiculite gypsum plaster on 3/8" perforated gypsum lath attached to 3/8" cold-rolled channels with approved clips giving continuous support to lath. Channels attached to or suspended below joists and held to bottom chord of joists.	2	2	2	2	1-3/8[6,8]	7/8[6]	7/8[7]	1[7,8]	1
10	Gypsum plaster on 3/8" perforated gypsum lath to 3/4" cold-rolled channels, with approved clips giving continuous support to lath. Channels attached to or suspended below joists and wire tired to bottom chord of joists.	—	—	2	—	—	—	18	—	
11	5/8" Type "X" gypsum wallboard attached to approved nailing channels 16" on center with 1- 1/4" by No. 11 gauge by 5/16" head nails with annular ring shanks spaced 7" on center. Double channels at end joints. Channels attached to bottom chord of joists with doubled No. 18 gauge wire ties or suspended below joists on wire hangers.	—	—	—	2	—	—	—	5/8	
12	Ceiling of 5/8" Type "X" wallboard attached to 7/8" deep by 2-5/8" by No. 25 gauge hat-shaped furring channels 12" on center with 1" long No. 6 wallboard screws at 8" on center. Channels wire tied to bottom chord of joists with doubled No. 18 gauge wire or suspended below joists on wire hangers.	—	—	2-1/2	—	—	—	5/8	—	

TABLE NO. 37-C (Continued)

Reinforced gypsum Concrete Slab Poured on ½" Gypsum Form board Supported on Unprotected Steel Bulb Tees, 32-⅝" on Center. Supported on individually Protected Steel Beams[9]	13	None	—	—	2-½	2	—	—	—	—
Reinforced Concrete	14	⅝" gypsum plaster on bottom of floor or roof construction.	—	—	8[10]	—	—	—	⅝	—
Slab and Joists with Hollow Clay Tile Fillers Laid End to End in Rows 2-½" or More Apart; Reinforcement Placed Between Rows and Concrete Cast Around and Over Tile	15	None	—	—	—	5-½[11]	—	—	—	—
Steel Joist Construction with a Reinforced Concrete Slab on Top poured on a ½" deep Steel Deck	16	Vermiculite gypsum plaster on metal lath attached to ¾" cold-rolled channels with No. 18 gauge wire ties spaced 6" on center.	2-½[12]	—	—	—	¾	—	—	—
3" Deep Cellular Steel Deck with Concrete Slab on Top. Slab Thickness Measured to Top of Cells	17	Perlite or vermiculite gypsum plaster on ⅜" perforated gypsum lath attached to ¾" cold-rolled with approved clips. Channels suspended by channels No. 8 gauge hanger wire through units between cells.	—	2-½	—	—	—	⅞[7,8]	—	—

TABLE NO. 37-C (Continued)

	18	Suspended ceiling of vermiculite gypsum plaster base coat and vermiculite acoustical plastic on metal lath attached at 6" intervals to ¾" cold-rolled channels spaced 12" on center and secured to 1-½" cold-rolled channels spaced 36" on center with No. 16 gauge wire. 1-½" channels supported by No. 8 hangers at 36" on center. Beams within envelope and gauge wire with a 2-½",air space between beam soffit and lath have a 4-hour rating.	2-½	—	—	—	1-⅛13	—	—	—
1-½" Deep Steel Roof Deck on Steel Framing. Insulation Board, 30 lbs. per Cubic Foot Density, Composed of Wood Fibers with Cement Binders of Thickness Shown Bonded to Deck with Unfinished Asphalt Adhesive. Covered with a Fire-retardant Roof Covering	19	Ceiling of gypsum plaster on metal lath. Lathl-⅞ attached to ¾" furring channels with No. 18 gauge wire ties spaced 6" on center. ¾" channel saddle-tied to 2"channels with doubled No. 16 gauge wire ties. 2"channels spaced 36" on center suspended 2" below steel framing and saddle-tied with No. 8 gauge wire. Plaster mixed 1:2 by weight, gypsum to sand aggregate.	1	—	—	¾8	¾8	—	—	

TABLE NO. 37-C (Continued)

1-'/2" Deep Steel Roof Deck on Steel Framing Wood Fiber Insulation Board, 17.5 lbs., per Cubic Foot Density on Top Applied Over a 15-lb. Asphalt Saturated Felt. Fire-retardant Roof Covering	20	Ceiling of gypsum plaster on metal lath. Lath attached to ¾" furring channels with No. 18 gauge wire ties spaced 6" on center. ¾" channels saddle-tied to 2"channels with doubled No. 16 gauge wire ties. 2"channels spaced 36" on center suspended 2" below steel framing and saddle-tied with No. 8 gauge wire. Plaster mixed 1:2 for scratch coat and 1:3 for brown coat, by weight, gypsum to sand aggregate for one hour system. For two-hour system plaster mix is 1:2 by weight, gypsum to sand aggregate.	—	—	1-½	1	—	—	7⁄88	3⁄48
1-1/2" Deep Steel Roof Deck on Steel Framing Insulation of Rigid Board Consisting of Expanded Perlite and Fibers impregnated with Integral Asphalt Waterproofing; Density 9 to 12 lbs./ Cu. Ft. Secured to Metal Roof Deck by ½" Wide Ribbons of Waterproof, Cold-process Liquid Adhesive Spaced 6" Apart. Steel Joist or Light Steel Construction with Metal Roof Deck, Insulation, and Built-up Fire-retardant Roof Covering	21	Gypsum-vermiculite plaster on metal lath wire-tied at 6" intervals to ¾" furring channels spaced 12" on center and wire-tied to 2" runner channels spaced 32" on center. Runners wire-tied to bottom chord of steel joists.	—	—	1	—	—	—	7⁄8	—

TABLE NO. 37-C (Continued)

Double Wood Floor Over Wood Joists[14]	22	Gypsum plaster over ⅛" perforated gypsum lath attached to joists with 1-1/8" by No. 13 gauge 19/64" head plasterboard blued nails at a spacing of 4" on center. All joints reinforced with 3" wide strips of metal lath nailed through gypsum lath to joists with 1-3/4" by No. 11 gauge by ½" head nails spaced 5" on center along joists and with two nails per joist in the opposite direction. Plaster mixed 1:2 by weight, gypsum to sand aggregate.	—	—	—	—	—	—	—	⅞
	23	Perlite or vermiculite plaster over ⅜" perforated gypsum lath nailed with 1-⅛" by No. 13 gauge by 19/64" head plasterbo ard blued nails.	—	—	—	—	—	—	—	⅞
	24	Gypsum plaster over ⅜" Type "X" gypsum lath. Lath initially applied with not less than four 1-⅛" by No. 13 gauge by 19/64" head plasterboard blued nails per bearing. Continuous stripping over lath along all joist lines. Stripping consists of 3"' wide strips of metal lath attached by 1-½" by No. 11 gauge by ½" head roofing nails spaced 6" on center. Alternate stripping consists of 3" wide .049" diameter wire stripping weighing one pound per sq. yd. and attached by No. 16 gauge by 1-½" by ¾" crown width staples, spaced 4"' on center. Where alternate stripping is used the lath nailing may consist of two nails at each end and one nail at each intermediate bearing. Plaster mixed 1:2 by weight gypsum to sand aggregate.	—	—	—	—	—	—	—	⅞

TABLE NO. 37-C (Continued)

	25	Portland cement or gypsum plaster on metal lath. Lath fastened with 1-1/2" by No. 11 gauge by $^{7}/_{16}$" head barbed shank roofing nails spaced 5" on center. Plaster mixed 1:2 for scratch coat and 1:3 for brown coat. by weight, cement to sand aggregate.	—	—	—	—	—	—	—	5/8
	26	Perlite or Vermiculite gypsum plaster on metal lath secured to joists with 1-1/2" by No. 11 gauge by 7/16" head barbed shank roofing nails spaced 5" on center.	—	—	—	—	—	—	—	5/8
	27	5/8" Type "X" gypsum wallboard nailed to joists with 6d cooler nails spaced 6" on center. End joints of wallboard centered on joists spaced 16" on center.	—	—	—	—	—	—	—	5/8
Plywood Stressed Skin Panels Consisting of 5/8" Thick Interior C-D (Exterior Glue) Top Stressed Skin on 2" x 6" Nominal (Minimum) Stringers. Adjacent Panel Edges Joined with 8d Common Wire Nails Spaced 6" on Center.	28	½" thick wood fiberboard weighing 15 to 18 lbs. per cu.ft. installed with long dimension parallel to stringers using 5d cooler nails spaced 12" on center. Second layer of 5/8" Type "X" gypsum wallboard applied with long dimension perpendicular to joists with 8d cooler nails spaced 6"' on center at end joints and attached and 8" on center elsewhere. Wallboard joints staggered with respect to fiberboard joints.	—	—	—	—	—	—	—	1

TABLE NO. 37-C (Continued)

Vermiculite Concrete Slab Proportioned 1:4 (Portland Cement to Vermiculite Aggregate) on a 1-½" Deep Steel Deck Supported on Individually Protected Steel Framing. Slab Reinforced with 4" x 8". No. 12/14 Welded Wire Mesh.	29	None	—	—	—	312	—	—	—	—
Perlite Concrete SlabProportioned 1:6 (Portland Cement to Perlite Aggregate) on a 1-¼" Deep Steel Deck Supported on Individually protected Steel Framing. Slab Reinforced with 4" x 8" No. 12/14 Welded Wire Mesh.	30	None	—	—	—	3-½[12]	—	—	—	—
Perlite Concrete Slab Proportioned 1:6 (Portland Cement to Perlite Aggregate) on a 9/16" Deep Steel Deck Supported by Steel Joists 4' on Center. Fire retardant Roof Covering on Top.	31	Perlite gypsum plaster on metal lath wire tied to ¾" furring channels attached with No. 16 gauge wire ties to lower chord of joists.	—	2[15]	2[15]	—	—	⅞	¾	—

TABLE NO. 37-C (Continued)

Floor and Beam Construction Consisting of 3" Deep Cellular Steel Floor Units Mounted on Steel Members with 1:4 (Proportion of Portland Cement to Perlite Aggregate) PerliteConcrete Floor Slab on Top.	32	Suspended envelope ceiling of perlite gypsum plaster on metal lath attached to ¾" cold-rolled to 1-1/2" cold-rolled channels spaced 42" on center channels, secured supported by No. 6 wire 36" on center. Beams in envelope with 3" minimum air space between beam. Soffit and lath having a 4-hour rating.	2[15]	—	—	—	1[8]	—	—	—
Wood Trusses spaced a maximum of 24 inches on centers, sheathed with a minimum of one-half inch plywood and covered with approved roofing materials.	33	1" x 3" furring 16"o.c., flat expanded metal lath (3.4 lbs. per sq. yd.) and ¾" sanded Vermiculite or Perlite gypsum plaster.	—	—	—	—	—	—	—	¾
	34	No furring but top of bottom chord laterally braced with 1" x 4" at each panel point, rib metal lath (3.4 lbs per sq. yd.) attached directly to the bottom chord and ¾"' sanded Vermiculite or Perlite gypsum plaster.	—	—	—	—	—	—	—	¾
	35	1" x 3" furring 16" o.c., two layers of ⅜" Type "X" gypsum lath, 6d cement-coated or ring-shanked nails 4" o.c., with butt and side joints staggered, and½" sanded Vermiculite or Perlite gypsum plaster.	—	—	—	—	—	—	—	⅞
	36	No furring, but top of bottom chord laterally braced with 1' x 4" at each panel point, two layers of ½" Type"X" gypsum lath, 3d cement-coated or ring-shanked nails 4" o.c. with butt and side joints staggered and ½" sanded Vermiculite or Perlite gypsum plaster.	—	—	—	—	—	—	—	1½

TABLE NO. 37-C (Continued)

Wood Trusses, spaced a maximum of 24 inches on centers, sheathed with a minimum of one-half inch plywood and covered with approved roofing materials. (Contd.)	37	1" x 3" furring 16" o.c., one layer 3/8" plain gypsum lath, 20 gage galvanized wire fabric (1" hexagon mesh reinforcement for plaster) over all lath and attached to furring with 8d box nails 5'" to 7" o.c. and 1" Vermiculite or Perlite plaster (2-½" cu. ft. to 100 Lb. bag gypsum, no sand) for scratch and brown coats.	—	—	—	—	—	—	—	1 3/8
	38	1" x 3" furring 16" o.c., one layer 3/8" plain gypsum lath, 3" wide strips of metal lath, welded or woven wire fabric continuous at each furring strip, ½" sanded gypsum plaster and a minimum of 3" of Vermiculite, Perlite or asbestos wool attic fill or 4" batts of fiberglass or mineral wool, or 6" of blown-in fiberglass or mineral wool.	—	—	—	—	—	—	—	7/8
	39	1" x 3" furring 16" o.c., one layer 3/8" Type "X" pinhole or perforated gypsum lath, ½" sanded Vermiculite gypsum plaster (2 cu. ft. Vermiculite and 1 cu. ft. sand to 100 lb. bag gypsum) and a minimum of 3" Vermiculite, Perlite or asbestos wool attic fill, or 4" batts of X asbestos wool 6" of blown-in fiberglass or mineral wool.	—	—	—	—	—	—	—	7/8

TABLE NO. 37-C (Continued)

Wood Trusses, spaced a maximum of 24 inches on centers, sheathed with a minimum of one-half inch plywood and covered with approved roofing materials (cont'd.)	40	No furring, but top of bottom chord laterally braced with 1" x 4" at each panel point, one layer ½" Type "X" gypsum lath, 3" wide strips of metal lath, welded or woven-wire fabric continuous at each truss, ½". sanded gypsum plaster and a minimum of 3" of Vermiculite or Perlite attic fill or asbestos wool, or 4" bats of fiberglass or mineral wood, or 6" of blown-in fiberglass or mineral wool.	—	—	—	—	—	—	—	1
	41	1" x 3" furring 16" o.c., two layers ⅝" Type "X" gypsum wallboard, cement-coated or ring-shanked nails 6" o.c. with butt and side joints staggered, paper tape embedded over joints and exposed nail heads covered with compound.	—	—	—	—	—	—	—	1¼
	42	1" x 3" furring 16" o.c., one layer ⅝" Type "X" gypsum wallboard, 5d cement-coated or ring- shanked nails 6" o.c., paper tape embedded in cementitious compound over joints, exposed nail heads covered with compound and product-approved insulation of fiberglass or mineral wool batts, or blown-in fiberglass, mineral wool or cellulosic insulation having a minimum insulating value of R-11.	—	—	—	—	—	—	—	⅝
	43	Group I Occupancy only: 1" x 3" furring 16" o.c., metal lath and ½" sanded Vermiculite or Perlite gypsum plaster.	—	—	—	—	—	—	—	½"

TABLE NO. 37-C (Continued)

44	Group I Occupancy only: 1" x 3" 16" o.c., one layer of ⅜" Type "X" gypsum lath with joints staggered and ½" sanded Vermiculite or Perlite gypsum plaster.

TABLE NO. 37-C
FOOTNOTES

1. Staples with equivalent holding power and penetration may be used as alternate fasteners to nails for attachment to wood framing.
2. The thickness may be reduced to three inches where limestone aggregate is used.
3. Slab thickness over steel joists measured at the joists.
4. Ref. omitted 7/15/88.
5. Ref. omitted 7/15/88.
6. One inch by No. 20 gauge hexagonal wire mesh installed below lath and tied to each furring channel at joints between lath
7. No. 14 gauge wires spaced eleven and three-tenths inches on center or ten inches on center (for channel spacing of sixteen inches and twelve inches respectively) installed below lath sheets in a diagonal pattern. Wires tied to furring channels or clips at lath edges.
8. Furring channels spaced twelve inches on center.
9. Allowable working stress for bulb trees to be based upon a factor of safety of four applied to the yield point for negative bending and six and five-tenths applied to the yield point for positive bending.
10. Six-inch hollow clay tile with two-inch concrete slab above.
11. Four-inch hollow clay tile with one and one-half-inch concrete slab above.
12. Thickness measured to bottom of steel form units.
13. Five-eighths inch of vermiculite gypsum plaster plus one-half inch of approved vermiculite acoustical plastic.
14. Double wood floor may be either of the following (see also Sub-Section 3705.4 for conditions where flooring or ceiling may be omitted):
(a) Subfloor on one-inch nominal boarding, a layer of asbestos paper weighing not less than 14 pounds per one hundred square feet and a layer of one-inch nominal tongue and groove finish flooring; or (b) Subfloor of one-inch nominal tongue and groove boarding or one-half-inch plywood with exterior glue, a layer of 0.010-inch thick rosin sized building paper and a layer of one-inch nominal tongue and groove finish flooring or five-eighths-inch interior type tongue and groove plywood finish flooring.
15. Thickness measured to top of steel deck unit.
16. See Table 37-B footnote 2 for determination of equivalent thickness.

TABLE 37-D
MULTIPLE FACTOR FOR FINISHES ON NON-FIRE-EXPOSED SIDE OF WALL

	Type of Aggregate Used in Concrete or Concrete Masonry			
Type of Finish Applied to Wall	**Concrete: Siliceous or Carbonate Concrete Masonry: Siliceous or Calareous Gravel**	**Concrete: Sand-light Weight Concrete Masonry: Limestone, Cinders or Unexpanded Slag**	**Concrete: Lightweight Concrete Masonry: Expanded Shale, Clay or Slate**	**Concrete Masonry: Pumice, or Expanded Slag**
Portland Cement Sand Plaster	1.00	0.75[1]	0.75[1]	0.501
Gypsum-Sand Plaster or Gypsum Wallboard	1.25	1.00	1.00	1.00
Gypsum-Vermiculite or Perlite Plaster	1.75	1.50	1.25	1.25

1. For Portland cement-sand plaster inch or less in thickness and applied directly to the concrete masonry on the non-fire-exposed side of the wall, the multiplying factor shall be 1.00.

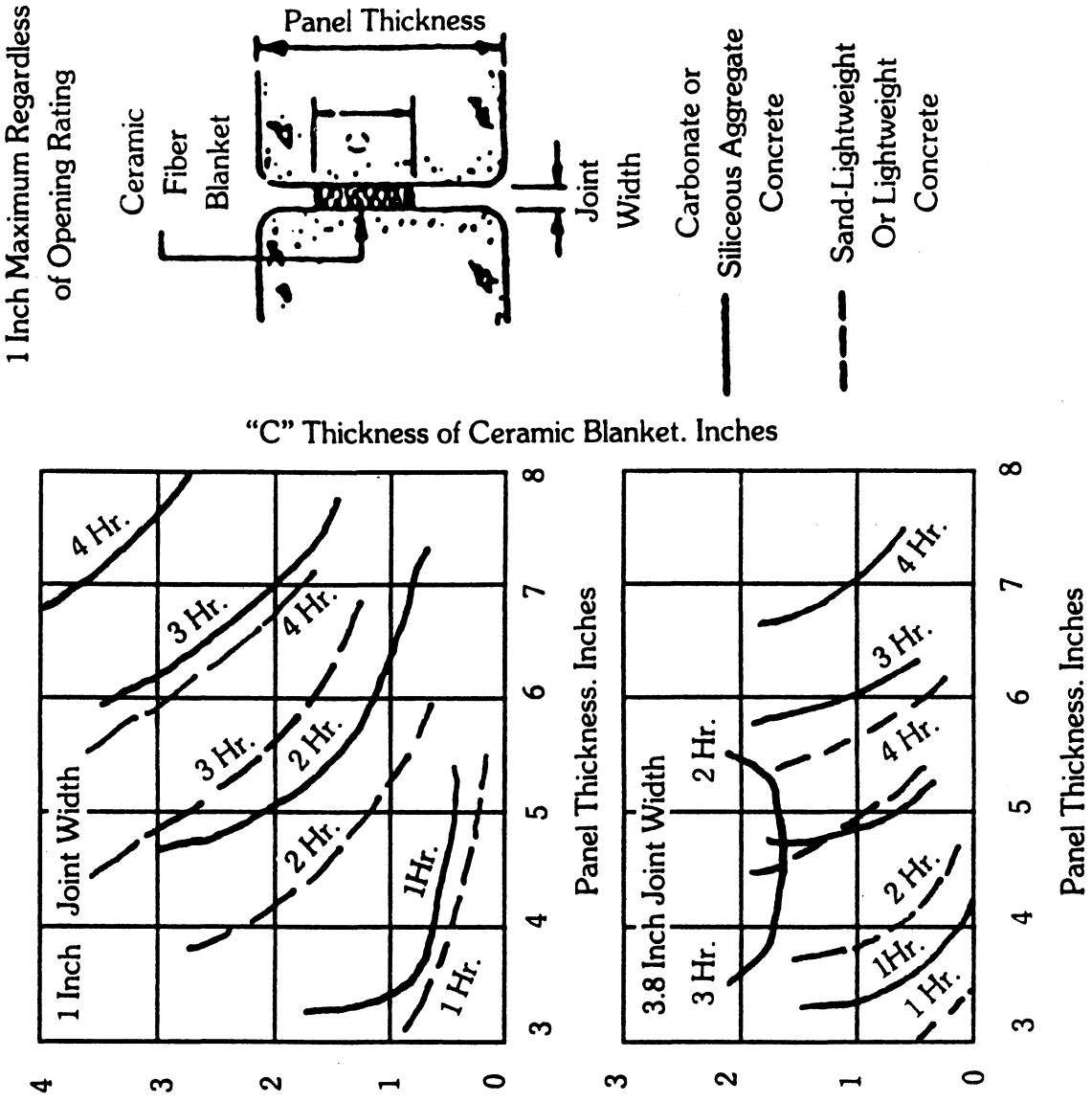
TABLE 37-E
TIME ASSIGNED TO FINISH MATERIALS ON FIRE-EXPOSED SIDE OF THE WALL

Finish Description	Time, Minutes
Gypsum Wallboard	
3/8-inch	10
½-inch	15
5/8-inch	30
2 layers of 3/8-inch	25
1 layer 3/8-inch, 1 layer ½-inch	35
2 layers ½-inch	40
Type X Gypsum Wallboard	
½-inch	25
5/8-inch	40
Portland Cement-Sand Plaster	See Note 1
Applied Directly to Concrete Masonry	
Portland Cement-Sand Plaster on Metal Lath	
3/4-inch	20
7/8-inch	25
1 inch	30
Gypsum Sand Plaster on 3/8-inch	
Gypsum Lath	
½-inch	35
5/8-inch	40
3/4-inch	50
Gypsum Sand Plaster on Metal Lath	
3/4-inch	50
7/8-inch	60
1 inch	80

1. The actual thickness of Portland cement-sand plaster, provided it is 1 inch or less in thickness, may be included in determining the equivalent thickness of the masonry for use in Table 37-B (27-31).

TABLE 37-F

Minimum thickness of ceramic fiber blanket required between precast concrete wall panels to provide fire resistance ratings of 1 hour to 4 hour.



3706 FIRE-RESISTIVE ASSEMBLIES FOR PROTECTION OF OPENINGS

3706.1 GENERAL:

(a) Where required by this Code for fire protection of openings, fire-resistive assemblies shall comply with the standards set forth in Sub-section 3701.2 and the requirements of this section.

(b) All fire assemblies required to have fire-protection rating of three-fourths hour or more shall bear a label or other identification showing the rating thereof except that such label shall not be required for windows complying with Sub-section 3706.6 herein.

(c) Such label shall be issued by an approved testing agency having a service for inspection of materials and workmanship at the factory during fabrication and assembly.

(d) For additional requirements for doors see Section 3103 and Table 31-C of this Code.

3706.2 FIRE DOORS:

(a) The identification, testing, hardware, frames, glazing and installation of fire doors shall be as set forth herein.

(b)A three-fourths-hour labeled fire assembly door may be used where a one-hour rating is required provided the door is tested, together with the frame and type of hardware as set forth in this Code, for a period of three-fourths hour in accordance with the Standard set forth in Paragraph 3701.2(c).

3706.3 FIRE-RESISTIVE TESTS:

(a) The fire protection rating of all types of required fire assemblies, except windows complying with the Paragraphs of Sub-section 3706.6, shall be determined in accordance with the requirements set forth in the Standards in Paragraphs 3701.2(c) and (e).

(b) A maximum transmitted temperature and end point shall not be required except for fire-exit doors in stairway enclosures where the temperature shall not exceed 450, F. at the end of 30 minutes of the fire exposure set forth in the standard in Paragraphs 3701.2(c) and 3701.2(e).

3706.4 HARDWARE AND FRAMES:

(a) Every fire assembly required to have a three-hour fire-protection rating shall be an automatic closing type.

(b) Every fire assembly required to have a one and one-half, one-hour, or three-fourths-hour fire-protection rating shall be an automatic of self-closing type.

(c) (1) Doors shall have closing devices as provided in Table 31-C and as set forth in Section 3103 of this Code.

(2) Closing devices may be omitted where three-fourths-hour fire-resistive assemblies are required in exterior walls and in interior walls and partitions unless otherwise required in Section 3103.

(d) Heat-activated devices used in automatic fire assemblies shall be installed, one on each side of the wall at the top of the opening and one on each side of the wall at ceiling height where the ceiling is more than three feet above the opening.

(e) Devices detecting products of combustion shall meet the approval of the Building Official as to installation and location, and shall be subject to such periodic tests as may be required by Section 3808 herein.

(f) Where required to be a rated fire assembly, doors shall be equipped with approved steel frames or such frames shall be of the material as used in the test assembly.

3706.5 GLAZED OPENINGS IN FIRE DOORS AND WINDOWS:

(a) There shall be no glazed openings in a fire assembly required to have a three-hour fire-resistive rating.

(b) The area of glazed openings in a fire door required to have one-and-one-half-hour or one-hour fire-resistive rating shall be limited to 100 square inches with a minimum dimension of four inches.

(c) Where both leaves of a pair of doors have observation panels, the total area of the glazed opening shall not exceed 100 square inches for each leaf.

(d) Glazed openings shall be limited to 1200 square inches in wood and plastic faced composite or hollow metal doors, per light, when fire-resistive assemblies are required to have a three-fourths-hour fire-resistive rating.

(e) Windows required to have a three-fourths-hour fire-resistive rating may have an area not greater than 84 square feet with neither width nor height exceeding 12 feet.

3706.6 FIRE WINDOWS: Where windows are provided in openings required by this code to be protected by a fire-resistive assembly having a three-fourths-hour fire-protection rating, such window shall be labeled as set forth in Sub-section 3706.2 or be as follows:

(a) Windows shall have frames and sash of solid steel sections or of hollow steel or iron shapes and be fabricated by pressing, riveting, interlocking, welding, or crimping together, but not by the use of solder or other fusible alloy.

(b) Wire glass and glazing shall comply with Sub-section 3706.7.

(c) Maximum height of hollow-metal-frame windows shall be 10 feet.

(d) Maximum width of hollow-metal-frame windows shall be six feet for double-hung, counter-weighted, counter-balanced, and fixed-sash type windows and shall be five feet for all other types.

(e) Solid-section-frame windows shall have a maximum area of 84 square feet with neither width nor height exceeding 12 feet, except that, when used with unprotected steel mullions, the width shall not exceed seven feet.

(f) Solid-section mullions, where used in lengths exceeding 12 feet, shall be fire-protected.

3706.7 GLAZING:

(a) Glazing shall be glass not less than one-fourth inch thick and shall be reinforced with wire mesh No. 24 gauge or heavier embedded in the glass with openings not larger than one inch square.

(b) Glass not conforming to these requirements may be used when qualified by tests in accordance with the standards set forth in Paragraph 3701.2(c) and Paragraph 3701.2(e).

(c) Glass shall be held in place by steel glazing angles except that in casement windows wire clips may be used.

3706.8 TIN-CLAD DOORS: If constructed as set forth in the standard in Paragraph 3701.2(d), tin-clad fire doors installed on each side of openings requiring protection shall be considered as providing a fire assembly having a three-hour fire-protection rating period each door bears the label of an approved testing agency showing the classification thereof.

3706.9 INSTALLATION: A fire assembly shall be installed as set forth in the standard in Paragraph 3701.2(d).

3706.10 SIGNS: A sign shall be displayed permanently near or on each required fire door in letters not less than one inch high to read as follows:

FIRE DOOR
DO NOT OBSTRUCT

3707 FIRE RETARDANT ROOF COVERINGS

Roof coverings shall be required to be fire retardant where and as set forth in Chapter 34.

3708 INTERIOR FINISHES

3708.1 GENERAL:

(a) Interior finish shall include the materials of walls, partitions, ceilings and other exposed interior surface of buildings, comprising both the plaster, wood or other interior finish material and any surfacing material such as paint or wallpaper applied thereto.

(b) Interior finish includes materials affixed to the building structure as distinguished from decorations or furnishings which are not so affixed.

(c) Requirements for finishes shall not apply to trim, doors or windows or their frames nor to materials which are less than 0.036 inch in thickness, cemented to the surface of walls or ceilings if these materials have flame-spread characteristics no greater than paper of this thickness cemented to an incombustible backing.

(d)A finish floor or floor covering such as wood, linoleum, vinyl, rubber or cork applied directly to the floor construction shall be exempt from the requirements of this section.

(e) Where carpeting is required to have a rating when used as a floor covering, it shall be tested in accordance with NFPA 253 (ASTM E648) Standard Method of Test for Critical Radiant Flux of Floor Covering Systems, using a Radiant Heat Energy Source.

(f) Carpeting or other flooring materials used on ceilings or walls over 6" above the finished floor shall be tested in accordance with NFPA 255(ASTM E84) Standard Method of Surface Burning Characteristics of Building Materials.

3708.2 CLASSIFICATION:

(a) Interior finish materials shall be classified in accordance with their average flamespread rating on the basis of tests conducted as set forth in Paragraph 3701.2(j) in which cement-asbestos board rates 0 on the scale and red oak lumber 100. Carpeting used as wall covering must be accompanied by an Affidavit stating flame spread classification of that particular carpet.

(b) Interior finish materials shall be grouped in the following classes in accordance with their flame-spread:

CLASS A Flame Spread 0-25
CLASS B Flame Spread 26-75
CLASS C Flame Spread 76-200
CLASS D Flame Spread 201-500
CLASS E Flame Spread ..... Over 500

(c) Interior finish for carpeting materials shall be grouped in the following classes in accordance with their critical radiant flux:

Class 1 ..... 0.45 watts per square centimeter
Class 2 ..... 0.22 watts per square centimeter

3708.3 REQUIREMENTS:

(a) The requirement for carpeting in the egress corridors and the minimum flame-spread classification of interior finishes shall be based on use or occupancy as follows:

(1) Group A or B Occupancy – in all means of egress, Class A; in general assembly areas, Class B; in rooms of less than 200 capacity, Class C. Carpeting: in all means of egress and general assembly areas, Class 1; in rooms less than 200 capacity, Class 2.

(2) Group C Occupancy – in all means of egress, Class A; in unsprinklered open-plan buildings, Class B; in all other areas, Class C. Carpeting in all means of egress and unsprinklered open-plan buildings, shall be Class 1. Carpeting in child care center, shall be Class 2.

(3) Group D Occupancy – in all means of egress, Class A; in any room, Class A except that Class B material may be used in individual rooms of not over four persons capacity. Carpeting: Division 1, Class 1; Division 2, Class 1.

(4) Group E and F Occupancy – Class C. Carpeting: no requirements.

(5) Group G Occupancy, Division 1, over 3000 square feet or over three stories; Ceilings, Class B or if completely sprinklered, Class C. Walls – Class C.

Group G Occupancy, Division 1, not over 3000 square feet or not over three stories. All interior finishes – Class C.

Group G, Division 2 – In means of egress and enclosed corridors, furnishing access thereto or ways of travel therefrom, Class B; or if sprinklered, Class C.

Group G, Division 2 – In general office areas, all interior finish, Class C.

Group G Occupancy, Division 1 or 2, over one story but less than 50 feet, Class II rating for carpeting.

(6) Group H Occupancy – in means of egress, Class B; in lobbies, Class B; in individual rooms or living units including dormitories or rooming houses, Class C Carpeting: Class II.

(7) Group I Occupancy – Class C. Carpeting; no requirement.

(8) Group J Occupancy – no requirements.

(b) Exposed portions of structural members complying with the requirements for heavy timber construction are excluded from flame-spread requirements.

(c) Where automatic sprinklers are installed, interior finish class C may be used where Class B is set forth and interior finish Class B may be used where Class A is set forth.

(d) Interior finish not in excess of 10 percent of the aggregate wall and ceiling areas of any room or space may be Class C materials in Occupancies where interior finish or lower flame spread rating is required.

(e) In existing buildings the flame-spread classification of interior surfaces may be secured by applying approved fire-retardant paints or solutions to existing surfaces having a higher flame-spread rating than otherwise set forth herein as approved. Fire-retardant paints or solutions shall be renewed at such intervals as necessary to maintain the required fire-retardant properties.

(f) In new buildings, other than Group I Occupancy, Class B interior finish shall be used in all basements or other underground spaces from which there is no direct means of egress to the outside of the building at grade if subject to occupancy for any purpose other than storage or service facilities.

3709 INSULATING MATERIALS

3709.1 GENERAL: Insulating materials which, when burning, produce smoke-density greater than that produced from the burning of untreated wood, or which have products of combustion more toxic than the burning of treated wood under similar conditions in accordance with the ASTM Standard Method of Test E84, set forth in Sub-section 3701.2, shall be used only where combustible materials are permitted inside of buildings and provided such use complies with the following:

(a) Exposed insulating materials shall not in any case exceed ten percent of the aggregate interior surfaces of the walls and ceiling of the room or space in which the material is installed, or

(b) The surfaces of such insulating materials shall be enclosed within incombustible materials.

3709.2 EXCEPTION: The conditions of Sub-section 3709.1 shall not apply where such rooms or spaces are provided with an approved automatic sprinkler system as set forth in Sub-section 3801.1 of this Code.

3710 CALCULATED FIRE RESISTANCE

3710.1 GENERAL:

(a) This section contains procedures for calculating the fire resistance ratings of walls, floor/ceiling and roof/ceiling assemblies based on the standard method of test reference in Section 3701.2(b).

(b) Fire resistance ratings calculated using the procedures in this section shall only be 1 hour.

(c) When dissimilar membranes are used on a wall assembly, the calculation shall be made from the least fire resistant (weaker) side.

3710.2 WALLS, FLOOR/CEILING, ROOF/CEILING:

(a) These procedures apply to both load bearing and non-load bearing assemblies.

(b) The membrane on the unexposed side shall not be included in determining the fire resistance of the assembly. The fire resistance rating of a wood framed assembly is equal to the sum of the time assigned to the membrane on the fire exposed side, the time assigned to the framing members and the time assigned for contribution by other protective measures such as insulation.

(c) Table 3710.2A gives the time during which the membrane on the fire-exposed side should remain in place during the standard test.

TABLE 3710.2-A

TIME ASSIGNED TO WALLBOARD MEMBRANES

Description of Finish	Time, Min.
½ inch fiberboard	5
3/8 inch plywood bonded with exterior glue	5
15/32 inch plywood bonded with exterior glue	10
19/32 inch plywood bonded with exterior glue	15
3/8 inch gypsum wallboard	10
½ inch gypsum wallboard	15
5/8 inch gypsum wallboard	30
½ inch type X gypsum wallboard	25
5/8 inch type X gypsum wallboard	40
Double 3/8 inch gypsum wallboard	25
½ + 3/8 inch gypsum wallboard	35
Double ½ inch gypsum wallboard	40

(1) These values apply only when framing members are spaced a maximum of 16" o.c.

(2) Gypsum wallboard installed over framing or furring shall be installed so that all edges are supported, except 5/8 inch type X gypsum wallboard may be installed horizontally with staggered horizontal joints unsupported but finished.

(3) On wood framed floor/ceiling or roof/ceiling assemblies, gypsum board shall be installed with the long dimension perpendicular to framing members and shall have all joints finished.

(d) Where fire exposure can be expected to occur only on one side of a wall, such as on the interior side of an exterior wall, the wall is assigned a rating dependent on the interior membrane and the framing as described in Tables 3710.2-A and 3710.2-B. The membrane on the outside or non-fire exposed side may consist of sheathing, sheathing paper and siding as described in Table 3710.2-C or may be any membrane that is assigned a time for contribution to fire resistance of at least 15 minutes in Table 3710.2-A.

Broward County Board of Rules and Appeals
955 S. Federal Highway
Ft. Lauderdale, Florida 33316

TABLE 3710.2-B
TIME ASSIGNED TO WALLBOARD MEMBRANES

Description of Frame	Frame, min.
Wood studs 16 inch o.c.	20
Wood floor and roof joists 16 inch o.c.	10

(1) This table does not apply to studs or joists spaced more than 16" o.c.

(2) All studs shall be nominal 2" x 4" and all joists shall have a nominal thickness of at least 2".

(3) Allowable spans for joists shall be determined in accordance with Section 2904.

TABLE 3710.2-C
MEMBRANE ON EXTERIOR FACE OF WOOD STUD WALLS

Sheathing	Paper	Exterior Finish
5/8 inch T&G lumber		Lumber siding
9/16 inch exterior glue plywood	Sheathing paper	Wood shingles and shakes
½ inch gypsum wallboard		¼ inch plywood exterior grade
5/8 inch gypsum wallboard		¼ inch hardboard
½ inch fiberboard		Metal siding
		Stucco on metal lath
		Masonry Veneer
None		3/8 inch exterior grade plywood

(1) Any combination of sheathing, paper and exterior finish listed on Table 3710.2-C may be used.

(e) In the case of a floor or roof, the standard test provides for testing for fire exposure from below. Except as noted in Section 3705.4, floor or roof assemblies of wood framing must have an upper membrane consisting of a subfloor and finish conforming to Table 3710-2-D or any other membrane that has a contribution to fire resistance of at least 15 minute in Table 3710.2-A.

TABLE 3710.2-D

FLOORING OR ROOFING OVER WOOD FRAMING

Assembly	Structural Members	Subfloor or Roof Deck	Finish Flooring or Roofing
Floor	Wood	15/32 inch plywood or 11/16 inch T&G softwood	Hardwood or softwood flooring on building paper. Resilient flooring, parquet floor felted-synthetic-fiber floor covering, carpeting, or ceramic tile on 3/8 inch thick panel-type underlayment. 1/4 inch ceramic tile on 1¼" mortar bed.
Roof	Wood	15/32 inch plywood or 11/16 inch T&G softwood	Finish roofing material with or without insulation

(1) This table applies only to wood joist construction and is not applicable to wood truss construction.

(f) Table 3710.2-E gives the time increments that can be added to the fire resistance of wood stud walls when glass wool rockwool or slag mineral wool insulation is incorporated in the assembly.

TABLE 3710.2-E

TIME ASSIGNED FOR ADDITIONAL PROTECTION

Description of Additional Protection	Time, Min.
Add to the fire resistance rating of wood wall if the space between the studs is filled with 0.6 lb/sq. ft. glass-wool or 1.2 lb./sq. ft. mineral wood batts or blankets 2– inch or 3½ inch thick nailed or stapled in place 12 o.c.	15

(g) Fastening of wood framed assemblies and the fastening of membranes to the wood framing members shall be done in accordance with Chapter 29 and Section 3510.2(a).

3710.3 DESIGN OF ONE-HOUR FIRE-RESISTIVE EXPOSED WOOD MEMBERS (6-INCH NOMINAL OR GREATER):

(a) GENERAL: The design of wood columns and beams for one-hour fire-resistive construction assumes that there are four distinct structural zones of wood assumed in a member exposed to fire. The outer char zone is assumed to offer no strength or stiffness to the wood member. The second and third zones involve elevated temperature areas with a maximum thickness of approximately 1½ to 2 inches. The outer zone has an assumed depth of about 5/8-inch with assumed residual strength and stiffness of 60 and 75 percent, respectively, or unaffected wood. The second elevated temperature zone provides residual strength and stiffness of approximately 80 and 90 percent, respectively. The fourth layer involves the core of the wood member, which remains at normal room temperature and thus is assumed to have full strength and stiffness capability.

(b) DESIGN:

(1) The fire-resistive rating, in minutes, of timber beams and columns with a minimum dimension of 6 inches is equal to:

Beams:

(a) 2.54 Zb (4-2(b/d)) for beams which may be exposed to fire on four sides.

(b) 2.54 Zb (4-(b/d)) for beams which may be exposed to fire on three sides.

Columns:

(c) 2.54 Zd (3-d/b) for columns which may be exposed to fire on four sides.

(d) 2.54 Zd (3-d/2b) for columns which may be exposed to fire on three sides.

Where:

b = the breadth (width) of a beam or larger side of a column before exposure to fire, inches.
d = the depth of a beam or smaller side of a column before exposure to fire, inches.
Z = load factor, based on Figure No. 1 symbols:
Ke = the effective length factor as noted in Figure No. 2
l = the unsupported length of column, inches.

(2) Formula (d) above applies only where the unexposed face represents the smaller side of the column. If a column is recessed into a wall, its full dimension shall be used for the purpose of these calculations.

(3) Allowable loads on beams and columns are determined using design values given in "Design Values for Wood Construction," a supplement to the 1982 Edition, National Design Specification for Wood Construction.

Where minimum one-hour fire endurance is required, connectors and fasteners must be protected from fire exposure by 1½ inches of wood, fire-rated gypsum board or any coating approved for a one-hour rating. Typical details for commonly used fasteners and connectors are shown in AITC Technical Note No. 7, Sept. 1984.

(4) Wood members are limited to dimensions of 6 inches nominal or greater. Glue laminated timber beams utilize standard laminating combinations except that a core lamination is removed. This tension zone is moved inward and the equivalent of an extra nominal 2 inch thick outer tension lamination is added.

FIGURE NO. 1
LOAD FACTOR

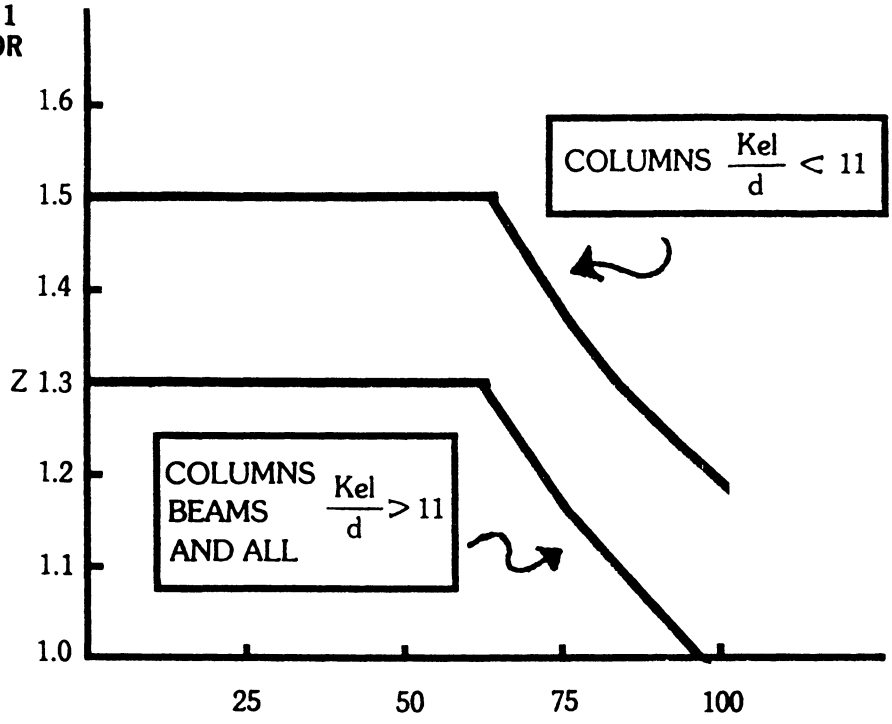
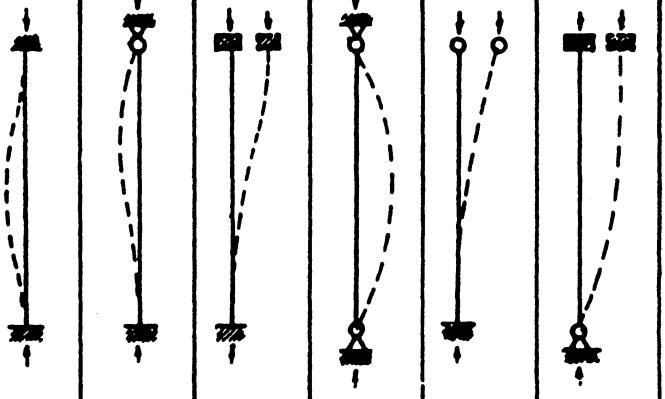


FIGURE NO. 2
APPENDIX N, 1982 NDS EFFECTIVE COLUMN LENGTH

Buckling modes						
Theoretical K_e value	0.5	0.7	1.0	1.0	2.0	2.0
Recommended design K_e when ideal conditions approximated	0.65	0.80	1.2	1.0	2.10	2.4
End condition code		Rotation fixed, translation fixed Rotation free, translation fixed Rotation fixed, translation free Rotation free, translation free				

CHAPTER 38
FIRE-EXTINGUISHING APPARATUS

3801 AUTOMATIC-SPRINKLER SYSTEMS
3802 CARBON DIOXIDE FIRE EXTINGUISHING SYSTEMS
3803 STANDPIPES AND HOSE STATIONS
3804 WATER SUPPLY
3805 FIRE DEPARTMENT CONNECTIONS
3806 YARD HYDRANTS
3807 PORTABLE FIRE EXTINGUISHERS
3808 INSPECTIONS AND TESTS

3801 AUTOMATIC-SPRINKLER SYSTEMS

3801.1 GENERAL:

(a) Sprinklers: For purposes of this Section only, the definition of a Story shall be that portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above, as defined in NFPA 101.

(1) In new buildings or in buildings altered to increase the area or height, and in existing buildings, as set forth in Sub-sections 104.7 and 503.1 of this Code, approved automatic-sprinkler systems shall be installed and maintained as provided in this chapter and in Chapter 51 of this Code, except that the Building Official may require or may permit a carbon dioxide fire-extinguishing system, as set forth in Section 3802 herein, or other approved automatic fire-extinguishing system, to be used in lieu of such sprinkler system.

(b) As used in this Chapter:

(1) Area shall be the allowable floor area set forth in Part III (Groups of Occupancy) of this Code for the various Types of construction.

(2) Height shall be the vertical distance from grade to the top of the main roof, exclusive of a mechanical penthouse.

(3) Grade shall be as set forth in Paragraph 5101.1(b) of this Code.

(c) Combustible goods or merchandise shall include those made of wood, plastics, cloth or rubber; those containing flammable liquids; those packed with excelsior, paper or moss; those packaged or packed in paper; cardboard or wood containers and other goods or merchandise of equivalent, or greater, combustibility.

(d) Combustible, incombustible and non-combustible shall be as defined in Section 401 of this Code.

(e) The installation of fire extinguisher or standpipes shall not reduce or nullify the requirements for automatic fire-extinguishing systems as set forth in this Chapter and in Chapter 51 of this Code.

(f) Where automatic fire-extinguishing protection is provided in other than High Hazard Occupancies, the fire-resistive requirements may be reduced by one hour in the area or portion of buildings so protected provided such buildings are not more than 50 feet in height, however, in no case shall it be less than one-hour fire rated.

(g) When six or less heads are required per building, they may be connected directly to the City water system provided that the following conditions are met:

(1) Pipe Schedule in NFPA 13 shall be used for sizing all piping in this sprinkler system. When the construction or conditions introduces unusually long runs of pipe or many angles, in risers or fire mains, an

increase in pipe size over that called for in the schedules shall be required to compensate for increase friction losses.

(2) Water supply shall be not less than the demand of all sprinkler heads if activated plus 100 gallons per minute.

(3) Such fire sprinkler line shall be equipped with a metered valve, approved backflow prevention device, indicating valve, test station with pressure gauge and flow switch connected to an audible alarm.

(4) Siamese or secondary water supply shall not be required.

(5) Such fire sprinkler lines shall not be installed beneath the slab.

(6) Piping and components shall comply with NFPA 13.

(h) Alternative to 3801.1(g): When six or less heads are required per building, they may be connected to domestic water service line provided that the following conditions are met:

(1) The minimum size of the supply line shall conform to Pipe schedule in NFPA 13. When the construction or conditions introduces unusually long runs of pipe or many angles, in risers or fire mains, an increase in pipe size over that called for in the schedules shall be required to compensate for increase in friction losses.

(2) Water supply shall be not less than the demand of all sprinkler heads if activated plus 100 gallons per minute.

(3) Such fire sprinkler lines shall be connected to the water service line before the building shut-off valve, and shall be equipped with a check valve, approved indicating valve, test station with pressure gauge, flow switch connected to an audible alarm; and there shall be an automatic valve to shut off domestic water flow when sprinkler system is activated.

(4) Automatic valve in (3) shall be provided with back-up power.

(5) The sizing of the water service tap shall be the larger of either of the domestic water demand or the fire demand.

(6) Siamese or secondary water supply shall not be installed beneath the slab.

(7) Such fire sprinkler lines shall not be installed beneath the slab.

(8) Piping and components shall comply with NFPA 13.

(i) Exception to 3801.1(g) and 3801.1(h):

(1) Paint spray booths having six (6) or less sprinkler heads shall comply with the Pipe Schedule in NFPA 13 for sizing all piping and may be connected directly to a domestic water supply system.

(2) A visible indicating type shut-off valve shall be installed in an accessible exterior location before the building main water control valve.

(3) A test station with pressure gauge shall be provided at the end of the sprinkler system.

(4) Enclosed spray booths (curtain excluded) shall have audible alarms.

(5) Siamese or secondary water supply shall not be required.

(6) Such fire sprinkler lines shall not be installed beneath the slat.

(7) Piping and components shall comply with NFPA 13.

(8) When the construction or conditions introduces unusually long runs of pipe or many angles, in risers or fire mains, an increase in pipe size over that called for in the schedules shall be required to compensate for increased friction losses.

(9) Such fire sprinkler line shall be equipped with an approved backflow prevention device.

3801.2 BASEMENTS: Approved automatic-sprinkler system shall be required:

(a) In basements or underground structures occupied as bowling lanes, restaurants, or for the manufacture, sale, or storage of combustible goods or merchandise (not including garages) and exceeding 2,500 square feet in area.

(b) In basements used as workshops or for storage of combustible goods in buildings used for assembly, educational or residential occupancies where the area used for such workshops or such storage of combustible goods exceeds 2,500 square feet.

(c) In basements of buildings used for assembly, educational, or residential occupancies where the area of such basements exceeds 5,000 square feet.

3801.3 REQUIREMENTS BASED ON OCCUPANCY:

(a) GROUP A OCCUPANCIES: Every Group A Occupancy including areas listed in Sec. 3801.3(b) shall be protected by approved automatic sprinkler system except in specified areas within Type I and Type II construction listed below.

(1) Auditoriums with fixed seating in one story building of any height.

(2) Multipurpose educational occupancy auditoriums of less than 12,000 sq. ft. in gross area.

(3) Passenger terminals at or above grade under 50 feet in height.

(4) Gymnasiums used for no other purpose in one story building of any height.

(5) Skating rinks and swimming pools used exclusively for participant sport and no audience facilities for more than 300 occupants.

(b) GROUP B AND C OCCUPANCIES: Approved automatic-sprinkler systems shall be installed in the entire building of Type V (protected) construction and in the following locations in buildings of Groups B and C Occupancies having a stage:

(1) Projection rooms where nitro-cellulous film is used.

(2) All accessible spaces on the stage side of the proscenium opening, including under the stage floor, gridiron and tie and fly galleries.

(3) Dressing rooms, workshops and storerooms.

(4) On the stage side and immediately back of the proscenium curtain and not more than five feet above the proscenium arc.

(5) Projection rooms of buildings of Groups B Occupancies not having a stage and having a seating capacity of 500 or more persons.

(c)GROUP D OCCUPANCIES: Approved automatic-sprinkler systems shall be installed in buildings of Group D as follows:

(1) Type I and Type II buildings exceeding three stories.

(2) Type III buildings for Division 1 and Division 2 and Type III, IV and V buildings for Division 3 only where the capacity exceeds thirteen (13) residents or in facilities with four (4) or more resident deemed incapable of self-preservation.

(d) GROUP E OCCUPANCIES: Approved automatic-sprinkler systems shall be installed in buildings of Group E Occupancy, Divisions 1 and 2, over one story in height, or in buildings of mixed Occupancies, or in buildings one story in height exceeding 1,500 square feet in area.

(e) GROUP F OCCUPANCIES: Approved automatic-sprinkler systems shall be installed:

(1) In buildings or within fire divisions of Group F, Division 1, Occupancy (other than parking garages) one and two stories in height used for the storage of combustible goods or merchandise and

exceeding 20,000 square feet per floor in area.

(2) In buildings or within fire divisions of Group F, Division 1, Occupancy (other than parking garages) three or more stories in height used for the storage of combustible goods or merchandise and exceeding 10,000 square feet per floor in area.

(3) In buildings of Group F, Division 1, Occupancy used for garages as follows:

(aa) In enclosed parking garages over 50 feet in height.

(bb) In open-air parking garages more than 75 feet in height.

(cc) In repair garages over one story in height, or located below another occupancy, exceeding 10,000 square feet per floor if of Type I construction, or 8,000 square feet per floor if of protected incombustible construction.

(dd) In one-story repair garages exceeding 15,000 square feet in floor area if of Type I construction, 12,000 square feet in floor area if of protected incombustible construction, or 9,000 square feet in floor area if of unprotected, incombustible construction or heavy timber, or Type III Protected construction.

(ee) In any basement-parking or repair garage located under any occupancy other than a parking or repair garage, where such basement garage exceeds 5,000 square feet in floor area.

(4) In boat storage facilities with four or more boats, regardless of square footage. When boats are stored on inside or outside multilevel racks for in and out operation, automatic sprinkler protections shall be provided for the entire building or structure and each boat in accordance with the Standard for the Installation of Sprinkler Systems, NFPA13.

(5) In buildings or Group F, Division 2, Occupancy where loose combustible fibers, chips, shavings and dust are produced or generated and such buildings are over one story in height, or:

(aa) In such buildings of mixed occupancies exceeding 8,000 square feet per floor, or

(bb) In such buildings one story in height and exceeding 15,000 square feet in floor area.

(6) In buildings of Group F, Division 2, Occupancy used for dry goods and apparel manufacturing shops as follows:

(aa) In such buildings one or two stories in height of Type II and Type III (Protected) Construction constructed with incombustible materials and exceeding 10,000 square feet per floor and,

(bb) In such buildings one or two stories in height of Type II and Type II (Protected) Construction constructed wholly or in part with combustible materials and exceeding 2,500 square feet per floor and,

(cc) In any such building of Type III (Unprotected), of Type IV, or Type V Construction of any floor area and,

(dd) In any building three or more stories in height of any floor area.

(f) GROUP G, DIVISION 1, OCCUPANCY: Approved automatic-sprinkler systems shall be installed:

(1) In buildings or within fire divisions of Group G, Division 1, Occupancy one story in height used for the sale or storage of combustible goods or merchandise and exceeding 15,000 square feet in floor area.

(2) In buildings or within fire divisions of Group G, Division 1, Occupancy over one-story in height used for the sale or storage of combustible goods or merchandise and exceeding 15,000 square feet per floor in area, or exceeding 30,000 square feet in gross floor the total of the floors.

(g) GROUP H – HOTELS, MOTELS, AND TIME-SHARE UNITS: Automatic sprinkler systems and smoke detection systems shall be installed in buildings of these categories as required by HB 1069, F.S. 509.215.

3801.4 REQUIREMENTS:

(a) Automatic-sprinkler systems shall comply with the Standard "The Installation of Sprinkler Systems," NFPA 13, as set forth in Section 402 of this Code and the provisions of Chapter 51 of this Code.

(1) Plans for automatic sprinkler systems shall bear the seal of a Florida Registered Engineer, as pursuant to F.S. 633.

(b) The alarm valve required for a standard sprinkler system shall be required only in buildings of Group A Occupancy and in basements exceeding 3,000 square feet in floor area of other occupancies.

(c) Buildings not exceeding 50 feet in height may have automatic-sprinkler systems complying with Chapter 51 of this Code and such systems may be supplied from a four inch standpipe.

(d) Sprinklers shall be installed:

(1) At the top and at alternate floors in any trash or linen chute.

(2) In every trash or linen terminal room and in every room exceeding 15 square feet of floor area connected to such trash or linen chute.

(3) In garbage or trash rooms of more than 15 square feet of floor area.

(4) In paint spray booths as provided in section 4106 of this Code.

(5) In film storage rooms storing nitro-cellulose film as provided in Section 4103 of this Code.

3801.5 SPRINKLER EXCEPTIONS AND ALTERNATIVE FIRE PROTECTION: In buildings of any occupancy with low or ordinary hazard contents, sprinkler protection required by this section may be provided in accordance with the exceptions and options outlined in this Sub-section.

(a) Areas where sprinklers may be omitted:

The following areas of buildings requiring an automatic sprinkler system need not be sprinklered:

(1) Open exterior balconies constructed of non-combustible materials.

(2) Electrical spaces such as transformer vaults, telephone equipment spaces, electric meter rooms, electric closets, electric switchgear spaces, and emergency generator spaces, need not be sprinklered pursuant to the requirements of N.F.P.A. No. 13 if such rooms or spaces are protected by an approved carbon dioxide, dry chemical, foam, halon, water spray or other extinguishment systems designed and installed in accordance with applicable N.F.P.A. Standards. See Exception 5102.1.

(3) In any occupancy where the character of the potential fuel for a fire is such that the extinguishment or control of the fire may be more efficiently accomplished by automatic extinguishing equipment other than an automatic sprinkler system, such alternative extinguishment system may be installed in lieu of an automatic sprinkler system or portion thereof. Alternative extinguishment systems may be carbon dioxide, dry chemical, Halon 1301, water spray or any other system recognized by N.F.P.A. Standards.

Such systems shall have been approved by the authority having jurisdiction, and shall be designed and installed in accordance with applicable N.F.P.A. Standards.

3802 CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS

3802.1 GENERAL:

(a) The Building Official may require and may approve substitution for required sprinkler systems in places not commonly used by the public and, where so approved, carbon dioxide or other Underwriter's Laboratories (UL) listed fire-extinguishing systems may be provided.

(b) Piping and materials shall comply with the Standards set forth in Paragraph 4604.1(b) of this Code.

3802.2 DESIGN AND CONSTRUCTION: Carbon dioxide fire-extinguishing systems shall comply in all respects with the Standard for Carbon Dioxide Fire-Extinguishing Systems, NFPA 12, as set forth in Section 402 of this Code.

3802.3 APPLICATION: Carbon dioxide fire-extinguishing systems may be used in rooms or enclosures containing flammable liquids in closed or open containers; ovens; dryers; electrical and other special machinery, apparatus and processes involving the use of flammable liquids, vapors, or dust; fur storage areas; lumber kilns; coal bins; loose textile stock areas; grain-handling machinery and in other enclosures containing stocks through which gas may permeate and where protection by water or other means may be ineffective or undesirable, and also in vaults; library stock-rooms; organs and other places where fires may be extinguished by carbon dioxide gas with less loss than if water were used.

3803 STANDPIPES AND HOSE STATIONS

3803.1

(a) GENERAL:

(1) Standpipes required herein shall be wet standpipe systems of Class III complying with the Standard "Standpipes and Hose systems," NFPA 14, as set forth in Section 402 of this Code, except those set forth in Sub-paragraph 3803.2(a)(3) herein.

(2) Wet standpipes having a primary water supply constantly or automatically available at each hose outlet, as required in this Section, shall be provided in buildings hereafter erected; existing buildings altered to increase the area or height; and existing buildings where the occupancy is changed to an occupancy required such standpipes.

(3) Standpipes shall be required in buildings under construction as set forth in Section 3323 of this Code.

(b)A permit for the installation of a standpipe system shall be required as provided in Sub-section 4601.5 of this Code and inspections shall be as set forth in Section 3808 herein.

3803.2 STANDPIPES REQUIRED:

(a) Buildings shall be equipped with standpipes as follows:

(1) Where Buildings exceed 50 feet in height, standpipe riser shall be designed to requirements of Chapter 2 of NFPA 14 as adopted by Sec. 3803.1.

(2) All standpipes shall be Class I design, as defined in NFPA 14 as adopted in Sec. 3803.1 as minimum requirements.

(3) Stages arranged or intended for theatrical, operatic, or similar performances shall have one, 2½-standpipe on each side and such standpipes shall be Class III.

(4) Standpipes shall not be required in one-story buildings regardless of height.

(5) Open-air parking garages provided with automatic-sprinkler systems shall not be required to be equipped with standpipes.

(b) (1) In buildings 3 stories or more, but not more than 50 feet in height where the primary means of egress and ingress is through an enclosed hallway, 4 inch diameter dry standpipes with water shall be provided. The water connection to the standpipe shall be from a domestic water system through a minimum inch water connection with an approved manufactured double check back-flow prevention device.

(2) The number of dry standpipe risers shall be as required in Sec. 3803.3(a).

(3) The location of dry standpipe risers shall be as stated in Sec. 3803.4.

(4) A connection at each floor shall be as per Sec. 3803.6**(c)**.

(5) At the base of each riser, a 4" x 2½" x 2½" fire department connection shall be provided as required by Section 3805.2 and 3805.3 Dry standpipes need not be interconnected at the base; should there be an interconnection at the base, then there shall be an approved indicating valve at the bottom of each riser positioned so as to isolate each riser from the interconnection.

(6) A permanent, legible sign with letters at least 1" high shall be attached to the exterior of the building adjacent to the connection, and such sign shall read:

"DRY STAND-PIPE — FOR FIRE DEPARTMENT USE ONLY."

(7) Roof manifolds are not required on dry standpipe systems.

3803.3 NUMBER:

(a) The number of standpipe risers and hose stations shall be such that a stream of water can be brought to bear on all parts of all floors within 15 feet of a nozzle connected to not more than 100 feet of hose connected to a standpipe.

3803.4 LOCATION:

(a) Standpipes shall be so located that they are protected from mechanical and fire damage.

(b) Standpipes shall be located:

(1) Within an enclosed stairway.

(2) Within 10 feet of the floor landing of an open stairway.

(3) Valve and hose connections located within a stairway enclosure shall not be behind a swinging door.

(4) Where additional standpipes and/or hose stations are required to comply with Sub-section 3803.3 herein and additional stairways are not otherwise required by this Code, such additional standpipes and/or hose stations need not be located in or at a stairway provided the first required standpipes and/or hose stations comply with this Sub-section.

(c) In buildings divided by partitions, standpipes shall be so located that streams can be brought to bear in all portions of any room, closet, or cubicle.

3803.5 MATERIALS:

(a) Standpipes above ground, within the exterior walls of a building, shall be black-steel pipe, hot-dipped zinc-coated (galvanized) steel pipe, wrought-iron pipe, or copper pipe and, together with the fittings and connections, shall be of sufficient strength to withstand the pressure to which the system may be subjected.

(b) Pipe and fittings may be shop or field welded provided the work is done in accordance with the Standard referenced in Sub-section 2805.1 of this Code and the requirements for welders set forth in Sub-section 2805.3.

3803.6 OUTLETS:

(a) Outlets from standpipes shall be provided at each floor, including the basement, and above the roof as set forth herein.

(b) At each floor, including the basement, a 2½" Fire Department outlet and a 2½" line to a 2½" hose valve with a 2½" reducer shall be provided.

(c) The two and one-half inch Fire Department outlets shall be provided with two and one-half inch valves adapted for two and one-half inch N.S.T. Fire Department hose connections not less than five feet nor more than six feet above the floor.

(d) Where a 2½" Fire Department outlet is located within a stair enclosure, as provided in Sub-paragraph 3803.4(b)(1) herein, a 2½" line through the stair enclosure to a 2½" valve with a 2½" x 1½" reducer shall be provided.

(e) All standpipes in buildings 50 feet or more in height shall extend full size above the main roof a minimum of 30 inches and be provided with an Underwriter's approved duplex or triplex roof manifold for two and one-half inch Fire Department hose and use.

3803.7 HOSE, CABINETS AND REELS:

(a) (1) All two and one-half inch hose connections are for Fire Department use.

(2) Building owners are not required to provide two and one-half inch hose.

(3) Where two and one-half inch Fire Department outlets are located within stairway enclosures, a hose station shall be located immediately outside within 10 feet of the door to such stair enclosure.

(4) Where two and one-half inch Fire Department outlets are not located within stairway enclosures, a hose station shall be located within 10 feet of the floor landing of an open stair or as otherwise provided in Sub-paragraph 3803.4(b)(3) herein.

(b) Where 2½" Fire Department valves are installed, 1½" hoses shall be provided except as set forth in Sub-paragraph 5102.1(h) of this Code, and except in parking garages for more than four cars.

(c) (1) Such hose shall be approved for 100 pounds per square inch working pressure.

(2) Pressure reducers shall be provided where necessary to control pressure on the hose to a maximum of 100 pounds per square inch.

(3) Each hose shall be equipped with an approved, adjustable fog nozzle with the pattern: off, fog, straight stream.

(4) Each hose shall be of sufficient length to satisfy the requirements of Paragraph 3803.3(a) but not more than 100 feet in length.

(d) Hose stations, for one and one-half inch hose together with one and one-half inch valve, shall not be located within stairway enclosures.

(e) (1) An approved standard form of wall-hose reel, cabinet or rack shall be provided for the hose and shall be located to make the hose accessible at all times.

(2) The required fire-resistive rating of the wall receiving recessed cabinets shall be maintained.

(f) Hoses, nozzles, hose cabinets and one and one-half inch hose will not be required where the building is provided with a fire-suppression life-safety system as set forth in Chapter 51 of this Code.

3804 WATER SUPPLY

3804.1 FOR STANDPIPES:

(a) QUANTITY:

(1) For buildings not more than 275 feet in height, water supply shall be sufficient to provide 500 gallons per minute for the first riser and 250 gallons per minute for each additional riser to a maximum of 1,250 gallons per minute.

(2) In buildings 275 feet or more in height, water supply shall be sufficient to comply with the Standard referenced in Paragraph 3803.1(a) herein.

(b) PRESSURE:

(1) The water supply shall be sufficient to maintain 100 pounds per square inch residual pressure at the topmost standpipe outlet with flow as set forth in Sub-paragraph 3804.8(a)(1) herein.

EXCEPTION: Where permitted by A.H.J. pressure shall be permitted to be reduced but not to less than 65-P.S.I.

(2) In buildings over 275 feet in height, the pressure shall be as set forth in the Standard referenced in Sub-paragraph 3804.1(a)(2) herein.

3804.2 FOR SPRINKLER SYSTEMS AND YARD HYDRANTS:

(a) The water supply for sprinkler systems shall be as set forth in the Standard referenced in Sub-section 3801.4 herein.

(b) The water supply for yard hydrants shall be as set forth in Section 3806 herein.

(c) Supply piping and appurtenances shall be installed in accordance with National Fire Protection Association standard NFPA 24, private fire service mains and their appurtenances.

3804.3 COMMUNITY WATER SUPPLY:

(a) Standpipe systems, sprinkler systems and yard hydrants shall be connected to the community water supply where such community supply is sufficient to provide quantities and pressures required and where such community water supply is available within 150 feet from the nearest point of the building to a street water main of not less than four inches in diameter.

(b) Where a standpipe system is required, and the community water supply, as set forth in Paragraph 3804.3(a) herein, is not sufficient or is not available, a fire pump or pressure tank shall be provided.

(c) Connection to a community water supply shall be provided with a control valve located in the public street, or other public space, and an approved manufactured backflow device, accessibly located, protecting the main.

(d) Water service shall be sized to provide the required quantity of water at the required pressure.

3804.4 FIRE PUMPS:

(a) Where pumps are proposed, detailed plans shall be submitted to the Fire Inspector having jurisdiction.

(b) Fire pumps for standpipe systems shall be of sufficient capacity to provide the quantity of flow set forth in Sub-paragraph 3804.1(a)(1) or (2), as applicable, and pressures as set forth in Paragraph 3804.1(b) herein.

(c) Fire pumps for sprinkler systems shall be of sufficient capacity to provide the quantity of flow and pressures set forth in the Standard referenced in Sub-section 3801.4 herein.

(d) Where a capacity of 500 gallons per minute is required, fire pumps shall be UL Inc. listed.

(e) Fire pump controllers shall be UL Inc. listed and may be of limited service for motors of 30 HP or less.

(f) The source of water supply for a fire pump shall be a street main of not less than four inch diameter and capable of supplying the quantity of water at which the pump, or pumps, will operate; or shall be a well or cistern having not less than a one-half hour supply.

(g) Pumps shall be supplied with a separate electric service and where a standby generator is provided, or otherwise required by this Code, shall be connected through a separate automatic transfer switch to such standby generator.

(h) Fire pumps shall be automatic in operation with compatible controls.

(i) A minimum pressure on a standpipe system of 15 pounds per square inch at the roof shall be maintained by a jockey pump actuated by a pressure switch; or by connection to a suitable domestic system through an approved backflow prevention assembly.

(j) Fire pump installations shall be fitted with a full size bypass provided with approved gate and check valves.

(k) Fire pumps provided to meet the requirements of Sub-paragraph 3804.1(a)(1) herein shall have flexibly coupled drives.

3805 FIRE DEPARTMENT CONNECTIONS

3805.1

(a) STANDPIPES:

(1) One Siamese (duplex) UL and/or FM approved Fire Department connection shall be provided for each of the first two risers, and one for every two risers thereafter.

(2) Where a building is required to have more than one Siamese connection such connections shall be remotely located.

(3) All standpipes shall be interconnected at their bases.

(4) Siamese (duplex) connections shall be of the same pipe diameter as the largest standpipe connected thereto and shall be protected by an underwriter's listed check valve.

(b) SPRINKLERS: One Siamese (duplex) Fire Department connection of not less than four-inch diameter shall be provided for each sprinkler system.

3805.2

(a) Fire Department connection shall be two and one-half inch N.S.T hose connections not less than one foot nor more than three feet above grade Location of all Siamese connections shall be approved by the Fire Department.

(b) Piping shall not project over public property more than two inches.

3805.3 A permanent legible sign with letters at lest one inch high shall be attached to the exterior of the building adjacent to the connection, and such sign shall read "STANDPIPE, DRY STANDPIPE, and/or SPRINKLER" as applicable.

3806 YARD HYDRANTS

3806.1 GENERAL: Mobile homes and trailer parks, marine terminals, marinas, boat yards, oil storage tanks, lumber yards and exhibition parks shall have yard hydrants and hose as set forth herein.

3806.2 STANDARDS:

(a) Mobile homes and trailer parks shall have yard hydrants as provided in the Standard for Mobile Home Parks, NFPA 501-A, as set forth in Section 402 of this Code.

(b) Marine terminals shall have yard hydrants and hose as provided in the Standard Fire Protection-Operation of Marine Terminals, NFPA 307, as set forth in Section 402 of this Code.

(c) Marinas and boat yards shall have yard hydrants and hoses as provided in the Standard Fire Protection of Marinas and Boat yards, NFPA 303, as set forth in Section 402 of this Code.

3806.3 REQUIREMENTS:

(a) (1) Private boat docking facilities shall have sufficient 1½" fire hose connected to a 2½" valve with a 2½" x 1½" reducer to reach all portions of the dock facilities. Supply shall be a minimum of 2½" underground fire line and shall have a minimum capability of delivering 40 gallons of water per minute at 25 pounds per square inch pressure through a combination fog nozzle, designed and sealed by a Florida Engineer.

(2) Where such docking facilities are inaccessible to Fire Department equipment, or exceed 150 feet from Fire Department vehicular access, a 2½" Fire Department Siamese connection shall be provided. Location of Siamese shall be approved by the Fire Department.

(b) In the absence of other requirements of this section, not less than one yard hydrant and hose shall be provided for each 20,000 feet of developed area.

(c) Yard hydrants shall have not less than two, two and one-half inch connections with threads uniform with the local Fire Department hose connections and not less than 100 feet of standard two and one-half inch fire hose with approved-type nozzles.

(d) A house hose and equipment shall be provided at each hydrant unless well located portable hose reels and equipment are accepted by the authority having jurisdiction.

(e) Hose houses shall have painted thereon the words "FIRE HOSE" in legible letters not less than six inches high on all exposed sides.

(f) Location of all yard hydrants shall be approved by the Fire Department.

3807 PORTABLE FIRE EXTINGUISHERS

3807.1 WHERE REQUIRED: Portable fire extinguishers shall be installed and maintained at each floor level as specified in this section as follows:

(a) In buildings for Group A occupancy: In every projection room and one for each 2,500 square feet of floor area or within a travel distance of 75 feet for buildings exceeding 50 feet in height or 50 feet for buildings not exceeding 50 feet in height.

(b) In buildings for Groups B, C, D, and E occupancies: One to each 2,500 square feet of floor area, but not less than one to each story or within a travel distance of 75 feet for buildings exceeding 50 feet in height or 50 feet for buildings not exceeding 50 feet in height.

(c) In buildings of Groups F, G, and H occupancies: One to each 2,500 square feet of floor area, but not less than one to each path of egress or within a travel distance of 75 feet for buildings exceeding 50 feet in height or 50 feet for buildings not exceeding 50 feet in height.

EXCEPTIONS: Where gasoline is dispensed there shall be a carbon dioxide fire-extinguisher of 15 pounds capacity extinguishment rating for the first two gasoline dispensing pumps or fraction thereof; and for each additional two gasoline dispensing pumps or fraction thereof after the first two there shall be either a carbon dioxide fire-extinguisher of 15 pounds capacity extinguishment rating or a dry chemical fire extinguisher of comparable rating. Additional fire extinguishers may be required for other extra Hazard Occupancies as set forth in NFPA 10.

(d) In buildings of Groups I occupancies other than single family residences and duplexes: One for each 2,500 square feet of floor area.

(e) In buildings for Group J occupancy: As required by the inspector having jurisdiction, complying generally with the above requirements.

3807.2 DETAILED REQUIREMENT:

(a) A portable fire extinguisher shall consist of a container or containers having a capacity of not less than one unit of fire protection, as defined by the National Fire Protection Association, so arranged and equiped that pressure may be generated and the contents discharged through a hose and nozzle, or portable extinguisher of other type, approved as equal by the inspector having jurisdiction.

(b) The installation, maintenance and use of portable fire extinguishers shall comply with the Standard for Installation, Maintenance and Use of Portable Fire Extinguishers, NFPA 10, as set forth in Section 402.

(c) Portable fire extinguishers, where required, shall be mounted in corridors or other approved locations generally accessible to the occupants of the building. Where they are placed in cabinets, they shall be visible, and the doors shall be unlocked or of glass which can be broken to give access to the extinguisher in case of fire.

3808 INSPECTIONS AND TESTS

3808.1 GENERAL:

(a) All required fire-extinguishing apparatus shall be maintained in sound operative condition and where, in the expressed and written opinion of the Fire Inspector having jurisdiction, such apparatus is defective or not in compliance with the Standards set forth in this Chapter, repairs or replacement shall be made with reasonable dispatch.

(b) All fire-extinguishing apparatus required by this Code shall be inspected by the Fire Department at least once every year and tests shall be made at the discretion of the Fire Inspector having jurisdiction.

(c) Such tests shall be conducted by the Fire Department having jurisdiction and equipment satisfying such tests shall be tagged as acceptable with notation of the date of the test and the date re-testing is recommended.

(d) The cost of making all tests shall be borne by the owner.

3808.2 PRESSURE TESTS:

(a) Every system of automatic-sprinklers, standpipes or yard hydrants, and all parts thereof except linen hose, shall satisfactorily meet the pressure tests provided in the Standards referenced in Paragraphs 3801.4(a) and 3803.1(a) herein.

(b) Test for residual pressure on standpipe systems may be made at the roof outlets giving consideration to pressure reduction due to head pressure.

CHAPTER 39

CHIMNEYS, FLUES, VENTS AND FIREPLACES

3901 GENERAL
3902 TYPE A FLUES OR VENTS
3903 TYPE B FLUES OR VENTS
3904 TYPE BW FLUES OR VENTS
3905 SMOKEPIPES
3906 FIREPLACES

GENERAL

3901.1 GENERAL: Chimneys, flues, vents and fireplaces, and their connections, carrying products of combustion, shall conform to the requirements of this Chapter, Chapter 40 and 47.

3901.2 EQUIPMENT AND APPLIANCES: Equipment and appliances connected to chimneys, flues, vents and fireplaces shall be of approved types and shall be installed and maintained as set forth herein and in Chapters 40 and, for gas appliances, as set forth in Chapter 47.

3901.3 DEFINITIONS AND CLASSIFICATION:

APPLIANCES, HIGH HEAT, are any installations or equipment in which the temperature of the flue gases as they enter the flue is above 1500°F.

APPLIANCES, MEDIUM HEAT, are any installations or equipment in which the temperature of the flue gases as they enter the flue is between 550°F and 1500°F.

APPLIANCES, LOW HEAT, are any installations or equipment in which the temperature of the flue gases is up to 550°F.

CHIMNEYS, FLUES OR VENTS are the conduits or passageways for conveying products of combustion to the other air and shall be classified as Type A, Type B or Type C.

CONDENSATE is the liquid which separates from a gas due to a reduction in temperature.

FIREBRICK is any refractory fire-clay brick which meet the approval of the Building Official.

FIRE-CLAY FLUE LINING is flue lining made of fire clay.

FIRE COLLAR is that portion of any appliance designed for the attachment of a draft hood.

SMOKEPIPE is the pipe connecting a heat-producing appliance burning solid or liquid fuels to a flue or vent.

VENT CONNECTOR is a pipe connecting a heat producing appliance burning gas fuel to a flue or vent.

3902 TYPE A FLUES OR VENTS

3902.1 GENERAL: Type A flues or vents shall consist of chimneys, metal smokestacks and special flues approved by the Underwriters Laboratories and the Building Official.

Type A flues or vents shall be required for: (1) solid and liquid fuel burning heating equipment, and (2) gas burning equipment which produces flue gas temperatures in excess of 500° Fahrenheit at the outlet of the appliance or the draft hood when burning gas at the input rating specified by the manufacturer of such equipment.

3902.2 CHIMNEYS:

(a) DESIGN:

(1) Chimneys shall be designed, anchored and supported as set-forth herein and as specified in Chapters 23, 25 and 27, except that fireplaces complying with Section 3906 may be used for solid fuels or liquid fuel-burning equipment where the temperature of the flue gases, as they enter the flue, does not exceed 1000° Fahrenheit.

(2) No chimney shall support any structural load other than its own weight.

(3) Chimneys shall be anchored laterally at each floor and roof line by incombustible struts, walls or beams, except that for chimneys built integrally with masonry walls of less than eight inches in thickness and bonded thereto, such walls shall be considered proper lateral support.

(4) Chimneys shall be supported on reinforced concrete footing or grade beams or on steel beams having not less than two-hour fire resistive protection.

(b) WALLS AND FLUE LINING:

(1) Masonry chimneys serving low and medium-heat appliances shall have walls of not less than eight inches of solid masonry or six inches of reinforced concrete or four inches of solid masonry and eight inches of block. Mortar used in laying up units of chimney construction shall be Portland cement mortar.

Masonry chimneys serving low and medium-heat appliances shall be lined with approved fire-clay flue lining not less than five-eights-inch thick or with other approved liners of material that will resist a temperature of 1800° Fahrenheit without softening or cracking. The lining shall extend from eight inches below the lowest inlet to a point at least four inches above enclosing masonry walls. Flue linings shall be installed ahead of the construction of the chimney as it is carried up, carefully bedded one on the other in fire-clay mortar, with close-fitting joints left smooth on the inside. Firebrick may be used in place of fire-clay lining and shall be not less than two inches thick. Cracked or broken flue lining shall not be used. Firebricks shall be laid in fireclay.

(2) Masonry chimneys serving high heat appliances shall be built with double walls, each not less than eight inches in thickness with an air space of not less than two inches between them. The inside of the interior walls shall be firebrick not less than four inches in thickness, laid in fire-clay mortar or refractory cement.

(c) FLUE AREA: No flue shall be smaller in area than the flue connection on the appliance attached thereto, provided that where more than one appliance is connected to such flue the area shall be increased as set forth in Section 3903.

(d) HEIGHT: Metal smokestacks shall extend to a height of not less than ten feet above the elevation of any part of any building within 25 feet except that, where such smokestack serves a forced-draft appliance, such smokestack shall be not less than three feet above the roof or any part of the building within 10 feet.

(e) CORBELING: No chimney shall be corbeled from a wall.

(f) SEPARATION OF CHIMNEY LINERS: When more than one flue or vent is contained in the same chimney, masonry separation at least four-inches thick shall be provided to separate flues.

(g) INLETS: Every inlet any chimney shall enter the side thereof and shall be of not less than one-eighth-inch thick metal or five-eights-inch thick refractory material.

(h) CLEARANCE: Combustible material shall not be placed within two inches of chimneys nor less than required to comply with the Standard set forth in Sub-section 4001.4.

3902.3 METAL SMOKESTACKS:

(a) SCOPE: The requirements of this Sub-section shall not be applicable to buildings of Group H or I occupancy, and no such smokestack shall be permitted in buildings of Group H or I occupancy or in other occupancies normally used for sleeping purposes.

(b) DESIGN: Smokestacks shall support no vertical loads other than their own weight and shall be

capable of resisting wind forces and of supporting its own weight without exceeding the stresses set forth in Chapter 28.

(c)CONSTRUCTION AND SUPPORT: Metal of smokestacks shall be not less than the following thicknesses:

Diameter of Stack	Metal Thickness
Not more than 8 inches	No. 16 gage
More than 8 inches, nor over 12 inches	No. 12 gage
More than 12 inches, nor over 16 inches	No. 10 gage
More than 16 inches, nor over 24 inches	No. 8 gage
More than 24 inches, nor over 30 inches	3/16 inch
More than 30 inches, nor over 43 inches	1/4 inch

Smokestacks shall be properly riveted or welded and, unless structurally self supporting, shall be guyed to incombustible construction.

Metal smokestacks used for high heat appliances shall be lined with four-inch firebrick laid in fire-clay mortar extending from not less than two feet below to not less than 25 feet above the smokepipe entrance.

(d) HEIGHT: Metal smokestacks shall extend to a height of not less than ten feet above the elevation of any part of any building within 25 feet except that, where such smokestack serves a forced-draft appliance, such smokestack shall be not less than three feet above the roof of any part of any building within 10 feet.

(e) CLEANOUTS: Cleanout openings shall be provided at the base of every metal smokestack.

(f) EXTERIOR STACKS:

(1) Metal smokestacks, or parts thereof, erected on the exterior of a building shall have a clearance of 24 inches from combustible walls and four inches from incombustible walls, but not less than required to comply with the Standard set forth in Sub-section 4001.4.

(2) No stack shall be nearer than 24 inches in any direction from a door, window or other wall opening or from a required means of egress.

(g) INTERIOR STACKS: Metal smokestacks, or parts thereof, in a building other than a one-story building shall be enclosed above the story in which the appliance served thereby is located, in walls of incombustible construction having a fire-resistance rating of not less than two hours, with a space on all sides between the stack and the enclosing walls sufficient to render the entire stack accessible for examination and repair. The enclosing walls shall be without openings except doorways equipped with approved self-closing fire doors of Class B or better at various floor levels for inspection purposes. Where such a stack passes through a roof constructed of combustible materials, it shall be guarded by a galvanized-iron ventilating thimble extending not less than nine inches below and nine inches above such roof construction. Such thimbles shall be of a size to provide a clearance on all sides of the stack for high-heat appliances of not less than 18 inches, for medium-heat appliances not less than eight inches and for low-heat appliances not less than six inches, but not less than required to comply with the standard set forth in Sub-section 4001.4. Smokestacks shall not be carried up inside of ventilating ducts unless such ducts are constructed as required by this Section for Type A flues and provided such stacks or flues are used solely for venting the room or space in which the appliance served by the smokestack is located.

3903-3904 TYPE B OR TYPE BW FLUES OR VENTS

Type B flues and vents shall comply with the requirement set forth in NFPA 211.

3905 SMOKEPIPES

3905.1 MATERIALS: Smokepipes and vent connectors serving fixed appliances shall be of substantial metal construction, but never less than as set forth in the following table:

Thickness of Metal for Smokepipes

Diameter (Inches)	Minimum Thickness (U.S. Gage)
6-10	26
11-29	24
30-39	22
40-49	20
50-up	18

3905.2 DETAILS OF CONNECTION:

(a) No vent connection connected to any gas appliance having pilot provision for automatic or remote control shall be connected to any kitchen ventilation or any chimney flue which is used as a smoke flue for any stove, boiler, heater or other apparatus designed to burn wood, coal, oil or any fuel other than gas, unless such pilot provision is so designed that the supply of gas to the main burners in connection therewith will be automatically shut off when combustion of gas is not taking place at the pilot.

(b) Two or more smokepipes shall not be joined to a single flue or vent unless the common smokepipe and flue or vent is of sufficient size to serve all the appliances thus connected. The smokepipe of a heating appliance shall not be connected into the flue or vent of an incinerator which as the rubbish chute identical with the smoke flue.

(c) No flue or vent shall have smokepipe connections in more than one story of a building unless provision is made for effectively closing smokepipe openings with devices made of incombustible materials, whenever their use is discontinued temporarily, and completely closing such openings with masonry when discontinued permanently. Smokepipes shall be exposed to view throughout their entire length.

(d) Smokepipes serving appliances other than water heaters shall have a rise of not less than one-fourth inch to the foot.

(e) Provision for removal of condensates shall be provided. Any two inlets shall be separated vertically by not less than the diameter of the larger inlet.

(f) All gas appliances connected to a common vent shall be located in the same story of the building and in the same tenancy thereof except as otherwise provided in the Standard NFPA 54, as set forth in Section 402.

(g) The horizontal projected length of the vent connector shall not exceed 75 percent of the vertical projected length of the vent unless the appliance is equipped for forced draft.

(h) Where smokepipes or vent connectors join into a single pipe, connector or flue, they shall be joined by a Y-fitting, discharging the flow in the direction of common passage.

3905.3 CLEARANCES: Clearances between smokepipes and combustible materials above shall be 18 inches where used for medium heat appliances and 36 inches where used for high heat appliances; except that such clearances may be reduced where insulating materials are provided as set forth in the Standard for Installation of Residential Type Warm Air Heating and Air Conditioning Systems, NFPA 90B, as set forth in Section 402.

3906 FIREPLACES

3906.1 GENERAL:

(a) Fireplaces and chimneys conforming to the minimum requirements herein may be used for solid fuels or liquid-fuel-burning equipment where the temperature of the flue gases, as they enter the flue, does not exceed 1000 degrees Fahrenheit.

(b) Fireplaces and chimneys shall be so constructed and insulated that adjacent combustible materials and structural members are not heated to temperatures in excess of 175 degrees Fahrenheit.

(c) Fireplaces and chimneys shall be built of only incombustible materials.

(d) Fireplaces and chimneys shall not support concentrated loads from the surrounding structure unless such loads are considered in the design and construction.

(e) Clay tile flue liners shall conform to the Standard specification for Clay Tile Flue Linings, ASTM C315, as set forth in Section 402.

(f) Fire brick shall conform to the Standard Specification for Fireclay Brick and Silicon Carbide Brick for Incinerator Service, ASTM C64, as forth in Section 402.

3906.2 FIRE-BOX CONSTRUCTION:

(a) Where a lining of firebrick at least 2 inches thick is provided, the total thickness of firebox wall, including lining, shall be not less than 8 inches solid thickness.

(b) Steel firebox lining, at least ¼ inch thick, may be used provided a minimum of 8 inch solid masonry walls are used. Insulation of steel lining shall be in accordance with manufacturer's recommendations.

(c) Where no steel lining or fire brick is provided, the total thickness of the walls shall be at least 12 inches of masonry.

3906.3 METAL HEAT CIRCULATORS: Approved metal heat circulators may be installed in fireplaces. Metal heat circulators shall be of not less thickness than 12 US Standard Gage and shall have a minimum of 2 inches of fire brick back-up.

3906.4 SMOKE CHAMBER: The front, or inward sloping wall, of the smoke chamber shall be constructed at set forth for the walls of the firebox. Other smoke chamber walls shall be constructed as set forth for chimney walls except the 5/8 inch minimum thickness fire-clay parging or equivalent treatment may be used in lieu of fire-clay flue tile lining.

3906.5 FIREPLACE CHIMNEY CONSTRUCTION:

(a) Chimney liners shall be of 5/8 inch refractory fire-clay lining or other material that will resist temperatures of 1800 degrees Fahrenheit without softening, cracking or other deleterious effects. The lining shall extend from the throat to a point 4 inches above the enclosed masonry walls.

(b) Chimney walls where lining is used shall be 4-inch nominal solid masonry or, where building is masonry, may be 8-inch nominal hollow masonry units.

(c) Chimney walls where lining is not used shall be 8-inch nominal solid masonry.

(d) Flue linings shall be built in as the masonry is laid. All joints and spaces shall be filled with mortar, and broken or cracked flue linings shall not be used.

(e) Chimneys shall extend to a height not less than 24 inches above the highest point of the roof within a radius of 10 feet.

(f) Where the chimney is built integrally with a masonry wall the tie beam shall be continuous on one or more side of the chimney.

3906.6 CLEARANCE:

(a) Concealed combustible material shall not be within 2 inches of fireplaces, smoke chambers or chimneys which are less than 8 inches in thickness.

(b) Exposed combustible material shall not be placed within 6 inches of the fireplace opening.

(c) No such combustible material within 12 inches of the fireplace opening shall project more than one-eight inch for each one-inch clearance for such opening.

3906.7 AREAS OF FLUES:

(a) The net cross-sectional area of the flue and the throat between the firebox and smoke chamber of a fireplace shall be not less than one-tenth of the area of the fireplace opening for chimneys 15 feet or more in height, nor less than one-eight of the area of the fireplace opening for chimneys less than 15 feet in height, and in no case less than 64 square inches.

(b) Where dampers are used, damper openings shall be not less in area, when fully opened, than the required flue area.

3906.8 LINTEL: Masonry over the fireplace opening shall be supported by a lintel of steel not less than one-fourth inch in thickness.

3906.9 HEARTH: Every fireplace shall be provided with a brick, concrete, stone or other approved incombustible hearth slab at least 12 inches wider on each side than the fireplace opening, and projecting at least 20 inches therefrom. This slab shall be not less than 4 inches thick and shall be supported by incombustible materials or reinforced to carry its own weight and all imposed loads. Combustible forms shall be removed.

3906.10 FALSE FIREPLACES: Wall recess for gas space heaters having a demand of more than 35,000 BTU per hour or electric space heaters having a demand of more than 10 KW per hour and/or wall recesses designed and constructed to resemble fireplaces shall be not more than 6 inches in depth, shall be labeled with a metal place bearing the words, "FOR GAS AND ELECTRIC APPLIANCES ONLY," shall be lined with materials providing not less than one-hour fire-resistive protection for combustible materials and gas-burning appliances shall be vented with a Type B or BW flue.

3906.11 PREFABRICATED FIREPLACES: Only such prefabricated fireplaces, with or without prefabricated chimney, which bear the seal of approval of the Fire Underwriters Inc. may be used, and installation shall be in accordance with the condition of approval of UL Inc. and the Building Official.

CHAPTER 40
HEAT-PRODUCING APPARATUS

4001 GENERAL
4002 GAS-BURNING APPLIANCES
4003 ELECTRIC APPLIANCES
4004 OIL-BURNING APPLIANCES
4005 SOLID FUEL-BURNING APPLIANCES
4006 BOILERS
4007 INCINERATORS
4008 SOLAR HEATERS
4009 COMBUSTION ENGINES

4001 GENERAL

4001.1 SCOPE: Heat producing appliances and apparatus, other than electrical or gas appliances, shall conform to the requirements of this Chapter. Electrical appliances shall comply with Chapter 45 herein and gas appliances shall comply with Chapter 47 herein. Flues and vents shall comply with Chapter 39 herein. The storage of flammable liquids shall comply with Chapter 41 herein.

4001.2 PERMITS:

(a) A permit shall be required to install, repair, or alter any heat-producing appliance or piping or flue or accessory thereto, except gas appliances as set forth in Chapter 47 and electric appliances as set forth in Chapter 45, except that permit shall not be required for any fully portable appliance which has no physical connection to piping or flue.

(b) Any person desiring a permit to be issued shall, in addition to filing an application therefore, and before such permit is issued, pay a permit fee as required.

4001.3 OCCUPANT HAZARD: Where heat-producing apparatus is installed in locations where the occupants of the space for reasons of age or physical limitations may, in the opinion of the inspection authority, be required to be designed and installed to be inaccessible or inoperative to unauthorized persons and protective guards or screens installed to prevent physical contact with heater parts.

4001.4 CLEARANCES FOR HEAT PRODUCING APPLIANCES: Clearances for heat producing appliances shall comply with the Standards for Clearances for Heat Producing Appliances, in appropriate NFPA Standards and manufacturers recommendations.

4002 GAS-BURNING APPLIANCES

Gas burning appliances shall comply with the requirements of Chapter 47.

4003 ELECTRICAL APPLIANCES

Electric heat-producing appliances shall comply with the requirements of Chapter 45.

4004 OIL-BURNING APPLIANCES

Oil burning appliances shall comply with the Standard for the Installation of Oil Burning Equipment, NFPA 31, as set forth in Section 402.

4005 SOLID-FUEL-BURNING APPLIANCES

4005.1 Solid-fuel-burning appliances shall comply with the Standard for the Installation of Heat Producing Appliances in appropriate NFPA Standards and Manufacturers recommendations.

4005.2 Ranges and space heaters burning solid fuel shall be vented directly or by means of smokepipes to

a Type A flue or vent as set forth in Chapter 39. No such connection shall be to a flue or vent to which a gas burning appliance is connected.

4006 BOILERS

4006.1 STANDARDS:

(a) The design, installation, alteration, location, operation and inspection of all boiler and pressure vessels, including boilers generating steam under pressure, shall be as set forth herein.

(b) The Boiler and Pressure Vessel Code, ASME, including all addenda thereto published prior to the adoption of this Code is hereby adopted as set forth in Section 402.

4006.2 CLASSIFICATION:

(a) A high-pressure steam boiler is any boiler generating steam or vapor at pressures over 15 pounds per square inch.

(b)A low-pressure steam boiler is any boiler generating steam or vapor at 15 pounds per square inch or less.

(c)A hot-water heating boiler operating at pressures under 160 pounds per square inch and temperatures under 250 degrees F. is classified as a low-pressure boiler.

(d) A hot-water heating boiler operating at pressures of 160 pounds per square inch or higher and at temperatures of 250 degrees F. or higher shall be classified as a high-pressure boiler.

(e) A hot-water supply boiler having a BTU rating of more than 200,000 BTU per hour or having a capacity of 120 gallons or more or operating at a temperature of more than 200 degrees F. is classified as a low-pressure boiler.

4006.3 ENCLOSURES FOR HIGH-PRESSURE BOILERS:

(a) High-pressure boilers shall be enclosed and separated from the rest of the building by walls, floors and ceilings of not less than two-hour fire-resistive construction.

(b) There shall be no openings in such enclosure except for doors and as required for ventilation.

(c) There shall be not less than two doors remotely located and all doors to the inside of the building shall be one and one-half hour fire-resistive assembly complying with Sec. 3706 herein.

(d) Clearances for boiler appurtenances shall be a minimum of 18 inches all around the boiler. Where a manhole opening is provided in the top of boiler shell a minimum clearance to ceiling shall be 36 inches.

(e) Boilers of 3 HP or less generating steam at less than 100 psi may be installed without enclosures; shall not be placed on combustible flooring; and shall comply with the standards set forth in Paragraph 4006.1(b).

4006.4 ENCLOSURES FOR LOW-PRESSURE BOILERS:

(a) Low-pressure boilers shall be enclosed and separated from the rest of the building by walls, floors and ceilings of not less than one-hour fire-resistive construction.,

(b) There shall be no openings in such enclosure except for doors and as required for ventilation.

(c) Doors to the inside of the building shall be a one-hour-fire-resistive assembly complying with Section 3706 herein.

(d) Clearances from boiler appurtenances shall be a minimum of 18 inches all around the boiler. Where a manhole opening is provided in the top of boiler shell a minimum clearance to ceiling shall be 36 inches.

(e) Boilers of 3 HP or less generating steam at less than 100 psi may be installed without enclosures; shall not be placed on combustible flooring; and shall comply with the standards set forth in Paragraph 4006.1(b).

4006.5 DETAILED REGULATIONS:

(a) High pressure steam boilers may be blown off only to a blow-tank complying with the requirements

of the pamphlet entitled, "Boiler Blow-Off Equipment," NBPVI, as set forth in Section 402.

(b) Boilers shall be connected to an approved flue or vent where required and as set forth in this Chapter.

(c) Combustion air shall be supplied or provided at the rate of eight CFM per boiler horsepower plus an additional two cubic feet per minute ventilation.

(d) Any person manufacturing or dealing in the sale of boilers or pressure vessels shall, on sale or delivery of such apparatus, notify the Building Official, giving the name and address of the purchaser.

(e) Second-hand or used boilers and pressure vessels shall be inspected by an agency approved by the Building Official before such apparatus is painted or offered for sale.

4006.6 CERTIFICATE OF INSPECTION:

(a) A Certificate of Inspection shall have been requested, issued and posted before any boiler or pressure vessel shall be placed or continued in operation.

(b)A Certificate of Inspection shall be requested from and issued after approval by the Building Official.

(c) A Certificate of Inspection shall be authorization to operate such equipment for a limited period as set forth herein.

(d) A Certificate of Inspection for a high-pressure boiler shall be for a period of not more than 6 months.

(e) A Certificate of Inspection for a low-pressure boiler shall be for a period of not more than 12 months.

(f)A Certification of Inspection may, at the discretion of the Building Official, be for a shorter period or such Certificate may be rescinded and inspection and tests be ordered at any time when in the opinion of the Building Official, a condition exists making such retesting or reinspection desirable in the interest of safety.

(g) A Certificate of Inspection shall be posted to be conspicuous to the operator and inspection of the equipment and shall state the period of approval and the maximum allowable approved operating pressures.

4007 INCINERATORS

4007.1 GENERAL:

(a) Incinerators for the reduction of refuse, garbage or other waste materials shall not be permitted where, in the opinion of the Building Official, a nuisance or fire hazard may result. Incinerators, where permitted, shall be as set forth in this section.

(b) Flue-fed or direct-fed incinerators and the accompanying chutes shall not be located within or attached to the buildings.

4007.2 SMALL DOMESTIC-TYPE:

(a) Indoor installation of small domestic-type incinerators having a grate area of not more than nine square feet, shall have been tested and approved by a recognized testing agency and shall be installed in accordance with the conditions of approval, or shall have roofs and walls of not less than eight inches of solid brick masonry or fire clay or reinforced concrete, and have not less than 36 inches clearance from protected combustibles or 48 inches from unprotected combustibles. Incinerators shall be mounted only on an incombustible floor and be connected to a Type A flue or vent.

(b) Outdoor installations of small domestic-type incinerators shall not be permitted.

4007.3 COMMERCIAL AND INDUSTRIAL TYPE:

(a)(1) Commercial and industrial incinerators shall comply with recognized Standards.

(2) Refuse chutes shall not feed directly to the combustion chamber but shall discharge into a room or bin enclosed and separated from the incinerator room by not less than two-hour fire-resistive construction.

(3) The opening through which material is transferred from such room or bin to the incinerator room shall be equipped with a fire-assembly having a Class A label.

(b) Refuse chutes shall comply with Section 1807.

(c) Commercial or industrial-type incinerators shall have a combustion chamber lined with not less than three and one-half inches of firebrick laid in fireclay mortar, including the space below the grate in downdraft incinerators, and shall have walls and roof of not less than eight inches of brick masonry laid in Portland-Cement mortar or reinforced concrete where having a grate area of not more than nine square feet, and 12 inches where having a grate area of more than nine square feet. Firebrick lining may be included in the required wall and roof thickness. The flue shall be constructed as set forth for chimneys, Chapter 39, and shall be covered with a corrosion-resistant spark arrester having a mesh not exceeding three-fourth inch and an area not less than twice the flue area.

4008 SOLAR ENERGY

4008.1 GENERAL:

(a) DESIGN: All solar collectors, tanks, piping, insulation, duct work, materials and devices shall conform to the requirements of this Chapter and Chapter 46 herein.

(1) Electrical wiring apparatus and equipment used in a solar system shall comply with Chapter 45 herein.

(2) All supporting structural members, components, and parts of a solar system subjected to live winds and dead loads shall comply with Chapter 23 herein.

(b) UNLAWFUL CONNECTIONS: No installation of solar piping or part thereof shall be made in such a manner that it will be possible for polluted or contaminated water, gases, fluids or other substances to enter any portion of the potable water system from any pipe, tank, receptacle, or other equipment by reason of back siphonage or suction.

(c) VALVES & VENTS:

(1) Water supplied solar piping systems shall have control valves capable of isolating the system from the potable water system.

(2) Shutoff valves shall be located to isolate heat generating or transfer equipment and pressure storage tanks. Such heat generating or transfer equipment and pressure storage tanks shall be provided with an approved, listed, adequately sized pressure relief valve capable of operating at the working pressure of the pipe or 150 psi, whichever is lesser.

(3) All required shutoff and control valves shall be readily accessible.

(4) Automatic air release vents shall be installed at all high points of the solar system, unless not required by design.

(d) STORAGE TANKS: Hot water storage tanks located in concealed or attic space shall be provided with an approved drain pan as required in Chapter 46.

(e) PERMITS: A solar permit shall be required to install, repair, or alter any solar system or piping or accessory thereto. Replacement of any component part which does not alter its original approval and complies with other applicable requirements of this section shall not require a permit.

(f) PLANS REQUIRED: Two sets of plans, specifications, calculations and/or test reports verifying the structural adequacy shall be prepared by a professional architect or engineer, registered in the State of Florida, except in I Occupancy, and shall be submitted with the application for permit.

(g) PROTECTION OF PIPING:

(1) All piping in connection with a solar system shall be so installed that the piping or connections will not be subject to undue strains or stresses and adequate provisions shall be made for expansion and contraction.

(2) Piping subject to undue corrosion or mechanical damage shall be protected in an approved manner.

(3) All piping and equipment shall be adequately supported in accordance with provisions of Chapters 46 and 48.

(h) WATERPROOFING OF OPENINGS:

(1) Joints around pipes, ducts, bolts or other appurtenances which penetrate the roof or exterior wall shall be made water-tight by the use of pitch pans, lead, copper, galvanized steel or other approved flashing material.

(2) Voids around piping, ducts and other appurtenances passing through walls, ceilings and floors shall be appropriately sealed.

4008.2 TESTING:

(a) PIPING SYSTEM:

(1) Upon completion of the installation of the solar system and the entire piping system, it shall be tested and proved tight under a water, fluid, or air pressure test of not less than two times the maximum working pressure under which it is to be used, and if not marked, a minimum of 160 psi.

(2) Equipment not capable of withstanding the above pressures shall be isolated in order to test the piping system.

(b) STORAGE TANKS: Pressure type tanks shall comply with paragraph 4614.18(c) herein.

(c) SOLAR COLLECTORS:

(1) Solar collectors installed in Broward County must be certified as meeting Florida Solar Energy Center standards.

(2) Solar collectors shall also be tested in vacuum chamber in accordance with ASTM E-330 for wind loads complying with Chapter 23 herein.

(3) Solar collectors shall not contain plastic pipes except in Swimming Pool Collectors.

(d) CONTROLS AND DEVICES: All controls and devices shall comply with established nationally recognized standards, shall carry labeling of an approved listing agency or laboratory and shall be of such design and construction as to be suitable for installation.

4008.3 INSULATION: All piping, tanks, ducts and equipment shall be insulated in accordance with the provisions of Chapters 48 and 52.

4008.4 INSTALLATION: Solar panels installed at ground level shall be at least six inches above the ground. Panels which are not an integral part of the roofing system shall comply with Chapter 34.

4008.5 LOCATION:

(a) Collectors constructed of combustible materials shall not be located on or adjacent to construction required to be of non-combustible materials.

(b) Collectors and equipment shall be accessible for maintenance and repair.

4008.6 OTHER SYSTEMS:

(a) Other systems installed in conjunction with solar systems for the purpose of comfort cooling or heating shall comply with applicable sections of this Code.

(b) Solar heating systems, or parts thereof, used in swimming pools, spas or other similar facilities, having a maximum working pressure of 40 psi shall comply with the requirements of Chapter 50 herein.

4009 COMBUSTION ENGINES

4009.1 The installation and operation of stationary combustion engines and gas turbines or within 15 feet of a building shall be as set forth herein.

4009.2 The Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, NFPA 37, is hereby adopted, as set forth in Section 402.

4009.3 When engine installations totaling more than 2000 horsepower are located inside structures which are frequented by the public, such engines shall be in rooms having walls, floors and ceilings of three hour fire-resistive construction. Openings in the engine room that open into the other sections of the structure shall be provided with automatic firedoors. Installations on roofs are not required to comply with this Subsection if the roof is of Type I Construction. Rooms housing such engines shall have provisions for venting a full explosion with minimum structural damage.

4009.4 An integral engine-driven unit for compressing a flammable gas or pumping a flammable liquid shall be located in a room of fire-resistive construction or by being placed in a separate structure and such engines shall also comply with the standard set forth in this Section.

4009.5

(a) Exhaust pipes shall terminate outside the structure at a point where the hot gases or sparks will discharge harmlessly and not be directed against combustible materials or structures, or into atmosphere containing flammable gases, vapors or combustible dusts. Exhaust pipes shall not terminate under loading platforms or structures, or near ventilation air inlets.

(b) Exhaust pipes shall be installed with clearances as set forth in Sub-section 4001.4 and guarded, where necessary, to prevent personnel burns.

CHAPTER 41
SPECIAL HAZARDS

4101 TRANSFORMER VAULTS
4102 FLAMMABLE LIQUIDS
4103 FILM
4104 EXPLOSIVES
4105 RADIATION PROTECTION
4106 PAINT SPRAY BOOTHS AND DIP TANKS
4107 BOAT STORAGE FACILITIES

4101 TRANSFORMER VAULTS

4101.1 STANDARDS: Article 450, Transformers and Transformer Vaults, of the Standard set forth in Sub-section 4502.1 herein supplements, but does not supersede, the requirements set forth herein for transformer vaults.

4101.2 LOCATION: Transformer vaults shall be located to be ventilated to the outside air without the use of flues or ducts wherever such arrangement is practicable.

4101.3 CONSTRUCTION:

(a) Transformer vaults shall be constructed in accordance with the following table:

REQUIRED THICKNESS OF WALLS - TRANSFORMER VAULTS

	Reinforced Concrete	Solid Masonry	Hollow-Unit Masonry
Above Grade	6"	8"	12"
Below Grade	6"	8"	8"

Transformer-vault floors on the ground shall be reinforced concrete, not less than four inches thick. Floors with open spaces below, and ceilings, shall be of reinforced concrete not less than six inches thick. Vault walls of hollow-unit masonry shall have a stuccoed surfacing not less than three-fourths inch in thickness on the inside. All openings in wall, floors or ceilings shall be protected by Class B firedoors or wire-glass windows, except that ventilating openings to the exterior of the building may be provided with corrosion-resistant, incombustible louvers.

(b)A sill of sufficient height to confine within the vault one-third more oil than the capacity of the largest transformer, but not less than four inches high, shall be provided across all doors.

(c) Entrance doors shall be provided with a hasp for padlocking and shall be kept locked, with access available only to authorized persons.

(d) As set forth in Paragraph 5102.2(b), transformer vaults shall not be sprinkled by an automatic-sprinkler system.

4101.4 DRAINAGE: A transformer vault, located below ground water level or which, for other reasons, may be subject to flooding or water infiltration, shall be provided with an adequate system of drains and/or automatic ejectors. Above-grade vaults shall be provided with a gravity drain, terminating in a soakage pit. All vault-drainage installations shall be subject to the approval of the Building Official.

4101.5 VENTILATION:

(a) Vaults shall be so designed that there shall be an air space of not less than six inches between any power transformer and a wall and not less than one foot between adjacent transformers in the same vault.

(b) Ventilation openings in transformer vaults shall be proportioned to the capacity of the transformers contained, to facilitate the movement of air and to prevent the development of excessive temperatures.

(c) Ventilation openings shall be located as far as practicable from doors, windows, exit facilities and combustible materials. Such openings shall be covered with suitable grates, screens or louvers, constructed of corrosion-resistant, incombustible materials.

4101.6 SPECIAL RESTRICTIONS: No pipes for sanitary plumbing, water or gas supply or for any other purposes foreign to the vault installation shall pass through a transformer vault. No toilets or wash basins shall be installed in the vault. Any conduit or piping required in connection with sump pumps or similar necessary equipment shall be installed in the vault. Vaults shall not be used for storage, nor any other purpose than to contain and protect the transformers and the necessary equipment, incident thereto.

4102 FLAMMABLE LIQUIDS

4102.1 STANDARDS: The Flammable and Combustible Liquids Code NFPA 30, and the Standard for the Installation of Oil Burning Equipment, NFPA 31, are hereby adopted, as set forth in Section 402.

4102.2 SCOPE: These provisions shall apply to new buildings, equipments and installation which constitute a hazard.

4102.3 CLASSIFICATION:

(a) FLAMMABLE LIQUIDS shall be as defined in NFPA 30.

(b) COMBUSTIBLE LIQUIDS shall be as defined in NFPA 30.

(c) Any manufactured liquid or fluid commodity such as paint, varnish, dryer, cleaning solution and polishing liquid which contains certain flammable or combustible liquid as herein defined shall be classified as being one of the classes defined in NFPA 30.

4102.4 DETAILED REGULATIONS:

(a) No Class I, II or III liquids shall be stored in glass containers, except containers approved by ICC regulations.

(b) No Class I or Class II liquids shall be kept or stored in any building of Groups A or B Occupancy nor in Group C Occupancies except in laboratories for experimental purposes.

(c) Except in sealed containers, no Class I or II liquids shall be stored within ten feet of any stairway or other path of egress unless separated therefrom by a five-resistive wall or partition.

(d) In buildings of other than Group I Occupancy, there shall be not less than two remote means of egress from the point of storage to point of use of Class I or II flammable liquids; except that a single means of egress may be provided where the travel distance does not exceed 15 feet.

(e) Flammable liquids for agricultural use at the point of use shall be exempt from the requirements of this Section, subject to the approval of the Building Official, based on location and hazard.

(f) Fuel-oil tanks shall not be located in garages attached to buildings of Group H or I Occupancies.

(g) Containers of Class I or Class II liquids shall not be filled, or used to fill other containers or appliances, unless outside of the building. Containers of Class III liquids of over five-gallon capacity shall not be filled, or used to fill other containers and appliances, unless outside of the building.

(h) All containers of Class I or Class II liquids shall be properly labeled and conspicuously marked or painted, as set forth in the standards, Sub-section 4102.1, to indicate danger.

(i) In all rooms or parts of buildings which contain flammable liquids in open containers or in which the vapors from flammable liquids are present, or in which flammable liquids are used in any manufacturing process,, open flame, sparks or smoking is prohibited. Suitable "NO SMOKING" signs shall be displayed.

(j) Flammable liquids shall not be stored, drawn or handled in the presence of open flame or fire, nor shall they be stored, drawn or handled in garages and utility rooms of Group H and I Occupancies which contain heat producing appliances or other sources of ignition. Where the storage, drawing or handling of flammable liquids is permitted under this code and other appropriate laws, lighting shall be installed to conform with Chapter 45 herein.

(k) Pumps for dispensing gasoline to the tanks of operating equipment shall not be located inside of building or sheds that are more than 50 percent enclosed with walls, and such pumps shall be not less than 15 feet from property lines and not less than ten feet from any building opening. Electric connection shall be as set forth in Chapter 45.

(l) Underground tanks shall be protected from damage caused by above-grade or lateral loads, shall be placed on a firm and well-tamped earth foundation and, where necessary to prevent flotation, shall be securely anchored and weighted.

(m) Underground storage tanks shall be equipped with pipe vents, independent of all other piping, and arranged to discharge to the open air. Vents shall be of ample size to prevent abnormal pressure during filling, but not smaller than one and one-fourth-inch pipe. Vent pipes shall drain to the tank. The top of the vent pipe shall not be closer then three feet to any building opening, shall be fitted with a weatherproof hood and shall not terminate in any areas where fumes may be trapped or may accumulate. The vent shall be protected by a flame arrester.

(n) Underground storage tanks shall be filled only through fill spouts, terminating outside of buildings at a point at least five feet from any building opening at the same, or at a lower level. Fill terminals shall be closed tight when not in use. Fill terminals shall be identified and at a location from any source of ignition.

(o) For tanks out of service, see Section 5239.12(c)(6).

(p) Underground tanks installed in soil known to be unusually corrosive due to the conditions hereinafter set forth shall be protected from corrosion based on evaluation and design by a Professional Engineer or Architect:

(1) Low soil resistivity to current flow.

(2) Very acid or very alkali soil.

(3) Excessive anaerobic bacteria.

(4) High water table.

(5) Backfill and land fill areas with high organic content.

(6) Location near waterfront areas.

(q) The limits referred to the Standards, Sub-section 4102.1, referring to allowable quantities of stored flammable liquids, shall be all of the area defined as Fire Zones 1 and 2 in Chapter 15 of this Code.

4103 FILM

The storage and handling of cellulose nitrate motion-picture film shall conform to the standard for Storage and Handling of Cellulose Nitrate Motion Picture Film, NFPA 40, as set forth in Section 402, except that the provision of this Section does not apply to the following:

(a) Films for amateur photographic use in original packages of "roll" and "film pack" films in quantities of less than 50 cubic feet.

(b) Safety film (cellulose-acetate base).

(c) Dental X-ray film.

(d) Films stored or being used in standard projection rooms.

4104 EXPLOSIVES

The transportation, storage, use and handling of dynamite and other explosives shall comply with applicable state and local regulations. The Building Official may require that persons transporting, storing, using or handling dynamite and other explosives produce permits therefor where such permits are required. The Building Official may confiscate dynamite or other explosives transported to, or used on, construction work within the scope of his inspection authority where such transportation or use is, to his knowledge, in violation of applicable regulations or where, in his opinion, explosives in other than sealed containers or locked transporting boxes are unguarded or otherwise suitably protected against theft.

4105 RADIATION PROTECTION

4105.1 Radiation apparatus and devices for medical or industrial uses shall comply with the following handbook, as set forth in Section 402:

(a) Control and Removal of Radioactive Contamination in Laboratories, NBS 48.

(b) Recommendations for Waste Disposal or Phosphorous-32 and Iodine-131 for medical users, NBS 49.

(c) X-Ray Protection Design, NBS 50.

(d) Radiological Monitoring Methods and Instruments, NBS 51.

(e) Recommendations for the Disposal of Carbon 14 Wastes, NBS 53.

(f) Protection Against Betatron-Synchratron Radiations Up to 100 Million Electron Volts, NBS 55.

(g) Photographic Dosimetry of X and Gamma Ray, NBS 57.

(h) Radioactive Waste Disposal in the Ocean, NCRP 16.

(i) Permissible Dose from External Sources of Ionizing Radiation, NBS 59.

(j) Regulations of Radiation Exposure by Legislative Means, NBS 61.

(k) Precautions in Management of patients Who Have Received Therapeutic Amounts of Radionucliades, NCRP 37.

(l) Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and Water for Occupational Exposure, NBS 69.

(m) Protection Against Radiation from Sealed Gamma Sources, NBS 73.

(n) Medical X-Ray and Gamma-Ray Protection for Energies up to 10 Me V-Equipment Design and Use, NCRP 33.

(o) Medical X-Ray and Gamma-Ray Protection for Energies up to 10 Me V-Structural Shielding Design and Evaluation, NCRP 24.

(p) Dental X-Ray Protection, NCRP 35.

(q) Radiation Protection in Veterinary Service, NCRP 36.

(r) Protection Against Radiation from Brachytherapy Sources, NCRP 40.

4105.2

(a) Where recommended in the Standards, radiation apparatus shall be used only where provided with protective barriers and structural shielding as set forth herein.

(b) The safe working practices set forth in the Standards shall be followed.

(c) The suitability of protective barriers and handling practices shall be effectively tested before the

handling of radioactive isotopes is put in general use.

4106 PAINT SPRAY BOOTHS AND DIP TANKS

4106.1 SCOPE: The application of flammable or combustible paint, varnish, lacquer, stain or other flammable or combustible liquid applied as a spray in continuous or intermittent process; and dip tank operations in which article or materials are passed through contents of tanks, vats or containers of flammable or combustible liquids, including coating, finishing, treating and similar processes shall comply with the requirements of this section.

4106.2 PAINT SPRAY BOOTHS:

(a) WHERE REQUIRED:

(1) Paint Spraying, spray finishing, or dipping operations shall not be conducted in a building of Group A, B, C, D, H or I Occupancy except in a room complying with the standards as set forth herein, and protected with an approved system of automatic sprinklers, and separated vertically and horizontally from other areas by construction having not less than 2 hours fire resistance.

(2) In building of Group E, F and G Occupancy where spraying apparatus is used repeatedly, such operations shall be conducted in spray booths or spray area constructed as set forth herein.

(3) Spraying operations shall be confined to the smallest practicable space commensurate with the operation.

(4) Where quantity of spraying or dipping materials used in a day does not exceed 2 quarts and the total amount of materials stored does not exceed 20 gallons, the Building Official may waive or vary these requirements subject to the consideration of safety.

(b) STANDARDS: Paint spraying and spray finishing shall comply with the Standard for Spray Finishing using Flammable and Combustible Materials, NFPA 33, as set forth in Section 402.

4106.3 DIP TANKS: Dip tank operations shall comply with the Standard for Dip Tanks Containing Flammable or Combustible Liquids, NFPA 34, as set forth in Section 402.

4107 BOAT STORAGE FACILITIES

Boat storage facilities shall comply with the Standard for Fire Protection for Marinas and Boat yards, NFPA 303.

PART IX
SIGNS
CHAPTER 42
SIGNS

4201 GENERAL
4202 DEFINITIONS
4203 ERECTION PERMITS
4204 INSPECTION
4205 DESIGN
4206 LIMITATIONS ON ROOF SIGNS
4207 LIMITATIONS ON GROUND SIGNS
4208 LIMITATIONS ON PROJECTING SIGNS
4209 LIMITATIONS ON WALL OR FLAT SIGNS
4210 LIMITATIONS ON MARQUEE SIGNS
4211 USE OF PLASTIC MATERIALS
4212 DETAILED REQUIREMENTS
4213 LIGHTING

4201 GENERAL

4201.1 The construction, alteration, repair and maintenance of all signs and outdoor display structures together with their appurtenant and auxiliary devices shall be as set forth herein.

4201.2 Where more restrictive in respect to locations, use, size height of signs and outdoor display structures, the limitations of zoning or other specific regulations shall apply.

4202 DEFINITIONS

AREA: The area of a sign, for the purpose of this Chapter, shall be the area of that square or rectangle which would enclose all parts of the sign: its border, decoration, excepting its ornamentation, appendage and appurtenances, excepting the supporting columns or posts of a roof sign or a ground sign. The area definition set forth herein shall not be construed to be applicable to a zoning regulation and the area or measuring size for such purposes shall be that set forth in such applicable zoning regulation.

AWNING SIGN: An outdoor advertising display sign painted, stamped, perforated or stitched on an awning, canopy, roller curtain or umbrella.

BANNER SIGN: An outdoor advertising display sign having the characters, letters, illustrations or ornamentations thereof applied to cloth, paper or fabric of any kind.

EMBELLISHMENT: A part of the sign which is superimposed on the sign area. This definition shall not be construed to be applicable to any zoning regulation.

WALL OR FLAT SIGN: An outdoor advertising display sign attached to and erected parallel to the face of, or erected or painted on the outside wall of a building and supported throughout its length by such wall or building; or any sign in any way applied flat against a wall. Wall signs shall not project more than 12 inches from the building or a wall.

GROUND SIGN: An outdoor advertising display sign supported by uprights or braces in or upon the ground.

MARQUEE SIGN: A projecting sign attached to or hung from a canopy or covered structure projecting

from and supported by a building, when such canopy structure extends beyond the building, building line or property line.

OUTDOOR ADVERTISING DISPLAYS: Outdoor advertising display means any letter, figure, character, mark, plane, point, marquee sign, design, poster, pictorial, picture, stroke, stripe, line trademark, reading matter or illuminated service, which shall be constructed, placed, attached, painted, erected, fastened or manufactured in any manner whatsoever, so that the same shall be used for the attraction of the public to any place, subject, person, firm, corporation, public performance, article, machine or merchandise, whatsoever, which is displayed in any manner whatsoever outdoors. Every outdoor advertising display shall be classified and conform to the requirements of that classification as set forth in this Chapter.

PROJECTING SIGN, HORIZONTAL: An outdoor advertising display sign attached to a building and projecting at any angle from the face of the wall, and which has a horizontal dimension greater than the vertical dimension.

PROJECTING SIGN, VERTICAL: An outdoor display sign attached to a building and projecting at any angle from the face of the wall, and which has a vertical dimension equal to or greater than the horizontal dimension.

ROOF SIGN: An outdoor advertising display sign which is fastened to, supported by or erected above the roof of a building or within the dimensions of the building. This dimension shall not be construed to be applicable to any zoning regulation.

SPECTACULAR SIGN: An outdoor advertising display sign, advertising copy usually animated, constructed of metal, wired for lights for luminous tubing, or both, with copy action controlled by the flashed circuit breakers or matographs and attached on an open face steel structure built especially for the purpose. They may be built upon the ground, attached to a wall, or above the roof, or projecting from a wall, provided that such spectacular signs meet the requirements of the provisions of this code governing ground, roof, wall, projection or marquee sign, depending upon where such signs are built, as set forth below. Spectacular signs shall be illuminated with electricity only.

SIGN: Any display of characters, letters, illustrations or ornamentations.

SIGN STRUCTURE: The complete structure on which such characters, letters, illustrations or ornamentations may be supported or applied.

4203 ERECTION PERMITS

4203.1 PERMIT REQUIRED: No sign structure shall be hereafter erected, constructed, altered, maintained or relocated until a building permit for a sign structure and/or an electric permit for any electric construction in connection therewith shall have been issued, as set forth in Chapter 3 herein. No sign shall be erected, constructed, posted, painted, altered, maintained or relocated, except the changing of copy of a bulletin board or poster board or marquee or repainting an existing sign; until application has been made and a permit therefor issued by the Building Official.

EXCEPTIONS:

(a) Official traffic signs or sign structures and provisional warning signs or sign structures when erected by a legally constituted government body.

(b) Signs or sign structures erected in connection with new construction work, where such signs or sign structures do not exceed two feet in height three feet in width and are displayed only during such time as the actual construction work is in progress, and provided such signs are located at the site of the construction work in progress.

4203.2 APPLICATION:

(a) The Building Official may request written consent of the property owner when application for permit is

by any person other than the owner of the property on which the sign or sign structure is proposed to be erected or to which it will be attached.

(b) Application for permit for proposed signs or sign structures exceeding 12 square feet in area shall be accepted only from qualified persons or firms. Qualification of persons or firms shall be in accordance with separate ordinance provided for qualification and certification of construction trades persons.

(c) Application for permit shall be accompanied by such drawings and information as are necessary to fully advise and acquaint the Building Official, and such other regulatory authorities having jurisdiction, with location, construction, weight, materials, methods of securing, manner of illuminating and advertisements to be carried.

(d) Computations, stress diagrams and stress calculations shall be submitted to show the structural sufficiency of the sign and its supports where required by the Building Official; and the application for permit for all signs, other than a sign painted on a wall, exceeding 12 square feet in area shall be accompanied by plans prepared by a Registered Professional Engineer.

EXCEPTION: All roof signs shall have plans prepared by and signed, dated and sealed by a Registered Professional Engineer.

(e) The Building Official may waive the requirement for plans for relatively small and obviously simply-constructed and erected signs when, in his opinion, no public safety is affected thereby, but shall not waive the requirement for such plans for construction over public property or for signs.

4204 INSPECTION

4204.1 ERECTION INSPECTION: The permit holder shall request a structural and electrical inspection before enclosure and shall request a final inspection within 48 hours of the completion of the work. The permit holder shall provide a ladder, or such other equipment as may be necessary, to make the inspections required.

4204.2 SIGN INSPECTION: Every ground sign, roof sign, wall sign and projection sign may be reinspected at intervals as required by the Building Official.

4204.3 UNSAFE SIGNS: Should any sign become insecure or in danger of falling or otherwise unsafe in the opinion of the Building Official, the owner thereof, or the person or firm maintaining same, shall upon written notice from the Building Official, forthwith in the case of immediate danger and in any case within 10 days, remove such sign or secure the same in a manner to be approved by the Building Official, in conformity with the provisions of this Code and as set forth in Section 202 of this Code. If such order is not complied within 10 days, the Building Official shall remove such sign at the expense of the owner or lessee thereof.

4205 DESIGN

4205.1 All signs and their supporting structures shall be so designed and constructed as to admit of rational analysis, in accordance with accepted principles of mechanics.

4205.2 The wind pressure on signs shall be computed as set forth in Chapter 23 based on the area of the proposed sign plus the area of any embellishments.

4205.3 Design shall not be based on removal of panels during periods of high wind velocities.

4205.4 EMBELLISHMENTS

(a) Embellishments can only be added to signs designed to support wind pressure of the added areas.

(b) Nothing in this Sub-section shall be construed to imply that an embellishment may exceed the limits of area, dimension or height as set forth in any applicable zoning regulation.

4205.5 WORKING STRESSES: In all outdoor advertising display signs, the allowable working stresses shall conform with the requirements of Chapter 23 of this Code, except as specified below.

(a) The allowable working stresses for materials shall be in accordance with the provisions of Chapters 24, 25, 27, 28, 29, 30, and 35 of this Code.

(b) The working strength of chains, cables, guys, steel rods, eye bolts or turnbuckles shall not exceed one-fifth of the ultimate tensile strength of such chains, cables, guys, steel rods, eye bolts or turnbuckles.

4206 LIMITATIONS ON ROOF SIGNS

4206.1 Roof signs shall be constructed of only incombustible materials.

4206.2 Roof signs shall be limited to size and location so that the face of the sign parallel to or at an angle not exceeding 30 degrees with the outside of the building shall be not less than 3 feet from the outside of the building and at the end of such a sign may extend to, but not past, the outside face of the building.

The ends of a roof sign at an angle of 30 degrees or more with the adjacent outside walls of the building may extend to, but not past, the outside face of the building.

4206.3 No part of a roof sign shall extend horizontally beyond the building walls at the roof.

4206.4 Roof signs exceeding 40 square feet in area shall be supported only by steel or concrete.

4206.5 All roof signs shall be constructed as to leave a clear space of not less than 6 feet between the roof level and the lowest part of the sign and shall have at least 5 feet clearance between the vertical supports thereof. No portion of any roof sign structure shall project beyond an exterior wall.

EXCEPTIONS:

(a) Signs on flat roofs with every part of the roof accessible shall have a minimum clear space between the roof level and the lowest part of the sign as required by Section 3409 of this Code.

(b) Such Vertical clearance above the roof shall not be required for signs ten feet of less in length where clear passage to all parts of the roof is not impeded thereby.

4206.6 Every roof sign shall be constructed entirely of incombustible construction, including the upright supports and braces, except that only the ornamental molding and battens behind the incombustible facing and the decorative lattice work may be of wood construction.

4206.7 The bearing plates of all roof signs shall distribute the load directly to or upon masonry walls, steel roof girders, columns or beams. The building shall be designed to avoid overstress of these members.

4206.8 A roof sign having a tight or solid surface shall not be at any point over 24 feet above the roof level.

4206.9 Open roof signs in which the uniform open area is not less than 40% of total gross area may be erected to a height of 75 feet on buildings or structures of type I or type II construction and on other types of buildings or structure to a height of 40 feet. All such signs shall be thoroughly secured to the building or structures upon which they are installed, erected or constructed by iron, metal anchors, bolts, supports, chains, stranded cables, steel rods or braces and they shall be maintained in good condition as set forth in this chapter.

4207 LIMITATIONS ON GROUND SIGNS

4207.1 Ground signs and their anchors and supports shall be constructed of rot and deterioration resistive materials. Wood shall be pressure treated as set forth in Paragraph 2913.2(a) and steel below grade shall be encased in concrete.

4207.2 Ground signs shall be limited in size and location so that the face of the sign parallel to or at an angle not exceeding 30 degrees with a lot line shall be not less than 3 feet from the line and the end of such a sign may extend to the lot line. The end of a ground sign at an angle of 30 degrees or more with adjacent lot lines may extend to the lot line.

4207.3 Lighting reflectors may project beyond the face of the ground sign.

4207.4 The bottom coping of every ground sign shall be not less than 3 feet above the ground or street level, which space may be filled.

4207.5 Every ground sign shall provide rigid construction to withstand wind action from any direction.

4207.6 Any person or persons, partnership, firm or corporation occupying any vacant lot or premises by means

of a ground sign, shall be subject to the same duties and responsibilities as the owner of the lot or premises, with respect to keeping the same clean, sanitary, inoffensive, free and clear of all obnoxious substances and unsightly conditions on the ground and in the vicinity of such ground sign on said premises for which they may be responsible.

4208 LIMITATIONS ON PROJECTING SIGNS

4208.1 All projecting signs shall be constructed entirely of metal or other noncombustible material and securely attached to a building or structure by metal supports such as bolts, anchors, supports, chains, guys or steel rods. Staples or nails shall not be used to secure any projecting sign to any building or structure.

4208.2 No signs projecting over public streets shall extend or project nearer than 18 inches to the curb.

4208.3 Signs projecting from a building or structure or extending over any part of a public sidewalk shall be erected not less than nine feet, measured vertically, above any part of such sidewalk.

4208.4 Projecting signs shall be so bolted or otherwise secured to their supporting members as to prevent their being unhooked.

4208.5 Projecting signs erected over alleys shall not be less than 15 feet above the grade directly beneath such signs.

4208.6 The dead load of projecting signs not parallel to the building or structure and the load due to wind pressure shall be supported with chains, guys or steel rods having net cross sectional dimension as required by rational analysis, but not less than 3/8 inch diameter. Such supports shall be erected or maintained at an angle of at least 65 degrees with the horizontal to resist the dead load and at an angel of 45 degrees or more with the face of the sign to resist the specified wind pressure. If such projecting sign exceeds 30 square feet in one facial area, there shall be provided at least two such supports on each side as required by rational analysis, but not more than 8 feet apart to resist the wind pressure.

4208.7 All supports shall be secured to a bolt or expansion screw that will develop the strength of the supporting chains, guys or steel rods as required by rational analysis, by with not less than 5/8 inch diameter bolt or lag screw with an expansion shield. Turnbuckles shall be placed in all chains, guys or steel rods supporting projecting signs.

4208.8 Chains, cables, guys or steel rods used to support the live, dead and uplift loads of projecting signs may be fastened to solid masonry walls with expansion bolts or by machine screws in iron supports, but such supports shall not be attached to an unbraced parapet wall. Where the supports must be fastened to walls made of wood, the supporting anchor bolts shall go through the wall and be plated or fastened on the inside in a secure manner.

4208.9 A projecting sign shall not be erected on the wall of any building so as to project above the roof or cornice wall or above the roof level where there is no cornice wall; except that a sign erected at a right angle to the building, the horizontal width of which sign is perpendicular to such a wall and does not exceed 18 inches may be erected to a height not exceeding 2 feet above the roof or cornice wall or above the roof level where there is not cornice wall. A sign attached to a corner of a building and parallel to the vertical line of such corner shall be deemed to be erected at a right angle to the building wall.

4209 LIMITATIONS ON WALL OR FLAT SIGNS

4209.1 Wall or flat signs attached to exterior walls of grouted solid unit masonry, grouted hollow unit masonry, engineered unit masonry, concrete or stone, shall be safely and securely attached by means of metal anchors, bolts or expansion screws as required by rational analysis, but not less than 3/8 inch diameter and shall be embedded to a depth as required by rational analysis. Wood blocks shall not be used for anchorage, except in the case of wall or flat signs attached to buildings or structures with walls of wood.

4209.2 Structural wall or flat signs shall not be erected where any part of such sign is less than nine feet, measured vertically above any part of the public sidewalk directly beneath such sign.

4209.3 Temporary cloth signs with wood frames may be kept in place for a period not exceeding 30 days where

permitted by the zoning regulations.

4210 LIMITATIONS ON MARQUEE SIGNS

4210.1 Marquee signs shall be constructed entirely of metal or noncombustible material and may be attached to, or hung from a marquee. Such signs when hung from a marquee shall be at least 9 feet at its lowest level above the sidewalk or ground level, and further, such signs shall not extend outside the line of such marquee. Marquee signs may be attached to the sides and front of a marquee, provided such signs does not extend more than 6 feet above, nor 1 foot below such marquee, but under no circumstances, shall the sign or signs have a vertical dimension greater than 8 feet.

4211 USE OF PLASTIC MATERIAL

4211.1 Not withstanding any other provision of this Code, plastic materials which burn at a rate no faster than 22 inches per minute when tested in accordance with A.S.T.M. D635 shall be deemed approved plastics and may be used as the display surface material and for the letters, decorations and facings on signs and outdoor display structures, provided that in Fire District No. 1 and 2 the structure of the sign in which the plastic is mounted or installed is noncombustible.

4211.2 Individual plastic facings of electric signs shall not exceed 200 square feet in area.

4211.3 If the area of a display surface exceeds 200 square feet the area occupied or covered by approved plastics shall be limited to 200 square feet plus 50 percent of the difference between 200 square feet and 2000 square feet. The area of plastic on a display surface shall not in any case exceed 1,100 feet.

4211.4 Letters and decorations mounted upon an approved plastic facing or display surface shall be made of approved plastics.

4211.5 See Sec. 3505 for definition of plastics.

4212 DETAILED REQUIREMENTS

4212.1 Signs shall be secured to their supports and supporting structures with rot-resistant fastenings such as galvanized iron, lead or brass. No wood or plastic plugs or pins shall be used.

4212.2 An outdoor advertising display sign shall not be erected, constructed or maintained so as to obstruct any means of egress or any window or door or opening used as a means of egress or so as to prevent free passage from one part of a roof to any other part thereof. A sign shall not be placed in such manner as to interface with any opening required for legal ventilation or light as set forth in this Code.

4212.3 No sign shall be constructed, erected, used, operated or maintained:

(a) Which involves motion or rotation of any part if it displays intermittent lights resembling, or seeming to resemble, the flashing lights customarily associated with danger or such as are customarily used by police, fire or ambulance vehicles, or for navigation purposes.

(b) Which uses the word - STOP - or - DANGER - or presents or implies the need or requirement of stopping or the existence of danger, or which is a copy or limitation of official signs.

(c) Which is so located and so illuminated as to provide a background of confusing, colored lights for traffic-signal lights when such traffic lights are viewed from a normal approaching position of a vehicle at a distance from 25 to 300 feet.

4212.4 Signs shall be constructed with adequate rain-water drains.

4212.5 MAINTENANCE: All signs for which a permit is required together with all their supports, braces, guys and anchors shall be kept in repair and unless of galvanized or non-corroding metal shall be thoroughly painted at least once every two years. The Building Official may order the removal of any sign that is not maintained in accordance with the provisions of this section. Such removal shall be at the expense of the owner or lessee.

4212.6 UNLAWFIL SIGNS: In case any sign shall be installed, erected or constructed in violation of any of

the terms of this Code, the Building Official shall notify the owner by registered mail.

4212.7 IDENTIFICATION OF SIGNS: Every outdoor advertising display sign hereafter erected, constructed or maintained, for which a permit is required shall be plainly marked with the name of the person, firm or corporation erecting and maintaining such sign and shall have affixed on the front thereof the permit number issued for said sign by the Building Official.

4213 LIGHTING

4213.1 Signs shall be illuminated by electrical means only.

4213.2 Electrically-illuminated signs shall comply with the requirements of Chapter 45 of this Code.

4213.3 Gooseneck, spot or floodlights shall not be placed as to extend over public property.

PART X

FABRIC AWNINGS, CANOPIES AND TENTS AND MEMBRANE STRUCTURES

CHAPTER 43

FABRIC AWNINGS, CANOPIES AND TENTS AND MEMBRANE STRUCTURES

4301 GENERAL
4302 DEFINITIONS
4303 PERMITS AND INSPECTIONS
4304 LOCATION AND USE OF FABRIC AWNINGS AND CANOPIES
4305 CONSTRUCTION OF FABRIC AWNINGS AND CANOPIES
4306 TENTS
4307 MEMBRANE STRUCTURES

4301 GENERAL

4301.1 GENERAL: Fabric awnings, canopies and tents and membrane structures shall be of materials, proportions and strength as set forth in this Chapter. Where more restrictive in respect to location, use, size and height the limitations of zoning or other specific regulations shall apply.

4301.2 PURPOSE: It is the intent and purpose of this Part to regulate construction and location of fabric awnings, canopies and tents and membrane structures on private property and to set forth the conditions under which awnings may be constructed over public property.

4031.3 STANDARDS:

(a) Guideline for structural condition assessment of existing buildings, A.N.S.I./A.S.C.E. 11.

4302 DEFINITIONS

AIR-INFLATED STRUCTURE: A building where the shape of the structure is maintained by air pressurization of cells or tubes to form a barrel vault over the usable area. Occupants of such a structure do no occupy the pressurized area used to support the structure.

AIR SUPPORTED STRUCTURE: A building wherein the shape of the structure is attained by air pressure and occupants of the structure are within the elevated pressure area. Air-supported structures are of two basic types:

(a) SINGLE SKIN: Where there is only the single outer skin and the air pressure is directly against that skin.

(b) DOUBLE SKIN: Similar to a single skin, but with an attached liner which is separated from outer skin and provides an air space which serves for insulation, acoustic, aesthetic or similar purposes.

AWNING: Any movable rooflike structure, cantilevered, or otherwise entirely supported from a building, so constructed and erected as to permit its being readily and easily moved within a few minutes time to close an opening, or rolled or folded back to a position flat against the building or a cantilevered projection thereof, or is detachable.

CABANA: A sun and wind protection erected nearby and in connection with swimming areas having removable fabric roof and walls, on a fixed metal frame.

CABLE-RESTRAINED AIR SUPPORTED STRUCTURE: A cable-restrained air-supported structure is one in which the uplift is resisted by cables or webbing which are anchored to either foundations

or deadmen. Reinforcing cable or webbing may be attached by various methods to the membrane or may be an integral part of the membrane. This is not a cable-supported structure.

CABLE STRUCTURE: A non-pressurized structure I which a mast and cable system provide support and tension to the membrane weather barrier and the membrane imparts structural stability to the structure.

CANOPY: Any fixed rooflike structure, not movable like an awning, and which is cantilevered in whole or in part self supporting, but having no side walls or curtains other than valances not more than 18 inches deep. Lean-to-canopies, fixed umbrellas and similar structures are included in this classification. Structures having side walls or valances more than 18 inches deep shall be classified as a tent or cabana as set forth herein.

FABRIC: Cloth or any material similarly flexible or woven.

FRAME-COVERED STRUCTURE: A non-pressurized building wherein the structure is composed of a rigid framework to support tensioned membrane which provides the weather barrier.

MEMBRANE:A thin, flexible, impervious material capable of being supported by an air pressure of 1.5 inches of water column.

NONCOMBUSTIBLE MEMBRANE STRUCTURE: A membrane structure in which the membrane and all component parts of the structure are noncombustible as defined by Section 401.

ROLLER CURTAIN: Shall be included in the classification of a movable awning and shall be defined as having a roller attached to the lower edge of a canvas and supported in whole or in part by the awning material.

SELF-SUPPORTING: Supported to the ground or construction below by columns or walls: but not cantilevered.

TENT: A fabric-roofed structure, wholly or partially self-supporting, with side walls of any material.

4303 PERMITS AND INSPECTIONS

4303.1 PERMITS:

(a) A permit shall be required as set forth in Chapter 3 herein for the construction, fabrication, installation, repair or replacement of any awning, canopy, membrane structure or any other fabric structure erected over public property, or over private property used for business or industrial purposes, or over private property when such structure is in whole or in part self-supported.

EXCEPTION: Permits will not be required for the repair or replacing of fabric awnings or canopies when the existing structural framework is not altered or removed and when such framework is in compliance with the requirements of this Code.

(b) Application for permit shall be accompanied by plans, and when required by the Building Official, such plans shall be prepared by, and signed, dated and sealed by a Professional Engineer.

(c) Where the proposed structure is to be erected over public property, applications will be accepted only from licensed contractors.

(d) Application for the erection of a tent exceeding 100 square feet in area shall be accompanied by written approval of all residents or owners of property located within a radius of 200 permission of the adjacent property owners will not be required.

(e) Permits for the erection of a tent shall be revocable on 24 hours notice and shall be temporary and for a period not exceeding 30 days.

4303.2 INSPECTION:

(a) The permit holder shall request the Building Official to make a final inspection when the work is completed.

(b) The name of the manufacturer shall be affixed and shall be visible and legible.

4304 LOCATION AND USE OF FABRIC AWNINGS AND CANOPIES

4304.1 LOCATION:

(a) Fabric awnings and canopies located over public property or in areas accessible to the general public shall be constructed so that no rigid part of such fabric awning or fabric canopy shall be less than seven feet six inches from the grade directly below, and no part of the cloth drop shall be less than six feet and six inches. The minimum clearance under fabric awnings or fabric canopies located over state highway rights-of-way shall be as required by the Florida Department of Transportation.

(b) No cantilevered portion of an fabric awning or fabric canopy exceeding nine feet in projection shall extend over public property, nor shall any portion be closer than 18 inches to the curb line.

(c) Fabric canopies, in whole or in part supported to the ground, shall comply with the zoning set-back for buildings except as may be otherwise regulated in Chapter 35 or in applicable zoning regulations.

(d) Structures, in whole or in part of fabric, erected in connection with gasoline service stations may not be erected within 15 feet of, or where, flammable liquids are transferred.

4304.2 USE:

(a) (1) Fabric awnings or canopies may be used for the shading and weather protection of windows, door entrances, fruit and vegetable displays, restaurant tables not enclosed with insect screen and seats and playgrounds.

(2) Fabric awnings and canopies used for the shading or weather protection of cars or boats in connection with Group I Occupancies shall be limited to a size to cover not more than 2 such vehicles. In connection with other than I Occupancies, canopies of fire-retardant material may be used for shading or weather protection of cars in asphalt paved parking lots at ground level, providing however, that the width does not exceed 20 feet and the length does not exceed

60 feet and it is not closer than 30 feet from any adjacent canopy, building, or property line.

(b) Fabric awnings and canopies may not be used for general storage of combustible materials or goods packaged in combustible materials.

(c) Fabric awnings and canopies may not be enclosed with any material other than a valance not more than 18 inches in vertical depth or fabric roller curtains for temporary shade and weather protection.

4305 CONSTRUCTION OF FABRIC AWNINGS AND CANOPIES

4305.1 AREA:

(a) No fabric awning or canopy shall exceed the area of the building to which it is attached.

(b) No fabric awning or canopy shall exceed 10 percent of the area of the lot on which awning or canopy is located.

4305.2 MATERIAL:

(a) Fabric used for any purpose herein defined shall be a minimum of 10.10 army duck. Fabric for tents shall be flame-resistant.

(b) Supports for fabric awnings and canopies shall be of metal or similar durable material.

4305.3 DESIGN:

(a) Design Loads:

(1) The minimum size of structural members of cantilevered awnings, canopies or cabanas with the fabric in place at the respective cantilever awning, canopy or cabana shall be not less than as set forth hereinafter, nor less than that required to resist a 75 miles per hour wind with the applicable factors as called

for in paragraph 2309.4(b) of this Code.

(2) The minimum size of structural members of cantilevered awnings, canopies or cabanas with the fabric not in place at the respective cantilevered awning, canopy or cabana shall be not less than as set forth hereinafter, nor less than that required to resist the wind loads with the applicable factors as called for in Chapter 23 of this Code.

(3) Design of the structural frame with the fabric in place shall not be based on the removal or repositioning of parts or the whole, during periods of 75 miles per hour wind velocity or less.

(4) Design of the structural frame with the fabric not in place shall not be based on the removal or repositioning of parts or the whole, during periods in excess of 75 miles per hour wind velocity.

(5) All fabric shall be designed to break away or for quick removal at wind velocities in excess of 75 miles per hour, or the entire structural assembly shall be designed in accordance with Chapter 23 of this Code.

MINIMUM SIZE OF FRONT BARS

3' width between supports	2" pipe
9' width between supports	3/4" pipe
14' width between supports	1" pipe

EXTENSIONS ON AWNINGS AND TRUSS EXTENSIONS ON CANOPIES

Rafters up to 5' in extension from supporting wall	2"pipe
Rafters up to 9' in extension from supporting wall	3/4"pipe
Rafters up to 12' in extension from supporting wall	1"pipe

NUMBER OF SUPPORTS REQUIRED OF ROLLER-GEAR AWNINGS

Up to 20' in width parallel to supporting wall	no center support
20' to 30' in width parallel to supporting wall	1 center support
30' to 50' in width parallel to supporting wall	2 center supports
50' to 60' in width parallel to supporting wall	3 center supports
60' to 70' in width parallel to supporting wall	4 center supports

NUMBER OF ARMS REQUIRED FOR ROLLER-GEAR AWNINGS

Up to and including 20'	2 arms
Up to and including 30'	3 arms
Up to and including 40'	4 arms

(b) The cloth parts of canopies and awnings shall be securely laced, tied or otherwise fastened to the frame; no rafter or front bar will be permitted in pockets; and in no case shall a rolling curtain be caused to operate over a canopy frame.

(c) The front bar of an awning, when pulled up, shall not be higher than the head of the awning.

(d) The awning head bar may be of wood, provided such wood is a durable species or treated to resist rot and weather deterioration.

(e) When attaching awnings of canopies to masonry walls or columns, lags and expansion bolts in metal shields shall be required. Wood plugs are hereby prohibited. Fastenings shall be by rational analysis by a professional Engineer, but not less than three-eighths inch diameter bolts, nor spaced more than three feet apart.

(f) (1) The horizontal projection of cantilevered portions shall not be greater than two times the height,

except where the building construction does not permit a proper installation in which case, a variance may be permitted by the Building Official, based on special design and construction.

(2) All fabric awnings, except roller-gear awnings with folding arms, shall be equipped with fire chains, one end of which fastens to the front bar or side arm, not more than six inches back of the front bar and the other end of which fastens to a point just under the head bar, but not to the head bar or head-bar fastenings.

(3) Such chains and fastenings shall be corrosion resistant and shall be of sufficient strength to withstand the stress of the awning being dropped and to keep the frame from going below the required minimum.

4306 TENTS

4306.1 No profit-seeking or commercial activity of any kind or character whatsoever shall be transacted within an area covered by a tent, except a traveling organization regularly employing such means of weather protection, such as a circus or a convention.

4306.2 Tents may not be used for general storage or any character whatsoever and may not be used for sleeping purposes.

4306.3

(a) All fabrics, curtains, cloth, rope, netting and decorative material used for, or in, or on, a tent shall be rendered flameproof.

(b) Tents required to be of flame-proofed material shall be inspected by the Building Official and the flame proofing certified on the Application for Building Permit, issued for the erection of such tent.

4306.4

(a) All tents at grade shall be constructed and erected to withstand a minimum wind pressure or suction of ten pounds per square foot.

(b) No tier of seats shall rise to a height exceeding 12 feet.

(c) All lighting shall be by electricity.

(d)A minimum of two exits shall be provided where a tent is used as a place of assembly of 100, or more, persons.

(e) Where tents are used as a place of assembly, with a capacity of 500 or more persons, each exit shall be not less than nine-feet wide; and the number of exits shall be one additional exit for each additional 500 persons, or major fraction thereof.

(f) Exits shall be spaced no more than 75 feet apart.

(g) Aisles shall not be less than 44 inches in width, provided such aisles shall not be less in width than the combined width of aisles they connect.

(h) There shall be not more than ten seats between any seat and aisle, and if the seating capacity of such tent exceeds 500 persons, collapsible chairs shall be fastened together in banks of ten.

4306.5 Tents shall not be less than 30 feet from side or rear property lines or from other buildings on the same property. No tent shall be erected in Fire Zone 1.

4307 MEMBRANE STRUCTURES

4307.1 GENERAL:

(a) PURPOSE: The purpose of this section is to establish minimum standards of safety for the construction and use of air-supported, air-inflated and membrane-covered cable or frame structures, collectively known as membrane structures.

(b) SCOPE: The provisions of this appendix shall apply to membrane structures erected for a period of 180 days or longer. Those erected for a shorter period of time shall comply with applicable provisions of

Chapter 52 of this Code.

EXCEPTION: Water storage facilities, water clarifiers, water treatment plants, sewer plants, agricultural greenhouses and similar facilities not used for human occupancy need meet only the requirements of paragraph 4307.2(b) and Sub-section 4307.5 of this Code.

4307.2 TYPE OF CONSTRUCTION AND GENERAL REQUIREMENTS:

(a) GENERAL: Membrane structures shall be classified as Type V Construction, except that noncombustible membrane structures may be classified as Type II Construction.

EXCEPTION: A noncombustible membrane structure used exclusively as a roof and located more than 20 feet above any floor, balcony or gallery is deemed to comply with the roof construction requirements for Type I and Type II fire resistant construction, provided that such a structure complies with the requirements of this section.

(b) MEMBRANE MATERIAL: Membranes shall be either noncombustible as defined by Section 401 or flame retardant conforming to Chapter 52 of this Code.

(c) APPLICABILITY OF OTHER PROVISIONS: Except as specifically otherwise required by this section, membrane structures shall meet all applicable provisions of this Code. Roof coverings shall be fire retardant.

EXCEPTION: Roof coverings for Group J, Division 1 and 7 Occupancies not exceeding 1,000 square feet in area need not be fire retardant.

(d) ALLOWABLE FLOOR AREAS: The area of a membrane structure shall not exceed the limits set forth in the requirements of the respective Occupancy Group, except as provided in Chapter 5.

(e) MAXIMUM HEIGHT: Membrane structures shall not exceed one story nor shall they exceed the height limits in feet set forth in the requirements of the respective Occupancy Group.

EXCEPTION: Noncombustible membrane structures serving as roof only.

4307.3 INFLATION SYSTEMS:

(a) GENERAL: Air-supported and air-inflated structures shall be provided with primary and auxiliary inflation system to meet the minimum requirements of this Section.

(b) EQUIPMENT REQUIREMENTS: The inflation system shall consist of one or more blowers and shall include provisions for automatic control to maintain the required inflation pressures. The system shall be so designed as to prevent over pressurization of the system.

In addition to the primary inflation system, in buildings exceeding 1,500 square feet in area, there shall be provided an auxiliary inflation system with sufficient capacity to maintain the inflation of the structure in case of primary system failure.

The auxiliary inflation system shall operate automatically if there is a loss of internal pressure or shall the primary blower system become inoperative.

Blower equipment shall meet the following requirements:

(1) Blowers shall be powered by continuous rated motors at the maximum power required for any flow condition as required by the structural design.

(2) Blowers shall be provided with inlet screens, belt guards and other protective devices as may be required by the Professional Engineer to provide protection from injury.

(3) Blowers shall be housed within a weather-protecting structure.

(4) Blowers shall be equipped with back draft check dampers to minimize air loss when operative.

(5) Blower inlets shall be located to provide protection from air contamination. Location of inlets shall

be by the Professional Engineer.

(c) EMERGENCY POWER: Whenever an auxiliary inflation system is required, an approved standby power-generating system shall be provided. The system shall be equipped with a suitable means for automatically starting the generator set upon failure of the normal electrical service and for automatic transfer and operation of all the required electrical functions at full power within 60 seconds of such normal service failure,. Standby power shall be capable of operating independently for a minimum of four (4) hours.

4307.4 SECTION PROVISIONS:

(a) A system capable of supporting the membrane in the event of deflation shall be provided in all air-supported and air-inflated structures have an occupant load of more than 50 or when covering a swimming pool regardless of occupant load. Such system shall maintain at least 7 feet above the floor, seating area or surface of the water.

EXCEPTION: Membrane structures used as roof for Type I and Type II FIRE RESISTANT CONSTRUCTION SHALL BE MAINTAINED NOT LESS THAN 25 FEET ABOVE FLOOR OR SEATING AREAS.

4307.5 ENGINEERING DESIGN:

(a) All membrane structures shall be structurally designed in accordance with criteria developed by a Professional Engineer.

(b) All membrane structures shall meet all of the impact and cyclic loading requirements as provided for in Chapter 35 of this Code and the wind loads with the applicable factors and the live and dead loads as provided for in Chapter 23 of this Code.

CHAPTER 44
RIGID AWNINGS, RIGID SUN SHADES, CANOPIES, SCREEN ENCLOSURES AND UTILITY SHEDS

4401 GENERAL
4402 PERMITS AND INSPECTION
4403 DESIGN
4404 LOCATION

4401 GENERAL

4401.1 GENERAL: Rigid awnings and canopies, screen enclosures and utility sheds shall be of the materials, proportions and strength as set forth in this Chapter.

4401.2 STANDARDS:

(a) Guideline for structural condition assessment of existing buildings, ANSI/ASCE II.

4401.3 DEFINITIONS:

AWNING: Any fixed rooflike structure, cantilevered, or otherwise entirely supported from a building or structure, so constructed and erected as to permit its being readily and easily moved within a few-minutes time to close an opening, or rolled or folded back to a position flat against the building or structure or a cantilevered projection thereof, or is detachable.

CANOPY: Any fixed rooflike structure not movable like an awning and which is cantilevered or in whole or in part self-supporting, but having no side walls or curtains other than valances not more than 18-inches deep. Lean-to canopies, fixed umbrellas and similar structures are included in this classification. Structures having side walls or valances more than 18-inches deep shall be classified as a building or a type of Construction set forth in Part V.

CANOPY SHUTTER: Any fixed rooflike structure which is movable like an awning and which is cantilevered or in part supported to the ground or construction below by removable columns or posts, but having no side walls or curtains other than valances not more than 18 inches deep and which is so constructed and erected as to permit its being readily and easily moved within a few minutes time to close an opening by folding back to a position flat against the building or structure when the building is unattended or act as a storm shutter during periods of high wind velocity.

CHICKEES: A thatched roofed structure, utilizing a wood pole type frame similar to those originated by the Seminole Tribe.

PRIMARY MEMBER: Structural framing members providing structural support to other members and/or surfaces of a structure including, but not limited to beams, posts, columns, joists, structural gutters and etc.

RIGID: Not flexible, as distinguished from fabric.

RIGID SUN SHADES: Any structure, cantilevered, or otherwise entirely supported from a building, so constructed and erected so as to permit it to be readily and easily moved within a few minutes time to open an enclosed area, or rolled back to an open position and serving to screen portions of a building from the sun and/or rain.

SCREEN ENCLOSURE: A building or part thereof, in whole or in part self-supporting, and having walls of insect screening and a roof of insect screening, plastic, aluminum, or similar lightweight material.

SECONDARY MEMBERS: Structural framing members which do not provide basic support for the entire

structure, generally including, but not limited to, such members as purlins, kickplate rail, chair rails, roof or wall pans and panels.

SELF-SUPPORTING: Supported to the ground or construction below by column or walls, but no cantilevered.

STRUCTURAL MEMBERS: Members or sections which provide support to an assembly and/or resist applied loads.

UTILITY SHED: Any building designed for storage of small equipment, tools and/or other miscellaneous items of use and which shall have maximum dimensions of 10' long x 10' wide and 7' high.

4402 PERMITS AND INSPECTIONS

4402.1 PERMITS:

(a) A permit shall be required as set forth in Chapter 3 herein for the construction, fabrication, installation, alteration or repair of any rigid awning, rigid sun shade, canopy or canopy shutter, screen enclosure or chickee.

EXCEPTION: Permits shall not be required for the repair or replacing of fabric or screening when the existing structural framework is not altered or removed and when such framework is in compliance with the requirements of this Code.

(b) Application for permit shall be accompanied by plans, and when required by the Building Official, such plans shall be prepared by and signed, dated and sealed by a Professional Engineer.

4402.2 INSPECTION: The permit holder shall request the Building Official to make a final inspection when the work is completed.

4402.3 POSTING: Structures designed to be readily removed or repositioned during periods of high wind velocity shall be posted with a permanent and legible and readily visible decal with instructions to the owner or tenant to remove or reposition the structure or part thereof during such periods of time as are designated by the U.S. Weather Bureau as being a hurricane warning or alert. Such permanent decal shall be in accordance with Paragraph 4402.3(a).

(a)A permanent decal shall consist of a contrasting label placed at the interior lower right corner (label shall face towards the interior of the space) that reads the following: **"WARNING: THIS IS NOT AN APPROVED HURRICANE PROTECTION DEVICE. DURING A HURRICANE, THIS PRODUCT MAY BECOME A HAZARD AND IT MUST BE ROLLED-UP TO AN OPEN POSITION."** The word **"WARNING"** shall be centered above the balance of the statement with the letter **"W"** in **"WARNING"** being 3/16" in height and the balance of the letters in "WARNING" being 1/8" high. The lettering in the balance of the statement shall be 3/32" in height. In addition to the aforementioned, each rigid sun shade shall bear a permanent label placed directly above the referenced warning label with the manufacturer's name or logo, city, state and the following statement: **"PRODUCT APPROVED".**

4402.4: In addition to items otherwise required by this Code, application for a building permit for a rigid sun shade shall be accompanied by a minimum of two copies of advice to customer letter signed by the buyer, explicitly stating the use and limitation of the rigid sun shade.

4403 DESIGN

4403.1 LOADS: Rigid awnings, rigid sun shades, canopies, canopy shutters and screened enclosures shall be designed to resist the loads set forth in Chapter 23 herein except that structures or parts thereof which are intended to be removed or repositioned during periods of high wind velocity shall be designed in their open or extended position to resist at grade velocity pressures not less than that based on 75 MPH wind with applicable shape factors and to resist not less than 15 pounds per square foot roof live load. Where such structure is intended to be folded or otherwise repositioned to close an opening when the building is unattended or act as a storm shutter the design in the closed position shall also comply with Chapters 23 and 35 of this Code. Utility

sheds at grade shall be designed to resist a wind load of not less than 15 pounds per square foot on the structure and resist not less than 15 pounds per square foot roof live load.

4403.2 ALLOWABLE STRESSES: The allowable stresses shall not exceed those set forth in this Code for the materials of construction.

4403.3 MATERIALS: Rigid awnings, rigid sun shades, canopies or canopy shutters located over public property shall be of incombustible materials unless specifically exempted by zoning regulations.

4403.4 SCREEN ENCLOSURES:

(a) (1) The maximum allowable deflection of roof supporting members shall not exceed the limits as set forth in Chapter 23.

(2) The top flange of these members shall be laterally supported by positive means of spacings not to exceed 40 times the flange width of the composite member and the entire structure shall be braced in the plane of the roof.

(b) Vertical members shall be designed to resist applicable axial and bending loads. Positive rational means shall be provided to transmit beam reactions to the columns and column loads to the footings.

(c) The supporting members of screens at grade having openings of less than 40 percent of the gross area shall be designed to resist the wind loads as required by Chapter 23. The supporting members of screens at grade having openings of 40 percent or more but not more than 60 percent shall be designed to resist 15 pounds per square foot wind load on the screen. The supporting members of screens at grade having openings of more than 60 percent shall be designed to resist 10 pounds per square foot wind load on the screen. The shape factors set forth in Chapter 23 shall be applied in all cases. The above is based upon utilizing a round spline that shall release the screen from the spline groove at the designated wind load, otherwise the supporting members for screen enclosures shall be designed in strict accordance with the provisions of ASCE 7 Chapter 23.

(d) Application for permit shall be accompanied by scaled drawings and, where required by the Building Official, shall be prepared by and signed, dated and sealed by a Professional Engineer. Drawings shall show a foundation plan, roof framing plan, all elevations, plot plan, properties and dimensions of members and, where required by the Building Official, computations of design.

(e) Screen enclosure walls shall be supported by a continuous concrete footing not less than 8 inches deep, by 8 inches wide and reinforced with one No. 5 continuous bar centered at the middle, or minimum 24 inch by minimum 24 inch by minimum 12 inch deep pads with three No. 5 bars each way at the bottom. The bottom of all footings and pads shall be a minimum of 6" below the finish grade. The vertical column members supporting beams and at all corners shall be attached to the foundation as required by rational analysis.

(f) Connections to existing walls or roofing systems shall be supported by specific calculations for each case to verify the ability of the existing building or structure to support the additional load. Screen enclosure roof framing members may be attached to a fascia at the end of rafter overhang only where such fascia is not less than a nominal two inches in thickness and the fascia is attached to each rafter with an anchor as required by rational analysis. An analysis of the existing structure to carry the enclosure loads shall be made.

(g) Aluminum structural members shall be not less than .055 inches in thickness with .006 inch tolerance. Tests to determine the physical properties of any alloy may be required by the Building Official. All structural aluminum members shall be visibly marked to indicate the alloy and heat treatment.

(h) Aluminum columns supporting aluminum roof beams shall be designed in accordance with Chapter 30 herein for both axial and bending wind, dead and live loads.

(i) The minimum bolt size shall be 3-inch diameter for any structural attachment and sheet metal screws may be used only where approved by the Building Official based on the result of tests.

(j) Reserved For Future Use.

(k) Sheet metal screws may be used only for connections of secondary members, except as set forth in Paragraph 4403.4(e). All Primary members shall be connected with bolts, pop-rivets or other positive connectors.

(l) Sheet metal screws may be utilized only in bearing and/or in shear in aluminum less than 0.090 inches in thickness. Any connections in tension shall be bolted, pop-riveted or secured with other positive connectors.

(m) All connection devices shall be rated by load testing by an approved testing laboratory or as listed in the Manufacturers Certified Published Data.

(n) All buildings and structures shall be designed to resist uplift. In the case of placement on existing slabs and foundations, sufficient information and calculations shall be provided by the Professional Engineer and or Architect to verify the ability of the slab or foundation to resist uplift loads.

(o) All connections shall be designed for positive fastening with a minimum factor of safety as required by the standards of this Code.

(p) All anchors shall be installed not less than 3 inches from the edge of a concrete slab or foundation unless designed by rational analysis. Expansion type anchors shall develop an ultimate withdrawal resisting force equal to a minimum four (4) times the imposed load. All cast-in-place anchor bolts shall develop an ultimate withdrawal resisting force equal to a minimum of three (3) times the imposed load.

(q) Cables shall not be permitted as required structural supports.

4403.5 UTILITY SHEDS:

(a) The foundations for utility sheds shall comply with the provisions of paragraphs 2403.4(c) and 2403.4(e) of this Code.

(b) The provisions of paragraphs 4403.4(a), 4403.4(b), 4403.4(d), 4403.4(I), 4403.4(j), 4403.4(k), 4403.4(l), 4403.4(m), 4403.4(n), 4403.4(o), 4403.4(p), and 4403.4(q) of this Code, shall be met by all utility sheds.

(c) One-half inch (2") diameter galvanized steel anchor bolts cast-in-place and embedded into the foundation a minimum of 4 inches with a minimum 5 inch 90 degree hook or an equivalent system may be used. Bolt placement shall not be closer than 2 inches or greater than 8 inches from each corner or wall, offset and spaced as required by rational analysis and/or test, but not greater than 18 inches on center. Each anchor bolt shall secure the bottom member with one washer, minimum 1 : inches in outside diameter.

4403.6 In fire Zones 1 and 2, chickees shall be limited to 800 square feet in total area of one structure or a cluster of smaller structures which will total 800 square feet. Height of building from finished grade to roof ridge shall not exceed 18 feet. The use of walls shall be limited to one side only with three sides being open. Said structure or cluster shall have a minimum separation of thirty feet from any other structure.

4404 LOCATION

4404.1 Rigid awnings, canopies or canopy shutters located over public property or such awnings or canopies located over private property shall be not less than seven feet above the grade directly below.

4404.2 No cantilevered portion of an awning, canopy or canopy shutter exceeding nine feet in projection shall extend over public property, nor shall any portion be closer than 18 inches to the curb line.

4404.3 Rigid canopies and canopy shutters, in whole or in part self-supporting, and screen enclosures shall comply with the zoning set-backs for buildings.

4404.4 All screen enclosures shall be constructed so that no part thereof will be under electric service conductors or other overhead electric wiring.

4404.5 Metal supported screen enclosures shall be grounded as required by Chapter 45 of this Code.

PART XI
ELECTRICAL
CHAPTER 45
ELECTRICAL

4501 ADMINISTRATION
4502 DEFINITIONS
4503 STANDARDS
4504 ELECTRICAL MATERIALS AND TYPES OF CONSTRUCTION
4505 PERMITS AND INSPECTIONS
4506 SERVICES, METER ROOMS AND ELECTRICAL EQUIPMENT ROOMS
4507 WIRING METHODS AND MATERIALS
4508 BRANCH CIRCUITS
4509 FEEDERS
4510 CONDUCTORS FOR WIRING
4511 TEMPORARY WIRING
4512 LOW VOLTAGE WIRING
4513 SPECIAL REQUIREMENTS
4514 SIGN INSTALLATIONS
4515 CLARIFICATIONS

4501 ADMINISTRATION

4501.1 TITLE: This Chapter shall be known as "The South Florida Electrical Code," and may be cited as such, or as the "Electrical Code."

4501.2 INTRODUCTION:

(a) SCOPE: This Chapter prescribes standards for materials used in the design and installation of electrical systems, equipment and wiring for construction as defined in Sub-section 4503.8 and regulated by this Code.

(b) PURPOSE: The purpose of this Electrical Code is to provide certain uniform minimum standards, regulations and requirements for safe and stable design, methods of construction and uses of materials in electrical wiring, apparatus or equipment used for all light, heat, power and low voltage systems and to secure the expressed intent for reasons of public safety.

(c) APPLICATION: Any work on electrical installations and every electrical system or device installed in new or existing construction shall conform to the requirements of this Code.

(1) Additions, alterations or repairs to existing electrical systems, apparatus or equipment in existing construction shall conform to the requirements of this Chapter to the extent required by Section 104 of this Code.

(2)A previously issued lawful electrical permit shall be valid under the terms of the Electrical Code under which it was issued.

(d) MAINTENANCE OR REPAIR: Electrical wiring, apparatus and equipment, and all installations for light, heat, power or low voltage systems as are required and/or regulated in this Electrical Code, shall be maintained in a safe condition and all devices and safeguards maintained in good working order.

Maintenance or repair that complies to Chapter 301(b)(2) shall be defined as the repair or replacement of

existing defective utilization equipment such as lighting fixtures, branch circuit devices, appliances and motors where the equipment is of the same current, power and voltage ratings. Branch circuit wiring between the utilization equipment and the required disconnecting means, within sight of the equipment; but not exceeding six feet in length between wiring devices shall be considered maintenance/repair, where the wiring method does not change.

Maintenance or repair work shall conform to the requirements of this Code. While it is not the intent of this Section to require a complete circuit to be changed to meet this Code, in no case shall maintenance or repair work be performed on any part of the circuit without insuring that the circuit provides for safety to both life and property. Any alteration or extension of the wiring system is not considered to be maintenance or repair.

All work shall be performed by qualified personnel, as defined by the Broward County Central Examining Board of Electricians.

4501.3 ELECTRICAL INSPECTORS:

(a) CHIEF ELECTRICAL INSPECTOR:APPOINTMENT, POWERS AND DUTIES:

(1) There shall be appointed by the appointing authority a person qualified to be certified in accordance with Sub-section 201.3 of this Code, and such person shall be herein termed Chief Electrical Inspector, construed to mean the Chief or Head of the Electrical Division.

(2) The Chief Electrical Inspector shall have the power to delegate powers and assignments to subordinate employees working under his authority.

(3) RIGHT OF ENTRY: Upon presentation of proper credentials, the Chief Electrical Inspector may enter, at any reasonable time, any building, structure or premises for the purpose of inspection or to prevent violations of this Electrical Code.

(4) STOP-WORK ORDERS: Whenever any electrical work is being done in violation of the provisions of this Electrical Code or is being installed in a manner that it would create a hazard to life or property, the Chief Electrical Inspector may order such work stopped or may order the violation corrected within a reasonable period of time, by notice in writing served on the person or persons engaged in the doing or causing of such work to be done. Such persons shall immediately stop such work until provisions have been made with the Chief Electrical Inspector to bring such work into compliance with this Electrical Code, at which time the Chief Electrical Inspector may allow the work to proceed.

(5) CONCEALED WORK: The Chief Electrical Inspector may order portions of a building structure to be exposed for inspection when, in his opinion, there is a good reason to believe that wiring or equipment concealed therein is in an unsafe condition, or that there is willful negligent concealment of a violation of this Electrical Code.

(6) OCCUPANCY: Whenever any building or portion thereof is being used or occupied contrary to the provisions of this Electrical Code, the Chief Electrical Inspector shall report such violation to the Building Official and the Building Official shall order such use or occupancy discontinued and the building or portion thereof vacated as set forth in Sub-paragraph 4501.3(a)(4) of this Code.

(b) ELECTRICAL PLANS EXAMINER, POWERS AND DUTIES:

(1) The powers and duties of the Electrical Plans Examiner shall be subject to the powers vested in the Board of Rules and Appeals as set forth in Sub-section 201.3 of this Code.

(c) POWERS AND DUTIES OF ELECTRICAL INSPECTOR:

(1) It shall be the duty of the Electrical Inspector to inspect all wiring, apparatus and equipment, and all installations for light, heat, power and low voltage systems and to enforce all the laws, rules and regulations relating thereto in the area of jurisdiction and to enforce all the provisions of this Electrical Code.

(2) The Electrical Inspector shall issue an Approval for all installations of light, heat, power and low voltage systems that comply with the rules and regulations of this Electrical Code. If defects, omissions or violations exist on any other part of the wiring system relating to work for which approval is requested, the issuance of the Approval shall be withheld until corrections have been made to the defective portion of the wiring system, and the same are made to comply with this Electrical Code.

(3)A 30-day temporary electrical service connection shall be approved by the Electrical Inspector, where the need for electrical power exists, if the wiring installation, apparatus or equipment is found to be in a safe operating condition. Under these circumstances, an application for temporary service shall be made in writing by the electrical contractor, firm, corporation, or owner requesting a temporary service connection to the public utility system or isolated generating plant.

(4) The Electrical Inspector is hereby empowered to inspect or reinspect any wiring, equipment or apparatus used in the installation of light, heat, power or low voltage systems and if this wiring, equipment, apparatus or low voltage system is found to be unsafe to life or property, the Electrical Inspector shall serve notice to the owner and/or operator, in writing, that the hazardous wiring or equipment exists and shall be corrected within a reasonable period of time.

(5) The Electrical Inspector is hereby given the power to disconnect extension cords, temporary wiring, branch circuits, feeder conductors or the main service supplying electrical energy to any portion of an electrical wiring system in buildings, or on premises, if this wiring is in the opinion of the Electrical Inspector, considered to be hazardous to life or property.Any person, firm or corporation supplying current, shall disconnect service from the source of supply upon instructions from the Chief Electrical Inspector where hazards are deemed to exist, after receiving written notice from the Electrical Inspector.

(6) The power and duties of the Electrical Inspector shall be subject to the powers vested in the Board of Rules and Appeals as set forth in Sub-section 201.3 of this Code.

4502 DEFINITIONS

4502.1 ELECTRICAL CONSTRUCTION: Shall be held to include and govern all work and materials used in installing, maintaining and/or extending a system of electrical wiring for the use of light, heat, power or low voltage systems, and all appurtenances, apparatus, or equipment used in connection therewith, inside of or attached to any building or structure, lot or premises.

4502.2 ELECTRICIAN: Shall be held to mean a person who is engaged in the trade or business of electrical construction, and who is qualified in accordance with the ordinance providing for the qualification and certification of construction tradespeople and maintenance personnel.

4502.3 LOW VOLTAGE SYSTEMS: Shall include fiber optics, telephone, television, communications, fire alarms, burglar alarms, computer systems, central vacuums and all other systems 77 volts and less, that are governed by Sections 402 and 4503 of this Code.

4503 STANDARDS

The following Standards are hereby adopted as set forth in Section 402 of this Code:

4503.1 Broward County Central Examining Board of Electricians, Jobsite Personnel, and Supervisory Requirements, Regulation 83-1.

4503.2 NATIONAL FIRE PROTECTION ASSOCIATION:

(a) Installation of Centrifugal Fire Pumps, N.F.P.A.20.

(b) The National Electrical Code, N.F.P.A. 70 (NEC).

(c) Electrical Safety Requirements for Employee Workplaces, N.F.P.A. 70E.

(d) National Fire Alarm Code, N.F.P.A. 72.

(e) Electrical Standard for Industrial Machinery, N.F.P.A. 79

(f) Standard for Health Care Facilities, N.F.P.A. 99.

(g) Standard for Emergency and Standby Power Systems, N.F.P.A. 110.

(h) Stored Electrical Energy Emergency and Standby Power Systems, N.F.P.A. 111.

(i) Standard on Aircraft Hangers N.F.P.A. 409.

(j) Classification of Class I Hazardous Locations for Electrical Installations in Chemical, Process Areas, N.F.P.A. 497A.

(k) Recommended Practice for the Classification of Class II Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, N.F.P.A. 497B.

(l) Classification of Gases, Vapors and Dusts for Electrical Equipment in Hazardous (Classified) Locations, N.F.P.A. 497M.

(m) Fire Safety Criteria for Manufactured Home Installations, Sites, and Communities, N.F.P.A. 501A.

(n) Recreational Vehicle Parks and Campgrounds, N.F.P.A. 501D.

(o) Installation of Lightning Protection Systems, N.F.P.A. 780.

4503.3 NATIONALLY RECOGNIZED TESTING LABORATORIES:

(a) American Gas Association. (AGA)

(b) Canadian Standards Association, (C.S.A.).

(c) ETL Testing Laboratories.

(d) Met Laboratories, Inc., Directory of Listed and Labeled Products.

(e) Underwriters Laboratories, Inc. (U.L.).

(1) U.L. Automotive, Burglary Protection, Mechanical Equipment Directory.

(2) U.L. Building Fire Resistive Directory.

(3) U.L. Building Materials Directory.

(4) U.L. Electrical Appliance and Utilization Equipment Directory.

(5) U.L. Electrical Construction Materials Directory.

(6) U.L. Fire Protection Equipment Directory.

(7) U.L. Gas and Oil Equipment Directory.

(8) U.L. Hazardous Location Equipment Directory.

(9) U.L. Marine Products Directory.

(10) Standard for Safety, Electric Signs, U.L. 48.

(11) Standard for Safety, Installation Requirements for Lightning Protection System, U.L. 96A.

(12) Standard for Safety, Portable Electric Lamps, U.L. 153.

(13) Standard for Safety, Household, Electric Storage Tank Water Heaters, U.L. 174.

(14) Standard for Safety, Manufactured Wiring Systems, U.L. 183.

(15) Standard for Safety, Single and Multiple Station Smoke Detectors, U.L. 217.

(16) Standard for Safety, Smoke Detectors, Photoelectric, U.L. 268.

(17) Standard for Safety, Smoke Detectors for Duct Application, U.L. 268A.

(18) Standard for Safety, Grounding and Bonding, U.L. 467.

(19) Standard for Safety, Heat Detectors for Fire Protective Signaling Systems, U.L. 521.

(20) Standard for Safety, Single and Multiple Station Heat Detectors, U.L. 539.

(21) Standard for Safety, Household Fire Warning Systems Units, U.L. 985.

(22) Standard for Safety, Fluorescent Lighting Fixtures, U.L. 1570.

(23) Standard for Safety, Incandescent Lighting Fixtures, U.L. 1571.

(24) Standard for Safety, High-Intensity Discharge Lighting Fixtures, U.L. 1572.

(25) Standard for Safety, Stage and Studio Lighting Units, U.L. 1573.

(26) Standard for Safety, Track Lighting Systems, U.L. 1574.

(27) Standard for Safety, Smoke Detector Monitors and Accessories for Individual Living Units of Multifamily Residences and Hotel/Motel Rooms, U.L. 1730.

(28) Standard for Safety, Low Voltage Landscape Lighting Systems, U.L. 1838.

(29) Standard for Safety, Single and Multiple Carbon Monoxide Detectors, U.L. 2034.

(f) Wyle Laboratories

4503.4 Regulations for Grounding of Portable Electric Equipment, F.I.C. 8AS-2.

4503.5 STATE OF FLORIDA:

(a) Agency For Health Care Administration (A.H.C.A.)

(1) Ambulatory Surgical Centers, Rules 59A-5

(2) Hospitals, Rules 59A-3

(3) Nursing Homes, Rules 59A-4

(b) Hotel and Restaurant Commission regulations applicable to emergency lighting, Florida Statutes 509.221(5)(g) and 509.221(b).

(c) Energy Efficiency Code for Building Construction.

4503.6 TESTING LABORATORIES, (APPROVED S.F.B.C. ONLY)

(a) Applied Research Laboratories.

4504 ELECTRICAL MATERIALS AND TYPES OF CONSTRUCTION

4504.1 No electrical materials, devices or appliances designed for attachment to, or installation in any electrical circuit nor any system for light, heat, power or low voltage shall be installed, used, sold, or offered for sale in the area of the jurisdiction of this Electrical Code, unless they are in conformity with the approved methods of construction for safety to life and property required by this Electrical Code.

4504.2 Conformity of electrical materials, devices or appliances with the Standards of Underwriters Laboratories, Inc. shall be held to mean that these materials are included in a published list of electrical materials or equipment distributed by Underwriters Laboratories, Inc. and complying with the Standards approved by the American National Standards Institute. (ANSI).

4504.3 Electrical material, devices, appliances and equipment that are sold or offered for sale or use in the area of jurisdiction of this Electrical Code shall bear all markings that are required by the Standards set forth in Section 4503 of this Electrical Code.

4504.4 The types of construction, materials or methods of design referred to in this Electrical Code shall be considered as Standards of Quality. New types of construction, materials or methods of design shall be at least equal to these Standards for the corresponding use intended.

4504.5 Any person desiring to use a type of construction, material(s) or method(s) of design not specifically

mentioned in this Electrical Code shall file with the Chief Electrical Inspector authentic proof in support of claims that may be made regarding the sufficiency, and request approval and permission for use. The Chief Electrical Inspector shall approve such alternate(s) if it is clear that the Standards of the Electrical Code are at least equaled. If, in the opinion of the Chief Electrical Inspector, the Standards of this Electrical Code will not be satisfied by the requested alternate, the Chief Electrical Inspector shall refuse approval.

4504.6 The provisions of this Electrical Code are not intended to prevent the use of type of construction, materials or methods of design as an alternate to the Standards herein set forth, but such alternates shall be offered for approval, and their consideration shall be as set forth in Section 4504 of this Code.

4504.7 Any person whose request for alternate types of construction, material(s) or method(s) of design has been refused by the Chief Electrical Inspector, or any person who believes the Electrical Inspector is incorrect in approving or disapproving any electrical installation under this Electrical Code may appeal to the Board of Rules and Appeals. This request shall be in writing and shall be transmitted to the Secretary of the Board of Rules and Appeals.

4504.8 Assemblies of Materials/Equipment such as custom made equipment and wiring without a recognized label shall consist of listed components. They shall be wired and assembled in accordance with the applicable codes and they may be inspected for compliance with the minimum code as certified by a Registered Professional Engineer.

4505 PERMITS AND INSPECTIONS

4505.1 GENERAL:

(a) PERMITS REQUIRED: It shall be unlawful to perform or commence any installation of light, heat, power or low voltage systems either permanent or temporary wiring, or to make extensions and/or changes to existing installations of light, heat, power or low voltage systems, upon premises, inside, outside and/or attached to buildings or structures of any character without having filed an application and obtained an electrical permit therefore from the appropriate Electrical Division.

(b) APPLICATIONS: Applications for permit will be accepted only from qualified persons or firms. Qualifications of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradespeople.

(c) SPECIAL CONDITIONS: GROUP APPLICATIONS for permit will be accepted only from qualified persons or firms. Qualifications of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradespeople. This group application shall be used for utility owned equipment. (i.e. FP&L ON CALL PROGRAM)

(1) The number of jobs shall be stated on group application to the inspecting authority, not to exceed 25. The inspecting authority has the right to refuse group applications if their current workload cannot cope with additional demand.

(aa) Group application to inspecting authority shall provide the following information: Name, address and telephone number of customer.

(2) Within 15 days the electrical contractor shall submit to the inspecting authority a list of customer's jobs installed and ready for inspection, which shall include the following:

(aa) Name, address and telephone number of customer.

(bb) Type of work to be inspected. (i.e. FP&L ON CALL PROGRAM — Water Heater)

(cc) Certificate of Competency number for journeyman electrician or employee number. If employee number is used, a master list with employee numbers and Certificate of Competency number for journeyman electricians shall be filed with the Chief Electrical Inspector of the inspecting authority.

4505.2 PLANS AND SPECIFICATIONS:

(a) GENERAL REQUIREMENTS

(1) Plans and specifications completely describing all proposed electrical work shall be submitted to the Electrical Plans Examiner at the same time application is made for a building permit. Plans shall be mechanically reproduced prints on substantial paper, drawn to scale except that an isometric or riser diagram need not be to scale. Designated Electrical Equipment Rooms and Meter Rooms shall be drawn at a minimum scale of ¼" = 1':0".

(2) DESIGN OF POWER SYSTEMS:

(aa) Electrical documents applicable to power systems shall at a minimum indicate the following:

(1) System Riser Diagram

(2) Conductor sizes and insulation type

(3) Protective devices and interrupting capability

(4) Main and distribution panelboard locations and sizes

(5) Circuitry of all outlets and devices

(6) Short circuit analysis

(7) Load computations

(8) Electrical legend

(9) Grounding and bonding

(10) Instrumentation control

(11) Load schedule for each panel

(3) DESIGN OF LIGHTING SYSTEMS:

(aa) Electrical documents applicable to lighting systems shall, at a minimum indicate the following:

(1) Lighting fixture performance specifications and arrangements

(2) Emergency Lighting

(3) Exit Lighting

(4) Lighting control and circuiting

(4) DESIGN OF GROUNDING SYSTEMS:

(aa) Electrical documents applicable to grounding systems shall indicate at a minimum the following:

(1) Type and location of grounding electrodes

(2) Bonding requirements

(3) Testing requirements

(4) Conductor material type, size and protection requirements

(5) Separate grounding systems, properly bonded, per Code and use requirements.

(b) PROFESSIONAL DESIGN REQUIREMENTS

(1) Plans and specifications for new construction requiring an aggregate service capacity of more than 600 amperes or more than 240 volts on residential or more than 800 amperes or more than 240 volts on commercial or industrial or an electrical system having a value greater than $50,000.00 or any electrical system(s) for an assembly area having an area greater than 5,000 square feet or a fire alarm and/or security alarm system(s) which cost more than $5,000.00 shall be prepared by and signed, dated and bear the impress seal of a

Professional Engineer who is competent in this field of expertise.

(2) Plans and specifications for construction requiring an aggregate service capacity not over 600 amperes at a maximum of 240 volts phase to phase, either single or three phase on residential or not over 800 amperes at a maximum of 240 volts phase to phase, single phase or three phase on commercial or industrial or an electrical system having a value of $50,000.00 or less or any electrical system(s) for an assembly area having an area of 5,000 square feet or less or a fire alarm system(s) with a cost of $5,000 or less may be designed by a Master Electrician, licensed in Broward County or certified by the State of Florida, provided the plans and specifications prepared by the Master Electrician bear the certificate of competency number and the notarized signature of the license holder, or by an Architect or Professional Engineer. All plans and specifications prepared by an Architect or a Professional Engineer pursuant to the requirements of this Chapter shall be signed, dated and sealed by the respective Architect or Professional Engineer who prepared such plans and specifications.

(c) APPROVAL: The Electrical Plans Examiner shall examine all plans and, if the proposed electrical work shown thereon complies with the Electrical Code, he shall mark the plans "Approved".

4505.3 PERMIT FEES: Any person desiring an electrical permit to be issued shall, in addition to filing an application therefore, and before such permit is issued, pay a permit fee if required.

4505.4 CONDITIONS OF PERMIT: The installation of the wiring, apparatus or equipment for light, heat, power or low voltage systems within or attached to any building or premises, whether for private or public use shall be done in accordance with the approved plans and specifications. Any changes or omissions in the wiring system from that shown on the approved plans prepared by an Electrical Contractor shall be approved by the Electrical Plans Examiner and the request for approval of such change shall be made by the permit holder, approved by the owner or his representative, in the form of plan revisions submitted to the Electrical Plans Examiner setting forth the changes and accepting the responsibilities for the changes.

Any changes or omissions in the wiring system from that shown on the approved plans prepared by an Architect and/or Professional Engineer shall be approved by the Electrical Plans Examiner and the request for approval of such changes shall be made by the permit holder, approved by the Architect of Record and/or Professional Engineer of Record, in the form of plans revisions submitted to the Electrical Plans Examiner setting forth the changes and accepting responsibility for the changes.

These changes shall be submitted and approved before the next mandatory inspection request is made.

4505.5 INSPECTIONS:

(a) Requests for all inspections required in Paragraph 305.2(a) Electrical of this Code shall be made to the appropriate Electrical Division at least one day prior to the required inspection. The request for inspection shall be made by the person, firm or corporation installing the wiring. Failure to request such inspections constitutes a violation of this Electrical Code.

It is assumed that the qualifying agent or the Electrician for the qualifying agent, as defined in Sub-section 4502.2 of this Code, has already inspected this job for Electrical Code and plans compliance before requesting an inspection. It is the responsibility of the permit holder to insure that the job is accessible for all requested inspections. Failure to provide for this access shall constitute a violation of this Electrical Code.

(b) The Electrical Inspector shall inspect all work for which a request for inspection is made and shall, after inspection, either approve by signing the appropriate sections of the building permit card or inspection record or disapprove the work and notify the permit holder of the discrepancies found and order corrections within a reasonable period of time. Violations shall be written and posted at the job site stating the Electrical Code Section(s), Sub-section(s), Paragraph(s) and/or Sub-paragraph(s) that have been violated.

(c) Any person, firm or corporation who fails to correct defective work within ten days after having been duly notified of such defects shall not be issued any further permits by the Electrical Division. Permits will resume after the defects have been corrected, inspected and approved or upon the filing of an appeal with the Board of

Rules and Appeals.

(d) It shall be unlawful for any person, firm or corporation, or their agents or employees, to cover or conceal any wiring for light, heat, power or low voltage systems until the appropriate Sections of the building permit card and/or inspection record are signed, signifying that the wiring has been inspected and approved.

(e) Inspections for special conditions Sub-section 4505.1(c) Electrical Contractor shall be responsible to notify customer with card furnished by utility of record.

(1) Customer card shall have permit number, jobsite address and telephone number of inspecting authority.

(2) Customer upon receiving customer card shall be responsible for calling the inspecting authority and scheduling an electrical inspection within 15 days from time of completion of work performed.

(3) All jobs shall be inspected by inspecting authority that issued the permit. Upon approval of work performed Electrical Inspector shall sign permit card.

4505.6 ENERGIZING SYSTEMS: It shall be unlawful for any person, firm or corporation to energize any wiring system or portion thereof until the electrical work has been inspected and approved and the responsible person, firm or corporation is authorized by the appropriate administrative authority to energize the system.

4506 SERVICES, METER ROOMS AND EQUIPMENT ROOMS

4506.1 SERVICES:

(a) SERVICE DROPS:

(1) Service drop conductors or other overhead wiring shall not be installed over any part of any screened roof.

(2) No overhead service drop shall be within 10 feet horizontally of the water's edge of the swimming pool.

(b) SERVICE MASTS:

(1) The minimum size of rigid steel conduit or intermediate metal conduit (I.M.C.) used for a service mast shall be 2" in diameter and shall extend not less than 2' above the roof and not more than 38" above the last point of support. Where the mast extends to a clearance of more than 38" above the roof, adequate supports shall be provided.

(2) There shall be no coupling above the last point of support.

(3) Where service masts or other electrical conduits penetrate a roof, these penetrations shall be sealed as required by Paragraph 3407.9(a) of this Code.

(c) TEMPORARY SERVICES:

(1) Temporary services for construction shall be installed on a substantially erected pole, braced or guyed to withstand the strain of the service-drop cable.

(2) Where permission is obtained from the Chief Electrical Inspector, for construction of single family dwellings, a temporary service may be mounted on the building that it serves. It shall also be permitted to use the permanent service for temporary power providing the interior panel feeders have been disconnected at the service and ground fault protected receptacles are installed for temporary construction.

(3) Electrical Inspectors are empowered to disconnect immediately and without notice any temporary service used to supply ungrounded equipment or equipment without the proper overcurrent protection.

(d) STORES AND WAREHOUSE SPACES: The raceway for the service of a store or warehouse space shall not be less than one and one-quarter inch trade size.

(e) GROUNDING ELECTRODES: For all new construction, a grounding electrode as defined by the NEC,

N.F.P.A. 70, Section 250-81(c) shall be made available by installing steel reinforcing bars in the foundation so that it is available for connection to the grounding electrode conductor. The grounding electrode conductor shall be installed from the service equipment to a supplemental ground rod and finally terminate at the foundation steel. The grounding electrode connection to the foundation steel shall be inspected before the foundation is poured.

(f) DISCONNECTING MEANS: Dwelling units without Meter Rooms or Electrical Equipment Enclosures shall have outside disconnecting means.

(g) TRANSFER SWITCHES: Buildings with separate services, but that share a common emergency system, shall be served with transfer switches that conform to NFPA-70 (NEC).

4506.2 METER ROOMS — SPECIAL REQUIREMENTS

(a) All buildings equipped with seven or more meters shall be provided with one or more Meter Room(s). For those buildings equipped with less than seven meters, a Meter Room is not required.

(b) Electrical Meter Rooms, where provided, shall be not less than four feet by six feet by seven feet high. These dimensions shall be increased where necessary to provide working clearances as required by the National Electrical Code, NFPA-70 (NEC).

EXCEPTION: In residential occupancies where conditions exist that preclude the use of Meter Rooms as described in Sub-paragraph 4506.2(b), the use of an approved Electrical Equipment Enclosure shall be permitted. However in no case shall this enclosure be of smaller size dimensionally than is required to safely house all electrical equipment intended, with the doors locked open, and maintain proper clearance requirements as set forth elsewhere in this Code.

4506.3 GENERAL REQUIREMENTS FOR ELECTRICAL METER ROOMS, ELECTRICAL EQUIPMENT ROOMS AND ELECTRICAL EQUIPMENT ENCLOSURES: Electrical Meter Rooms, Electrical Equipment Rooms and Electrical Equipment Enclosures where provided, shall be as follows:

(a) All Meter Rooms, Electrical Equipment Rooms and Electrical Equipment Enclosures shall be ventilated as required by NFPA-70 (NEC).

(b) There shall be no storage in a Meter Rooms, Electrical Equipment Rooms or Electrical Equipment Enclosures and a durable, waterproof sign with letters not less than seven-sixteenths of an inch high shall be mounted on the outside of the door reading:

ELECTRICAL ROOM, NO STORAGE PERMITTED

(c) The construction of Meter Rooms, Electrical Equipment Rooms, and Electrical Equipment Enclosures shall be of the same material as that of the buildings served and walls and ceilings shall be of not less than one-hour fire-resistive construction including that part of the wall behind any panelboard, except that for buildings of Type I, II, III and IV construction the walls shall be of incombustible materials.

(d) Each main shall be permanently identified by numbers providing both numerical order and the total number of mains.

(e) Exit doors for the Meter Rooms, Electrical Equipment Rooms and Electrical Equipment Enclosures shall swing out a minimum of 90 degrees and shall have no obstruction in front of the exit.

(f) Separately metered conductors shall not be installed in the same raceway, except in load gutters in the Meter Rooms and Electrical Equipment Enclosures that contain service equipment. Said gutters shall contain only metered conductors.

4507 WIRING METHODS AND MATERIALS

4507.1 Non-metallic-sheathed cable shall be prohibited from all installations other than residential occupancies as permitted by the NFPA-70 (NEC) and temporary wiring for construction.

4507.2 Aluminum conduit, boxes, cabinets, fittings and support hardware may be installed in the earth or in

concrete only where protected by factory-applied P.V.C. coating not less than 40 mils in thickness.

4507.3 Galvanized Electrical Metallic Tubing (E.M.T.) shall not be used outdoors above grade east of the Florida East Coast Railroad Tracks. Electrical Metallic Tubing, where used within the jurisdiction of this Electrical Code, shall not be installed under ground floor slabs, in contact with the earth or utilized for roof penetrations. An approved protective coating shall be provided at all locations where the EMT penetrates the concrete, for a distance of 6 inches on each side of the penetration.

4507.4 Cut-nails shall not be used for securing boxes, panels, or similar items in place.

4507.5 Where 120 volt smoke detectors are installed in residential occupancies, they shall be installed ahead of all switches and shall be connected to bathroom or kitchen lighting circuits. Smoke detectors shall comply with the requirements of Sub-sections 305.2, 3127.1 and 3127.2 of this Code.

EXCEPTION: In existing buildings, smoke detectors may be connected to a lighting circuit or to a general receptacle circuit within the same dwelling unit, provided the smoke detector shall not be subject to loss of power by a switch or switches.

4507.6 ONE AND TWO FAMILY DWELLINGS: One branch circuit panelboard in new construction shall have a minimum of two (2) extra spaces to provide for one (1) 208 or 240 volt fuses or circuit breakers for future use.

4507.7 Each ballast and/or auto-transformer shall be provided with overcurrent protection on the primary side, either self-contained or by any other approved method.

4507.8 Rigid Nonmetallic Conduit (PVC) shall be restricted from use in parking garages as provided in Sub-paragraph 1102.2(c)(6) of this Code.

4507.9 Flexible watertight raceway shall be required for weather-proof flexible conduit where flexibility is needed.

4507.10 Short-radius ells, often referred to as "telephone ells" shall not be used in a run of concealed conduit.

4508 BRANCH CIRCUITS

4508.1 RANGES:

(a) The wiring for all electric ranges over 8 Kilowatt shall be a minimum of 50 amperes to an approved receptacle located within three feet of the range. For ranges of 8 Kilowatt rating or less, conductors shall have an ampacity of at least 40 amperes. When the oven unit is separate from the surface unit, each unit shall be on a supplied by a separate circuit, served with conductors that have an ampacity of not less than 30 amperes. An approved method of connection shall be provided for each unit. A range as referred to above shall be a complete cooking unit, consisting of both oven and surface burners.

(b) Single-family and multiple-unit residential occupancies of 800 square feet or more in area per unit, where electric ranges are to be used, shall be wired for ranges rated at not less than 12 kilowatts.

(c) Where such units are less than 800 square feet in area, range name plates shall be specified on the construction plans.

4508.2 KITCHENS:

(a) Refrigerators and/or freezers of more than 5.0 cubic feet shall each be supplied from an independent circuit in all new construction and alterations to existing construction at the refrigerator and/or freezer location.

4508.3 The wiring for all water heaters shall be with a minimum wire capacity of 20 amperes. Water heaters of 1000 watts or over shall be on a separate circuit. Points of electrical connections for heaters and replacement of elements shall be accessible.

4508.4 The maximum number of 120 volt outlets permitted per circuit in residential occupancies shall not exceed the provisions of TABLE 4508.4.

TABLE 4508.4
MAXIMUM NUMBER OF
OUTLETS PER CIRCUIT FOR RESIDENTIAL OCCUPANCIES

Light outlets	12	11	10	9	8	7	6	5	4	3	2	1	0
Receptacles	0	0	1	1	2	2	3	3	4	4	5	5	6

4508.5 In common or public areas such as, but not limited to, places of assembly, lobbies and parking garages in residential condominium, townhouse and apartment complexes, the minimum size branch circuit conductors shall be not less than 20 amperes.

4508.6 The minimum size of branch circuit conductors for residential condominium, townhouses and apartment complex outdoor parking area illumination shall be not less than 20 amperes.

4508.7 At all areas of commercial or industrial occupancies, a minimum of 20 amperes per branch circuit shall be provided.

4508.8 LAUNDRY:

(a) Where more than one washing machine is required by this Code in Sub-section 4613.19(m) Footnote No. 1, electric outlets shall be provided for clothes dryers based on one dryer per two washing machines or fraction thereof.

(b) When laundry space is provided, a 20 ampere 120 volt, 1500 watt circuit and receptacle for the washing machine and a 30 ampere 120/208 or 120/240 volt 5,000 watt circuit and receptacle for the dryer shall be provided.

4509 FEEDERS:

4509.1 All feeders in inaccessible locations in new construction, shall be in a raceway.

4509.2 Where residential electrical services are changed and there is an existing feeder that consists of Service Entrance Cable without an insulated neutral, the feeder shall be changed out and an approved wiring method used.

4509.3 Raceways for feeders for individual stores or warehouse spaces shall not be less than one and one-quarter inch trade size.

4510 CONDUCTORS FOR WIRING

4510.1 Color coding for all service entrance, feeder and branch circuit conductors shall be as follows:

(a) For 120/208 volt and 120/240 volt systems:

(1) Three-wire systems: one black, one red and one white neutral.

(2) Four-wire systems: one black, one red, one white neutral and one blue.

(b) For 240/480 and 277/480 volt systems:

(1) Three-wire systems: The colors shall be one brown, one yellow, and one gray neutral.

(2) Four wire systems: The colors shall be one brown, one orange, one gray neutral and one yellow.

(c) All conductors of the same color shall be connected to the same phase feeder conductors throughout the electrical system.

EXCEPTION: Switch legs and travelers for three and four way switches.

4510.2 All conductors for circuits rated 60 amperes and less shall be copper or copper-clad aluminum.

4510.3 All aluminum building wire shall be AA 8000 Series Alloy Conductor. All aluminum building wire shall be terminated or spliced with compression-type fittings (screw-type fittings of any type are prohibited).

4511 TEMPORARY WIRING

4511.1 All temporary electrical installations for carnivals, circuses, exhibitions, fairs, shows, tents and the like, regardless of the manner in which the electricity is generated or supplied, shall be maintained in a safe and serviceable condition.

4511.2 A qualified licensed electrician shall be required to patrol these temporary installations where considered necessary by the Chief Electrical Inspector for safety to life or property, or, the disconnect switches, except emergency circuits, may be locked in the "off" position.

4511.3 All stairways and parts of buildings under demolition, erection, or repair shall have adequate lighting, while persons are engaged in work, as set forth in Section 3318 of this Code.

4512 LOW VOLTAGE WIRING

4512.1 All permanent low voltage wiring installed outdoors shall be in an approved raceway.

EXCEPTION: Telephone, cable television and satellite dish lead-in cables.

4512.2 Low voltage systems shall conform to the Standard set forth NFPA-70 (NEC) and where the wiring is inaccessible, said wiring shall be enclosed in raceways.

EXCEPTION: Low voltage wiring in residential occupancies not exceeding three floors above grade shall not require raceways.

4512.3 Swimming Pool Lighting Fixtures: Underwater wet niche and no-niche lighting fixtures shall be of the type for use with 15 volts or less.

4512.4 Fire Alarm or similar systems which are designed and installed for safety to life and property, shall be installed by a qualified person regardless of voltage or amperage, and permits shall be obtained for such installations. Alterations and additions to existing Fire Alarm or similar systems shall comply with this Sub-section of this Electrical Code.

4513 SPECIAL REQUIREMENTS

4513.1 Any ceiling fan installed lower than seven feet from the floor to the bottom of the blades shall be provided with an approved protective guard enclosing such blades.

4513.2 Electrical systems including all light, heat, power and low voltage systems shall not be run through the interior of a Trash Room where the systems would be subject to fire damage.

EXCEPTION 1: Where these systems are enclosed in a two hour chase.

EXCEPTION 2: Those electrical devices which service the Trash Room only.

4513.3 COVES: Construction of coves for indirect light shall provide the following minimum dimensions for installation and maintenance:

(a) Minimum vertical depth, fourteen and one-half inches from ceiling.

(b) Minimum horizontal width for one tube, four and one-half inches (add two inches to width for each additional tube).

(c) Minimum lip or face of cover, four and one-half inches, to provide ten inches of free working space from the top of the lip to ceiling.

4513.4 STRUCTURAL MEMBERS:

(a) Conduit raceway and tubing embedded in concrete shall be as set forth in Sub-section 2507.3 of this Code.

(b) Cutting of holes in pre-cast concrete members shall be limited to the provisions of Sub-section 2509.8 of this Code.

(c) Cutting of holes in steel members shall be limited to holes spaced not less than the depth of the member, not larger than one-sixth of the depth of the member and shall be located in the middle one-third of the member. Chapters 24 and 28 of this Code shall be strictly adhered to.

(d) Notching or boring of wood members shall be limited to the provisions of Chapter 29 of this Code.

(e) Where electric ceiling outlets, or other openings, pierce a ceiling that is part of a fire-resistive assembly, such outlets or other openings shall comply with Sub-section 3703.6 of this Code.

4513.5 ISOLATION OF PIPING: Conduit and tubing shall be isolated from water service and distribution pipe, soil pipe, gas pipe and tubing, process piping and other building materials where electrolysis and damage by friction and abrasion may be anticipated except where electric ground is required by this Code.

4513.6 METAL BUILDINGS: All metal frame and metal clad buildings or portions thereof that may become energized and are subject to personal contact shall be grounded.

4513.7 ELEVATORS: Elevators, where provided, shall be supplied with light and power and arranged for Fire Department emergency use as set forth in Section 3112 and Sub-section 3204.2 of this Code.

4513.8 EXTERIOR INSTALLATIONS: All electrical equipment, piping and conduit shall meet the requirements of Chapter 23 and Section 3409 of this Code as applicable.

EXCEPTION: All permanently mounted rooftop electrical piping or conduit shall be installed with a minimum clearance between the roof surface and the bottom side of the electrical piping or conduit, of three and one-half inches. Maximum horizontal distance of twelve inches shall be maintained for all electrical piping and conduit ran adjacent to one piping or conduit. Minimum spacing between racks of piping or conduit shall be three feet.

4513.9 FIRE PUMPS: Electrical installations for fire pumps shall be as set forth in Sub-section 3804.4 and Sections 5108 and 5109 of this Code and with NFPA-20.

4513.10 Illumination of Means of Egress and Emergency Lighting shall be as set forth in Sections 3112 through 3123 of this Code and shall comply with NFPA 101.

4513.11 Exit Signs and Marking of Means of Egress shall be as set forth in Sections 3112 through 3123 of this Code and shall comply with NFPA 101.

4514 SIGN INSTALLATIONS

4514.1 EXTERIOR SIGN INSTALLATIONS:

(a) See Section 4202 of this Code for all required inspections.

(b) (1) Minimum ¼" drain holes shall be provided in transformer enclosures and junction boxes exposed to the weather, and such holes shall be de-burred to prevent accumulation of water within the enclosure.

(2) Transformer enclosures shall be mounted securely to the parapet wall.

(3) Transformer enclosures, racks or frames shall be of sufficient strength to securely hold the weight of the transformer or transformers.

(4) Where transformer enclosures are mounted on the roof they shall be elevated at least eight inches above the roof and the lid shall be placed upward.

(5) Combustible material shall not be used for mounting, supports, or to elevate transformers, or transformer enclosures.

(6) Masonry bricks are acceptable for such support where properly strapped or attached.

(c) Tubulation glass and No. 14 bare wire shall not be used except as follows:

(1) Short jumpers between neon units on wall signs and channel letters and on flat wall signs where the use of conduit or electric metallic tubing would disfigure the face of the building.

(2) Insulators shall be all glass and at least one and one-half inches long, spaced not more than 24 inches

apart, minimum 2 per neon unit.

(3) (aa) Open conductors and tubing of sign shall not be installed on any wood or combustible surfaces.

(bb) Open conductors and tubing of the sign shall not be installed on the roof side of the parapet or on top of any roof or parapet.

(4) Conductors and neon tubing shall maintain a height of at least eight feet from the ground, and shall not be installed on walls where they can be reached from platforms, balconies, fire-escapes or through windows, doors or other similar openings. Neon below 8' shall be enclosed to prevent direct contact with neon tube.

EXCEPTION: Where outdoor signs are totally enclosed so that ready accessibility is prevented and signs that totally insulate all connecting terminals, the eight foot height requirement shall not apply.

(d) All metal raceways shall be grounded in a manner which complies with the grounding regulations contained in the Standard set forth in Paragraph 4503.2(b) herein.

(e) (1) Each sign shall have a disconnect switch located visibly on the exterior of the sign as well as 1 disconnect switch mounted on transformer can when installed in a remote location. A minimum of 1 disconnect switch for each circuit.

(2) The rating of such switches shall comply with the Standard set forth in Sub-section 4503.8 herein.

(f) Metal boxes shall be bonded together so they will be suitably and properly grounded when used to house electrodes, transformers or other apparatus used in connection with both primary and secondary circuits for neon lighting.

(g) Lighting of signs shall also comply with Sections 4209 and 4210.

4514.2 HIGH VOLTAGE WIRE:

(a) (1) All isolated runs of electric metallic tubing enclosing high-voltage wiring shall be grounded regardless of length.

(2) Conductors which run from the grounded mid-point terminal of a neon transformer shall be 15,000 volt GTO wire.

(3) Wire from the mid-point of transformers shall be installed in metallic raceway, liquidtite, approved non-metallic raceway with a bonding wire or other approved raceways.

4514.3 NEON TRANSFORMERS:

(a) When tubes are removed for repairs, jumpers shall be installed in high-voltage wire, supported with the same clearance as tube, but the jumpers must be removed within seven days.

(b) Only window-type and portable transformers may be plugged in and all other transformers shall be permanently connected with an approved method of wiring.

4514.4 INTERIOR WINDOW SIGNS AND WINDOW-BORDER LIGHTING:

(a) Window-type sign-transformers shall be especially designed for use with window signs unless such signs are installed in compliance with this Sub-section.

(b)(1) Such signs shall be designed and installed to form a complete unit and so that the frame carries the entire weight of the sign.

(2) Such frames shall be fastened to the sill or other part of the window so that the neon tubing carries none of the weight of the sign. Frames shall have a minimum of 2 safety bumpers with a minimum length of 3 inches.

(c)(1) Transformer wires feeding window signs shall be in an approved raceway from transformer enclosure to the bottom of the ceiling.

(2) Electrodes on window signs which connect tot he transformer wires shall be designed and placed so that such wires drop straight and may be readily covered by straight glass sleeves of sufficient size, and that jumps from one electrode to another electrode shall be of one piece construction without splices.

(d) Transformer wires shall not be supported by or in contact with any combustible material.

(e) (1) Secondary wiring systems shall be installed in metallic raceway, liquidtite, approved non-metallic raceway with a bonding wire or other approved raceways.

(2) Other approved means may be used where special permission is obtained from the Chief Electrical Inspector.

(f) (1) Neon window borders below 8' from grade will require a minimum of 3/16" polycarbonate (i.e. LEXAN) cover eliminating the possibility of direct contact with neon.

(2) Neon borders installed on metallic mullions shall be bonded.

(g) Approved type of connectors or solder must be used on all secondary connections.

4514.5 INTERIOR NEON OR COLD CATHODE LIGHTING:

(a) Approved housings and fittings shall be used on all interior series neon or cold cathode lighting and interior window border lighting, regardless of the milliampere rating of the transformer or color of the tubing.

(b) Neon transformers with a rating over 60-milliamperes are not approved for exposed exterior neon or cold-cathode tubing.

(c) (1) Transformers, cans, shall be clearly marked with voltage, amperes and manufacturer.

(2) Transformers, cans, shall be clearly marked danger high voltage in 1" high red letters.

(3) Minimum residential height of 8' or in an accessible cove space.

4515 CLARIFICATIONS

4515.1 Columns having a diameter of 2 feet or more (610mm or more) wide shall be considered wall space in dwelling units. Therefore, receptacle outlet shall be required.

4515.2 The requirements for a permanently installed swimming pool and spa combination need not be more restrictive than those of a swimming pool, when the permanently installed spa which has common filtered water from the shell area encompassing both the swimming pool and spa.

4515.3 The use of galvanized tie-wire is only to secure not support, the running of raceways in construction. Example, above and below bar-joists.

4515.4 The State Accessability Code requires the height of essential switches and controls to be located between 42 and 52 inches from the floor.

The height of fire alarm pull stations falls under this category, and therefore, must be between 42 and 52 inches from the floor.

4515.5 When junction boxes for future paddle fans, or lights, do not have a fan or a light mounted on same; a blank cover is permissible. No fixture of any kind will be required to cover these junction boxes.

4515.6 Inspectors utilizing correction notices ("red tags"), for violations or corrections to work in progress, shall indicate, on the tag, the item to be corrected and the Section of South Florida Building Code in violation.

Violation notices issued without indication of the Code Sections will not be considered valid by the Broward County Board of Rules and Appeals.

4515.7 Doors, without an exterior locking mechanism, at entrances, are not required to comply with NEC Article 210-70 for wall switch controlled interior lighting outlet.

4515.8 Plans and Specifications: The following is Explanatory Material

(a) Power systems convey or distribute electrical energy. items to be included in the design and analysis of these systems are: steady state and transient loads, short circuit protection, load flow, voltage drop, harmonics, and protective device coordination.

(b) Lighting systems convert electrical energy into light. Items to be included in the lighting design and analysis are: Average illuminance, Equivalent spherical illuminance, Uniformity ratio, Visual comfort probability, special purpose lighting, and the requirements of the Florida Energy Efficiency Code, Part IX, Chapter 553, Florida Statutes.

(c) Grounding Systems are passive systems used to establish an electrical potential reference point in an electrical system for the proper dissipation of energy in case of abnormal or transient conditions.

4515.9 In reference to National Electrical Code 1996, Article 300-11 (a)(2) Exception. A maximum of two (2)-one-inch conduits and boxes may be suspended in the ceiling fixed to the hanger wires supporting the ceiling.

PART XII
PLUMBING AND GAS
CHAPTER 46
PLUMBING

4601 ADMINISTRATIVE
4602 DEFINITIONS
4603 GENERAL
4604 MATERIALS
4605 DRAINAGE SYSTEM AND DISPOSAL
4606 INDIRECT WASTE PIPING AND SPECIAL WASTES
4607 JOINTS AND CONNECTIONS
4608 TRAPS AND CLEANOUTS
4609 HANGERS AND SUPPORTS
4610 VENTS AND VENTING SYSTEMS
4611 STORM DRAINAGE
4612 INTERCEPTORS AND SEPARATORS
4613 PLUMBING FIXTURES
4614 WATER SUPPLY AND DISTRIBUTION
4615 SEPTIC TANKS AND DRAINFIELDS
4616 SUPPLY AND DISPOSAL WELLS
4617 FIRE-EXTINGUISHING APPARATUS
4618 SWIMMING POOLS
4619 TRAILER COACHES AND TRAILER PARKS
4620 CROSS CONNECTION, BACKFLOW AND BACK-SIPHONAGE

4601 ADMINISTRATIVE

4601.1 TITLE AND SCOPE:

(a) TITLE: This Chapter shall be known as "THE SOUTH FLORIDA PLUMBING CODE" and may be cited as such or as the "PLUMBING CODE."

(b) PURPOSE: The basic principles of the Plumbing Code are designated to protect the public health, welfare and safety by properly designing, installing and maintaining plumbing systems. While details of plumbing installations must of necessity vary, the basic principles of sanitation and safety remain the same. The following basic principles are necessary to obtain these results and while unforeseen situations will no doubt arise which are not included in this Code, the following principles may serve to define the intent.

(1) All premises intended for human habitation, occupancy or use shall be provided with a supply of pure and potable water, shall not be connected to unsafe water supplies nor be subject to the dangers of backflow or backsiphonage, and shall be connected to an approved method of public or private sewer disposal.

(2) Plumbing fixtures, appliances and appurtenances shall be supplied with a sufficient supply of water at adequate pressure to enable them to function properly without undue noise under normal operating conditions. The hot water supply shall be installed on the left side.

(3) Appurtenances for heating and storing water shall be so designed and installed that dangers from overheating and explosion are eliminated.

(4) (aa) Each apartment or dwelling unit shall have installed at least one kitchen sink, one water closet, one lavatory and one bathtub or shower.

(bb) Clothes washing machine outlets shall be provided as set forth in Footnote No. 1, Paragraph 4613.19(m).

(5) (aa) Every building having plumbing fixtures installed and intended for human habitation, occupancy, or use on premises abutting on a street, alley or easement in which there is a public sewer, shall have a connection with the sewer.

(bb) When an approved sanitary sewer is made available and operative in a public right-of-way or easement abutting the property, any existing individual sewage disposal system, device or equipment shall, within 180 days, be abandoned and the sewage wastes from the residence or building discharged to the sanitary sewer through a properly constructed house sewer.

(6) The drainage system shall be designed to prevent fouling and depositing of solids.

Cleanouts shall be provided as set forth in Section 4608 so that pipes may be readily cleaned.

(7) Every fixture connected to the drainage system shall be equipped with a water-seal trap.

(8) The drainage system shall be designed so as to provide a free circulation of air with no danger of siphonage or forcing of trap seals.

(9) No substance which will produce explosive mixtures, obstruct free flow in piping, destroy the pipes or joints, or interfere with the sewage disposal system shall be allowed to enter the drainage system.

(10) Proper protection shall be provided to prevent contamination of food, water or similar materials by backflow of sewage.

(11) Plumbing fixtures shall be spaced as set forth in Sub-section 4613.3 to be readily accessible for the intended use and water heaters shall be installed so that inspection, service, repair and replacement may be made without removing permanent construction materials.

(12) Plumbing shall be installed in such a manner as to preserve the strength of structural members.

(13) Sewage and other waste from a plumbing system which may be deleterious to surface or subsurface waters shall not be discharged into the ground or into any lakes, ponds, streams, ditches or tidal waters unless it has first been rendered innocuous by some form of treatment and approved in accordance with Sec. 301.2 and the Florida Department of Environmental Regulation.

(14) The pipes conveying water to water-closets shall be of sufficient size to supply the water at a rate required for adequate flushing without unduly reducing the pressure at other fixtures.

(15) Plumbing fixtures shall be made of smooth non-absorbent materials, and shall be free from concealed fouling surfaces.

(16) Each vent terminal shall extend full size upward through the roof and have a free opening; the roof terminal being so located that there will be no danger of drain gas passing from it to any window, louvers or air intake mechanism and no danger of clogging the pipe by articles being thrown into it, or of roof water drainage into it.

(17) Liquid wastes from air conditioning equipment, swimming pools, etc., shall be disposed of by an accepted and approved method, as hereinafter described.

(c) SCOPE:

(1) New plumbing or drainage systems or parts thereof or additions, alterations, repairs or changes to existing plumbing or drainage installations or fixtures or appliances shall conform to the requirements of this Plumbing Code.

(2) A previously issued lawful plumbing permit shall be valid under the terms of the Plumbing Code under which it was issued.

(d) APPLICATION TO EXISTING PLUMBING INSTALLATIONS: Nothing contained in this Code shall be deemed to require any plumbing or drainage system or part thereof, or any other work regulated by this Code and existing prior to the effective date of this Code, to be altered, changed, reconstructed, removed or demolished if such work was installed in accordance with all applicable laws in effect prior to the date this Code became effective, except when any such plumbing or drainage system or other work regulated by this Code is dangerous, unsafe, unsanitary or a menace to life, health or property, in the opinion of the Plumbing Official.

(e) MAINTENANCE:

(1) All installations regulated by this Code or related drainage work shall be maintained and executed in such a manner as not to constitute a nuisance or to threaten or impair the health of any individual or the public in general. The contents of such installations shall not be permitted to overflow in a building, on a premises or upon the surface of the ground, street or sidewalk.

(2) It shall be unlawful for any person, firm or corporation whether owner or agent, to create, keep, cause, maintain, propagate or permit the existence of a nuisance as defined in this Code.

(3) The Plumbing Official shall have the power to abate any nuisance by the issuance of a notice in writing, to correct and/or eliminate the nuisance within a reasonable length of time.

4601.2 PLUMBING INSPECTORS:

(a) CHIEF PLUMBING INSPECTOR: APPOINTMENT, POWERS AND DUTIES OF CHIEF INSPECTOR: There shall be appointed by the appointing authority a person qualified to be certified in accordance with Sec. 201 of this Code, and such person shall be herein termed the Chief Plumbing Inspector, construed to mean the chief or head of the division or department of Plumbing Inspectors. The Chief Plumbing Inspector shall have the power to delegate powers and assignments to subordinate employees working under his authority.

(1) RIGHT OF ENTRY: Upon presentation of proper credentials, the Chief Plumbing Inspector may enter, at any reasonable time, any building, structure or premises for the purpose of inspection or to prevent violations of this Plumbing Code.

(2) STOP-WORK ORDERS: Whenever any plumbing work is being done contrary to the provisions of this Plumbing Code or is being improperly installed or may create a structural or health hazard or nuisance, the Chief Plumbing Inspector may order such work stopped or may order the violation corrected within a reasonable period of time, by notice in writing served on the person or persons engaged in the doing or causing of such work, to be done; and such persons shall immediately stop such work until arrangements in compliance with this Plumbing Code and satisfactory to the Chief Plumbing Inspector have been made, at which time he may order the work to proceed.

(3) CONCEALED WORK: The Chief Plumbing Inspector may order portions of a building or structure to be exposed for inspection when, in his opinion, there is good reason to believe that plumbing or drainage systems or fixtures, or parts thereof, concealed therein are in an unsafe, dangerous or unsanitary condition, or that there is willful or negligent concealment of a violation of this Plumbing Code.

(4) OCCUPANCY: Whenever any building or portion thereof is being used or occupied contrary to the provisions of this Building Code, the Chief Plumbing Inspector shall report such violation to the Building Official and the Building Official shall order such use or occupancy discontinued and the building or portion thereof vacated as set forth in Sub-section (2) above.

4601.3 UNSAFE BUILDING AND PREMISES:

(a) The Plumbing Official shall periodically, as may be practicable, inspect the plumbing and drainage systems

of all buildings and premises, except buildings of Group I Occupancy and public works structures, for compliance with the Plumbing Code.

(b) The Plumbing Official shall examine or cause to be examined every plumbing or drainage system or fixture or appliance or portion thereof reported to be dangerous or unsanitary or inadequate.

(c) Any building or premises found to be unsanitary or inadequate, or which constitute a health or safety hazard, or which by reason of illegal use or improper use, occupancy or maintenance constitute a violation of the provisions of this Code, shall be deemed to be unsafe.

(d) Whenever any building or premises is, in the opinion of the Plumbing Official, unsafe for reasons set forth in this Sub-section, he shall proceed by any or all of the following methods, whichever are, in his opinion, reasonable to correct the condition of violation.

(1) The Plumbing Official shall serve notice in writing to the owner or person in charge of the building or premises stating the defects thereof. This notice shall require the owner or person in charge of the building or premises, within a reasonable length of time, to commence the required repairs or improvements or removal of the plumbing system or parts thereof or fixtures or appurtenances thereto, and all such work shall be completed within 30 days from the date of notice, unless otherwise stipulated by the Plumbing Official. If necessary, such notice shall also require the building to be vacated forthwith and not reoccupied until the required repairs and improvements are completed, inspected and approved by the Plumbing Official.

Proper service of notice shall be by personal service on the owner of record, if he shall be found. If the person or persons addressed with such notice cannot be found after diligent search, then such notice shall be sent by registered mail to the last known address of such person, and a copy of the notice shall be posted in a conspicuous place on the premises, and such procedure shall be deemed the equivalent of personal service.

(2) The Plumbing Official shall post a signed, red notice in a conspicuous place on the premises reading: "WARNING, THIS BUILDING AND/OR, PREMISES IS, IN THE OPINION OF THE PLUMBING OFFICIAL, UNSAFE, UNSANITARY AND UNFIT FOR HUMAN OCCUPANCY, NOTICE HAS BEEN GIVEN AND THIS BUILDING AND/OR PREMISES SHALL NOT BE USED OR OCCUPIED. THIS NOTICE SHALL NOT BE REMOVED EXCEPT BY THE PLUMBING OFFICIAL."

(3) Upon refusal, failure or neglect of the person or persons, served with a notice, to comply with the requirements of the order to abate the unsafe condition, the Plumbing Official shall report the condition to the Building Official who shall proceed as set forth in Section 202, including the directive of the Unsafe Structures Board to the Building Official to cause the work to be done and costs collected as set forth in Sub-section 202.8.

4601.4 ALTERNATE MATERIALS AND TYPES OF CONSTRUCTION: The provisions of this Plumbing Code are not intended to prevent the use of types of construction or materials or methods of design as an alternate to the Standards herein set forth, but such alternates may be offered for approval, and their consideration shall be as set forth in this Sub-section.

(a) STANDARDS: The types of construction or materials or methods of design referred to in this Plumbing Code shall be considered as Standards of Quality. New types of construction or materials or methods of design shall be at least equal to these Standards for the corresponding use intended.

(b) APPLICATION: Any person desiring to use types of construction or materials or methods of design not specifically mentioned in this Plumbing Code shall file with the Plumbing Official authentic proof in support of claims that may be made regarding the sufficiency, and request approval and permission for use. The Plumbing Official shall approve such alternates if it is clear that the Standards of the Plumbing Code are at least equaled. If, in the opinion of the Plumbing Official, the Standards of the Plumbing Code will not be satisfied by the requested alternate, he shall refuse approval.

(c) APPEAL: Any person, whose request for alternate types of construction, materials or methods of design has been refused by the Plumbing Official, or any person in whose considered opinion an action by the Plumbing

Official in approving or disapproving construction under this Plumbing Code does not satisfy the Standards of this Code for reasons of safety, quality or sanitation, may appeal to the Board of Rules and Appeals by written request to the Secretary of the Board and such written request shall be transmitted to the Board at once.

(d) REPEATED TESTS: The Plumbing Official may require tests of a fixture, method, device or appurtenance to be repeated if, at any time, there is reason to believe that an approved fixture, method, device or appurtenance no longer conforms to the characteristics on which its approval was based.

4601.5 PLUMBING PERMITS:

(a) PERMITS REQUIRED: It shall be unlawful to commence work on any building or premises on which plumbing is required or is to be installed: perform any work covered by the Plumbing Code including, but not limited to, the excavation or obstruction of any public or private street, alley or other thoroughfare for the purpose of installing plumbing, sewer or drainage work or connect to any public or private water supply system and/or sewer or appurtenance thereof, commence the construction, reconstruction, alteration, repair and/or remodeling of any plumbing, sewer, septic tank, sewer or liquid waste treatment system, surface drainage, public swimming pools, supply or drainage wells, fire lines, water supply and waste connections from air handling and heating units and/or other drainage work without first having filed application and obtained a plumbing permit from the Plumbing Official, except that no permit will be necessary for the repair of leaks, unstopping of sewers or waste pipes, repairing faucets or valves or cleaning of a septic tank where such work is located within the property lines.

(b) OTHER APPROVALS: In addition to the plumbing permit, permits shall be required by other regulatory authorities having jurisdiction. Following are some, but not necessarily all, other required permits: from the Engineering Department, Fire Department and Police Department before obstructing or excavating in any public thoroughfare: from the Engineering Department before cutting any street paving, sidewalk curb or sewage system or part thereof or appurtenance thereto; or making a connection to or otherwise cutting, tapping or piercing any public sewer or appurtenance thereof; from the Building Official before the addition of any fixtures or the removal or alteration of any structural or load bearing members.

(c) PRIVATE SEWER TAPPING: No person shall cut, break, pierce or tap any main or private sewer or appurtenance thereof, or introduce any tube, pipe, trough or conduit into any public sewer or appurtenance thereof, without the written consent as may be required by the Plumbing Official.

(d) APPLICATION:

(1) Any person desiring a plumbing permit to be issued by the Plumbing Official, as required hereby, shall file an application therefor in writing on a form furnished by the Plumbing Official for that purpose. Each application shall describe the land on which the proposed work is to be done; shall show the use or occupancy of the building or premises; shall be accompanied by plans and specifications as required hereafter; shall give such other information as reasonably may be requested by the Plumbing Official; and shall be signed by the permitee or his authorized agent, who may be required to submit evidence to indicate such authority.

(2) Application for permit will be accepted from any qualified persons or firms. Qualification of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradesmen.

(3) Nothing in this Code shall prevent any homeowner from installing or maintaining plumbing within his own property boundaries, providing such plumbing work is done by himself and is used exclusively by himself and his family.

(4) The privilege provided in Sub-paragraph (3) above shall not convey the right to violate any of the provisions of this Code and is not to be construed as exempting any such homeowners from obtaining a permit, paying the required fee and calling for inspections.

(e) PLANS AND SPECIFICATIONS:

(1) Each application for a plumbing permit shall be accompanied by two sets of plans and specifications when required by the Plumbing Official. The Plumbing Official may authorize the issuance of a plumbing or building permit without plans or specifications for relatively small and unimportant work.

(2) (aa) For all new buildings or additions or plumbing systems where more than 250 fixture units are proposed to be installed or added to an existing building or has a value of $50,000 or for any structure greater than 5,000 square feet in area which is designed for public assembly, the plans and specifications shall be prepared by, and each sheet shall bear the impress seal of a Professional Engineer, registered in the State of Florida, who is competent in this field of expertise.

(bb) Applications for permits for installation of medical gas systems shall be accompanied by sufficient drawings to clearly define the work. When the estimated cost of medical gas, oxygen, steam, vacuum, toxic air filtration or Halon systems exceed $5,000, the plans shall be prepared by and bear the impress seal of a Professional Engineer, registered in the State of Florida, who is competent in this field of expertise.

(3) Plans shall be mechanically reproduced prints on substantial paper or cloth with the main details, other than an isometric drawing, drawn to scale and shall be suitably descriptive and shall fully and clearly illustrate, together with the specifications, sufficient detail and data to show the nature, character and location of the proposed work. Where, in the opinion of the Plumbing Official, isometric plans are necessary to describe the proposed work, and particularly, but not limited to, proposed residential buildings having eight or more units or store buildings having five or more stores, riser diagrams and isometric plans shall be submitted. Any specification in which general expressions are used to the effect that "Work shall be done in accordance with the Plumbing Code" or "to the satisfaction of the Plumbing Official" shall be deemed imperfect and incomplete and every reference to the Plumbing Code shall be by Section or Sub-section applicable. Plans shall be adequately identified.

(4) The number of persons anticipated to occupy a proposed building or portion thereof or a changed use or tenant thereof shall be shown on the plans submitted with application for permit. The number of persons shall be as set forth in Sub-section 4603.22.

(f) PRECONTRACT EXAMINATION OF PLANS: Preliminary plans should be submitted by the designer to the Plumbing Official before a contract for the proposed work is entered into by the owner. It is the duty of the Plumbing Official to cooperate with owners, designers and contractors to provide precontract examination of plans and specifications, to ensure the sufficiency and Plumbing Code compliance of such plans before final contracts for construction are made. Application for plumbing permit may not be required for such examination.

(g) EXAMINATION OF PLANS: The Plumbing Official shall examine all plans and applications for permits. Plans and applications shall be examined in the order received, except that plans previously given precontract examination shall be examined first. When approvals by other agencies having authority may logically be required to be affixed to the plan before approval by the Plumbing Official, such approval shall be affixed on the plans before examination by the Plumbing Official. If the application or plans do not conform to the requirements of all pertinent laws or regulations, the Plumbing Official shall reject such application in writing, stating the reasons therefore. Plans which are rejected, as stated hereinabove, shall be returned for correction. Penciled notations on mechanically reproduced plans may be accepted for only minor corrections. If the applications, plans and specifications, upon examination, are found to comply with the requirements of the Plumbing Code, the plans shall be signed and marked as approved.

(h) PLUMBING PERMIT FEE:

(1) Any person desiring a plumbing permit to be issued shall, in addition to filing an application and before such permit is issued, pay a plumbing permit fee as required.

(2) When work for which a plumbing permit is required is started or proceeded with prior to the obtaining of said permit, the fees as specified herein shall be doubled. The payment of such double fee shall not relieve any person, firm or corporation from fully complying with this Code nor from any penalties prescribed herein.

(i) PERMITS AVAILABLE AT WORK SITE: All permits shall be kept at the work site and shall be exhibited on request to do so by an authorized person.

4601.6 INSPECTION AND TESTS:

(a) INSPECTIONS:

(1) All materials and installations covered by the Plumbing Code shall be inspected by the Plumbing Official to ensure compliance with the requirements of the Plumbing Code.

(2) The plumbing permit holder shall notify the Plumbing Official when the work is ready for test and inspection.

(b) FINAL INSPECTION: When the work for which a plumbing permit is issued is completed, the permit holder shall request final inspection and such request shall be made before the building or construction in which such work done is occupied or used and not more than 30 days after completion of the work.

(c) TESTS: Before approving any plumbing system or addition thereto for use, the system shall be tested, in whole or in part, to demonstrate sufficiency and tightness except where the requirement for testing is otherwise specifically excepted herein. All equipment, material, power and labor necessary for inspection and test shall be supplied by the permit holder.

(d) SYSTEM TEST: All the piping of the plumbing system shall be tested with water or air. The Plumbing Official may require the removal of any Cleanouts, plugs or caps to ascertain if the pressure has reached all parts of the system.

(e) METHODS OF TESTING:

(1) WATER TESTS, GENERAL: For building sewer tests a fitting shall be placed at the property line for the purpose of inserting a test plug and such building sewer shall be connected with proper fittings to the public sewer lateral at time of test. The water test may be applied to the drainage system in its entirety or by section. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening above the roof, and the system filled with water to the point of overflow above the roof. When tested in sections, at least the lower five feet of the next section above shall be retested, so that every joint and pipe in the plumbing drainage system shall have been submitted to a test of not less than a five-foot head of water.

AIR TEST: The air test shall be made by attaching the air compressor or test apparatus to any suitable opening, and closing all other inlets and outlets to the system, then forcing air into the system until there is a uniform pressure, sufficient to balance a column of mercury ten inches in height or five pounds-per-square inch on the entire system.

(2) WATER TESTS IN UNFRAMED ONE-STORY BUILDINGS: For one-story, unframed buildings with bathtubs on the first floor and where the plumbing is installed prior to completion of building walls, partitions and roofs, the test shall be made by plugging all openings except the terminus of the vent stacks and filling the system and waste branches, which are to be concealed with water to a point in vent stacks, five feet above the highest fixture branch. On ground inspections for one-story buildings entering a common sewer and having more than one stack, a five-foot head of water will not be required where steel or copper stacks are to be installed; provided one stack is filled to a point five feet above the highest fixture branch. Other stacks may be plugged above the fixture openings provided all lead joints are made and tested. Free standing stacks shall not exceed 14 feet above the horizontal soil line.

(3) WATER TESTS IN FRAMED BUILDINGS: Where building walls and partitions are in place and support the stacks, the water test shall be applied to test the entire system to the overflow point of the highest vent terminus above the roof.

(4) BATHTUB CONNECTION WATER TEST: After the test required in (2) and (3) has been applied and approved, the bathtub on the first floor shall be set and properly connected and the drainage system and first

floor tub filled with water to the flood rim level of the first floor tub. The water test above the required five-foot head shall be waived and a visual inspection substituted provided all lead caulked, screwed or sweated type joints are properly made and accepted by the Plumbing Official. Above the first floor, tub connections shall be tested with the tub filled with water to the overflow point flowing through the overflow connection and with the tub draining.

(f) COMBINED BATHTUB, AND/OR BUILDING SEWER/WATER PIPE INSPECTION: The required bathtub or building sewer and/or water pipe inspection shall be called for in combination and made at the same time, or shall be called for and inspected separately.

(g) TESTS WHERE ALL PARTS OF SYSTEM ARE OUTSIDE OF BUILDING: Where all parts of soil, waste and vent lines are outside a building and visible and fixtures may be set and the system filled with water to the point of overflow of the lowest fixture on the highest floor.

(h) COVERING OF WORK: No drainage or plumbing system or part thereof shall be covered until it has been inspected, tested and approved. It shall be the duty and responsibility of the permit holder to determine if work has been inspected before it is covered or concealed. Any drainage or plumbing system or part thereof that is covered or concealed before being inspected, tested and approved shall be uncovered upon order of the Plumbing Official.

(i) DEFECTIVE WORK: If on inspection and tests any plumbing work shows defects, the defective work or material shall be replaced within three days and inspection and test repeated.

(j) CORRECTION NOTICES: The Plumbing Official shall make written notice of violation of the Plumbing Code and/or corrections ordered and such notice shall be served on or mailed or delivered to the permit holder or his job representative or may be posted at the site of the work. Refusal, failure, or neglect to comply with such notice or order within ten days, except where an appeal has been filed with the Board of Rules and Appeals, shall be considered a violation of this Code, and shall be subject to the penalties as set forth. In event of failure to comply with this Section, no further permits shall be issued to such person, firm or corporation.

(k) TESTS OF ALTERATIONS, REPAIRS OR EXTENSIONS: All alterations, repairs, or extensions which include more than ten feet in length of piping and fittings shall be inspected and tested before final approval.

(l) TEST OF RAINWATER PIPES: Rainwater pipes and their roof connections within buildings and extending to a point five feet outside the building shall be tested by the water test.

(m) TEST OF WATER DISTRIBUTION SYSTEM: Upon the completion of the entire water distribution system, it shall be tested, inspected and proved tight under a water pressure of not less than the maximum working pressure under which it is to be used. Water shock or hammer in water supply system will be cause of condemnation on final inspection.

(n) TEST OF STANDPIPES: (See Section 4617).

(o) WORKMANSHIP: All plumbing work shall be done in a workmanlike manner, and in compliance with the provisions of this Plumbing Code.

(p) CERTIFICATES OF APPROVAL: After the satisfactory completion and final inspection of the plumbing system, or any part thereof, and upon request, a Certificate of Approval shall be issued by the Plumbing Official to the permit holder.

(q) TEST OF EXISTING INSTALLATIONS: The Plumbing Official may require that a suitable test be applied to any existing plumbing system which he has reason to believe has become unsanitary or defective. The Plumbing Official shall notify the owner or agent of the property to apply such test within a reasonable length of time but not to exceed ten days. If defects or unsanitary conditions are, by such tests found to exist, correction of the defects or unsanitary conditions shall be made within ten days.

(r) INSPECTION AND TESTS — EXCEPTIONS: A test shall not be required for a plumbing system or part thereof set up for exhibition or demonstration purposes and not to be used for the disposal of body wastes. A test shall not be required after the repairing or replacing of an old faucet or valve, nor after forcing out stoppages and repairing leaks. A test shall not be required for a building storm sewer.

(s) DAMAGES RESULTING FROM REQUIRED TESTS: Damage caused by breakage or faulty installation during required tests shall be the responsibility of the permit holder.

4602 DEFINITIONS

Unless otherwise expressly stated, all words other than herein defined shall have the meaning implied by their context in the Code or their ordinarily-accepted meanings in the construction industry; words used in the present tense shall include the future; words in the masculine gender shall include the feminine or neuter; the singular number shall include the plural; and the plural number shall include the singular.

Wherein a definition set forth in this Chapter varies from a definition set forth in Chapter 4 herein, the definition set forth as follows shall be applicable to only this Chapter 46.

ACCESSIBLE: See Sections 401 and 515.

AIR GAP: An air gap in a water-supply system is the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the receptacle. This distance shall be at least two (2) times the diameter of the supply outlet unless the outlet is less than three (3) times that diameter away from a wall or surface, in such cases the air gap shall be a minimum of three (3) times that diameter. In no case shall the air gap be less than one inch.

APPROVED: Approved by the Plumbing Official or other authority given jurisdiction by this Code.

AREA DRAIN: An area drain is a receptacle designed to collect surface or rain water from an open area.

ATMOSPHERIC VACUUM BREAKER: An approved device consisting of a check valve and an air inlet to relieve a vacuum.

BACKFLOW: Backflow is the flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water, and any other fixture or appliance, from any source or sources other than its intended course. (See Back-siphonage.)

BACKFLOW CONNECTION: Backflow connection or condition is any arrangement whereby backflow can occur.

BACKFLOW PREVENTER: A backflow preventer is a device or means to prevent backflow into the potable water system.

BACKFLOW PREVENTION DEVICE — APPROVED: The term approved device shall mean a device that meets one or more of the appropriate AWWA, ASSE OR USC-FCCHR standards and passed UL, FM or USC-FCCHR testing requirements for devices with test cocks.

BACKFLOW PREVENTION DEVICE TECHNICIAN: A person who is certified to make competent inspections, test, repair, overhaul and make reports on backflow prevention devices. This person shall have successfully completed and met the continued educational requirements of a recognized certification program for backflow prevention device testers. TREEO, NETTI, USC-FCCHR, ASSE, ICCC, or other programs approved by the Board of Rules & Appeals shall be recognized.

BACK-SIPHONAGE: Back-siphonage is the flow of water or other liquids, mixtures or substances into the distributing pipes of a potable supply of water, or any other fixture, device, or appliance, from any sources other than its intended course, due to a negative pressure in such pipe. (See Backflow.)

BASEMENT: See Section 401.

BATTERY OF FIXTURES: A "battery of fixtures" is any group of two or more similar adjacent fixtures which discharge into a common horizontal waste or soil branch.

BOILER BLOW-OFF: A boiler blow-off is an outlet on a boiler to permit emptying or discharge of the water or sediment in the boiler.

BRANCH: A branch is any part of the piping system other than a main.

BRANCH FIXTURE: See Fixture Branch.

BRANCH, HORIZONTAL: See Horizontal Branch.

BRANCH INTERVAL: A branch interval is a length of soil or waste stack corresponding in general to a story height, but in no case less than eight feet within which the horizontal branches from one floor or story of a building are connected to the stack.

BRANCH VENT: A branch vent is a vent connecting one or more individual vents with a vent stack or stack vent.

BUILDING:A building is a structure built, erected, and framed of component structural parts designed for the housing, shelter, enclosure, or support of persons, animals, or property of any kind.

BUILDING CLASSIFICATION: Building Classification is the arrangement adopted by law for the designation of buildings in classes based upon their use and occupancy.

BUILDING DRAIN: That part of the main horizontal collection system exclusive of the waste and vent stacks which receives the discharge from soil, waste and other drainage pipes, exclusive of the storm water, inside the wall line of the building and conveys it to the building sewer beginning five feet outside the building wall.

BUILDING SEWER: The building (house) sewer is that part of the horizontal piping of a drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sewer, private sewer, individual sewage disposal system.

BUILDING STORM DRAIN: A building (house) storm drain is a drain used for conveying rain water, surface water, ground water, subsurface water, condensate, cooling water, or other similar discharge to a building storm sewer or a combined building sewer, extending to a point not less than five feet outside the building wall.

BUILDING STORM SEWER: A building (house) storm sewer is the extension from the building storm drain to the public storm sewer, combined sewer, or other point of disposal.

BUILDING SUBDRAIN: A building (house) subdrain is that portion of a drainage system which cannot drain by gravity into the building sewer.

CODE: The word "Plumbing Code" when used alone shall mean these regulations, subsequent amendments thereto, or any emergency rule or regulation which the Administrative Authority having jurisdiction may lawfully adopt.

COMBINED BUILDING SEWER: A combined building sewer receives storm water, sewage and liquid waste.

COMMON VENT: A common vent is a vent above the junction of two fixture drains installed at the same level in a vertical stack and serving as a vent for both fixture drains.

CONDUCTOR: A "Leader."

CONTAMINATION: An impairment of the quality of the potable water by any solid, liquid, or gaseous compounds to a degree which would create an imminent danger to the public health, or would create an unacceptable taste, odor or color to the potable water.

CONTAMINANT: Any foreign material which would be considered an imminent health hazard.

CONTAINMENT: To control the potential contamination of the public water supply by installing an

approved backflow prevention device on the discharge side of the public water main meter or tap.

CONTINUOUS WASTE: A continuous waste is a drain connecting the compartments of a combination fixture to its trap or connecting other permitted fixtures to a common trap.

CROSS-CONNECTION: A cross-connection is any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other water of unknown or questionable safety, or any other kind of matter, whether element, compound or mixture, whereby water may flow from one system to the other, the direction of flow depending on the pressure differential between the two systems. (See Backflow and Back-siphonage.)

DEAD END: A dead end is a branch leading from a soil waste or vent pipe, building drain or building sewer which is terminated at a developed distance of two feet or more by means of a plug or other closed fitting.

DEVELOPED LENGTH: The developed length of a pipe is its length measured along the center line of the pipe and fittings.

DIAMETER: Unless specifically stated, the term "diameter" is the nominal diameter as designated commercially.

DOUBLE CHECK BACKFLOW PREVENTER: An approved device consisting of two single, independently acting check valves, including tightly closing shut-off valves at each end of the device and properly located test cocks.

DOWNSPOUT: A "Leader."

DRAIN:A drain is any pipe which carries liquid, waste water or water borne wastes to an approved point of disposal.

DRAINAGE SYSTEM: A drainage system (drainage piping) includes all the piping within public or private premises, which conveys sewage, rain water, or other liquid wastes to a legal point of disposal.

DRAINAGE WELL: A drainage well, referred to in this Code is any cavity, drilled, driven or natural, which taps the underground water and into which surface waters; waste waters, industrial waste or sewage is placed.

DUAL CHECK BACKFLOW PREVENTER: An approved device consisting of two independently operating and removable for testing check valves.

DURHAM SYSTEM: Durham system is a term used to describe soil or waste systems where all piping is of threaded pipe, tubing or other such rigid construction, using recessed drainage fittings to correspond to the types of piping.

EFFECTIVE OPENING: The effective opening is the minimum cross-sectional area at the point of water-supply discharge, measured or expressed in terms of: the diameter of a circle of equivalent cross-sectional area. (This is applicable to air gap.)

FIXTURE BRANCH: A fixture branch in a drainage system is the drain from the tap of a fixture to the junction of that drain with a vent.

FIXTURE DRAIN: A fixture drain is the drain from the fixture branch to the junction of that drain with any other drain pipe.

FIXTURE UNIT: A fixture unit is a design factor so chosen that the load-producing valves of the different plumbing fixtures can be expressed approximately as multiples of that factor. For the purposes of this Code, one fixture unit flow rate shall be deemed to be one cubic foot or seven and five-tenths gallons of water per minute.

FIRE LINES: The fire control system, including water service, standpipe, siamese connections and pumps. (See Fire Standpipe System.)

FLOOD-LEVEL RIM: The flood-level rim is the top edge of the receptacle from which water or other liquids overflow.

FLOOR DRAIN: A floor drain is an opening or receptacle located at approximate floor level connected to a trap to receive the discharge from indirect wastes and floor drainage.

FLUSHOMETER VALVE: A flushometer valve is a device which discharges a predetermined quantity of water to fixtures for flushing purposes and is actuated by direct water pressure.

GRADE: Grade is the slope or fall of a line of pipe in reference to a horizontal plane. In drainage it is usually expressed as the fall in a fraction of an inch per foot length of pipe.

GREASE INTERCEPTOR: An "Interceptor."

GREASE TRAP: An "Interceptor."

GUTTER: An open channel for carrying away rainwater.

HANGERS: "Supports."

HAZARD — DEGREE OF: A qualification of the potential and/or actual harm that may result from cross-connections within a water using facility, relating to the type and toxicity of the contaminant or pollutant.

HORIZONTAL PIPE: Horizontal pipe means any pipe or fitting which makes an angle of more than 45 degrees with the vertical.

HORIZONTAL BRANCH: A horizontal branch is a drain pipe extending laterally from a soil or waste stack or building drain, with or without vertical sections or branches, which receives the discharge from one or more fixture drains and conducts it to the soil or waste stack or to the building (house) drain.

INDIRECT WASTE: An indirect waste pipe is a pipe that conveys liquid wastes (other than body wastes) by discharging them into an open plumbing fixture or receptacle, the overflow point of which is at a lower elevation than the item drained and which is properly connected to the drainage system, soakage pit or discharge well.

INDUSTRIAL WASTES: Industrial wastes are liquid wastes resulting from the processes employed in industrial establishments and are free of body wastes.

INSANITARY: Contrary to sanitary principles — injurious to health.

INTERCEPTOR: An interceptor is a device designed and installed so as to separate and retain deleterious, hazardous, or undesirable matter from normal wastes and permit normal sewage or liquid wastes to discharge into the disposal terminal by gravity.

INTERMEDIATE ATMOSPHERIC VENT — BACKFLOW PREVENTER: An approved device consisting of two independently operating check valves separated by an intermediate chamber with a means for automatically venting it to the atmosphere.

ISOLATION: To control the potential contamination of the private potable water system by installing air gaps and/or approved backflow prevention devices.

LEADER:A leader (downspout) is the vertical water conductor from the roof to the building storm drain, combined building sewer, or other means of disposal.

LIQUID WASTE: Liquid waste is the discharge from any fixture, appliance, of appurtenance, in connection with a plumbing system which does not receive body waste.

LOAD FACTOR: Load factor is the percentage of the total connected fixture unit flow rate which is likely to occur at any point in the drainage system. It varies with the type of occupancy, the total flow unit above this point being considered, and with the probability factor or simultaneous use.

LOOP OR CIRCUIT WASTE AND VENT: A combination of plumbing fixtures on the same floor level in the same or adjacent rooms connected to a common horizontal branch soil or waste pipe as set forth in Sub-section 4610.5.

MAIN: The main of any system of continuous piping is the principal artery of the system, to which branches may be connected.

MAIN VENT: The main vent is the principal artery of the venting system, to which vent branches may be connected.

MAY: The word "may" is a permissive term.

MEZZANINE: Is an intermediate floor placed in any story or room. When the total area of any such mezzanine floor extends 33 3/8 percent of the total floor area in that room or story in which the mezzanine floor occurs, it shall be considered as constituting an additional story. The clear height above or below a mezzanine-floor construction shall be not less than seven feet.

NUISANCE: Public nuisance as known at common law or in equity jurisprudence: and whatever is dangerous to human life or detrimental to health: whatever building, structure, or premises is not sufficiently ventilated, sewered, drained, cleaned, or lighted, in reference to its intended or actual use; and whatever renders the air or human food or drink or water supply unwholesome.

OFFSET: A combination of elbows or bends in a line of piping which brings one section of the pipe out of the line parallel with the other section.

PENTHOUSE: See Section 401.

PERSON: Person is a natural person, his heirs, executors, administrators or assigns; and includes a firm, partnership or corporation, its or their successors or assigns. Singular includes plural; male includes female.

PLUMBING: Plumbing means, includes and refers to:

(1) The materials including pipe, fittings, valves, fixtures and appliances attached to and a part of a plumbing system for the purpose of creating and maintaining sanitary conditions in buildings, camps and swimming pools on private property where people live, work, play, assemble or travel.

(2) That part of a water supply and sewage and drainage system extending from either the public water supply mains or private water supply to the public sanitary, storm or combined sanitary and storm sewers or to a private sewage disposal plant, septic tank, disposal field pit, box filter bed or any other receptacle or into any natural or artificial body of water, water course upon public or private property.

(3) The design, installation or contracting for installation, removal and replacement, repair or remodeling, of all or any part of the materials, appurtenances or devices attached to and forming a part of a plumbing system, including the installation of any fixture, appurtenance or devices used for cooking, washing, drinking, cleaning, fire fighting, mechanical or manufacturing purposes.

PLUMBING APPURTENANCE: Manufactured device, or a prefabricated assembly, or an on-the-job assembly of component parts, which is an adjunct to the basic piping system and plumbing fixtures. An appurtenance demands no additional water supply, nor does it add any discharge load to a fixture or the drainage system. It is presumed that it performs some useful function in the operation, maintenance, servicing, economy, or safety of the plumbing system.

PLUMBING FIXTURES: Plumbing fixtures are receptacles, devices, or appliances which are supplied with water or which receive or discharge liquids or liquid borne wastes, with or without discharge into the drainage system with which they may be directly or indirectly connected.

PLUMBING OFFICIAL: The Chief Administrative Officer charged with the administration, enforcement and application of the Plumbing Code and all amendments thereto. The duly authorized and appointed representative of the legislating authority adopting this Plumbing Code, charged with the inspection of all work performed under this Code, the enforcement and application of this Code and such other duties, not inconsistent with the provisions hereof, as may be assigned him from time to time.

PLUMBING SYSTEM: The plumbing system shall include the drainage system, water supply, water-supply

distribution pipes, plumbing fixtures, traps, soil pipes, waste pipes, vent pipes, building drains, building sewers, building storm drain, building storm sewer, liquid waste piping, water treating, water using equipment, sewerage treatment, sewerage treatment equipment, fire standpipes, fire sprinklers, and relative appliances and appurtenances, including their respective connections and devices, within the private property lines of the premises and also to include pressure, vacuum and gravity piping conveying air, gas or liquids.

POINT OF DELIVERY: See Service Connection.

POLLUTANT: Any foreign material which would normally create an unacceptable taste, odor or color.

POLLUTION: See Contamination.

POTABLE WATER: Potable water is water which is satisfactory for drinking, culinary and domestic purposes, and meets the requirements of the Health Authority having jurisdiction.

PRESSURE: The normal force exerted by a homogenous liquid or gas, per unit of area, on the wall of the container.

PRESSURE, STATIC: The pressure existing without any flow.

PRESSURE, FLOWING: The residual pressure in the water supply pipe at the faucet or water outlet while the faucet or water outlet is wide open and flowing.

PRESSURE, RESIDUAL: The pressure available at the fixture or water outlet after allowance is made for pressure drop due to friction loss, head, meter and other losses, in a system during maximum demand periods.

PRIVATE PROPERTY: Private property for the purposes of this Code shall mean all property except streets or roads dedicated to the public and easements (excluding easements between private parties). (See definition of Plumbing.)

PRIVATE OR PRIVATE USE: In the classification of plumbing fixtures, private applies to fixtures in residences and apartments and to fixtures in private bathrooms of hotels and similar installations where the fixtures are intended for the use of a family or an individual.

PRIVATE SEWER: A private sewer is a sewer privately owned and not directly controlled by public authority.

PUBLIC OR PUBLIC USE: In the classification of plumbing fixtures "public" applies to fixtures in commercial and industrial establishments, in restaurants, bars, public buildings, comfort stations, schools, gymnasiums, railroad stations, or places to which the public is invited or which are frequented by the public without special permission or special invitation, and other installations (whether pay or free) where a number of fixtures are installed so that their use is similarly unrestricted.

PUBLIC SEWER: A public sewer is a common sewer directly controlled by public authority.

PUBLIC SWIMMING POOL: A public swimming pool is a pool together with its buildings and appurtenances where the public is allowed to bathe or is open to the public for bathing purposes by consent of the owner.

REDUCED PRESSURE BACKFLOW PREVENTER: An approved device consisting of two single, independently acting check valves, an automatically operating pressure differential relief valve located between the two check valves, including tightly closing shut-off valves at each end of the device and properly located test cocks.

RELIEF VENT: A relief vent is a vent, the primary function of which is to provide circulation of air between drainage and vent systems.

RIM: For the purpose this Code a rim is an unobstructed open edge at the overflow point of a fixture.

RISER: A water supply pipe which extends vertically one full story or more to convey water to branches or fixtures.

ROCK DRAINFIELD: Three-quarter inch drainfield rock 100 percent passing a one-inch screen and a maximum of ten percent passing a one-half inch screen.

ROCK-OOLITE:A rock consisting of small round grains, usually carbonate of lime, resembling the roe of fish cement together.

ROOF-DRAIN:A roof drain is an outlet installed to receive water collecting on the surface of a roof and to discharge it into the leader (downspout).

ROUGHING-IN: Roughing-in is the installation of all parts of the plumbing system which can be completed prior to the installation of fixtures. This includes drainage, water-supply, and vent piping, and the necessary fixture supports.

SAND INTERCEPTOR: See Interceptor.

SANITARY SEWER: A Sanitary sewer is a pipe which carries sewage and excludes storm, surface and ground water.

SECOND HAND: Second hand as applied to material or plumbing equipment is that which has been installed, and has been used or removed.

SERVICE CONNECTIONS: The terminal end of a service from the public potable-water system — that is where the Water Purveyor loses jurisdiction and sanitary control over the water at its point of delivery to the consumer's water system.

SEPARATOR: See Interceptor.

SEPTIC TANK: A septic tank is a watertight receptacle which receives the discharge of a drainage system or part thereof, and is designed and constructed so as to separate solids from the liquid, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside of the tank through a sub-surface system of open-point or perforated piping, or other approved methods.

SEWAGE: Sewage is any liquid waste containing animal, mineral or vegetable matter in suspension or solution, and may include liquids containing chemicals in solution.

SHALL: The word "shall" is a mandatory term.

SIZE OF PIPE AND TUBING: See Diameter.

SLIP JOINT: A mechanical type joint used primarily on fixture traps: the joint tightness is obtained by compressing a friction type washer such as rubber, nylon, neoprene, lead or special packing material against the pipe by the tightening of a (slip) nut.

SLOPE: See Grade.

SOLVENT CEMENT: A adhesive (solvent) or mixture of adhesives which when applied to the surface of pipe and fittings will soften and fuse the plastic resin or compound of resins. Pipes and fittings are then joined causing the surfaces to unite forming a liquid tight joint.(SEE TABLE 46-C)

SOIL PIPE: A soil pipe is any pipe which conveys the discharge of water closets or fixtures having similar functions, with or without the discharge from other fixtures, to the building drain or building sewer.

SPECIAL WASTE PIPE: See Indirect Waste Pipe.

STACK: A stack is the vertical pipe of a system of soil, waste, or vent piping.

STACK VENT: A stack vent (sometimes called a waste vent or soil vent) is the extension of a soil or waste stack above the highest horizontal drain connected to the stack.

STORM DRAIN: See Building Storm Drains.

STANDPIPE SYSTEMS: A system of piping installed for fire protection purposes having a primary water supply constantly or automatically available at each hose outlet.

STORM SEWER: A storm sewer is a sewer used for conveying rain water and/or surface water.

STORY: See Section 401.

SUBSURFACE DRAIN: A subsoil drain is a drain which receives only subsurface or seepage water and conveys it to a place of disposal.

SUMP: A sump is a tank or pit which receives sewage or liquid waste, located below the normal grade of the gravity system and which must be emptied by mechanical means.

SUPPORTS: Supports, hangers, and anchors are devices for supporting and securing pipe and fixtures to walls, ceilings, floors or structural members.

SUPPLY WELL: Any artificial opening in the ground designed to conduct water from a source bed through the surface when water from such well is used for public, semi-public or private use.

TRAP:A trap is a fitting or device so designed and constructed as to provide a liquid seal which will prevent the back passage of air without materially affecting the flow of sewage or waste water through it.

TRAP SEAL: The trap seal is the maximum vertical depth of liquid that a trap will retain, measured between the crown weir and the top of the dip of the trap.

VACUUM BREAKER: See Backflow Preventer.

VACUUM BREAKER — PRESSURE TYPE: An approved device consisting of a single spring loaded check valve and a spring loaded air opening air inlet valve. The device shall include a tightly closing shut-off valve at each end of the device and properly located test cocks.

VENT STACK: A vent stack is a vertical vent pipe installed primarily for the purpose of providing circulation of air to and from any part of the drainage system.

VENT SYSTEM: A vent system is a pipe or pipes installed to provide a flow of air to or from a drainage system or to provide a circulation of air within such system.

VERTICAL PIPE: A vertical pipe is any pipe or fitting which is installed in a vertical position or which makes an angle of not more than 45 degrees with the vertical.

WASTE: See Liquid Waste and Industrial Wastes.

WASTE PIPE: A waste pipe is any pipe which receives the discharge of any fixture, except water closets or fixtures having similar functions and conveys it to the building drain or to the soil or waste stack.

WATER-DISTRIBUTING PIPE: A water-distributing pipe in a building or premises is a pipe which conveys water from the water-service pipe to the plumbing fixtures, appliances and other waste outlets.

WATER-HAMMER ARRESTOR: A device utilized to absorb the pressure surge (water hammer) that occurs when water flow is suddenly stopped in a water supply system.

WATER MAIN: The water (street) main is a water supply pipe for public or community use.

WATER OUTLET: A water outlet, as used in connection with the water-distributing system, is the discharge opening for the water; (1) to a fixture; (2) to atmospheric pressure (except into an open tank which is part of the water-supply system); (3) to a boiler or heating system; (4) to any water-operated device or equipment requiring water to operate, but not a part of the plumbing system.

WATER SERVICE PIPE: The water-service pipe is the pipe from the water main or other source of water supply to the building served.

WATER-SUPPLY SYSTEM: The water-supply system of a building or premises consists of the water-service pipe, the water-distributing pipes, standpipe system and the necessary connecting pipes, fittings, control valves, and all appurtenances in or on private property.

WELL

BORED: A well constructed by boring a hole in the ground with an auger and installing a casing.

DRILLED: A well constructed by making a hole in the ground with a drilling machine of any type, and installing casing and screen.

DRIVEN: A well constructed by driving a pipe in the ground, the drive pipe is usually fitted with a well point and screen.

DUG: A well constructed by excavating a large diameter shaft and installing a casing.

WET VENT: A wet vent is a waste pipe which serves to vent and convey waste from fixtures other than water closets.

YOKE VENT: A yoke vent is a pipe connecting upward from a soil or waste stack to a vent stack for the purpose of preventing pressure changes in the stacks.

4603 GENERAL

4603.1 CONFORMANCE WITH CODE:

(a) All plumbing systems hereafter installed shall conform to the minimum requirements and provisions as set forth in this Code.

(b) There will be no open ends permitted throughout the construction of any structure within the jurisdiction of this Code.

4603.2 CHANGE IN DIRECTION: Changes in direction in drainage shall be made by appropriate use of 45-degree wyes, long-or-short-sweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or other approved fittings. Single and double sanitary tees, quarter bends and one-fifth bends may be used in vertical sections of drainage lines only where the direction of flow is from the horizontal to the vertical.

4603.3 PROHIBITED FITTING AND CONNECTIONS:

(a) No fitting having a hub in the direction opposite to flow, or tee branch shall be used as a drainage fitting.

(b) No running threads, bands, or saddles shall be used in the drainage system.

(c) No drainage or vent piping shall be drilled or tapped.

4603.4 REPAIR AND ALTERATIONS TO EXISTING PLUMBING: Alteration, repair, or renovation of existing plumbing or drainage installations may be made at variance from the provisions of this Code, provided such deviations conform to the intent of the Code and are approved in writing by the Plumbing Official. Any previously installed fixtures or material found to be defective, deteriorated or dangerous to personal health or safety by the administrative authority shall be replaced in accordance with the provisions of this Code.

4603.5 TRENCHING, EXCAVATION, AND BACKFILLING:

(a) SUPPORT OF PIPING: Buried piping shall be securely supported in an approved manner to prevent sagging, misalignment and breaking.

(b) OPEN TRENCHES: All excavations required to be made for the installation of a plumbing piping system shall be open trench work and shall be kept open until the piping has been inspected, tested and accepted.

(c) BACKFILLING: Adequate precaution shall be taken to ensure proper compactness of backfill around piping without damage to such piping. Backfilling to a point not less than 12 inches above the top of the pipe shall be placed in thin layers with clean fill which does not contain stones greater than ½ inch, boulders, cinder-fill, or other material which would damage or break the piping or cause corrosive action.

4603.6 STRUCTURAL SAFETY: The work of installing or repairing any part of a plumbing and/or drainage system shall not impair the structural safety of the building or premises. The building or premises shall be left in a safe structural condition in accordance with the requirements of this Code.

4603.7 HIGHER REQUIREMENTS: Nothing herein contained shall be construed to prevent the owner form using higher requirements than those set forth in this Code.

4603.8 PROTECTION OF PIPES:

(a) BREAKAGE AND CORROSION: Pipes passing under or through walls shall be protected from external loadings or against differential settlement. Pipes in contact with cinders, concrete or other corrosive materials shall be protected from external corrosion by sleeves, coating, wrapping or other approved methods which will prevent such corrosion.

(b) CUTTING OR NOTCHING: No structural member shall be weakened or impaired by cutting, notching, or otherwise, except to the extent permitted by the Building Official.

(c) PIPES THROUGH CAST-IN-PLACE CONCRETE:

(1) Piping passing under a footing shall have a clearance of at least two inches between the top of the pipe and the bottom of the footing.

(2) Piping passing through cast-in-place concrete shall be sleeved to provide one-half inch annular space around the entire circumference of the pipe, except that piping may be cast in concrete without sleeves where movement or stresses have been specifically considered by the designing Architect or Professional Engineer.

4603.9 DAMAGE TO DRAINAGE SYSTEM OR PUBLIC SEWER: It shall be unlawful for any person to deposit by any means into the building drainage system or into a public or private sewer any ashes; cinders; rags; inflammable; poisonous, or explosive liquids; gases; or any other deleterious material which would or could obstruct, damage, or overload such system or sewer.

4603.10 INDUSTRIAL WASTES: Wastes detrimental to the public or private sewer system or detrimental to the functioning of the sewage-treatment plant shall be treated and disposed of as approved by the County Pollution Department and as directed by the Plumbing Official or other authority having jurisdiction. Air conditioning equipment shall not discharge directly or indirectly into rain water leaders which discharge into any surface gutter.

4603.11 SLEEVES: Annular space between sleeves and pipes shall be filled or tightly caulked with coal tar or asphaltum compound, lead, or other material found equally effective and approved as such by the Plumbing Official.

4603.12 VERMIN PROOFING: All inaccessible or concealed lead work within the enclosing walls of a building not enclosed in concrete or fill, shall be made rat proof by covering with copper or galvanized wire cloth well secured. Interior openings through walls, floors, and ceilings shall be sealed vermin proof.

4603.13 USED OR SECOND HAND EQUIPMENT: It shall be unlawful to purchase, sell, or install used equipment or material for plumbing installations unless it complies with the minimum standards set forth in this Code.

4603.14 CONDEMNED EQUIPMENT: Any plumbing equipment condemned by the Plumbing Official because of wear, damage, defects, or sanitary hazards, shall not be reused for plumbing purposes.

4603.15 PIPING IN RELATION TO FOOTINGS: Unless otherwise approved by the Building Official, by reason of a special design, no excavation for piping or drainage work shall be placed within the angle of pressure as transferred from the base of an existing structure to the sides of an excavation on a 45-degree angle, other than an excavation making an angle of more than 45 degrees to the wall.

4603.16 CONNECTIONS TO PLUMBING SYSTEM REQUIRED: All plumbing fixtures, drains, appurtenances, devices and appliances used to receive or discharge liquid wastes or sewage shall be connected to a drainage system, in accordance with the provisions of this Code.

4603.17 SEWER REQUIRED:

(a) Every building in which plumbing fixtures are installed shall have a connection to a public sewer if available.

(b) When a public sewer is not available for use, sewage and drainage piping shall be connected to an individual sewage, or waste disposal system.

4603.18 LOCATION OF FIXTURES:

(a) LIGHT AND VENTILATION: Plumbing fixtures shall be located in compartments or rooms provided with ventilation and illumination as set forth in Part III.

(b) IMPROPER LOCATION: Piping, fixtures, or equipment shall not be located in a manner to interfere with the operation of windows, doors, or other exit openings.

4603.19 FLANGED FIXTURE CONNECTIONS:

(a) (1) Fixture connections between drainage pipes and water closets, pedestal urinals and earthenware trap standards shall be made with flanges of brass, hard lead, iron or plastic connected to the drainage pipe as set forth in Section 4607 herein.

(2) The connections shall be bolted with approved gaskets, washers, or setting compound between the earthenware and the connections.

(3) The bottom of the flanges shall be set on top of the finished floor on an approved firm base.

(b) (1) Four by three inch reducing one-quarter bends or four by four inch one-quarter bends are acceptable.

(2) Lead outlets may be dressed or swedged to receive three inch ferrules.

(c) (1) Wall-mounted water-closet fixtures shall be securely bolted to carrier fittings.

(2) The connecting piping between carrier fittings and fixtures shall be designed to accommodate adequately sized gaskets.

(3) Gasket material shall be graphite-impregnated asbestos, felt, or similar approved materials.

(d) Lead bends and lead stubs shall be not less than 1/8 inch wall thickness (8 pounds psf).

4603.20 DEAD ENDS: In the installation or removal of any part of a drainage system, dead ends shall be avoided except where necessary to extend a cleanout so as to be accessible.

4603.21 TEMPORARY TOILETS:

(a) GENERAL:

(1) Sanitary facilities shall be required at construction sites, fairs, carnivals, revivals, encampments and other locations where numbers of people congregate for short periods of time and such sanitary facilities shall be permanent facilities as set forth herein or, where permanent facilities are not practicable, may be temporary toilets either of a water-borne flush type with sewer connection or of a portable chemical type, either of which shall comply with the requirements set forth herein.

(2) Pit, bucket or ground surface privies are prohibited.

(3) Any persons desiring to provide or erect temporary toilet facilities shall first submit plans and secure approval as set forth in this Chapter.

(4) The permit for a temporary toilet shall be for such period of time as the facilities may actually be needed but not to exceed 3 months except that for construction sites such period may be for 6 months.

(5) Temporary facilities are acceptable only where permanent facilities are not available.

(6) Temporary toilets shall be not less than 50 feet from any well.

(b) CONSTRUCTION SITES:

(1) PERMANENT TOILETS: Permanent toilet facilities located in a structure where alterations or additions are being made, or toilet facilities within 200 feet of the construction work, may be used provided the owner or party in possession thereof shall have given written consent for the use of such facilities during the entire period of construction and that a letter of written consent is attached to the approved plans.

(2) MINIMUM FIXTURE UNITS: Where the building under construction is multi-storied, fixtures shall be proportioned on the first floor, the fifth floor, the 10th floor, the 15th floor and every other 5th floor above.

No. of Workers	No. of Water Closets	No. of Urinals
1-19	1	—
20-40	1	1
41-80	2	2
81-120	3	3
121-160	4	4
161-199	5	5
200 and	1 additional water closet and 1 additional above urinal for each additional 50 workmen	

(c) PUBLIC ASSEMBLY: In places of public assembly such as fairs, carnivals, encampments and similar temporary assembly where permanent facilities are not available, toilet facilities shall be provided as set forth in Sub-section 4613.19 and such facilities may be of the temporary type as set forth herein.

(d) TEMPORARY TOILET ENCLOSURE:

(1) For other than water-borne, flush type, temporary toilets shall be enclosed in fly-tight, weather protected, well ventilated buildings with self-closing doors or the containers shall be enclosed to be fly-tight and ventilated with screened vents having an area not less than 1/7 of the floor area.

(2) Doors to stalls be provided with internal lock.

(3) Urinals shall be non-absorbent, and non-corrosive and designed to drain completely.

(4) Toilet tissue shall be furnished.

(5) Enclosures shall be constructed of non-corrosive materials not readily absorptive of odor or moisture.

(6) Enclosures shall be maintained in sanitary condition and shall be thoroughly cleaned and disinfected at least twice weekly.

(7) Enclosure shall be not less than 11 square feet total inside area.

(e) WATER-BORNE FLUSH TYPE:

(1) Flush tanks or flush valves shall be connected to an approved community water supply except that where community water supply is not available water pressure shall be provided by means of a well and pump.

(2) Where a public sewer is available, a permit to connect thereto shall be obtained and a proper branch fitting inserted between the reducing fitting at the property line and the test fitting. Upon completion of the construction work or termination of use of the temporary toilet, temporary sewer and water branches shall be removed and the branch sewer opening closed and a cast iron plug or cleanout caulked in place with an oakum

and lead caulked joint. Water lines shall be permanently capped or plugged.

(3) A permanent building sewer or drain may be installed to serve temporary toilets provided such sewer or drain complies with all requirements of this Chapter.

(4) Where a public sewer is not available disposal may be to a septic tank and drain field. Fixtures may be connected by a proper fitting in the building sewer between the septic tank and the test fitting; except that at construction sites fixtures may be placed over the septic tank on a temporary wood platform, by either removing the permanent concrete top cover or by providing a temporary wood platform over a manhole. A hole shall not be cut into a septic tank cover for the insertion of a water closet outlet.

(5) Fixture vent shall not be required for temporary water closets.

(6) Full caulked oakum joints without lead may be used for temporary water closet branches.

(f) PORTABLE CHEMICAL TYPE:

(1) Containers shall have a capacity of not less than 24 gallons.

(2) The top of the seat shall be not less than 8 inches above the liquid level in the container.

(3) Containers shall be of non-absorptive, non-corrosive material.

(4) Drain line from urinal to container shall be a minimum ½-inch ID plastic or non-corrosive material.

(5) Containers shall be completely emptied, thoroughly cleaned and disinfected at least twice weekly in accordance with Health Department requirements.

(6) An approved type disinfectant shall be used in sufficient quantity to provide odorless operation with normal usage.

(7) Waste shall be collected, transported and disposed of in a manner as approved by the Plumbing Official and Pollution Department.

(8) Units shall be marked with the name, address and telephone number of the servicing company.

4603.22 NUMBER OF PERSONS:

(a) Where minimum plumbing facilities are based on numbers of persons, the number of persons shall be taken as that reasonably anticipated and the number of persons anticipated shall be shown on plans for the proposed work.

(b) In place of public assembly where seating is provided including restaurants and bars, the number of persons shall be taken as not less than the number of seats nor less than as set forth in Table 31-A.

(c) In other Occupancies, the number of persons shall be taken as not less than the number of employees reasonably anticipated with consideration of anticipated public use such as at large retail sales areas or merchandise displays.

(d) Where the use of Occupancy of a building or space is changed, the number of persons shall be redetermined and facilities provided accordingly.

4604 MATERIALS

4604.1 STANDARDS:

(a) COMPLIANCE:

(1) All plumbing materials required by this Chapter: including pipe, fittings, valves, fixtures, appliances and appurtenances; when used in the construction, installation, alteration or repair of any plumbing or drainage system, shall comply with the Standards of this Section or as otherwise set forth herein and the identification of materials as set forth in Sub-section 4604.8.

(2) (aa) Plastic pipe and fittings for drain, waste and vent, both above and below ground shall be limited only by the occupancy and fire safety limitation of the South Florida Building Code.

(bb) The use of plastic pipe and fittings to support the weight of plumbing fixtures or other approved pipe and fittings will not be permitted.

(cc) The co-mingling or mixing of different types of plastic systems will not be permitted.

(3) The extension, addition or relocation of existing soil, waste or vent pipes may be made with materials of like grade and quality.

(b) STANDARDS:

(1) Materials and installation or use of materials shall comply with the Standards set forth in Table 46-C, as set forth in Section 402.NOTE: See Appendix A for schedule of piping system materials.

(2) Material not included in Table 46-C shall be used only as provided in Sub-section 4601.4 or Sub-paragraph 4604.1(a)(2).

(3) Materials shall be free of manufacturing defects, or damage, however occasioned, which would, or would tend to, render such materials defective, insanitary or otherwise improper to accomplish the purpose of this Code.

(c) LIMITS ON LEAD CONTENT OF MATERIALS IN POTABLE WATER SYSTEMS: The lead content of materials used in potable water systems shall not exceed the following maximums:

(1) The lead content of solder and fluxes shall not exceed 0.2 percent.

(2) The lead content of pipes and fittings shall not exceed 8.0 percent.

4604.2 MATERIALS FOR DRAINAGE SYSTEMS:

(a) ABOVE GROUND PIPING WITHIN BUILDINGS:

(1) Piping for a drainage system within a building or structure shall be of (service-weight or hubless) cast iron, galvanized steel, lead, brass, copper-pipe, copper-tube (type K, L, M,or D W V) or plastic pipe.

(2) Pipe shall be supported at floors as set forth in Section 4609.

(3) All copper pipe or copper tube offered for sale or installed within the jurisdiction of this Code shall have the standard colors for identification marked therein in accordance with the Standard Colors as promulgated by the Copper and Brass Research Association Data-76.

(b) UNDERGROUND PIPING WITHIN BUILDING:

(1) All underground piping for a drainage system within a building not exceeding three stories in height shall be cast-iron soil pipe, brass pipe, copper pipe Type K, L, M, or plastic pipe.

(2) All underground piping for a drainage system within a building exceeding three stories in height shall be cast-iron soil pipe, brass pipe, copper pipe Type K, L, M, or plastic pipe. Installation methods shall be the same as set forth in sub-section 4603.5 except that the minimum cover within the building shall be 2".

(c) UNDERGROUND PIPING WITHIN BUILDING OVER DELETERIOUS FILL:

(1) In buildings where the presence of hydrogen sulphide gas is known and in areas originally below high tide, all underground soil, waste and vent piping and fittings shall be centrifugally spun service weight cast iron, extra-heavy cast iron or plastic pipe and shall be continued to the point of disposal.

(2) Soil, waste and vent piping above ground in such areas may be copper type K, L, or D W V, galvanized pipe, centrifugally spun service-weight cast iron or plastic pipe with appropriate fittings.

(d) FITTINGS: Fittings on the drainage system shall conform to the material and type of piping used. Fittings on screwed pipe, plastic pipe or copper tube shall be of the recessed drainage type.

4604.3 BUILDING SEWER:

(a) GENERAL: The building sewer shall be of cast-iron, coated soil pipe of not less weight than used underground within the building, with leaded, hubless or neoprene rubber gasket joints; ; vitrified clay pipe and

fittings with compression type joints; ; plastic pipe and fittings with compression or cemented type joints, as set forth in Table 46-C.

(1) Installation methods of bedding, backfill and depth of cover shall be as set forth in Sub-section 4603.5.

(2) The installation of flexible thermoplastic sewer pipe shall also comply with the Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe, ASTM D2321, as set forth in Section 402.

(b) OLD BUILDINGS DRAINS AND SEWERS: Old building drains and building sewers may be used in connection with new buildings or new plumbing and drainage work only when they are found, on examination or test, to conform in all respects to the requirements governing new building drains and building sewers.

4604.4 BUILDING STORM SEWER:

(a) MATERIAL: The building storm sewers shall be clay pipe, cast-iron, concrete pipe or plastic pipe. Installation methods of bedding, backfill and depth of cover shall be as set forth in Sub-section 4603.5.

(b) INSIDE LEADERS AND DRAINS: Where placed within the building or run in an inner or interior court or shaft, all roof leaders shall be constructed of cast iron, copper tube, brass, galvanized steel pipe or plastic pipe. Roof drainage systems shall be provided with recessed drainage fittings.

(c) ROOF DRAINS: Roof drains with domes or strainers shall be connected as set forth in Section 4607 herein.

(d) OUTSIDE LEADERS: Outside rain leaders shall be installed as follows: Where located in a place accessible or exposed to contact with vehicles, cast iron shall be extended five feet above grade. All other locations, cast iron shall extend at least one inch above grade. Install foot block at bottom of leader eight inches above grade and six inches beyond leader.

(e) DEFECTIVE LEADER PIPE: When an existing leader pipe becomes defective, such leader shall be replaced by one which conforms to this Code.

(f) BACKWATER VALVES: Backwater valves shall have all bearing and moving parts of corrosion-resistant material.

4604.5 CLEANOUTS: Cleanouts shall be of metal or plastic, shall have a threaded plug or other approved type of connection, and shall conform to the materials requirements for pipe and fittings set forth in this section.

4604.6 VENTS:

(a) PIPING ABOVE GROUND: Vent piping shall be of cast-iron, galvanized steel, lead, brass, copper tube or plastic pipe.

(b) UNDERGROUND: Vent piping placed underground shall be cast-iron soil pipe, lead pipe, brass pipe or plastic pipe.

(c) FITTINGS: Fittings shall conform to the type of pipe used in the vent system as required by Sub-Section 4604.2 Drainage pattern fittings shall not be required in a dry vent system.

(d) ACID SYSTEMS: Vent piping on acid-waste systems shall conform to that required for acid-waste pipe, except where other material is found adequate by the Plumbing Official.

4604.7 SPECIAL REQUIREMENTS:

(a) CAULKING FERRULES:

(1) Brass caulking ferrules shall be of brass pipe or of heavy cast brass of weight and dimensions as set forth in Table 46-A.

(2) Seamless copper ferrules may be used in lieu of cast brass, provided they correspond in size and weight.

TABLE 46-A

For Use With Extra-Heavy				For Use With Service Weight		
Pipe Size (Inches)	Actual Inside Diameter (Inches)	Length (Inches)	Weight (Oz.)	Actual Inside Diameter (Inches)	Length (Inches)	Weight (Oz.)
2	2 1/4	4 1/4	16	2	4	12
3	3 1/4	4 1/2	28	3	4	25
4	4 1/4	4 1/2	40	4 1/8	4 1/2	30

(b) SOLDERING NIPPLES AND BUSHINGS: Soldering nipples and bushings shall be brass pipe or of heavy cast brass of weight and dimensions as set forth in Table 46-B.

TABLE 46-B

Size of Pipe (Inches)	Weight Per Foot (Lb.)	(Oz.)
1 1/4	0	6
1 1/2	0	8
2	0	14
2 1/2	1	6
3	3	2
4	3	8

(c) SINKS AND SPECIAL FIXTURES: Sinks and special fixtures may be made of soapstone, chemical stoneware, or may be lined with lead, copper-base alloy, nickel-copper alloy, corrosion-resisting steel or other materials especially suited to the use for which the fixture is intended.

(d) DRAINFIELD PIPING: Piping from a septic tank or dosing chamber to a drainfield shall be cast-iron or PVC and PVC under paving shall be Schedule 40.

4604.8 IDENTIFICATION OF MATERIALS: Each length of pipe, and each pipe fitting, trap, fixture, and device used in a plumbing system shall have cast, stamped, or indelibly marked on it the maker's mark or name, the weight, type, and classes of the product, when such marking is required by the approved Standard that applies.

TABLE 46-C

STANDARDS FOR MATERIALS IN PLUMBING INSTALLATIONS

Description	ANSI	ASTM	FS	Other
Ferrous Pipe, Fittings and Valves				
Cast Iron Drainage Fittings, Threaded	B16.12-1991	None	WW-P 49lb-1967	None
Cast Iron Screwed Fittings (Threaded)	B16.4-1992	None	WW-P 50lb-1967	None
Cast Iron Pipe (Threaded) D.W.V.	A40.5-1943	None	WW-P356a-1967	None
Cast Iron Pipe, Thickness Design of	A21.1-1967(R-1977)	None	WW-P-421c-1967	None
Cast Iron Soil Pipe and Fitting Hub & Spigot	A112.5.1-1973	A74-94	WW-P-401e-1974	
Cast Iron Water Pipe (2")	A21.12-1971	A377-89	WW-P36Ob-1968	None
Cast Iron Water Pipe (Cast in metal molds)	A21.6-1975	None	WW-P-421c-1967	None
Cast Iron Water Pipe Fittings	C110-77	A377-89	None	AWWA C110-87
Ductile-Iron Pipe	A21.51-1991	A377-89	WW-P-421c-1967	AWWA C151-86
Hubless Cast Iron Sanitary System with No-Hub System Fittings	None	A-888-94	WW-P401e-1974	CISPI 301-95
Malleable Iron Screwed Fittings, 150 lbs and 300 lbs	B16.3-1992	None	WW-P521f-1968	None
Nipples, Pipe, Threaded	None	None	WW-N-35lb(1)-1970	None
Pipe Fittings, Ferrous (Bushings, plugs and locknuts) Threaded, 125 and 150 lbs	B16.14-1991	None	WW-P47lb-1970	None
Pipe Threads (except Dry seal)	B1.20-1983	None	None	None

Steel Pipe, Stainless	B36.19M-1985	A312-92A	None	None
Steel, Stainless, Water-DWV Tubes	None	A651-79	None	None
Steel Pipe, Welded or Seamless (for coiling) Black or Galvanized	B125.1-1976	A53-90B	WW-P-47 lb-1970	None
Steel Pipe, Welded or Seamless Black or Galvanized	B125.2-1976	A120-83	WW-P0-404c(1)1962	None
Steel Pipe (Cement-mortar lining and Reinforced Cement-mortar Coating)	A21.4-1990	None	SS-P305a(1)1968	AWWA C104-90
Steel Pipe, Wrought, Welded and Seamless	B36.10-85	None	None	None
Steel Pipe (Coal tar enamel or cement mortar lining and coal tar enamel lining and coal tar enamel coated and wrapped	None	None	WWP1432-1970	AWWA C203-86
Unions, Pipe, Steel or Malleable Iron	B16.39-1986	None	WW-U 531-c 1965	None
Valves, Ball	None	None	WW-V-35a-1965	None
Valves, Cast Iron, gate 125 and 250 lb.	None	None	WW-V-58b-1971	None
Valves, Cast Iron, Swing Check	None	None	None	AWWA C508-82
Wrought Iron Pipe, Welded, Black or Galvanized	B-3610M-1985	A72-68	None	None
Non-Ferrous Metallic Pipe, Fittings and Valves				
Brass Tube, Seamless	H-36.1-1973	B135-83	WW-T-791a-1971	None
Brass, Red, Seamless, Pipe, Standard Sizes	H27.1-1973	B43-84	WW-P351a-1963	None
Bronze Flanges and Flanged Fittings	B16.24-1991	None	None	None

Cast Bronze Fittings for Flared Copper Tubes	B16.26-1988	None	None	None
Cast Bronze Solder-Joint Pressure Fittings	B16.18-1984	None	WW-T-725-1967	None
Cast Bronze Solder-Joint Drainage Fittings	B16.23-1992	None	None	None
Copper Pipe, Seamless, Standard Sizes	H26.1-1976	B42-93	WW-P-377d-1962	
Copper Pipe, Threadless	H26.2-1976	B302-92	WW-P-377d-1962	None
Copper Tube, Drainage DWV	H23.6-1976	B306-92	None	None
Copper Tube, Seamless	H23.3-1976	B75-92a	WW-T-797c-1963	None
Copper Tube, Water, Seamless Types, K, L, and M	H23.1-1976	B88-93	WW-T-799d-1971	None
Copper and Copper Alloy Pipe and Tube, General Requirements	H23.4-1976	B251-84	None	None
Copper and Copper Alloy Tube (Welded)	None	B88-93	None	None
Lead Pipes, Bonds and Traps	None	None	WW-P-325a-1967	None
Pipe Fittings, Brass or Bronze, 125 and 250 lbs. Cast or Wrought	B16.15-1985	None	WW-P-460b-1967	None
Solder-Joint Fittings, Pressure, Copper Alloy	B16.22-1989	None	WW-T-00725-1967	None
Shower Receptors, and Shower Stall Units Gel-Coated, Glass fiber reinforced Polyester Rosin	Z184.2-1987	None	None	None
Sinks, Kitchen and Service, and Laundry Tub	A112.19.1-1973	None	WW-P-541/5A-1971	None
Supports for Off-the-Floor Plumbing Fixtures for Public Use	A112.61M-1979	None	None	None

Thermostat Mixing Valves, Self-Actuated Primarily for Domestic Use	None	None	None	ASSE 1017-79
Urinals	A112.19.2-1973	None	WW-P-541/2A-1971	None
Water Closets	A112.19.2-1973	None	WW-P-541/1A-1971	None
Water Closets Bowls, Trim for	A112.19.5-1978	None	None	None
Water Hydrants	None	None	None	ASSE 1010-78
Backflow Preventers	A40.6-1943			
Vacuum Breakers, Anti-Sophon	A112.1.1-1971	None	None	ASSE1001
Vacuum Breakers, Hose Connection	A112.1.3-1976	None	None	ASSE 1011-70
Double Check with Atmospheric Vent	None	None	None	ASSE1012
Reduced Pressure Principle Assembly	None	None	None	ASSE 1013
Double Check Valve Assembly	None	None	None	ASSE-1015
Pressure Vacuum Breakers Assembly	A112.1.7-1976	None	None	ASSE 1020
Diverters for Plumbing Faucet w/Hose Spray, Anti-Siphon Type Residential Applications	None	None	None	ASSE-1025-78
Dual Check Valve Type	None	None	None	ASSE 1024
Laboratory Faucet Vacuum Breakers	None	None	None	ASSE1035
Reduced Pressure Principle Assembly Test Procedures	None	None	None	ASSE 5010-1013-1
Double Check Valve Assembly Test Procedures	None	None	None	ASSE 5010-1015-1 ASSE 5010-1015-2 ASSE 5010-1015-3 ASSE 5010-1015-4

Pressure Vacuum Breaker Assembly Test Procedures	None	None	None	ASSE 5010-1020-1
Double Check Detector Assembly	None	None	None	ASSE 1048
Double Check Pressure Detector Assembly	None	None	None	ASSE 1047
Double Check Detector Ass. Test Procedures	None	None	None	ASSE 5010-1048-1 ASSE 5010-1048-2 ASSE 5010-1048-3 ASSE 5010-1048-4
Reduced Pressure Detector Assembly Test Procedures	None	None	None	ASSE 5010-1047-1
Backflow Prevention Assembly Tester	None	None	None	ASSE 5000
Miscellaneous				
Air Gap Standards A112l.1.2-1942 R-1979	None	None	None	None
Arresters, Water Hammer	A112.26.1-1969 R1975	None	None	ASSE 1010
Asbestos, Cement Pressure Pipe Installation	None	None	None	AWWA-C603-1
Enamel, Coat-Tar, (Protective Coating)	None	None	None	AWWA-C203-86 AWWA-C210-84
Clamps, Hose	None	None	WW-C440B(a)1969	None
Water Heater, Electric Storage Tank Household	None	None	W-H-196j-1973	UL174-1977 ASSE-1002-73
Water Heater, Instantaneous	None	None	WW-H191lb-1970	None
Water Heater Oil Fired Storage Type	None	None	None	UL732-1975
Plumbing Fixtures and Appurtenances				
Accessories for Plumbing Fixtures	None	None	WW-P541/Oa-1974	None
Bathtubs	A112.19.1H-1979	None	WW-P-541/3a-1971	None

Bathtubs Units, Gel-Coated, Glass Fiber Reinforced Polyester Resin	Z124.1-1987	None	WW-P541/3a-1971	None
Drinking Fountains	A112.11.1-1973	None	WW-P-541/6a-1971	None
Fittings, Plumbing Fixtures, Finished and Rough Brass	A112.18.1M1-1989	None	WW-P541 ALL-1971	None
Floor Drains	A112.21.1-1991	None	None	None
Hand-Held Showers, Performance				
Requirement	None	None	None	ASSE 1014-79
Individual Control Valves, Anti-Scald Type	None	None	None	ASSE 1016-79
Lavatories	None	None	WW-P-541/4a-1971	None
Lavatory, Cultured Marble	Z-124.3-1986	None	None	
Plumbing Fixtures, General Specification	None	None	WW-P-541/Gen-1971	
Plumbing Fixtures, Enameled Cast Iron	A112.19.1-1973	None	WW-P-541/3A 5A-1971	
Plumbing Fixtures, Stainless Steel	A112.19.3-1976	None	WW-P541/5A-1971	None
Plumbing Fixtures, Vitreous China	A112.19.2-1973	None	WW-P-541/1A,2A, 4A, 6A-1971	
Plumbing Fixtures, Enameled Steel	A112.19.4-1977	None	None	None
Polyvinyl Chloride (PVC) Plastic Flexible Concealed Water--Containment Membrane	None	ASTM D4551	None	None
Shower Baths and Heads and Water Control Valves	None	None	WW-P-541/7B-1974	None
Shower receptor, Shower Enclosures and Non-Metallic Bathtubs Prefabricated	Z124.1-1987 Z124.2-1987	None	None	

Rubber Gaskets for Cast Iron Soil-Pipe and Fittings	None	C564-82	None	None
Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings	A21.11-1990	None	None	AWWA C111-90
Rubber Gaskets Molded or Extruded, for Concrete Non-Pressure Sewer Pipe	None	C443-79	HH-G-o160b-1968	None
Rubber Rings for Asbestos Cement Pipe	18.7-1971	D1869-83	None	None
Rubber Gaskets, Sheet	17.2-1971	D1330-70	None	None
Pipe Joining Materials and Gaskets, and Supports				
Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints	None	None	SS-S-210(1965)	None
Sealing Compound, Sewer, Bituminous Two-Component, Mineral-Filled, Cold Applied	None	None	SS-S-168(2)1962	None
Pipe Hangers and Supports	None	None	WW-H-171d-1970	None
Plumbing Appliances and Appurtenances				
Dishwashing Machines Commercial	None	None	OOO-431c(2)-1970	UL 921-1978 ASSE 1006
Dishwashing Machines, Household	None	None	None	UL 749-1978
Drinking Water Coolers, Self-Contained Mechanically Refrigerated	None	None	None	ARI-1010-1020-84 UL 399-1978
Food Waste Disposal Units, Household	None	None	QQ-G-001513-1968 ASSE 1008	
Home Laundry Equipment	None	None	None	UL560-1978 ASSE 1007
Water Heaters, Automatic Storage Type	Z21.10.1a-1978	None	None	None

Water Heaters, Circulating Tank	Z21.103a-1978	None	None	None
Polyvinyl Chloride (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	K65.56-1971	D2665-91B	L-P320a-1966	NSF-14
Type PSM PVC Sewer Pipe and Fittings	None	D3034-89	None	None
Styrene-Rubber Plasstic Drain Pipe and Fittings	None	D2852-89	None	None
Solvent Cement for Styrene Rubber Plastic Pipe and Fittings	None	D3122-89	None	None
Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)	None	D2241-89	None	NSF 14
Thermoplastic Accessibile and Replaceable Plastic tube and Tubular Fittings	None	F409-81	None	NSF 14
Polybutylene (PB) Plastic Pipe and Tubing for Cold Water Service Pipe (SDR)	None	D2662-89	None	NSF 14
Tubing	None	D2666-89	None	NSF 14
Pipe (SDR-00)	None	D3000-89	None	NSF 14
Recommended Practice for making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Plastic Pipe and Fittings	None	D2855-83	None	None
Pipe Joining Materials and Gaskets, and Supports				
Caulkling, Lead Wool and Lead Pig	None	None	QQ-C40(2)1970	None
Compression Joints for Vitrified Clay Bell and Spigot Pipe	A106.6-1977	C425-91	None	None
Plastic Elastomeric Joints	None	D3139-77 D31281	None	None
Fixture Setting Compound	None	None	TT-P-1536(1968) Revision of HHC 536a-1954	None

Hubless Stainless Steel Couplings	None	None	None	CISPI 307-78
Non-Metallic Gaskets for Pipe Flanges	B1621-1978	None	None	None
Neoprene Rubber Gaskets for Hub and Spigot Cast Iron Soil Pipe and Fittings	None	C564-88	None	CISPI HSN-76
Polyethylene (PE) Plastic Pipe, (SDR-PR)	B72.1-1975	D2239-89	L-P315c-2-1975	NSF 14
Butt Fusion Polyethylene(PE) Plastic Pipe Fittings, Schedule 40	K65.160-1971	D3261-90	None	NSF 14
Butt Fusion Polyethylene (PE) Plastic Pipe Fittings, Schedule 80	K65.159-1971	D3261-90	None	NSF 14
Plastic Insert Fittings for Polyethylene Plastic Pipe	None	D2609-90A	L-F001546-1968	NSF 14
Polybutylene (PB) Plastic Hot and Cold Water Distribution Systems	None	D3309-83	None	NSF 14
Type PSP PVC Sewer Pipe and Fittings	None	D3033-83	None	NSF 14
Polyethylene (PE) Plastic Tubing	None	D2737-89	None	NSF 14
Chlorinated Poylvinyl Chloride (CPVC) Plastic Hot-Water Distribution Systems	None	D2486-92	None	NSF 14
Chlorinated Polyvinyl Chloride (CPVC) Solvent Cement	None	P493	None	NOne
Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120	B72.7-1971	D1785-91	L-P1036A-1974	NSF 14
Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40	None	D2466-90A	None	NSF 14

Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80	None	D2467-92	None	NSF 14
Solvent Cement for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings	B72.16-1971	D2564-91	None	NSF 14
Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80	K65-166-1971	D2464-90	None	NSF 14
Bell-End Poylvinyl Chloride (PVC) Pipe	B72.20-1971	D2672-92	None	NSF 14
Clay Pipe, Perforated, Standard and Extra Strength	A106.8-1978	C700-91	SS-P-361E	None
Concrete Drain Tile	None	C412-90	None	None
Concrete Low Head Pressure Pipe Reinforced	None	C361-92	None	None
Concrete Pipe Perforated	None	C444-90	None	None
Concrete Pipe (Sewer, Storm Drain and Culvert) Non-reinforced	None	C14-92	SS-P371e-1968	None
Concrete Pipe, Pressure Reinforced Concrete, Pre-Tensioned Reinforcement				
Concrete Pipe, Pressure Reinforced Concrete, Pre-Tensioned Reinforcement (Steel Cylinder Type)	None	None	SS-P—381A-(2)-1972	AWWA C30387
Concrete Pipe (Culvert, Storm Drain and Sewer) Reinforced	None	C76-90	SS-P-375d-1970	None
Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedule 40 and 80	B72.5-1971	D1527-89	None	None
Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR and Class T)	B72.3-1975	D2282-89	None	NSF 14

Socket-Type Acrylonitrile-Butadiene Styrene (ABS) Plastic Pipe, Fittings, Schedule 40	K65.164-1971	D2468-90	None	NSF 14
Socket-Type Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Fittings, Schedule 80	K65163-1971	D2469-76	None	NSF 14
Threaded Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 80	K65.165-1971	D2465-79	None	NSF 14
Acrylonitrile-Butadiene-Styrene (ABS) Plastic Drain, Waste, andVent Pipe and Fittings, Schedule 40	B72.18-1971	D2661-91	L-P332D-1973	
Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and fittings	B72.23-1971	D2235-89	None	NSF 14
Polyethylene (PE) Plastic Pipe, Schedule 40	B72.8-1971	D2104-89A	None	NSF 14
Polyethylene (PE) Plastic Pipe, Schedule 40 and 80 Based on Outside Diameter	B72.23-1971	D2447-89	None	NSF 14
Coating Pipe, Epoxy, Fusion Bond	None	None	None	AWWA-C213-85
Coating Pipe, Thermoplastic Resin or Thermosetting, Epoxy	None	None	L-CO53OB-1970	None
Copper , Sheet and Strip for Building Construction	None	B370-83	None	None
Clay Pipe, Installation	A106.2-1977	C12-82	None	None
Clay Pipe, Testing	A106.5-1978	C301-78c	None	None
Drain, Roof	A112.21.2-1971	None	None	None
Interceptors, Grease	None	None	None	PDI G 101

Drain, Floor	A112.21.1-1968R1974	None	None	None
Lead Sheet, Grade A	None	None	QQ-L-201f(2)-1970	None
Relief Valves, Automatic	Z21.11-1979	None	None	None
Reducing Valves, Water Pressure for Domestic Water Supply System	A112.26.2-1975	None	None	ASSE 1003S
Solder, Soft	None	None	QQ-S-571d-1963	None
Tape Pipe Coating, Pressure Sensitive Polyethylene	None	None	L-T-0075(1)-1966	None
Thermoplastic Pressure Piping Underground Installation	None	D2774-83	None	None
Trap Seal Primer Valves	None	None	None	ASSE 1018-7
Valve, Backwater	A112.14.1-1975	None	None	None
Valve, Drain, Water Heater	None	None	None	ASSE 1005
Water Closet, Flush Tank, Ball Cocks	None	None	None	ASSE 1002-7

*__NOTE__: The Standards set forth in this table are intended to supplement, not supersede, the requirements otherwise set forth in this Chapter. Only those procedures of the Standards stated as being mandatory by the Code shall be mandatory, and recommendations, suppositions or preferences so stated as Standards shall not be construed to be mandatory.

4605 DRAINAGE SYSTEM AND DISPOSAL

4605.1 GENERAL REQUIREMENTS:

(a) Sewage and liquid waste shall be treated and disposed of as hereinafter provided. Septic tanks, sewage treatment systems, soakage pits, drainage wells, and/or other drainage work on or from premises or building sites shall be constructed, installed and maintained as herein provided.

(b) It shall be unlawful for any person to cause, suffer, or permit the disposal of sewage, human excrement and/or liquid waste in any place or manner except through and by means of an approved plumbing and drainage disposal system installed and maintained in accordance with the provisions of this Code. (See Section 4615 for septic tank requirements.)

(c) In areas where no public sewer is provided or where a connection to the public sewer is not permitted by the Engineering Department, or where no sewer connection through an easement is available, plumbing and drainage of all properties shall be connected to a private disposal system constructed in compliance with the provisions hereinafter set forth. (NOTE: Some public sewers are surcharged or over-loaded. In some

instances, therefore, the Engineering Department may prohibit the disposal of additional waste to these sewers. Liquid wastes shall then be disposed of by means of an approved soakage pit, drainage well, or other approved means.

(d) No septic tank, drainfield pipe, soakage pit, drainage well or water supply well or other drainage work shall be installed or discharged on any public property outside the property lines of the premises or structure served without first securing a written approval to do so from the Engineering Department and the Plumbing Official. Approval may be limited to certain specific conditions.

(e) ENCROACHMENT ON PRIVATE PROPERTY — EASEMENT REQUIRED: No sewer, septic tank, drainfield pipe, soakage pit, drainage well, water supply well or other drainage work shall be located or installed or discharged on any privately owned property outside the property lines of the premises or structures served except as specifically permitted herein. Permission for such installation may be granted upon presentation to the Plumbing Official of a properly executed easement which has been recorded with the Clerk of the Circuit Court. Such easement which has been executed and recorded as aforesaid must be filed with the Plumbing Official before a permit for such work may be approved. The common ownership of the property for which such permit is approved and the property encumbered by such easement shall not waive any of the above requirements.

(f) SEWER EASEMENT: At the option of the owner of a property which does not abut a public sewer but where a sewer connection can be secured through an adjoining lot or property whether of the same ownership or not, a connection to the public sewer may be made through such adjoining lot or property by virtue of a properly executed and recorded easement under such conditions as the Plumbing Official and Engineering Department shall permit, and as set forth in paragraphs 4605.1(d) and 4605.1(e).

(g) PLANS AND SPECIFICATIONS AND INFORMATION REQUIRED: Complete and detailed specifications, plans and other information shall be provided as required in this Code from the person designing the work and/or by the owner of the premises desiring to dispose of liquid waste or sewage before a permit is approved and construction work of any nature is commenced.

(h) LOCATION OF HOUSE DRAIN: House drains installed in connection with new construction where waste disposal is to a septic tank shall comply with Paragraph 4615.

4605.2 REGULATIONS GOVERNING THE DISCHARGE OF LIQUID WASTESAND/OR SEWAGE INTO THE PUBLIC SEWER SYSTEMS:

(a) The volume of liquid waste discharged into the public sewer system shall be regulated in such manner as not to impede or overload or surcharge or cause the public sewer system to overflow or back up into private property or flood public thoroughfares or private property.

(b) APPROVAL AND PERMITS REQUIRED BEFORE COMMENCING WORK: No work shall be commenced before the approval of the Engineering Department is secured in writing upon plans submitted or before a building and plumbing permit is issued. The Engineering Department shall not give approval for the discharge of liquid waste to a public sewer except in accordance with the following terms and restrictions:

(c) PROHIBITED DISCHARGES TO SEWERS: Storm or rainwater or other liquid waste shall not discharge into a sanitary sewer, nor shall sewage discharge into a public storm sewer, except as herein provided for.

(d) SEWER CONNECTIONS REQUIRED AND LIMITED: Connection for the disposal of sewage and liquid waste shall be made to a public sewer when and where such connection can be made without impending, over-loading or surcharging the public sewer system.

(e) IMPEDING, IMPAIRING, OR SURCHARGING PUBLIC SEWER PROHIBITED: Notwithstanding any other provisions of this Code, no person, firm or corporation shall permit any sewage, substance or liquid waste to discharge into a public or private sewer, which would injure, impede, impair,

overflow, surcharge, overload, stop or clog such sewer. No person, firm or corporation shall permit any explosive or volatile substances, cleaning fluids, solvents, gas, smoke, exhaust fumes, gasoline, benzene, naphtha, steam, acid, oil, grease, sand, glass or any other deleterious substances to enter or discharge into a plumbing system or a public sewer system.

(f) Where a container for food, garbage and liquid waste is required, it shall be set on a 6" raised slab 12" larger on all sides of the container. The drain shall be 4" with a required grate with a free area of at least 16 square inches. (This section shall not apply to "H" and "I" Occupancies.)

4605.3 SEWAGE AND LIQUID WASTE DISPOSAL WHERE A PUBLIC SEWERIS AVAILABLE:

(a) Sewage and liquid waste shall discharge into public sewer if such sewer is available and abutting the property except as herein provided. Rainwater only may discharge to street gutters (not over sidewalks) if permitted by the Plumbing Official and Engineering Department.

(b) LIQUID WASTE DISPOSAL WHERE A PUBLIC SEWER IS AVAILABLE: Liquid waste may discharge into a public sewer only upon approval of the Engineering Department. Such approval shall accompany request for plumbing plan approval and the permit therefore shall be obtained from the Plumbing Official. If not permitted to discharge into a public sewer, liquid waste may discharge to soakage pits or drainage wells; however, the responsibility for satisfactory operation shall rest upon the owner, and permits shall be issued conditionally with the owner (not the contractor or other person) assuming full responsibility for the maintenance and operation.

NOTE: Some types of liquid wastes cannot be successfully disposed of via pits or wells. Pits and wells receiving liquid wastes from establishments such as automobile wash floors, refrigerators, laundries, milk bottling plants, bars and food processing plants generally result in unsanitary conditions and public nuisance, and therefore must be abated by legal action. Soakage pits and drainage wells for rainwater or other clear water wastes have operated successfully in the majority of installations.

(c) INTERCEPTING TANKS REQUIRED: Until such time as the proposed public sewer and sewage treatment system is completed, a septic tank and drainfield shall be installed as required.

4605.4 CONDITIONAL RETENTION AND TIME DISCHARGE TO PUBLIC SEWERS:

(a) Where the Engineering Department determines a public sewer to be overloaded and/or surcharged at times of peak usage, said Department is hereby empowered and authorized to issue a conditional permit for the discharge of sewage or liquid waste to the public sewer system, provided that the owner and designer shall comply with all conditions and requirements set forth in said conditional permit and/or contained in this Code and before a sewer permit is issued, Conditional permits shall provide:

(1) That a retention tank of suitable and acceptable size be provided, designed to hold and retain all of the sewage and liquid waste at times when the public sewer is over-loaded and surcharged and to discharge the contents of said tank at such time as the Engineering Department may require and specify.

(2) That such tank be provided with an automatic time control device designed to limit and regulate the flow from the tank to the public sewer at a time when and in such quantity as within the capacity of the public sewer to care for same.

(3) That the premises be open to inspection at such time and place as the Engineering Department and Plumbing Official may specify, and that the installation be maintained in good and proper working condition.

(4) That upon a violation of any of the provisions herein contained the conditional permit shall be revoked and the sewer connections be removed and plugged by a licensed Master Plumber.

(5) That should such connection not be removed upon proper notice, the Engineering Department be and is hereby authorized to cause a disconnection and assess the cost of same to the owner and/or management of the property.

(6) Any permit issued for connection to a public sewer under any of the conditions set forth in any of the foregoing sections, shall be issued and accepted conditionally.

(b) Such conditional permit shall be issued in writing by the Plumbing Official, and the acceptance of the terms and conditions of issuance shall be indicated thereon by the signature of the person to whom such permit is granted. It is expressly provided however, that in the event of change of ownership and/or occupancy of the property and/or premises for which such permit has been granted then such permit shall become void and of no effect, unless renewed by the Plumbing Official. Upon the change of ownership and/or occupancy the person to whom a conditional permit is granted shall forthwith surrender such conditional permit to the Plumbing Official for regranting and/or cancellation. (See Table 46-F.)

(c) The volume of liquid waste permitted to discharge into the public sewer system shall be limited to a zone and a lot area bases of 7,500 square feet for a limited volume of liquid waste or sewage as permitted by the Engineering Department.

4605.5 SEWAGE AND LIQUID WASTE DISPOSAL WHERE A PUBLIC SEWER IS NOT AVAILABLE:

(a) Where a public sewer is not available, sewage, all waste from plumbing fixtures, except liquid waste of a non-fecal character, shall discharge into a septic tank or other acceptable method of sewage disposal as hereinafter provided. Liquid wastes of a non-fecal character shall discharge into an approved soakage pit, drainpipe field or bed or drainage well for that purpose only and/or shall be disposed of by a form of treatment acceptable to the Plumbing Official.

(b) Where a permit to connect to a public sewer is refused, or where no public sewer is available, the factors in Table 46-E shall govern and apply in the disposal of liquid wastes from establishments as herein set forth or similar establishments.

(c) DILUTION TANK REQUIRED FOR CORROSIVE WASTES: No corrosive waste which has a pH of less than 5.0 shall discharge into any plumbing pipe or any house drain or a house sewer of standard material and construction without first discharging into a neutralizing tank or basin. Every neutralizing tank or basin used for this purpose shall be constructed of earthenware or glass or other non-corrosive material and shall be provided with a standing waste and overflow or other approved means to ensure neutralization. A chamber shall be provided to retain a sufficient quantity of lime or other approved neutralizing material which shall be removed as often as may be necessary to render such neutralization effective. Such neutralizing tank or basin shall be provided with a controlled supply of water or neutralizing medium to make its contents non-injurious to an ordinary plumbing system or to the public sewer system. All pipes and fitting to neutralizing tanks and to a point of approved neutralization in a plumbing system, including the connecting fitting in a main drain or sewer, shall be duriron or equal.

TABLE 46-E

Type of Liquid Waste	Type of Establishment	Method of Disposal
(a) Liquid wastes containing appreciable amounts of grease, oil, solids or other material in suspension or liquid wastes of like character from establishments such as:	Auto Wash Floors Bakeries Bottling Plants Candy Manufacturing Plants Dry Cleaning Plants Restaurants or places preparing or serving food Laundries Milk Plants Food Processing Plants	To separate disposal systems for such waste only.
(b) Liquid wastes which ordinarily do not contain appreciable amounts of oil, grease, solids or other materials in suspension from establishments as:1	Air Conditioning Equipment Liquor or Beer Bars Juice Bars Soda Fountains not preparing or serving food Condensation from Refrigeration Boiler or Clothes Pressing Blow-Off Exhausts Ice Plants Fire Sprinkler Drains Drip or Overflow Pans Condensers De-humidifiers	May be discharged to disposal system combined for liquid waste set out in paragraph (b)1

(1) Rainwater to separate disposal system.

(d) INDEPENDENT SYSTEMS: The septic tank and drainage system of each building shall be separate and independent of any other building except that where buildings are built on a single lot or building site of single ownership and it is apparent that the lot cannot be subdivided and result in dual ownership, one septic tank and drainage system may be installed.

(e) LIMITS FOR DISCHARGE OF LIQUID WASTE INTO SEPTIC TANKS AND DRAINAGE PIPES: Liquid waste shall not discharge into an existing septic tank or drainpipe thereof when such septic tanks and drainpipe constitute the minimum requirement of this Code for the disposal of sewage.

(f) DISCHARGE OF SEWAGE OR LIQUID WASTE INTO NATURAL OR ARTIFICIAL BODIES OF WATER: The discharge of any sewage or liquid waste (as herein defined) whether treated or untreated into any body of water natural or artificial is hereby prohibited except as expressly permitted by the Florida Department of Environmental Regulation.

TABLE 46-F
CONDITIONAL PERMIT FOR DISCHARGE OF LIQUID WASTE OR SEWAGE TO A PUBLIC SEWER SYSTEM

I _____ do hereby certify that I am the legal owner, representative of the owner, lessee, of the _____ _____ located at Lot _____ Block _____ Subdivision _____

In making application for, and accepting a permit for the discharge of sewage and/or liquid waste

_____

_____

at the above described premises, it is understood by the undersigned that such permit is a CONDITIONAL PERMIT and is issued conditionally and is accepted by the undersigned upon the following condition, viz; that the _____

_____

will be maintained by the undersigned in such manner as to exclude from the public sewer system all milk products, cloth, steam, water over 125 degrees F., vapor, sand, silt, dirt, mud, or other solids, and all greases, oil, gasoline and/or inflammable fluids.

It is further understood and agreed that should this connection be improperly maintained to such an extent as to interfere with the operation of the public sewer, or should the sewer become overloaded, then in that event the undersigned will have the public sewer connection disconnected by a licensed Master Plumber and seal the connection to the public sewer upon a twenty-four hour notice so to do served by the Plumbing Official.

Any change of the legal ownership, representative of the owner, or lessee will invalidate this agreement unless renewed on the part of such new legal owner, representative of the owner or lessee.

Signed _____

Address _____

STATE OF FLORIDA

SS

COUNTY OF _____

Before me the undersigned authority, personally appeared _____

_____

to me well known, and who being first duly sworn upon oath deposes and says that he is the owner, representative of the owner, lessee, of the above described premises and that he has carefully read the foregoing and that he did sign the same and that all the facts therein by him stated are true.

Read, sworn to and subscribed before me

Signed

_____

Notary Public

My commission expires _____

(g) GARBAGE CONTRIBUTED TO SEWERS FROM DOMESTIC AND COMMERCIAL FOOD GRINDERS: Garbage contributed from domestic and commercial food grinders shall not enter a sewer which conveys same to a sewer treatment plant unless approved by the proper administrative authority.

4605.6 FIXTURE UNITS: VALUES FOR FIXTURES:

(a) Fixture values as given in Table 46-I designate the relative load weight of different kinds of fixtures which shall be employed in estimating the total load carried by a soil or waste pipe and shall be used in connection with the Table of sizes for soil, waste, and drain pipes for which the permissible load is given in terms of fixture units.

Bathtub (with or without overhead shower)	2	1 1/2
Bidet	1	1 1/2
Dental unit or cuspidor	1	1 1/4
Dental lavatory	1	1 1/4
Drinking fountain	1/2	1 1/4
Dishwasher domestic	2	1 1/2
Floor drains	3	3 or 4
Lavatory Small P.O.	1	1 1/4
Lavatory Large P.O.	2	1 1/2
Lavatory, barber, beauty parlor	2	1 1/2
Lavatory, surgeon's	2	1 1/2
Laundry tray (1 or 2 compartments)	2	1 1/2
Shower stall, domestic	2	2
Shower (group) per head	3	2
SINKS		
Combination sink-and-tray	3 Nominal	1 1/2
Combination sink-and-tray with food disposal unit	3 See 4613.10(b)	1 1/2
Kitchen sink, domestic	2	1 1/2
Kitchen sink, domestic with food waste grinder and/or dishwasher	2 See 4613.10(b)	1 1/2
Surgeon's sink	3	1 1/2
Flushing rim sink (with valve)	8	3
Service sinks, combination trap standard	3	2 or 3
Service sink (P Trap) ordinary	2	2
Pot, scullery, etc., sink	4	2
Wash sink, (circular or multiple), each set of faucets	1	1 1/2
Urinal, pedestal	8 Nominal	3
Urinal, wall	4	2
Urinal stall	4	3
Water closet, tank operated	4 Nominal	3
Water closet, valve operated	8 Nominal	3
Automatic dish washer (domestic)	2	1 1/2
Automatic clothes washer	4	2

(b)VALUES FOR CONTINUOUS FLOW: For a continuous or semicontinuous flow into a drainage system, two fixture units shall be allowed for each gpm of flow.

(c) Fixtures not listed in Table 46-I shall be determined in accordance with Table 46-J.

Table 46-J

Fixture Drain or Trap Size	Fixture-Unit Value
1 1/4 inches and smaller	1
1 1/2 inches	2
2 inches	3
3 inches	5
4 inches	6

4605.7 DETERMINATION OF SIZES FOR THE DRAINAGE SYSTEM:

(a) MAXIMUM FIXTURE-UNIT LOAD: The maximum of fixtures units that may be connected to a given size vertical soil or waste stack is given in Table 46-H.

(b) Sizes and grade of horizontal drainage piping:

(1) Horizontal drainage piping shall be installed at a slope of not less than 1/16 inch per foot.

(2) The size of building drains, building sewers and horizontal branches shall be determined by the fixture units and slopes in accordance with Table 46-G.

(3) Any portion of the sanitary drainage system installed underground shall be not less than 2-inch diameter.

TABLE 46-G
BUILDING DRAINS, SEWERS AND HORIZONTAL BRANCHES

Diameter Pipe in Inches	Maximum Number of Fixture Units that may be Connected to any Portion of the Building Drain or the Building Sewer — Fall per Foot: 1/16 Inch	1/8 Inch	1/4 Inch
1 1/4	1	1	1
1 1/2	2	4	6
2	4	10	21
3(1)	22	28	36
4(2)	60	180	216
5	150	390	480
6	360	700	840
8	1,400	1,600	1,920
10	2,500	2,900	3,500
12	3,900	4,600	5,600
15	7,000	8,300	10,000

(1) Not over two fixtures having integral traps requiring three or four inch waste connection.

(2) Size of building sewers shall be a minimum of 4 inches, with the exception that, if connected to a septic tank and if the developed length measured along the pipe and fittings from the exterior of the building wall to the septic tank does not exceed 10 feet, the building sewer may be sized the same as the building drain.

(c) On remodeling and additions to residential buildings where soil and vent lines are inaccessable and where it becomes necessary to install sewer lines outside of and around the existing buildings such lines shall be considered horizontal branches and shall be installed in accordance with Table 46-G.

(d) Where accessory residential buildings are on the same lot with an existing building, the sewer from such

accessory building shall be considered a horizontal branch and shall be installed in accordance with Table 46-G provided such horizontal branch enters an existing building sewer.

(e) The required sizes and permitted lengths of vertical soil or waste stacks shall be independently determined by the total fixture units of all fixtures connected to the stack in accordance with

Table 46-H

Diameter of Pipe in Inches	Maximum Total Fixture Number of Fixture Units	Permitted Length In Feet	Units at One Story or Branch Interval
1 1/4	1	45	1
1 1/2	8	60	6
2	24	80	12
3	72	150	36
4	500	225	120
5	1,100	300	200
6	1,900	400	350
8	3,600	600	600

(1) An automatic clothes washer shall be considered a pump discharge fixture. It shall be installed on a minimum 2 inch stack with a 2 inch arm and a 2 inch trap with a minimum drop of 24 inches to the crown weir of its trap.

(2) No kitchen sink or other sinks receiving greasy wastes shall be installed in a waste stack less than 2" in diameter except as set forth in Sec. 4613.10(b). No automatic clothes washer shall discharge into a wet vent 2" or less in diameter.

(3) No pumped discharge fixtures shall be installed on a cross less than 3" stack diameter. Domestic dishwashing machines and food grinders shall not be considered as pump discharge fixtures.

4605.8 RESTRICTIONS: No water closet shall discharge into a stack less than three inches in diameter. Not more than two water closets shall discharge into a three inch stack at the same point. Not more than four water closets shall discharge into a three inch stack at the same level. All horizontal soil and waste sections shall be governed by Table 46-G.

(a) MINIMUM SIZE OF SOIL AND WASTE STACKS: No soil or waste stack shall be smaller than the largest horizontal branch connected thereto except that a 3 x 4 one quarter bend connected to a water closet outlet shall not be considered as a reduction in pipe size.

(b) FUTURE FIXTURES: When provision for the future installation of fixtures, those provided for shall be considered in determining the required sizes of drain pipes. Construction to provide for such future installation shall be terminated with a plugged fitting or fittings.

4605.9 SUMPS AND EJECTORS — DRAINAGE BELOW STREET LEVEL:

(a) SUMPS, SEWAGE AND LIQUID WASTE EJECTORS: Sewage and liquid waste from any plumbing fixture or appliance installed where the floor level at the fixtures is below the crown of the street shall discharge into a sump or receiving tank by gravity and be lifted and discharged into the building sewer or drain by ejectors. The sump or receiving tank shall be sized to retain a 30-minute peak flow. Pump discharge pipes shall be provided with a check located on the pump side of a gate valve located as close to the pump as possible.

(b) MINIMUM NUMBER EJECTORS REQUIRED: Single ejector for one or two family buildings. Duplex ejectors for all other buildings for sumps collecting sewage. (See definition of sewage.) One ejector permitted for liquid waste provided such a single ejector is not located in a place where failure to operate will flood a place where food or drink is store or prepared.

(c) Pumps, when connected to the drainage systems, shall connect to the building sewer or shall connect to a wye fitting in the building drain a minimum of 10 feet from the base of any soil stack, waste stack or fixture drain.

4605.10 SUMP CONSTRUCTION: Sump basins or receivers shall be of waterproof concrete adequately reinforced with steel rods or of cast iron or vitrified clay. If of vitrified clay pipe the bottom shall rest on a concrete base extending at least six inches laterally from the pipe. All basins and receivers shall be watertight.

4605.11 SUMP VENTS:

(a) Plumbing fixtures discharging into a sump shall be vented.

(b) All sumps receiving the discharge from plumbing fixtures shall be vented as follows:

(1) No less than a three inch vent for sumps receiving body waste from plumbing fixtures.

(2) For clear water liquid waste, separate sump vent optional, no cover required.

(3) Vents from pneumatic ejectors or similar equipment shall be carried separately.

(c) Such sump and fixture vents may be connected to the plumbing system discharging into a public sewer or septic tank or extended independently to above the roof.

(d) All sumps shall be provided with a metal cover. (Exception — See (2) or 4605.11(b).) Sumps receiving sewage or liquid waste shall be provided with a gas and air tight metal cover securely fastened in place and provided with an air and gas tight manhole for access for repairs.

4605.12 MOTORS AND COMPRESSORS FOR EJECTORS:

(a) All motors, air compressors, and air tanks shall be located where they are open for inspection and repair at all times. The air tanks shall be so proportioned as to be of equal cubic capacity to the ejectors connected therewith, in which there shall be maintained an air pressure of not less than two pounds per square inch for each foot of height the sewage is to be raised.

(b) CONNECTIONS: No direct connection of a steam exhaust blowoff, or drip pipe shall be made with the building drainage system. Waste water when discharged into the building drainage system shall be at a temperature not higher than 140 degrees F. When higher temperature exists, proper cooling method shall be provided.

(c) SUBSOIL DRAINS: Where subsoil drains are placed under the cellar or basement floor or are used to surround the outer walls of a building, they shall be made of open-jointed or horizontally split or perforated clay tile, not less than four inches in diameter. When the building is subject to backwater, the subsoil drain shall be protected by an accessibly located backwater valve. Subsoil drains may discharge into a properly trapped area drain or sump. Such sumps do not require vents.

(d) BUILDING SUBDRAINS: Building subdrains located below the public sewer level shall discharge into a sump or receiving tank the contents of which shall be automatically lifted and discharged into the drainage system as required for building sumps.

4605.13 PRIVATE SEWER SYSTEMS:

(a) Private sewers shall be designed in accordance with Section 4615 and a minimum peak load factor of 2.5 shall be applied. Sizes, minimum slope, construction of manholes and materials shall be in accordance with Section 301.2.

(b) A manhole shall be installed:

(1) Not greater than 300 feet apart and at the end of each private sewer.

(2) At every change of grade, size or alignment.

(3) At the connection with a building sewer only where such building sewer is larger than the private sewer and

(4) At the connection with a public sewer.

(c) Drainage drawings, specifications and calculations shall be prepared by and bear the impressed seal of a Professional Engineer and shall be in accordance with good engineering practice. Upon completion of the private

sewer, the design engineer shall submit as-built drawings to the Plumbing Official with a letter stating that the work has been accepted as complying with the South Florida Building Code.

4606 INDIRECT WASTE PIPING AND SPECIAL WASTES

4606.1 INDIRECT WASTE PIPING:

(a) GENERAL: Wastes from the following shall discharge to the building drainage system through an indirect waste pipe serving the individual fixtures, devices, appliances or apparatus.

(b) FOOD HANDLING: Establishments engaged in the storage, preparation, selling, serving, processing, or otherwise handling of food shall have the waste piping from all preparation sinks, dishwashers, ice machines, refrigerators, ice boxes, bar sinks, cooling of refrigerating coils, laundry washers, extractors, steam tables, egg boilers, coffee urns or similar equipment discharge indirectly into a floor drain or as otherwise provided in this Code.

(g) STRAINERS AND BASKETS: Every indirect waste receptor which could receive solids ½ inch or larger in diameter shall be equipped with a basket or other device which shall prevent passage of such solids into the drainage system The basket or device shall be removable for cleaning purposes.

(h) SPLASHING: All plumbing receptors receiving the discharge of indirect waste pipes shall be of such shape and capacity as to prevent splashing or flooding. No plumbing fixture which is used for domestic or culinary purposes shall be used to receive the discharge of an indirect waste pipe.

(i) The maximum length of the indirect waste to vent shall not exceed 25 feet.

(j) The condensate or waste from an air conditioning unit shall be classified as a plumbing fixture only if connected to the plumbing sanitary system.

4606.2 MATERIAL AND SIZE:

(a) (1) Indirect waste when installed above the floor, shall be a minimum of three-quarters inch diameter, but not less than the size of the fixture ~~of~~ or appliance outlets and shall be cast-iron, galvanized, lead, brass, copper or plastic pipe with drainage fittings.

(2) Indirect waste below a floor shall be a minimum of 2 inches with drainage fittings.

(3) Indirect waste pipes carrying the discharge of more than one fixture unit shall be sized in accordance with Table 46-I and 46-G.

(b) (1) Drip pipes from walk-in refrigerator floors or store-room floors where food is stored shall be installed as indirect wastes and such drip pipes shall discharge into an approved fixture.

(2) Such drip piping shall be equipped with a flap check as close as possible to the drain outlet.

(3) Such floors shall be two inches above overflow point or receiving fixture.

(4) All walk-in cooler floors shall be a minimum of 2" above surrounding floor. If a ramp is provided on the interior, it shall not project into cooler more than one foot or any wider than door opening.

(c) Any fixture or appliance installed where food or drink is stored, and which is equipped with a drain, shall be independently and indirectly connected to an approved fixture or receptacle with overflow level below the bottom of such fixture or appliance.

4606.3 CLEAR WATER WASTES: Water lifts, expansion tanks, cooling jackets, sprinkler systems, drip and overflow pans, or similar devices which waste clear water only, shall discharge into the building drainage system through an indirect waste.

4606.4 CONDENSERS AND SUMPS: No live steam pipe shall connect directly to any part of a drainage or plumbing system.

4606.5 DRINKING FOUNTAINS: Drinking fountains may be installed with indirect wastes only for the purpose of resealing required traps of floor drains installed to receive other clear wastes.

4606.6 SPECIAL WASTES:

(a) Acid and chemical indirect waste pipes and fittings shall be of materials unaffected by the discharge of such wastes.

(b) Liquid wastes having a pH of less than 5 or more than 10 shall be properly neutralized and diluted before being discharged into any soil or waste pipe or any building drain or sewer.

(c) NEUTRALIZING DEVICE: In no case shall corrosive liquids, spent acids, or other harmful chemicals which might destroy or injure a drain, sewer, soil or waste pipe and fittings or which might create noxious or toxic fumes, discharge into the plumbing systems without being thoroughly diluted or neutralized by passing through a properly constructed and acceptable dilution or neutralizing device. Such device shall be automatically provided with a sufficient intake of diluting water or neutralizing medium, so as to make its contents noninjurious before being discharged into the soil or sewage system.

4606.7 AIR CONDITIONING CONDENSATE DRAINS:

(a) Condensate drains shall be a minimum of ¾ inch diameter for one unit or any number of connected units totaling not over 10 tons of refrigeration capacity.

(b) Air conditioning condensate drains shall be a minimum of 1¼ inch diameter for one unit or any number of connected units totaling over 10 tons of refrigeration capacity.

(c) Connections to the unit drain pans may be either flexible connections or rigid piping and shall be provided with a minimum two-inch trap seal. Flexible connections used to form a trap shall not exceed 18 inches in length. On units larger than 3 tons, a minimum three-inch trap seal and a union installed on the pan side of trap shall be provided.

(d) Condensate drainage systems serving more than one air handler shall be vented.

(1) Risers for condensate drainage collection systems may terminate a minimum of 12 inches above the topmost drain pan and have a perforated cap. Termination of vents shall be accessible and vents shall not terminate in a return plenum or supply plenum.

(e) Air conditioning condensate drains for units with not more than 5 tons capacity may discharge upon a pervious area. Units with not more than ten tons capacity may discharge to a 10-inch diameter by 24-inch long pipe without cover, filled with ¾ inch crushed rock.

(f) (1) Air conditioning condensate drains for units regardless of tonnage may discharge to a drainage well, storm sewers, adequate soakage pit, drainfield or the building drainage systems except where such discharge is specifically prohibited by the Administrative Authority.

(2) Connections to storm or building drains shall be by indirect connections.

(3) Condensate drains will be independent of a storm drain system within a building.

(g) The materials to be used in condensate drains for air-conditioning equipment shall comply with the minimum Standards set forth in Table 46-C.

(h) Installation of PVC pipe under concrete floor slabs on fill shall be as follows:

(1) The top of the pipe shall be a minimum of 2 inches below the bottom of the slab.

(2) All piping under slab areas shall be installed after fill and compaction is completed. All risers passing through the slab from main condensate line, shall be sleeved with a minimum of ½ inch annular space. All pipe shall be laid on a firm base for its entire length and backfilled with 2 inches of sand.

4607 JOINTS AND CONNECTIONS

4607.1 TIGHTNESS: Joints and connections in the plumbing system shall be gas-tight and water-tight for the pressure required by test, or use, with the exceptions of those portions of perforated or open-joint piping which are installed for the purpose of collecting and conveying underground or seepage water.

4607.2 TYPES OF JOINTS:

(a) CAST IRON PIPE JOINTS:

(1)CAULKED JOINTS: Caulked joints for cast-iron bell-and-spigot soil pipe shall be firmly packed with oakum or hemp and filled with molten lead not less than one inch deep and shall extend up to not less than one eighth inch below rim of hub. No paint, varnish, or other coatings shall be permitted on the jointing material until after the joint has been tested and approved.

(2)HUBLESS JOINTS: Joints for hubless cast iron soil pipe and fittings and all parts of the clamp assembly used in joining a hubless cast iron sanitary system for soil, waste, vent and house or building sewer lines shall comply with the mechanical and dimensional requirements of the Cast Iron Soil Pipe Institute's Standard 310-95.

(3)COMPRESSION-TYPE GASKET JOINTS: Neoprene rubber gaskets for hub and spigot cast-iron soil pipe and fittings shall conform to the Standard specification for Rubber Gaskets for Cast-Iron Soil Pipe and Fittings, ASTM C564, and the Standard Neoprene Rubber Gaskets for Hub and Spigot Cast-Iron Soil Pipe and Fittings, CISPI HSN, as set forth in Section 402.

(b) PLASTIC PIPE JOINTS:

(1) Plastic pipe and fittings shall be solvent-welded using procedures recommended by the manufacturer and/or Plastic Pipe Institute.

(2) Solvent cement shall be manufactured under the specifications set forth in the Standard for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings, ASTM D2235, or Solvent Cement for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings, ASTM D2564, as set forth in Section 402, and further bearing the seal of approval of the National Sanitation Foundation (NSF herein).

(3) No Schedule 40 pipe shall be threaded on the job site.

(4) All such transitions shall be with approved adapter fittings.

(5) Connections between plastic pipe and other materials shall be through approved adapter fittings only.

(6) The co-mingling of ABS and PVC plastic pipe or fittings with solvent weld joints shall not be permitted.

(c) THREADED JOINTS — SCREWED JOINTS:

(1) Threaded joints shall conform to the Standards, ANSI B2.1, or GAS GGG-P-351a, as set forth in Section 402.

(2) All burrs shall be removed.

(3) Pipe ends shall be reamed or filed out to the size of bore and all chips removed.

(4) Pipe-joint cement and paint shall be used only on male threads.

(d) WIPED JOINTS: Joints in lead pipe or fittings, or between lead pipe or fittings and brass or copper pipe, ferrules, solder nipples, or traps, shall be full wiped joints. Wiped joints shall have an exposed surface on each side of a joint not less than ¾ inch and at least as thick as the material being jointed. Wall or floor flange lead-wiped joints shall be made by using a lead ring or flange placed behind the joints at wall or floor. Joints between lead pipe and cast-iron steel, or wrought iron shall be made by means of a caulking ferrule, soldering nipple, or bushing. Minimum lengths of lead from wiped joint to fixture connection shall be four inches.

(e) SOLDERED OR SWEAT TYPE JOINTS: Soldered or sweat type joints for tubing shall be made with approved fittings. Surfaces to be soldered shall be cleaned bright. The joints shall be properly fluxed and made with approved solder in accordance with 4604.1(c) and Table 46-C. Screwed joints from copper to cast iron or steel pipe shall be made by the use of approved adapters. Caulk joints between DWV copper and cast iron pipe shall be made with the use of an approved caulking adapter.

(f) HOT-POURED JOINTS: Hot-poured compound for concrete sewer pipe shall not be water absorbent and when poured against a dry surface shall have a bond of not less than 100 psi. All surfaces of the joint shall be cleaned and dried before pouring. If wet surfaces are unavoidable, a suitable primer shall be applied. Compound shall not soften sufficiently to destroy the effectiveness of the joint when subjected to a temperature of 160 degrees F. nor be soluble in any of the waste carried by the drainage system. Approximately 25 percent of the joint space at the base of the socket shall be filled with jute or hemp. A pouring collar, rope or other device shall be used to hold the hot compound during pouring. Each joint shall be poured in one operation until the joint is filled. Joints shall not be tested until one hour after pouring.

(g) COMPRESSION-TYPE JOINTS FOR NON-METALLIC PIPE: Neoprene rubber gaskets for vitrified-clay bell-and-spigot pipe shall conform to the Standard Specification for Compression Joints for Vitrified

Clay Bell and Spigot Pipe, ASTM C425, as set forth in Section 402.

(h) BRAZED JOINTS: Brazed joints shall be made in accordance with the provisions of Section 6 of the Code for Power Piping, ANSI B31.1 and the National Fuel Gas Code, ANSI Z223.1, as set forth in Section 402 of this Code.

(i) CEMENT MORTAR JOINTS: Cement joints shall be used only when specifically permitted in other chapters of this Code or when approved by the Plumbing Official, as sufficient to accomplish the purpose of this Code. A layer of jute or hemp shall be inserted into the base of the joint space and rammed to prevent mortar from entering the interior of the pipe. Jute or hemp shall be dipped into a slurry suspension of Portland cement in water prior to insertion into bell. Not more than 25 percent of the joint space shall be used for jute or hemp. The remaining space shall be filled in one continuous operation with a thoroughly mixed mortar composed of one part cement and two parts sand, with only sufficient water to make the mixture workable by hand. After one-half hour of setting, the joint shall be rammed around entire periphery with a blunt tool to force the partially stiffened mortar into the joint and to repair any cracks formed during the initial setting period. Pipe interior shall be swabbed to remove any material that might have fallen into the interior. Additional mortar of the same composition shall then be troweled so as to form a 45 degree taper with the barrel of the pipe.

(j) BURNED LEAD JOINTS: Burned (welded) lead joints shall be lapped and the lead shall be fused together to form a uniform weld at least as thick as the lead being joined.

4607.3 SPECIAL JOINTS:

(a) COPPER TUBING TO SCREWED PIPE JOINTS: Joints from copper tubing to threaded pipe or threaded connection shall be made by the use of brass or copper converter fittings. The joint between the copper pipe and the fittings shall be properly soldered, and the connection between the threaded pipe and the fitting shall be made with a standard pipe size screw joint. See Paragraph 4607.2(d).

(b) WELDING OR BRAZING: Brazing or welding shall be performed in accordance with requirements of recognized published standards of practice.

(c) SLIP JOINTS: In drainage systems, slip joints may be used only on the inlet side of the trap or in the trap seal. In water piping, only one slip joint connection shall be allowed on each exposed supply to a fixture.

(d) EXPANSION JOINTS: Mechanical type expansion joints permitting adjustment shall be accessible for replacement.

(e) GROUND JOINT BRASS CONNECTIONS: Ground joint brass connections which allow adjustments of tubing but provide a rigid joint when made up shall not be considered as slip joints.

4607.4 UNIONS (SCREWED):

(a) DRAINAGE SYSTEM: Unions may be used in the trap seal and on the inlet side of the trap. Unions shall have metal-to-metal seats.

(b) WATER SUPPLY SYSTEM: Unions in the water-supply system shall be metal-to-metal with ground seats.

4607.5 PROHIBITED JOINTS AND CONNECTIONS IN DRAINAGE SYSTEMS:

(a) Any fitting or connection which has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area, that offers an obstruction to flow through the drain, is prohibited.

(b) EXCEPTIONS: Floor or urinal strainers may be caulked. A directional fitting may be used to connect a domestic food-waste disposal unit in a two-compartment sink as set forth in Paragraph 4613.10(b).

(c) The drilling and tapping of drains, sewers, soil leaders, waste or vent pipes and the use of saddle hubs and bends is prohibited.

4607.6 INCREASERS AND REDUCERS: Where different sizes of pipes, or pipes and fittings are to be connected, the proper size increasers or reducers or reducing fittings shall be used between the two sizes.

4608 TRAPS AND CLEANOUTS

4608.1 TRAPS:

(a) FIXTURE TRAPS:

(1) Plumbing fixtures, excepting those having integral traps, shall be separately trapped by a waterseal trap. (See Section 4606 indirect wastes.)

(2) The vertical drop of a pipe serving a floor-connected integral trap fixture shall not exceed twenty-four inches.

(3) Floor drains requiring a vertical drop greater than eighteen inches on the inlet side of the trap may be installed by a vertical rise not to exceed 6 feet from the horizontal drain except that the horizontal section of the rise shall be a minimum of three feet from the outlet of the trap to the vertical section.

(4) Other fixture trap inlets shall not be more than eighteen inches measured vertically from the bottom of the fixture to the top of trap seal.

(5) No offsets shall be permitted for the purpose of avoiding the requirements of Table 46-K.

(b) HORIZONTAL DISTANCE OF FIXTURE TRAP FROM VENT: The horizontal distance of a fixture trap to a vent shall not exceed that set forth in Table 46-K. The distance shall be measured along the center of the fixture branch from the crown weir of the trap to the vent opening except for fixtures with integral traps in which case the horizontal distance shall be measured from the vent to the downstream edge of the vertical section of the fixture outlet branch.

TABLE 46-K

HORIZONTAL DISTANCE OF FIXTURE TRAP FROM VENT OPENING

Size of Fixture Branch	Size of Trap	Fall per foot	Distance from Trap
1 1/4"	1 1/4"	1/4"	5'
1 1/2"	1 1/2"	1/4"	5'
2"	1 1/2" or 2"	1/4"	8'
3"	3"	1/4"	8'
Floor connected fixtures with integral traps			5'
Floor drains and interceptors			15'
Island or loop vents			15'

The number of quarter bends in a fixture arm shall not exceed two, not counting the fixture tee entering the stack.

(c) TRAPS PROTECTED: Every fixture trap shall be protected against siphonage and back pressure; and air circulation shall be assured by means of a soil vent, waste vent, stack vent, a common vent, loop, circuit or wet vent. No crown vent shall be installed.

(d) RELATION TO FIXTURE DRAINS: No trap outlet shall be larger than the fixture branch to which it is connected.

(e) TYPE OF TRAPS: Fixture traps shall be self-cleaning, except interceptor traps.

(f) TRAPS PROHIBITED:

(1) No form of trap which depends for its seal upon the action of moveable parts shall be used.

(2) No bell trap, ¾ S trap, drum trap, pot trap, running trap, or bottle trap shall be used.

(g) TRAP SEAL: Each fixture trap shall have a water seal of not less than two inches and not more than four inches, except when deeper seals are required for interceptors.

(h) TRAP CLEANOUTS: Trap cleanouts are prohibited on all concealed traps.

(i) TRAP LEVEL AND PROTECTION: All traps shall be set level in relation to their water seals and protected from siphonage.

(j) TRAP MATERIAL:

(1) Traps in covered and concealed places shall be of cast iron, cast brass, copper, or may be a solvent weld plastic trap.

(2) All exposed traps 2" and smaller except tubs, showers, and washing machines shall be of the swivel type with two collars. EXCEPTION: Unless provided with cleanout in trap.

(3) Accessible traps, except integral traps, including tail pieces, trap arms, overflow and trap assembly, shall be of cast iron, cast brass, 20 gage brass, copper, or may be plastic.

4608.2 CLEANOUTS:

(a) REQUIRED: A cleanout shall be required at the base of each soil and waste stack excluding interior rainwater leaders.

(1) Every building drain and branch drain and building sewer shall have an accessible cleanout every 75 feet.

(2) Required cleanouts shall be located in a basement or flush with finish floor or outside of building and brought to finish grade or in a vertical stack not more than five feet above finish floor.

(3) No cleanout will be required in the base of a stack rising vertically from a horizontal building drain provided the building drain cleanout is upstream from the vertical stack connection.

(4) All cleanouts shall be accessibly located and have 18 inches clearance to permit upstream and/or downstream rodding.

(5) Wall cleanouts shall be flush with or protrude beyond finished walls or made accessible through an access door or panel.

(6) Floor cleanouts shall be flush with finished floor and equipped with flush type plugs.

(7) In lieu of a cleanout at the base of a stack or in the vertical section of the stack, the cleanout may be extended from the upstream side of the stack base to the finished floor level, or to the outside of the building and brought to finish grade level, or the outside of the building into a pit or box with cover brought to finish grade.

(8) The base of a stack shall be deemed to mean the lowest point of any vertical soil or waste stack inclusive of horizontal sections in such vertical stacks.

(9) Cleanouts shall be the same nominal size as the pipe into which they are installed up to six inches and not less than six inches for larger pipe.

(10) A cleanout shall be required on the horizontal discharge from all interceptors to provide upstream and/or downstream rodding.

(11) A cleanout fitting shall be provided in the horizontal arm section of grease interceptors within a building.

(12) Test fittings shall be placed at property line with suitable cleanout fittings. Such cleanout need not be brought to grade unless required by the Public Works Department of the municipality having jurisdiction.

(13) Cleanouts installed in vehicular traffic paved areas shall be protected from breakage by use of cleanout box with metal lid (valve box).

(14)A full size cleanout shall be required in or at the base of all stacks receiving the waste from a kitchen sink or washing machine.

(15) Each building drain shall be provided with a cleanout near the junction of the building drain and building sewer, and shall be sized the same size as the building sewer.

4608.3 EXCEPTIONS: In single family residential unattached homes:

(a) A full size cleanout shall be required in or at the base of all stacks receiving the waste from a kitchen sink or washing machine. Such cleanouts shall be accessible from the outside of the building if the stack is in an outside wall.

(b) Minimum vent size to be 2 inches in "I" Occupancy when such vent penetrates the roof.

(c) Stack offsets, if necessary, may be made with 45 degree elbows. (If 90 degree elbows are used, a cleanout must be at the base of the stack.)

(d) All cleanouts shall be brought to, or above, grade except as provided in Section 4608.2(a)(12).

(e) Interior vents stacks for powder or bath rooms not adjacent to outside walls shall not require cleanouts.

(f) Bath and toilet rooms with an exterior wall shall have a cleanout in the extended waste line, stack, or installed as per Section 4608.2(a)(7), cleanout to be 2" minimum.

4609 HANGERS AND SUPPORTS

4609.1 STRAINS AND STRESSES:

(a) Piping in a plumbing system shall be installed without undue strain and stresses and provisions shall be made for expansion, contraction and structural settlement.

(b) All suspended soil, waste, and vent piping shall be supported, hung, or suspended with "clevis type" metal hangers, and a minimum of 3/8" metal rods or other approved hangers and rods. Perforated metal strap, wire and similar materials shall not be used. All underground installations to have said hangers coated with a mastic paint and installed in accordance with the requirements of Section 4609. On all above the slab installations where it is necessary to support, hang, or suspend soil waste and vent piping, "clevis type" or other approved metal type hangers shall be required with steel rods. All structures on piling with structural floor slab shall have slab hangers for piping support; slabs supported on fill shall not have hangers.

4609.2 VERTICAL PIPING:

(a) ATTACHMENT: Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.

(b) CAST-IRON SOIL PIPE: Cast Iron soil pipe shall be supported at the base and at each story level at intervals not exceeding 15 feet.

(c) SCREWED PIPE COLD: Screwed pipe I.P.S. shall be supported at not less than every other story height with maximum 30 foot intervals.

(d) SCREWED PIPE HOT: Screwed pipe (I.P.S.) shall be properly supported to provide for expansion.

(e) COPPER TUBING: Cold copper tubing shall be supported at each story.

(f) COPPER TUBING: Hot copper tubing shall be properly supported to provide for expansion.

(g) PLASTIC PIPE: Plastic piping shall be supported at each story for piping 2 inches and larger and not more than mid-story intervals for piping 1½ inches or under.

4609.3 HORIZONTAL PIPING:

(a) SUPPORTS: Horizontal piping shall be supported at sufficiently close intervals to keep it in alignment and prevent sagging.

(b) CAST-IRON SOIL PIPE: Cast-iron soil pipe shall be supported at not more than five-foot intervals; except that pipe exceeding five feet in length, may be supported at not more than ten-foot intervals. Supports shall be placed within eighteen inches of the hub or joint. Hubless or compression gasket joints must be supported at least at every other joint except that when the developed length between supports exceeds four feet, they shall be provided at each joint. Supports shall be placed on or immediately adjacent to the coupling. Suspended lines shall be suitably braced to prevent horizontal movement.

(c) SCREWED PIPE: Screwed pipe (I.P.S.) shall be supported at approximately 10-foot intervals.

(d) COPPER TUBING: Copper tubing shall be supported at approximately 8-foot intervals.

(e) IN GROUND: Piping in the ground shall be laid on a firm bed for the entire length, except where support is otherwise provided which is adequate in the judgement of the Plumbing Official.

(f) PLASTIC PIPE:

(1) DWV Plastic Pipe shall be supported at intervals of not more than four (4) feet.

(2) Water distribution and process pipe shall be installed according to manufacturer's recommendations.

4609.4 HANGERS AND ANCHORS:

(a) MATERIAL: Hangers and anchors shall be metal of sufficient strength or other approved materials to support the pipe and contents in proper alignment and to prevent rattling.

(b) ATTACHMENT: Hangers and anchors shall be securely attached to the building construction.

4609.5 BASES OF STACKS:

(a) SUPPORTS: Bases of cast-iron soil stack shall be supported on masonry construction, metal brackets attached to the building construction, or by other methods approved by the Plumbing Official.

(b) PIPING MATERIAL: Other piping materials shall be so anchored as to take the load off the stack at the base.

4610 VENTS AND VENTING SYSTEMS

4610.1 VENT TERMINALS:

(a) Extensions of vent pipes through a roof shall be terminated at least six inches above the finished roofing excluding base flashing, but not less than 4" above the invert of the emergency overflow.

(b) Vent stacks on the exterior walls of a structure with parapet walls shall extend six inches above same. Vent extensions above the roof shall not exceed ten feet and be securely fastened to prevent wind damage. Where roofs are used for sun decks, solariums or similar purposes, all vents shall extend not less than seven feet above the deck.

(c) FLAG POLING: Vent terminals shall not be used for the purpose of flag poling, TV aerials, or similar purposes.

(d) ROOF TERMINAL:

(1) The roof terminal of any vent pipe if within 10 feet of any door, window or exhaust opening shall extend not less than three feet above such door, window or exhaust opening.

(2) The vent terminal of a sanitary system of a building shall not be located less than 10 feet developed distance from any mechanical air intake opening.

4610.2 VENT GRADES AND CONNECTIONS:

(a) GRADE: All vent and branch-vent pipes shall be so graded and connected as to drain dry.

(b) VERTICAL RISE: Where dry vent pipes connect to a horizontal soil or waste pipe, the vent shall be taken off above the center line of the soil pipe, and the vent pipe shall rise vertically, or at an angle not more than 45 degrees from the vertical to a point at least six inches above the flood level rim of the fixture it is venting before offsetting horizontally or before connecting to the branch vent. EXCEPTION: Island vent.

(c) HEIGHT ABOVE FIXTURES: A connection between a vent pipe and vent stack or stack-vent shall be made at least six inches above the floor-level rim of the highest fixture served by the vent.

4610.3 VENTS: Where fixtures are located directly adjacent to one another and connect to a vertical stack at the same level, the fixture trap may be served by a common vent.

4610.4 WET VENTING:

(a) Horizontal wet vents shall not exceed 15 feet and shall receive discharge from fixture branches only. (See Paragraph 4610.4(c).)

(b) Vertical wet vents connecting to a horizontal wet vent shall not exceed six feet and shall receive discharge from fixture branches only. (EXCEPTION: See Combination Waste and Vent Sub-section 4610.10.)

(c) The minimum size and the maximum capacity of wet vents shall be as follows:

(1) 2" VENT: Six-fixture units other than urinals, pressure fixtures, kitchen sinks, service sinks, or medical type sinks with plaster trap, except as set forth in Sec. 4613.10(b).

(2) 3" VENT: 16-fixture units. No water closets or other fixtures having an opening greater than 3 inches.

(3) 4" VENT: 32-fixture units. No water closets or other fixtures having an opening greater than 4 inches.

(d) Two water closets on a horizontal section may be vented by a wet or dry vent taken off between the two water closets, providing the vent intersection is within five feet horizontal developed length from each water closet vertical outlet, and all fixtures are on same story level.

(e) Wet vents shall not be reduced in size.

4610.5 CIRCUIT OR LOOP VENT:

(a) GENERAL:

(1) A series of adjacent fixtures may be installed on a horizontal drain.

(2) A vent shall be installed vertically within five feet downstream from the first fixture branches, and another vent installed vertically between the last two water-supplied fixture branches connected to the horizontal drain section provided all fixtures are located in the same or adjacent toilet rooms at the same level.

(3) Branch drains not exceeding 15 feet in length and receiving the discharge of fixtures, other than water closets and pedestal urinals located in the same or adjacent toilet rooms may connect to the horizontal section of a loop or circuit vent.

(4) A branch may be taken off the upstream side of a battery provided the horizontal section remains full size to the highest fixture branch and not to exceed 15 feet in length.

(b) SIZE OF CIRCUIT OR LOOP VENT: The pipe of the dry vent section of a circuit or loop vent may have a diameter of one pipe size less than the diameter of the pipe of the horizontal soil or waste drain it serves.

TABLE 46-L

Size of Pipe	Number of Traps	Size of Dry Vent Pipe
2"	Six 1¼" traps or four 1½" traps other than sink traps. No urinal traps allowed	1 ½ "
3"	Thirty (30) waste fixture units, other than urinal traps, or six (6)urinal traps	2"
4"	Twelve (12) water closets and, in addition, thirty-six (36) waste fixture units may waste into such soil pipe.	3"

4610.6 CABANA SHOWERS: Multiple cabana showers may be installed on a circuit or loop vented branch and not limited as to distance from fixture branches, provided that all cabana shower drains, where appreciable quantity of sand washing into the shower drain is a possibility, shall waste through an approved sand interceptor before entering the sewer, drainage or disposal system.

4610.7 FIXTURES WASHED BY WATER CLOSETS: Fixture branches installed downstream from a water closet in a circuit or loop vent group shall be minimum three (3) inches.

4610.8 MAIN VENTS TO CONNECT AT BASE:

(a) All main vents or vent stacks shall connect full size at their base to the main soil or waste stack, at or below the lowest fixture branch of such waste stack. Such base shall be washed by a fixture or group of fixtures. The diameter of the vent pipe shall not exceed the diameter of the soil or waste stack to which it connects.

(b) SIZE ON INDIVIDUAL VENTS: The diameter of an individual vent shall be not less than 1¼ inches not less than one-half the diameter of the drain to which it is connected. No vent for a water closet shall be less than two inches in diameter. (See Sub-section 4612 for interceptor vents.)

(c) SIZE OF VENT PIPING: The nominal size of vent piping shall be determined from its developed length and the total of fixture units connected thereto as provided in Table 46-M.

4610.9 SOIL WASTE AND VENT STACKS:

(a) For each building having a single building sewer receiving the discharge of a water closet there shall be at least one minimum size vent stack, extending above the building roof no less than three or four inches in diameter or of a larger diameter as set out in Table 46-M.

(1) Main vent stack size for buildings having multiple building sewers. Buildings having more than one building sewer, each building sewer receiving the discharge of a water closet shall have at least one minimum size vent stack, no less than three or four inches in diameter or of a larger diameter extending above the building roof as set out in Table 46-M.

(2) Vent stacks for accessory buildings. For accessory buildings on a lot or building site connected by a common building sewer, the minimum size for a vent stack shall be as provided for in Table 46-M. If a water closet is installed in accessory building the minimum size vent shall be two inches.

TABLE 46-M
SIZE AND LENGTH OF VENT PIPING

Diameter of Soil or Waste Stack	Maximum Fixture Units	Size and Maximum Length of Vent (Feet)							
		1¼	1½	2	3	4	5	6	8
1 ¼	1	70							
1 ½	4	70	190						
1 ½	6	50	175						
2	8	50	150	400					
2	12	45	75	300					
2	24	20	50	200					
3	12	—	30	100	1200				
3	36	—	—	50	800				
3	72	—	—	40	400				
4	100	—	—	35	300	1200			
4	200	—	—	30	240	900			
4	500	—	—	20	100	450			
5	200	—	—	—	80	450	1300		
5	500	—	—	—	70	300	1000		
5	1100	—	—	—	45	180	600		
6	350	—	—	—	50	200	600	1300	
6	620	—	—	—	30	150	400	1100	
6	960	—	—	—	25	100	300	1100	
6	1900	—	—	—	15	80	250	700	
8	600	—	—	—	—	80	200	500	1300
8	1400	—	—	—	—	50	100	400	1200
8	2200	—	—	—	—	40	80	350	1100
8	3600	—	—	—	—	30	60	250	800

(b) All soil, waste and vent stacks serving fixtures for more than one floor shall extend full size above the roof, or shall be connected to a vent stack of the same diameter or larger. In buildings three or more stories in height, vents through the roof shall equal or exceed the free square inch area of the building drain at the point of collection.

4610.10 COMBINATION WASTE AND VENT:

(a) Fixture branches other than water closets or fixtures requiring a flushometer valve on the water supply with a waste opening not greater than two inches (other than floor drains) shall be permitted and may be installed on a combined waste and vent stack as follows: Such branches will be allowed to discharge into a waste stack

extended undiminished in size through the roof according to the following table provided that the stack is vertical throughout, and that no kitchen sinks be placed on a two-inch combined waste and vent stack.

Table 46-N

Diameter of Stack	Fixture Units On Stack	Maximum Length
2 inch (No kitchen sinks)	4	30 feet
3 inch	16	50 feet
4 inch	32	100 feet
5 inch	50	200 feet
6 inch	80	300 feet

(b) For drinking fountains and fountain cuspidors, the fixture units may be increased ten times and the permitted length increased two times above those specified.

(c) (1) ISLAND VENT: Island venting shall be permitted only when no other system is possible.

(2) The branch of an island vent shall not exceed 15 feet from a vented line.

(3) The minimum size of an island vent shall be three inches except for the fixture arms which shall be a minimum of one and one-half inches and the loop vent which shall be a minimum of two inches.

(4) Both the dry and wet riser shall have full size clean-outs. The wet riser clean-out to be located below the fixture arm(s).

(5) The dry side of the island vent shall connect vertically to the horizontal drain.

4610.11 RELIF VENTS-STACKS OF MORE THAN 10 BRANCH INTERVALS:

Soil and waste stacks in buildings having more than ten branch intervals shall be provided a relief vent at each tenth interval installed, beginning with the top floor. The size of the relief vent shall be equal to the size of the vent stack to which it connects. The lower end of each relief vent shall connect to the soil or waste stack through a wye below the horizontal branch serving the floor and the upper end shall connect to the vent stack through a wye not less than 3 feet above the floor.

4611 STORM DRAINAGE SYSTEM

4611.1 DISPOSITION OF RAINWATER:

(a) Rainwater or other liquid wastes from any premises shall be disposed of where same originates and/or falls in such manner as herein provided. The disposal of any rainwater or other liquid wastes by causing or allowing same to be disposed of or flow on or across any adjoining property or sidewalk, either public or private, shall be deemed a nuisance, and shall be corrected by properly disposing of same in accordance with the provisions of this Code.

(b) Rainwater shall be disposed of as follows with required preference in the order listed:

(1) Upon pervious ground (see Sub-paragraph 4611.7).

(2) Into a soakage pit (see Sub-section 4611.6).

(3) Into a drainage well, if approved by the Florida Department of Environmental Regulation.

(4) To a street gutter only if first approved by the Engineering Department.

(5) To a storm sewer or a storm sewer catch basin where permitted by the Engineering Department.

4611.2 ROOF DRAINAGE:

(a) Storm sewers, drains, gutters and leaders for conveying rainwater from a roof shall be of not less size than set forth in Table 46-O.

TABLE 46-O

Nominal Pipe Size (Inches)	Maximum Roof Area (Square Feet)				
	Building Storm Sewers and Drains			Gutters	Leaders
	1/8" per foot Slope	1/4" per foot Slope	1/2" per foot Slope		
1-1/2	127	190	222		222
2	270	380	460		460
3	745	1,080	1,270	635	1,270
4	1,560	2,210	3,080	3,080	3,080
5	2,810	4,000	5,620	2,810	5,620
6	4,450	6,290	8,880	4,440	8,880
8	9,460	13,760	18,950	9,975	18,950
10	18,100	25,600	36,400	18,200	36,400
12	30,000	42,000	60,000		60,000
14	38,500	54,700	76,000		76,000
15	55,400	78,400	109,000		
18	91,000	129,000	182,000		
21	138,000	197,000	276,000		
24	195,800	279,000	390,000		
27	271,000	386,000	545,000		
30	362,000	510,000	715,000		

For required sizes of ground surface drainage, see Paragraph 4611.4(h).

(b) The roof area to be taken in the sizing of storm sewers, drains, gutters and leaders is the horizontal projection, except that, where a building wall extends above the roof or court in such manner as to drain into the area considered, then one-third of the area of the vertical wall shall be added to the horizontal projection.

(c) Rainwater leaders and drains shall not reduce in cross-sectional area in the direction of flow.

(d) The sizes of rain leaders are based on diameter of circular rain leaders, and gutters based on semi-circular sheet metal gutters with the top dimension given. Other shapes may be used if equivalent area capacity is provided.

4611.3 ROOF DRAIN STRAINERS: Where roof surfaces drain through the roof, as to the inside leader, a strainer shall be provided and such strainer shall extend not less than four inches above the surface of the roof immediately adjacent to the roof drain, furthermore, such strainer shall have an available inlet area, of not less than two and one-half times the area of the conductor or leader to which the drain is connected, with the exception that roof drain strainers for use on sun decks, parking decks, and similar ares, normally serviced and maintained, may be of flat surface type, level with the deck and shall have an available inlet area of not less than two and one-half times the area of the conductor of leader to which the drain is connected.

4611.4 DETAILED REGULATIONS:

(a) Leader pipes shall not be used as soil, waste or vent pipes; nor shall any soil waste or vent pipes be used as leaders. Air-conditioning equipment shall not discharge or overflow upon any roof where rainwater leaders

discharge into any surface or curb gutter at grade except by specific approval of the Plumbing Official.

(b) Impervious areas shall be graded to drain to a collection basin or to a pervious area as set forth in Sub-section 4611.7.

(c) Rainwater pipes shall not discharge over sidewalks.

(d) Liquid waste, except rainwater, shall not be discharged into rainwater pipes which terminate at a street or sidewalk or above the ground surface.

(e) (1) The disposal of rainwater shall be based on 0.0417 cubic feet of rainwater during any five minute period for each square foot of impervious area drained.

(2) The disposal of rainwater shall be through underground structures into pervious ground.

(3) The Plumbing Official may require percolation tests to be made to determine the percolation rate.

(4) Where the percolation rate at the bottom of the proposed drainage structure is found by test to be longer than one minute per inch of fall, the soakage volume herein set forth shall not apply and a design to store the volume of five minutes of rain and disposal of dispersement within one hour shall be provided.

(5) Soakage pits, when used as part of the drainage structure, shall be sized to provide a minimum of 0.0417 cubic foot volume, from water table to the bottom of the soakage pit lid, for each square foot of impervious area drained thereto, except as otherwise set forth herein.

(6) The cubic content of ballast filled structures shall be taken at not more than 50 percent of the ballast volume.

(f) (1) Pipe to carry rainwater only, where located under a sidewalk and discharging into a street gutter, shall be cast iron or Schedule 40 PVC. Where such pipe cannot be installed by reason of the depth of the curb being less than the pipe diameter plus the necessary concrete cover over such a pipe, a 14-inch gauge (5/64 in.) galvanized sheet metal flume box, or equivalent cross-sectional area may be substituted for the pipe.

(2) The following table shall be used to compute such cross-sectional area:

I.D. of Pipe (inches)	Area in Inches
2	3.141
3	7.068
4	12.566
5	19.635
6	28.269
8	50.265
10	78.54
12	113.09
14	153.93

(3) A concrete cover not less than two inches thick, reinforced with a 6 inch x 6 inch No. 10 gauge road mesh wire shall be required over a pipe of flume box under a public sidewalk. The bottom and sides of a flume box through which asbestos cement pipe pass shall be of poured concrete at least four inches thick and the concrete shall be of not less strength that 3000 psi in 28 days.

(4) In the construction and installation of flume boxes and/or pipe under sidewalks to street or street gutter for disposal of rainwater, all plumbing permits and inspection for work inside the property line shall be secured from the Plumbing Official. Permits and inspection for work outside the property line shall be secured from the Engineering Department.

(g) Public sidewalks and driveways of concrete which are cut, tunneled or channeled to necessitate repair may be repaired by replacing the concrete in only full sized blocks between scored or construction joints.

(h) The minimum size for sloping rainwater drains and storm sewers for surface drainage (not including pipes or building drains for roof drainage) shall be not less than the following size based on the horizontal projections of the surface area drained.

MINIMUM PIPE SIZES AND SLOPES FOR GROUND SURFACE STORM SEWERS

Diameter of Pipe in Inches	Maximum Ground Surface Area for of Various Slopes		
	1/8" per foot slope	1/4" per foot slope	1/2" per foot slope
3	1,360	1,590	1,930
4	2,470	2,930	3,600
5	4,270	5,020	6,030
6	7,110	8,360	11,400
8	15,900	18,400	22,600
10	30,200	34,300	42,300
12	49,800	57,000	68,600
15	87,800	107,000	130,000
18	150,000	167,500	210,000
21	226,000	268,000	326,000
24	326,000	377,000	453,000
27	453,000	510,000	630,000
30	586,000	670,000	837,000

Where ground surface storm sewers are connected to the building storm sewer, the size of the combined storm sewer shall be as set forth in Table 46-O.

(i) Rainwater drainage openings which discharge sewer or other gases and which are within 25 feet of adjacent building openings, interior courts or air shafts, windows, ventilating openings, air intake equipment, or where roof is used by human beings for sun bathing or other purposes, shall be protected from discharging such gases by installation of accessibly located back water valves or automatic self sealing traps. Back water valves shall be so constructed as to remain in a closed position when not discharging liquids.

(j) Rain or storm water drains shall be installed to drain dry.

(k) Soakage pits shall have the distance separation from property lines as set forth for septic tanks in Paragraph 4612.2(n).

4611.5 PROTECTION FROM MOSQUITOS:

(a) A film of oil or other equally effective substance shall be maintained on the surface of all liquids of any exposed basin, trap, tank, or receptacle not in regular use.

(b) A flap or flapper valve shall be placed on each soakage pit pipe inlet connection from rainwater surface catch basin and such flap or flapper shall be suitable to prevent the passage of mosquitos and vermin. (See Sub-section 4611.6.) The flap check shall be hung so as to completely close the pipe inlet when not in use.

EXCEPTION: In areas where inlet pipe from catch basin to soakage pit terminates below the water table, mosquito flaps may be omitted.

(c) Emergency inverted overflow fittings of the same size as the leader pipe up to and including four inch shall be provided at the base of the rainwater leaders discharging directly into soakage pits. Such fittings shall discharge at points which, in the opinion of the Plumbing Official, are the least possible to become a nuisance to the public, to occupants of a premises, or to neighboring property. Should the overflow from such a fitting become a nuisance, it shall be sealed and some other acceptable method of disposal be provided. For leaders five inches and over, the emergency overflow shall be a minimum of four inches. All overflow openings shall be screened to prevent entrance of mosquitoes.

4611.6 SOAKAGE PIT LIDS:

(a) Soakage pit lids shall be designed to support the anticipated loadings not less than that of a 10-ton truck. Not less than the following minimum slab thicknesses and reinforcement areas shall be permitted.

TRENCH SPAN	SLAB THICKNESS	REINFORCEMENT #3	#4	#5	#6	#7	#8
2'	5" Bottom Bars	6"	12"	12"	12"	12"	12"
3'	6" Bottom Bars	3"	7"	10"	12"	12"	12"
4'	7" Bottom Bars	No	6"	7"	10"	12"	12"
5'	7" Bottom Bars	No	No	5"	7"	10"	12"
6'	8" Bottom Bars	No	No	No	6"	8"	10"

(b) Reinforcing across trench is to be placed ¾-inch up from bottom of slab. Temperature reinforcing lengthwise in the lid shall be No. 4 bars 9 inch o.c.

(c) Support of slab lid shall be on block walls or on rock trench walls.

(d) If slab lid is supported on block walls, such walls shall be supported on an eight-inch deep by ten-inch wide footing. Vertical support shall be provided about every 15 feet by reinforcing two adjacent block cells with #5 vertical bars and filling such reinforced cells with concrete. For precast concrete lid, an eight-inch wide by 12-inch deep beam with four #5 bars shall be placed over the block walls under the lid.

(e) Support may be on rock trench walls, provided the rock is solid and free from honeycombing. A footing, 10 inches deep (including slab thickness) by sixteen inches wide with two No. 5 bars, shall be provided. Trench width shall be computed from the center of such footing for the table given above.

(f) Any reasonable combination of these methods may be used. Under unusual conditions on filled soil where the entire pit will rest on such fill, a design by a Registered Engineer with plans to be approved by the Building Official shall be required.

(g) When the block wall bearing is used it is necessary that a properly designed cantilever, 18 inches in width, be constructed to retard or prevent back wash. Such cantilever shall be of the same thickness as the slab and the principal slab reinforcing shall be alternately bent bars.

(h) Concrete block shall be laid in mortar with the block cell vertical and with the vertical block intersection having one-fourth inch gap without mortar. Not less than one foot width of ¾-inch washed rock shall be placed as backfill around the outside of the soakage pit walls.

(i) Plumbing inspection shall be required and requested when blocks are in place and sewer is connected to soakage pit, and before top form is placed over soakage pit.

(j) No concrete shall be poured until steel is tied and in place and approved by the Building Official.

4611.7 DISPOSAL TO PERVIOUS GROUND:

(a) Rainwater may be disposed to uncovered, pervious areas where not otherwise disposed of as set forth above.

(b) Sufficient effective uncovered pervious areas for rainwater seepage shall be provided on each building site on a minimum ratio of one square foot of effective pervious area for each ten square feet of impervious area.

(c) For the purposes of this Code pervious area shall be deemed to mean ground unpacked by traffic or uncoated by any material.

(d) Where there is reason to believe the ground is of low porosity, the Plumbing Official may require that the owner submit the results of a percolation test to support his request for disposal thereto.

4612 INTERCEPTORS AND SEPARATORS

4612.1 GENERAL REQUIREMENTS:

(a) INTERCEPTORS REQUIRED: Interceptors (including grease, oil and sand interceptors), shall be provided where required herein for the interception and separation from liquid waste materials such as grease, flammable wastes, sand, plaster, ground glass and all other ingredients or liquids considered harmful to the building drainage system, the public sewer or sewage-treatment plant or processes. The terms interceptor and separator may be used interchangeably and may be prefaced by a term indicating the material separated or the location or use.

(b) APPROVAL:

(1) Interceptors shall not be installed unless approved by the Plumbing Official.

(2) The size, type and location of each interceptor together with drawings including all pertinent information, shall be submitted to the administrative authority for approval before installation.

(3) Grease interceptors shall not be approved unless of a type having been tested by a recognized laboratory and found to conform to all applicable requirements of this Code.

(c) SEPARATION: A mixture of light and heavy solids or liquids and solids having various specific gravities may be treated and then separated in an interceptor, in accordance with Paragraph 4612.1(b). Wastes not requiring treatment or separation shall not be discharged into or through an interceptor.

(d) INTERCEPTOR EFFICIENCY: Interceptors shall be rated and approved for their efficiency in accordance with accepted practice.

(e) ACCESSIBILITY: Interceptors shall be so installed as to provide ready accessibility to the cover and contents and means of servicing and maintaining the interceptor in working and operating condition.

(f) MAINTENANCE: Interceptors shall be maintained in efficient operating condition by periodic removal of accumulated contents.

(g) VENTING INTERCEPTORS: Interceptors shall be so designed and installed that they shall not become air bound if closed covers are used.

(h) DISTANCE SEPARATION: Interceptors and separators shall have the distance separation from buildings, other facilities and property lines as set forth in Section 4612.2(n).

4612.2 COMMERCIAL GREASE INTERCEPTORS:

(a) A grease interceptor may be omitted for single-family residences, but shall be installed in the waste line leading from sinks, drains or other fixtures in the following establishments; restaurants, kitchens, cafeterias,

processing plants, food preparation areas and other establishments where grease can be introduced into the drainage system in quantities that can affect line stoppage or hinder sewage disposal.

(b) Commercial grease interceptors shall be installed as required by the Broward County Public Health Unit. When disposal is to a public sewer system, grease interceptors shall be governed by this section.

(c) A two-way clean-out tee, brought to grade, shall be installed entering and leaving each grease interceptor, and protected as called for in Section 4608.2(a)(13).

(d) All grease traps and drainfields, where required, shall be designed in accordance with the established criteria and approved by the Environmental Engineering section of the Broward County Public Health Unit. Minimum size of grease interceptors where disposal is to sanitary sewer system shall be:

Up to 50 persons or 2,600 gallons per day	750 gallon tank
51 to 100 persons or 4,900 gallons per day	1,200 gallon tank
101 to 150 persons or 7,200 gallons per day	1,600 gallon tank

Above 150 persons or 7,200 gallons per day, multiple series tanks shall be used at the aforementioned ratios, but in all cases tanks in series shall be of the same size.

(e) Grease interceptors shall be rectangular in shape with inside length between two and three times the inside width, or shall be of a shape approved by the Florida Department of Environmental Regulation.

(f) Grease interceptors shall be constructed of concrete, either precast or poured-in-place or other approved material. All concrete used in the construction of grease interceptors shall have a strength of not less than 3,000 psi in 28 days. Tests to determine water tightness may be required by the Plumbing Official and where required shall be made by filling tank with water to the overflow point at the time of inspection. Metal, block, bricks or sectional tanks of any description are not permitted. The interior wall of grease interceptors shall be finished smooth and impervious. Voids, pits, or protuberances on or in the inside walls of grease interceptors are prohibited. The Plumbing Official may require that plans for proposed grease interceptor bear a statement by a registered professional engineer or architect as to the character of the soil and the sufficiency of the support for the tank.

(g) Precast concrete grease interceptors shall have a minimum wall and bottom thickness of 4" and for tanks exceeding 1,200 gallon capacity the minimum concrete cover over the reinforcing shall be not less than 1½". Tops shall have a minimum thickness of 4", and be reinforced with No. 3 bars set on 6" centers across the carrying span and 12" on centers for temperature reinforcement. Precast tanks shall be sufficiently reinforced to resist cracking during handling or installation with a minimum reinforcement of 6 x 6 ten-ten wire mesh or equivalent area. Precast grease interceptors shall not be located where vehicular traffic or other overburden loads are anticipated unless a design by a professional engineer and construction is provided to support the anticipated loads bearing on the tank. Where support is provided without bearing on the tank, bearing shall be on the soil independent from the grease interceptor and reinforced as set forth in Sub-section 4611.6.

(h) Cast-in-place grease interceptor shall have a minimum wall, floor and lid thickness sufficient to provide 3" of concrete cover between the reinforcing and any ground-contact surface and 1½" of concrete cover between the reinforcing and any formed wall surface but not less than 4".

(i) Cast-in-place grease interceptors subject to overburden loads not in excess of 2' of fill and not subject to vehicular loads shall be as follows:

(1) Walls and floors shall be reinforced with No. 4 bars, 6" on centers each way with continuity around corners.

(2) Bars shall have the cover set forth in (h) above.

(3) Lids spanning not more than 4'6" shall be reinforced with No. 4 bars 6" on centers short way and No. 3 bars 6" on centers long way and such bars shall be located ¾" from bottom of slab.

(j) Cast-in-place grease interceptors subject to overburden loads in excess of the loads set forth in paragraph (i) above shall be designed to support the anticipated load but not less than that of a ten-ton truck and shall have concrete lids of the thickness and reinforcing as set forth in paragraph 4611.6(a) and (b). Traffic lids for cast-in-place grease interceptors subject to loads other than those herein described shall, when deemed necessary in the opinion of the Building Official, be designed by a registered professional Engineer.

(k) Ventilation of grease interceptors and drainpipes shall be provided through grease interceptor inlet and outlet tee thence through the plumbing system and in no other manner.

(l) The grease interceptor outlet tee shall be terra cotta, or concrete with a wall thickness of at least 1", and a cross-section area not less than the building sewer in connection therewith and not more than two times greater. Outlet tee may be cast iron or PVC.

(m) A manhole located directly above the inlet connection and the outlet tee and having a least dimension of 22" shall be provided at all grease interceptors. Such manholes shall be brought to grade and have cast iron ring and cover.

(n) Grease interceptors shall not be located under any building or within 5' thereof, within 10' of water supply pipe lines, within 5' of property lines other than public streets.

(o) Unless otherwise approved by the Building Official, by reason of special design, excavations shall not be made within the angle of pressure as transferred from the base of an existing structure to the sides for an excavation on a 45 degree angle.

(p) Grease and contents from grease interceptors shall not be deposited in any canal, reservoir, bay or water, nor upon the top of the ground nor buried under the ground and shall be disposed of only by a method approved by the Florida Department of Environmental Regulation.

(q) Outlet tees shall extend to within 8" of the bottom of the tanks and the inlet invert shall discharge a minimum of 2½-inch above the liquid level line.

(r) Abandoned grease and septic tanks shall be pumped out, a hole broken in the bottom, and filled with clean sand or other suitable material.

4612.3 GASOLINE, OIL AND SAND INTERCEPTORS:

(a) REQUIRED: An approved gasoline, oil and sand interceptor shall be provided in the following places:

(1) Public storage garages where floor drainage is to be provided.

(2) Where motor vehicles are washed, floor drains shall be provided, private individuals excluded.

(3) Any place where motor vehicles are repaired and floor drainage is provided.

(4) Shops, manufacturing and assembly plants where parts are washed to remove oil and/or greasy substances or anything deleterious to any public sewer.

(5) Where oil, gasoline or other volatile liquid becomes a nuisance.

EXCEPTION: Where sewers (Public Operated Treatment Works) licensed by Office of Natural Resource Protection are not available, the floor drain shall discharge to a holding tank approved by ONRP and shall be vented as per Sec. 4612.3(d)(5). Tank shall be on exterior of building as per Sec. 4612.2(n). Waste to be disposed as per ONRP regulations.

(b) FLOOR DRAINS: Floor drains shall be of a bucket type with minimum 4-inch diameter outlet.

(c) MINIMUM DIMENSION: Oil interceptors shall have a minimum depth of not less than 2 feet below the invert of the discharge drain and a minimum capacity of 18 cubic feet per 20 gallon flow per minute.

(d) PIPE CONNECTIONS:

(1) The minimum inlet, outlet and vent pipes shall be 4 inches except as otherwise set forth herein.

(2) The 4-inch outlet shall be taken off the outer wall at the bottom of the interceptor basin at a 45 degree angle in such manner as to provide a trap seal of approximately 24 inches.

(3) The invert of the 4-inch drain inlet to the interceptor basin shall be located not less than one inch above the water line.

(4) The interceptor local vent for the interceptor basin shall be taken off vertically not more than 6 inches below the cover.

(5) Approved commercial interceptors may be used.

(6) The local vent for the interceptor basin shall be a minimum size of 3 inches.

(7) When service sinks, drinking fountains or novelty boxes are installed in or adjacent to wash areas, the interceptor local vent may be installed on the drain line for the purpose of receiving the wastes from such fixtures.

(8) A cleanout shall be required on the horizontal discharge to provide downstream rodding only.

(e) STRUCTURAL DESIGN: Interceptors shall be structurally adequate to support the loads superimposed thereon dependent on their location. A 5/8-inch thick removable metal cover may be used under vehicular traffic loads where the interceptor area does not exceed 9 square feet. A 3/8-inch thick removable metal cover may be used where vehicle traffic loads are not possible and the interceptor area does not exceed 9 square feet. For larger areas or greater load capacities or at the option of the designer, concrete lids may be used but cast iron manholes brought to grade must be provided. All covers must be accessible and brought to grade.

4612.4 LAUNDRY INTERCEPTORS: Commercial laundries shall be equipped with an interceptor having a non-removable ½-inch mesh screen metal basket or similar device that will prevent strings, rags, buttons or other materials detrimental to the collection and treatment system from passing into the drainage system. Such ½-inch screen metal basket or similar device shall be designed to be easily cleaned without completely removing such basket or device.

4612.5 BOTTLING ESTABLISHMENT INTERCEPTORS: Bottling plants shall discharge their process wastes into an interceptor designed to provide the separation of broken glass or other solids, before discharging liquid wastes into the drainage system. (See Paragraph 4606.6(b).)

4612.6 SLAUGHTER HOUSE INTERCEPTORS: Slaughtering rooms and dressing rooms shall be provided with floor drains equipped with metal screen type baskets piped to separators which shall prevent the discharge into the drainage system of feathers, entrails or other materials likely to clog the drainage system. Metal screen type baskets shall prevent passage into the drainage system of solids exceeding one-half inch.

4612.7 ABANDONED GREASE INTERCEPTORS: When a grease interceptor is abandoned or discontinued, the contents shall be completely pumped out, the bottom broken to permit drainage, and the interceptor filled with clean sand or other suitable material. The contents of grease interceptors shall be disposed of in accordance with the authority having jurisdiction.

4613 PLUMBING FIXTURES

4613.1 GENERAL REQUIREMENTS:

(a) (1) Plumbing fixtures shall be constructed with approved materials, shall have smooth impervious surfaces, shall be free from defects and concealed fouling surfaces, and, except as permitted elsewhere in this Code, shall conform in quality and design with one of the Standards in Table 46-C.

(2) Fixtures constructed of pervious material and equipped with a waste outlet to retain water, shall not be installed.

(b) REQUIREMENTS FOR THE PHYSICALLY HANDICAPPED: See Sec. 515.

(c) WATER CONSERVATION STANDARDS: Every plumbing fixture installed in new construction regulated by this Code shall comply with the water conservation standards set forth in this section.

EXCEPTION: Showerheads manufactured for use in safety spray installations, penalware and specialty hospital fixtures shall be exempt from the requirements of this section.

(1) TESTING AND LABELING: All plumbing fixtures subject to compliance with this section shall be tested by the manufacturer for compliance with the water conservation standards specified herein and fixtures meeting these standards shall bear a label certifying compliance. All testing shall be performed by independent testing laboratories acceptable to the authority having jurisdiction.

(2) WATER CLOSETS, URINALS AND ASSOCIATED FLUSHING MECHANISMS: The maximum water flow of water closets, urinals and associated flushing mechanisms shall not exceed the values specified in Table 46-R when tested in accordance with ANSI A112.19.2M (1990).

(3) SHOWERHEADS AND SINK OR LAVATORY FAUCETS: The maximum water flow of showerheads and sink or lavatory faucets shall not exceed the values set forth in Table 46-R when tested in accordance with ANSI A112.18.1M (1989). In addition, the flow control valve or device which restricts the flow of water in such fixtures shall not be capable of being removed without special tools.

4613.2 OVERFLOWS:

(a) DESIGN: When any fixture is provided with an overflow, the waste shall be so arranged that the standing water in the fixture cannot rise in the overflow when the stopper is closed or remain in the overflow when the fixture is empty.

(b) CONNECTION: The overflow pipe from a fixture shall be connected on the house or inlet side of the fixture trap, and it shall be unlawful to connect such overflows with any other part of the drainage system.

4613.3 INSTALLATION:

(a) FIXTURE CLEARANCE:

(1) Plumbing fixtures shall be installed and spaced in a manner to permit easy access for cleaning and for the intended use, and shall be set with the following minimum clearances:

(2) Closet bowls and the roughing-in of bends shall be spaced a minimum of 15 inches from the center of the bowl to any finished wall or shower compartment wall (curb): A minimum of 15 inches from the center line of the closet tank to the edge of a lavatory, vanity lavatory counter-top, or any other infringement: A minimum of 15 inches from the center of the water closet and/or bidet to the outside wall or edge of a shower curb/bathtub, and in battery installations a minimum of 30 inches center to center of bowls plus the total thickness of partitions:

(aa) There shall be a minimum clearance of 21 inches from the front of the bowl to any finished or stall compartment wall, door, or other fixture.

(3) Pedestal, stall and wall hung urinals shall be spaced a minimum of 15 inches from the center of the urinal to any finished or stall compartment wall, and in battery installations a minimum of 30 inches center-to-center of the urinals, plus the total thickness of the partition.

(aa) There shall be a minimum clearance of 18 inches from the front of pedestal urinals and 21 inches from the front of a stall or wall-hung urinal to any finished or stall compartment wall, door, or other fixture.

(4) Lavatories shall be spaced a minimum of four inches from any finished or stall compartment wall, a minimum of two inches from a tub and, in battery installations, a minimum of four inches between lavatories.

(aa) There shall be a minimum clearance of 21 inches in front of any lavatory and any finished or stall compartment wall, door or other fixture.

(5) Shower receptors and compartments shall have a minimum clearance of 24 inches in front of opening to any finished or stall compartment wall, door or other fixture.

(b) PIPES FROM FIXTURES: Where practical, all pipes from fixtures shall be run to the nearest wall.

(c) GROUTING OR SEALING: Where fixture surfaces come in contact with wall or floor, the point of contact shall be grouted with suitable material to provide a water-tight seal.

(d) SECURING FIXTURES: Floor-outlet fixtures shall be rigidly secured to floor flange by brass bolts and/or screws.

(e) WALL HUNG FIXTURES: Wall-hung fixtures shall be rigidly supported by concealed approved floor mounted carriers securely bolted to the floor or to suitable backing.

(f) SETTING: Fixtures shall be set level and in proper alignment with reference to adjacent walls. See Paragraph 4613.3(a).

NOTE: See Appendix A-2 for graphic reference.

4613.4 PROHIBITED FIXTURES AND CONNECTIONS:

(a) WATER CLOSETS: Pan, valve, plunger, offset, washout, washdown bowls, latrine, frostproof, and other water closets having an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge, shall be prohibited. Any water closet which might permit siphonage of the contents of the bowl back into the tank shall be prohibited.

(b) URINALS: Trough urinals are not permitted. Urinals which have an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge shall be prohibited. Urinals with integral strainers shall be prohibited. Pedestal urinals are not permitted in school installations.

4613.5 WATER CLOSETS:

(a) PUBLIC USE: Water closet bowls, except within the residence or apartment of a single family, shall be of an elongated type and equipped with open front seats.

(b) FLUSHING DEVICE: Water-closet tanks shall have a flushing capacity sufficient to properly flush the water-closet bowls with which they are connected.

(c) FLOAT VALVES: Float valves in flush tanks shall close tight and provide water to properly refill the trap seal in the fixture.

(d) FLUSHING TANKS: Flushing tanks shall be equipped with an approved ball-cock. The ball-cock shall be installed with critical level of the vacuum breaker at least one inch above the full opening of the overflow pipe. In cases where the ball-cock has no hush tube, the bottom of the water supply inlet shall be installed one inch above the full opening of the overflow pipe.

(e) CLOSE-COUPLED TANKS: The flush-valve seat in close-coupled water-closet combinations shall be one inch or more above the rim of the bowl.

(f) AUTOMATIC FLUSH VALVE: Flushometer shall be so installed that they will be readily accessible for repairing. When the valve is operated, it shall complete the cycle of operation automatically, opening fully and closing positively under the service pressure. At each operation the valve shall deliver water in sufficient volume and at a rate that will thoroughly flush the fixture and refill the fixture trap. Means shall be provided for regulating flush-valve flow. Not more than one fixture shall be served by a single flush valve, except as approved by the Plumbing Official.

4613.6 URINALS: Tanks, or plumbing devices, flushing more than one urinal shall be automatic in operation and of sufficient capacity to provide the necessary volume to flush and properly cleanse all urinals simultaneously. All stall urinals shall be equipped with beehive strainers.

4613.7 LAVATORIES: Lavatories shall have waste outlets not less than one-and-one-fourth inches in diameter. Wastes may have open strainers or may be provided with stoppers.

(a) LEAD: (See Table 46-C.) Sheet lead shall be as follows:

For safe pans, not less than 4 pounds psf.

(b) COPPER: Sheet copper shall be not less than the following:

Safe pans — 12 ounces per square foot.

4613.8 SHOWER RECEPTORS AND COMPARTMENTS:

(a)(1) SHOWER: All shower compartments, except freestanding, pre-fabricated shower compartments, shall have approved pans of lead, copper or other approved material and shall turn up on all sides at least two inches above the finished curb level or 3 ½ inches above the rough curb level.

(aa) See Section 4613.7(a).

(bb) See Section 4613.7(b).

(2)A separate shower pan may be omitted for shower compartments built integrally with a concrete slab on the first floor level where the construction provides a concrete curb having a height on the enclosed sides at least one inch higher than the entrance curb finish height so that the water level may not rise to the height of any surrounding wood plates or studs.

(3) A separate shower pan may be omitted for shower compartments where the finished shower drain is depressed a minimum of 4" below the surrounding finish floor on the first floor level and where the shower recess is poured integrally with the main floor adjoining.

(4) Lead and copper shower pans shall be protected against the corrosive effects of concrete or mortar by a coating of asphaltum paint inside and outside before being placed in position.

(5) Pans shall be securely fastened to the trap stubs at the invert of the weep holes, to provide a watertight joint between the pan and the trap.

(6) Shower receptacle waste outlets on all showers shall be not less than two inches and shall have removable strainers.

(7) Before the completed pan is placed in the space provided for the stall shower, a 30-pound asphalt saturated felt or a 1-inch thick layer of sand shall be placed under the pan for protection against rough surfaces or projecting nails.

(8) Strainers for 2-inch stubs shall have a minimum three and one-half-square inches of free area including the removable plate.

(9) All strainers and pans shall be installed and ready for inspection at time of tub and/or waterpipe inspection.

(10) Free standing prefabricated shower stalls or receptors shall require individual approval.

(b) DIMENSIONS: Shower compartments shall be not less than 1,020 square inches in free standing floor area (minimum 30 inches). The minimum required area and dimensions shall be measured at a height equal to the top of the threshold and at a point tangent to its center line.

(c) PUBLIC OR INSTITUTION SHOWERS: Floors of public shower rooms shall be drained in such a manner that no waste water will pass over areas occupied by other bathers.

(d) WALLS: Walls of smooth, non-corrosive and non-absorbent water-proof materials shall be provided at showers to a height of 6 feet above the floor for shower compartments and stalls not having a tub and to a height of 4 feet above the rim of the tub where a shower is provided in a tub.

(e) JOINTS: Built-in tubs with overhead showers shall have waterproof joints between the tub and the wall.

(f) See Section 4614.17(h).

4613.9 SINKS:

(a) WASTE OUTLETS: Sinks shall be provided with waste outlets not less than one and one-half inches in diameter. Waste outlets may have open strainers or may be provided with stoppers.

(b) FOOD GRINDERS: Where commercial food-waste grinders are installed, the waste from those units shall discharge directly into the building drainage system and not through a grease interceptor. Installation to public sewers shall not be allowed until such time as sewers are adequate.

4613.10 FOOD GRINDERS — WHERE PERMITTED:

(a) FOOD GRINDERS: Sinks on which a food grinder is installed shall have a waste opening not less than three and one-half inches in diameter.

(b) FOOD-WASTE — DISPOSAL CONNECTIONS: A domestic food-waste-disposal unit in a two-compartment sink on a minimum two-inch line shall waste through a two inch by one and one-half-inch double tapped vertical sanitary tee (Hi-Lo) fitting. The tappings shall be no more than 6 inches apart on the vertical, and each compartment shall be separately trapped and separately wasted to the stack or vented branch. In existing sink installations where the second waste opening is not available a domestic food grinder may be installed on a two-compartment sink and waste through a single 1½-inch trap provided an approved directional tee or wye is used.

(c) GREASE INTERCEPTORS: No food-waste grinder shall be connected through a grease interceptor.

(d) COMMERCIAL-TYPE GRINDERS: Commercial-type food grinders shall be provided with a waste line equal in size to the discharge opening of the machine, but not less than a two-inch waste line. Each waste shall be trapped and vented as provided in other Sections of this Code.

4613.11 DRINKING FOUNTAINS:

(a) DESIGN AND CONSTRUCTION: Drinking fountains shall conform to the Standards for Self-Contained Mechanically Refrigerated Drinking-Water Coolers, ANSI A112.11.1, or the Standard Specifications for Drinking Fountains, ANSI Z4.2, as set forth in Section 402.

(b) PROTECTION OF WATER SUPPLY: Stream projectors shall be so assembled as to provide an orifice elevation as specified by ANSI Standard Air Gaps in Plumbing Systems. Drinking fountains equipped with water heating devices shall be equipped with pressure and temperature valves in accordance with Sub-section 4614.18 and Table 46-C herein.

4613.12 FLOOR DRAINS AND BACK WATER VALVES:

(a) PROHIBITED LOCATION:

(1) Floor drains serving indirect waste pipes serving food or drink storage rooms shall not be installed in any toilet room nor in any inaccessible or unventilated space such as a closet or store room.

(2) No floor drain or other plumbing fixture shall be installed in a room containing air handling machinery. Equipment drains shall be conveyed through an indirect waste to a floor drain located outside such room or other approved point of disposal.

(3) Drinking fountains shall not be used to reseal floor drain traps located in toilet rooms.

(4) Floor drains located in toilet rooms shall not receive indirect waste from any fixture, appliance or appurtenances.

(b) FLOOR DRAIN TRAPS: Floor drain shall connect into a trap so constructed that it can be readily cleaned and of a size to serve efficiently the purpose for which it is intended. The floor drain inlet shall be so located that it is at all times in full view. When subject to backflow or back pressure, such drains shall be

equipped with an approved back-water valve. One or more floor drains may be connected to the same fixture branch without a revent provided that all traps are within 15 feet measured horizontally from the vented sewer line.

(c) WATER TRAP SUPPLIES: Every trap which is directly connected to the drainage system, shall be provided with a permanent water seal, fed from an approved source of water, or by means of an approved automatic priming device designed and installed for that purpose, except where in the opinion of the Plumbing Official such water seal is not necessary for safety or sanitation.

(d) FLOOR DRAINS: Floor drains sized three inches and larger may be installed within 15 feet, measured horizontally, from a vented sewer line without a revent; provided that no floor drain shall connect to a soil line within five feet of the base of a soil stack serving more than six water closets or equivalent fixture units. All public toilet rooms shall be required to have floor drains. In public coin-operated laundries and in the central washing facilities of apartment buildings, except in one and two family dwellings. The rooms containing the laundry machines shall be provided with adequate floor drains located to readily drain the entire floor area.

(e) FLOOR DRAINS SHALL BE PROVIDED WITH TRAPS AND STRAINERS: Approved bucket type drains shall be provided for filling stations, garages, garbage areas, chicken and fish cleaning areas, bottling plants, food processing plants and other floor areas where solids could find entry into a drainage system.

(f) FLOOR DRAINS CONSIDERED FIXTURES: A floor drain shall be considered a plumbing fixture.

(g) BACKWATER VALVES:

(1) Backwater valves shall be so constructed as to ensure a mechanical seal against backflow.

(2) Backwater valves, when fully opened, shall have a capacity not less than that of the pipes in which they are installed.

(3) Backwater valves shall be so installed as to provide ready accessibility to their working parts.

4613.13 DISHWASHING MACHINES:

(a) Domestic dishwashing machines shall comply with the requirements set forth in Sub-section 4614.4.

(b) Gravity discharge dishwashing machines installed on ground floor shall have an emergency overflow not less than one inch diameter connected to the machine tailpiece and terminating outside of building wall above grade.

(c) Wastes from dishwasher with pump discharges shall rise to a height equal to the height of the underside dishwasher top and may connect to tailpiece of sink by means of a "Y" connection. If a food-disposal unit is provided, the domestic dishwasher shall connect to the inlet side of the food-disposal unit.

4613.14 MULTIPLE WASH SINKS:

(a) CIRCULAR TYPE: Each 18 inches of wash sink circumference (circular type) shall be equivalent to one lavatory.

(b) STRAIGHT-LINE TYPE: Multiple wash sinks of the straight-line type shall have hot and cold combination spouts not closer than 18 inches from adjacent similar spouts and each spout shall be considered the equivalent of one lavatory.

4613.15 GARBAGE-CAN WASHERS:

(a) DISCHARGE: Garbage-can washers shall not discharge through a trap serving any other device or fixture.

(b) BASKETS: The receptacle receiving the wash from garbage cans shall be provided with a bucket type strainer or similar device to prevent the discharge of solids into the building drainage system.

(c) CONNECTIONS: Water supply connections shall conform to Sub-section 4614.4.

4613.16 LAUNDRY TRAYS: Each compartment of a laundry tray shall be provided with a waste outlet not less than one and one-half inches in diameter and with a stopper.

4613.17 BATHTUBS: Bathtubs shall be provided with waste outlets not less than one and one-half inches in diameter.

(a) WHIRLPOOL BATHTUBS:

(1) Access An access panel of sufficient size shall be installed to provide access to the pump for repair and replacement.

(2) Pump When not factory assembled to the tub assembly, the circulation pump shall be accessibly located above the crown weir of the trap. The pump drain line shall be properly graded to assure minimum water retention in the volute after fixture use.

(3) Operation Leak testing and pump operation shall be performed in accordance with manufacturer's recommendations.

(4) Whirlpool Bathtubs Appliances Whirlpool bathtub appliances shall comply with ANSI/ASME A112.19.7.

(5) Suction Fittings Suction fittings for use in whirlpool bathtubs shall comply with ANSI/ASME A112.19.8.

4613.18 SPECIAL FIXTURES AND SPECIALTIES:

(a) WATER AND DRAIN CONNECTIONS: Baptistries, ornamental pools, aquaria, ornamental fountain basins, developing tanks or sinks and similar constructions when provided with water supplies shall be protected from back-siphonage as required in Section 4620.

(b) APPROVAL: Specialties requiring water and waste connections shall be submitted to the Plumbing Official for approval before installation.

(c) WATER USED FOR PROCESSING: Water used for cooling of equipment or similar purposes shall not be to the potable-water distributing system. When permitted, the waste water shall be discharged through an indirect waste pipe or air gap to the drainage system or other approved point of disposal.

4613.19 MINIMUM FIXTURE REQUIREMENTS:

(a) GENERAL: (See Footnote No. 12 which applies to all fixture requirements.)

(1) Wherever installation of plumbing fixtures is required or provided the minimum number of each type of fixture installed shall be as set forth in this Sub-section based on the use or occupancy proposed and based on the number of persons, as set forth in Sub-section 4603.22, except as may be otherwise specifically provided.

(2) Where facilities are provided for 1 to 9 persons, one water closet and one lavatory for use of both sexes will be accepted in accordance with Footnote 12 and shall be classified as semiprivate facility. Impermeable wainscoating and floor drain will not be required under this condition.

(3) See Paragraph (m) for Footnotes referenced.

(b) PLACES OF EMPLOYMENT: Minimum fixture requirements for places of employment such as factories, office buildings, stores and similar establishments shall be as follows and these minimum fixture requirements shall be applicable to any occupancy or use except as may be otherwise specifically set forth hereafter:

MALES				FEMALES		
No. of Males	**Water**	**Urinals**	**Lavatorie**	**No. of**	**Water**	**Lavatories**
1-9	As per (a) (2) above			1-9	As per (a) (2) above	
10-25	1	1	2	10-25	1	2
26-60	2	1	2	26-50	2	2
61-100	3	2	2	51-75	3	3
101-140	4	2	3	76-100	4	3
141-180	5	3	3	101-125	5	3
181-220	6	3	4	126-150	6	4
				151-175	7	4
				176-225	8	5
Where the number exceeds two hundred-twenty (220) there shall be provided one (1)water closet or one (1) urinal and one (1)lavatory for each additional forty (40) male employees.				Where the number exceeds two-hundred and twenty five (225) there shall be provided one (1) water closet and one (1) lavatory for each additional fifty (50)female employees.		
Urinals: See Footnote 2.						

(1) For service sink requirements see Footnote No. 8.

(2) For Drinking Fountain requirements see Footnote Nos. 5 and 7.

(3) Shower shall be provided for each 15 persons subject to excess heat or to contamination infection or irritating material.

(4) Each store or warehouse shall have a minimum of one lavatory or sink and 1-1/2 inch fixture branch connected to a three or four inch waste stack.

(5) Arcades and shopping malls containing stores which are 1000 square feet or less in area may be serviced by centrally located toilet facilities that are accessible to the entrances of said stores within a 300 foot travel distance.

(6) Group G Division I Occupancy buildings or portions thereof shall have its minimum fixture requirements determined by using an occupant count of 200 square feet per person of the net sales area.

(7) Kiosk of less than 400 square feet in area, and other isolated minor uses, shall be exempt from requiring bathroom facilities, if a letter is submitted by a tenant within a 300 feet travel distance to the Plumbing Official permitting the use of its plumbing facilities, or public toilets are available within a 300 foot travel distance. (See Footnotes 3, 4, 6, 9, 11 and 12.)

PUBLIC ASSEMBLY: Minimum fixture requirements for places of public assembly such as theatres, churches, arenas, stadiums, lodge halls and similar assembly of Group A and Group B Occupancy shall be as follows:

MALES				FEMALES		
No. of Males	**Water Closets**	**Urinals**	**Lavatories**	**No. of Females**	**Water Closets**	**Lavatories**
1-100	1	2	2	1-50	2	2
101-250	2	1	2	51-250	3	2
251-360	2	2	2	251-360	4	2
361-470	2	3	2	361-470	5	2
471-580	3	3	2	471-580	6	2
581-700	3	4	3	581-700	7	3
701-820	3	5	3	701-820	8	3
821-975	4	5	4	821-975	9	4
976-1150	4	6	4	976-1150	10	4
1151-1325	4	7	4	1151-1325	11	4
1326-1490	5	7	5	1326-1490	12	5
1491-1675	5	8	5	1491-1675	13	5
1676-1875	5	9	5	1676-1875	14	5
1876-2075	6	9	6	1876-2075	15	6
2076-2250	6	10	6	2076-2250	16	6
2251-2475	6	11	6	2251-2475	17	6
2476-2700	6	12	7	2476-2700	18	7
Above 2700 and add 1 water closet and 1 lavatory for each additional 500 males and 1 urinal for each additional 300 males.				Above 2700 add one water closet for each additional 350 females and one lavatory for each additional 500 females		
Urinals: See Footnote 2.						

(1) Drinking fountains shall be provided at a ratio of 1 for each 200 persons up to 800 total number of persons, over 800 to be considered a special problem and design is to be submitted for approval.

(2) The occupancy control of drive-in theatres shall be based on 3 persons per parking space. (See Footnote 11.)

(d) PLACES SERVING FOOD AND/OR DRINK: Minimum fixture requirements where food and/or drink are served and consumed on the premises such as restaurants, bowling alleys, liquor bars, barbeque stands, drive-in stands, cafeterias, counter service, private clubs and similar eating and drinking establishments shall be as follows:

MALES				FEMALES		
No. of Males	**Water Closets**	**Urinals**	**Lavatories**	**No. of Females**	**Water Closets**	**Lavatories**
1-9	As per (d) (4) below			1-9	As per (d) (4) below	
10-40	1	1	2	10-40	1	2
41-90	2	1	2	41-90	2	2
91-150	2	2	2	91-150	3	2
151-225	3	2	2	151-225	4	2
226-300	3	3	3	226-300	5	3
301-400	4	3	3	301-400	6	3
Where the number exceeds four hundred (400) there shall be provided one (1)water closet or one (1) urinal and one (1)lavatory for each one-hundred twenty-five (125) males				Where the number exceeds four-hundred (400) there shall be provided one (1) water closet and one (1) lavatory for each one-hundred twenty-five (125) females.		
Urinals: See Footnote 2.						

(1) See Footnote No. 9 for bar space.

(2) Curb service to be based on a minimum of one person per 100 square feet of parking area.

(3) Public food service establishments that offer only a take-out service will not be required to provide guest toilets and will be required to provide only one employee's toilet under the following conditions:

(aa) The number of employees does not exceed nine expected to be present at one time.

(bb) The establishment does not allow consumption of food on the licensed premises or provide equipment such as tables, chairs, benches, counters, etc., as a convenience for patrons to consume food on the licensed premises.

(See Footnote 11.)

(4) Where facilities are provided for 1 to 9 persons, one water closet and one lavatory for use of both sexes will be accepted in accordance with Footnote 12. Impermeable wainscoating and floor drain will be required.

(e) SCHOOLS: Minimum fixture requirements for schools and similar Group C Occupancies shall be as follows:

KINDERGARTEN THROUGH 2nd GRADE					
MALES				FEMALES	
Water Closets	**Urinals**	**Lavatories**	**Drinking Fountains**	**Water Closets**	**Lavatories**
1 per 30 males		1 per 30 males (26" rim height)	One in each classroom	1 per 30 females	1 per 30 females
3rd GRADE THROUGH 6th GRADE					
1 per 75 males	1 per 30 males	1 for each 50 males minimum of one. (28" rim),	1 per 75 pupils and a minimum of 1 per floor and a minimum of 1 accessible to the playground area (26" height)	1 per 35 females	1 per 50 females
7th GRADE THROUGH 12th GRADE					
1 per 75 males	1 per 30 males	1 per 50 males, minimum of 1 per floor and a minimum of one accessible to the playground area. (30" rim height)	1 per 75 pupils and a minimum of 1 per floor and a minimum of 1 accessible to the playground area (36" height)	1 per 45 females	1 per 50 females

(1) There shall be one water closet, one lavatory and one drinking fountain in each room except where common toilet rooms are provided. (See Footnote 11.)

(2) Showers shall be provided wherever there is a gymnasium at a rate of one for each 5 boys and one for each 4 girls, based on the maximum number that can use the facilities. (The number of each sex to be provided for, may be calculated on the number of classrooms multiplied by 2.5 or the known total number of pupil boys and girls divided by 12.)

I) EXAMPLE: School has 16 classrooms.
16 x 2.5 = 40 of each sex to be provided for.
Hence 40 ÷ 5 = 8 showers for the boys.
40 ÷ 4 = 10 showers for the girls.

II) EXAMPLE: Total school enrollment: 480 pupils.
480 ÷ 12 = 40 of each sex to be provided for.
40 ÷ 5 = 8 showers for the boys.
40 ÷ 4 = 10 showers for the girls.

(3) Toilets shall be accessible from the playground as well as from the inside of the building.

(f) DAY NURSERIES: Minimum fixture requirements for day nurseries shall be as follows:

Total No. of Children	Water Closets	Lavatories	Bathtubs or Showers	Drinking Fountains
Day Care:				
1-10	1	1	1	1 for each 50. Minimum of 2;1 inside building and one on playground.
11-15	1	2	1	
16-30	2	3	1	
31-50	3	4	1	
above 50	1 per 30	1 per 30	1	
Night Care:				
1-8	1	1	1	
9-18	2	2	2	
9-30	3	3	3	
1-50	4	4	3	
above 50	1 per 30	1 per 30	3	

(1) Toilets shall be accessible from the playground as well as from inside building.

(g) PLACES OF DETENTION: Minimum fixture requirements for places of detention and similar Group D, Division I Occupancies shall be as follows:

(1) Fixture requirements in places of detention are special requirements and plans for proposed installation shall be submitted to the Plumbing Official for approval. (See Footnote 11.)

(h) HOSPITALS: Minimum fixture requirements for hospitals and similar Group D, Division 2 Occupancies shall be as follows:

MALES					FEMALES			
No. of Males	**Water Closets**	**Urinals**	**Lavatories**	**Bed Pan Washers**	**No. of Females**	**Water Closets**	**Lavatories**	**Bed Pan Washers**
1-25	1	1	1	1	1-20	1	1	1
26-40	2	1	2	1	21-40	2	2	1
41-55	2	2	2	2	41-60	3	3	2
56-70	3	2	3	2	61-90	4	4	2
71-85	3	3	3	3	91-130	5	5	3
81-100	4	4	4	4	131-170	6	6	3
101-130	4	4	4	4	171-210	7	7	4
above 130	1 per 60	1 per 60	1 per 60	1 per 60	above 210	1 per 40	1 per 40	1 per 40

(1) Other requirements, such as sterilizers, slop sinks, special fixtures, etc., shall be special problems, and shall be submitted to the Plumbing Official for approval. (See Footnote 11.)

(2) See schedule for "Places for Employment" for employees facilities.

(i) FILLING STATIONS: Minimum fixture requirements for filling stations shall be as follows:

MALES		FEMALES	
Water Closets	**Lavatories**	**Water Closets**	**Lavatories**
1	1	1	1

(1) Grease and oil interceptors shall be provided as set forth in Sub-section 4612.3 herein and such interceptors shall have a basket-type floor drain and a trap.

(See Footnote 11.)

(j) RESIDENCES: Minimum fixture requirements for single family residences, duplexes, and apartments shall be as follows:

(1) One water closet per dwelling unit.

(2) One lavatory per dwelling unit.

(3) One tub or shower per dwelling unit.

(4) One kitchen sink per dwelling unit.

(5) One laundry tub or washing machine per dwelling unit.

(See Footnotes No. 1 and 12.)

(k) ROOMING AND BOARDING HOUSES: Minimum fixtures requirements for rooming and boarding houses shall be as follows:

MALES					FEMALES		
No. of Males	**Water Closets**	**Urinals**	**Lavatories**	**Tub or Shower**	**No. of Females**	**Water Closets**	**Lavatories**
1-11	2	1	2	1	1-11	1	2
12-18	2	1	2	2	12-18	2	2
19-26	3	1	3	3	19-26	3	3
27-33	4	1	4	4	27-33	4	4
34-41	5	1	5	5	34-41	5	5
42-48	5	2	6	6	42-48	6	6
49-56	6	2	7	7	49-56	7	7
57-63	7	2	8	8	57-63	8	8
64-71	7	3	9	9	64-71	9	9
72-78	8	3	10	10	72-78	10	10
79-86	9	3	11	11	79-86	11	11
87-93	10	3	12	12	87-93	12	12
94-101	10	4	13	13	94-101	13	13

(1) Over five males a urinal is required.

(2) The above schedule applies for each floor. (See Footnote No. 11.)

(3) Both hot and cold water shall be supplied to showers, tubs and lavatories.

(4) Where accommodations exceed 15 persons per floor a service sink is required on each floor.

(l) DORMITORIES: Minimum fixture requirements for dormitories shall be as follows:

MALES				FEMALES	
Water Closets	**Urinals**	**Lavatories**	**Drinking Fountains**	**Water Closets**	**Lavatories**
1 for the first 10 Males. Over 10, 1 for each additional 25 males.	1 for each 25 males,up to 150 males. Over 150 males add 1 for each 50 additional males.	2 for each 12 males up to 75 males Over 75, 1 for each 20 males. Additional separate dental lavatories should be provided in communal toilet rooms at 1 for each 20 males.	1 per each 75 persons and a minimum of one per floor and a minimum 2 per dormitory.	1 for each first 8 females.Over 8, one for each additional 20 females. See Footnote 11.	2 for each 12 females up to 75 females.Over 75,one for each additional 15 females. Additional separate dental lavatories should provided in communal toilet rooms at 1 for each 20 females.

(1) Bath or shower requirements same as for lavatories.

(2) For service sink requirements see Footnote No. 8.

(m) FOOTNOTES: Footnotes to the preceding Paragraphs:

FOOTNOTES

Footnote No. 1

At least one laundry tub or the rough supply and drainage for a clothes washing machine shall be provided for single family and duplex buildings. For apartment houses, such tub or clothes washing machines for the first five apartments and one such tub or clothes washing machine for each additional 15 apartments shall be required. Such laundry tub or clothes washing machines shall be available to all residents of the building and shall be within a travel distance of not more than 400 feet from an entrance to such building.

Footnote No. 2

Female urinals may be substituted for water closets up to one-half of the required number of water closets.

Footnote No. 3

Wash-up sinks may be substituted for lavatories where type of employment would warrant.

Footnote No. 4

For factories the above requirements are minimum and may be adjusted upward depending upon the provisions of work periods, and type of operation, when it is considered that these minimum requirements will not provide adequate facilities.

Footnote No. 5

One drinking fountain shall be provided accessibly within 50 feet of all operational processes and at least 1 drinking fountain for each 75 persons.

Footnote No. 6

Toilet facilities shall be provided on each floor for each sex using that floor and shall be located to be readily accessible except that in a building where the two lower levels, such as a first floor and mezzanine or the first floor and second floor where there is no mezzanine, are occupied by a single tenant and the toilet facilities are not for public use. The combined total toilet facilities required for these two levels may be located on either

the first or second level. Total facilities accessible only through private offices shall be considered in addition to the above minimum requirements and the personnel occupying such offices may be substracted from the total employment. EXCEPTION: Toilet facilities for public use in Group A or B Occupancies, restaurants, bars, transportation terminals and similar locations shall be provided on each floor for each sex.

Footnote No. 7

One drinking fountain shall be provided if there are over 10 employees and 1 drinking fountain for each 75 employees. Such drinking fountains shall be conveniently located and accessible to the offices served. Not to be located in any toilet room or vestibule to a toilet room. EXCEPTION: Bottled water may be substituted for the installation of drinking fountain(s) provided drinking fountain(s) rough-in(s) is installed.

Footnote No. 8

Where there are 10 offices or rooms or more, and 25 employees or persons, a service sink shall be provided on each floor.

Footnote No. 9

Seating capacity shall be determined as follows: Restaurants and eat and drink establishments where no alcoholic beverages are served, 30" of counter space and/or 15 square feet of dining room area shall be equal to 1 person. Where alcoholic beverages of any kind are served, 18" of counter or bar space and/or 15 square feet of serving area shall equal 1 person. All toilet rooms shall be of easy and convenient access to both patrons and employees, with and under the responsible direction of the management of the premises served; and shall be not over 100 feet along the line of travel from the nearest exit to the dining room, bar or food service area. Where such dining room, bar or food service area is incidental to another Occupancy, the limiting travel distance set forth herein may be varied where adequate directional signs from the food or drink service area to the toilets are provided, and the toilets are of sufficient and adequate number and are conveniently located to serve the food and drink service area plus the remainder of the floor area. Such exceptional travel distance, however, shall not exceed 300 feet.

Footnote No. 10

Passenger terminals, such as railroad, bus or airline terminals are not included in this classification. Such establishments are special problems and shall be submitted to the Plumbing Official for approval.

Footnote No. 11

Hotels, places of public assembly, public toilet rooms, places of employment, stores, hospitals, convalescent homes, schools, dormitories, day nurseries, rooming houses, filling stations, places of detention, community toilets and all locations that may be classed as other than private residential or private apartments shall have water closet bowls of an elongated type and equipped with open-front seats.

Footnote No. 12

All calculations shall be on the basis of equal numbers of males and females where sanitary facilities are required for both sexes.

4613.20 TRASH CHUTES, LINEN CHUTES AND TRASH ROOMS:

(a) Sprinkler heads shall be required as set forth in Sub-section 3801.1 and water supply shall be as set forth in Section 4614 except that, where no other automatic sprinklers are required or provided in the building, such sprinklers may be connected to the domestic supply.

(b) A one-half inch hose bib with syphon breaker shall be provided in or near each trash room or garbage room supplied by a chute.

(c) A floor drain shall be provided in each linen room supplied by a chute and/or in which sprinklers are provided.

(d) A floor drain shall be provided in every trash or garbage room exceeding 15 square feet in area where such room is used for collection or compacting and in every trash, garbage or linen room served by a fire sprinkler.

(e) All garbage or trash chutes shall be supplied with a flushing ring.

4614 WATER SUPPLY AND DISTRIBUTION

4614.1 QUALITY OF WATER SUPPLY:

(a) PUBLIC WATER SERVICE REQUIRED: All premises intended for human habitation or occupancy, including but not limited to establishments to be used for household, domestic, food processing, food handling, restaurant, dairy or bottling purposes, public buildings and places of assembly or other establishments, where a water supply is or may be used for human consumption, shall be supplied from the approved public water mains, where such mains are available. Where a water supply is not available from approved public water mains such premises shall be supplied with potable water (as herein defined) from a privately-owned well or other source which has been properly approved by the authorities having jurisdiction.

(b) APPROVAL: No water supply of a non-potable nature shall be used for commercial or industrial purposes unless such use and the source of supply has first been approved by the Florida Department of Health and Rehabilitation Service, Division of Health and Plumbing Official and/or other authority having jurisdiction.

(c) ACCEPTABLE SOURCES: Where a public supply of potable water is not available, the requirements of the Florida Department of Health and Rehabilitation Services, Division of Health shall be satisfied.

4614.2 WATER SUPPLY MANDATORY: Every building in which plumbing fixtures are installed and are for human occupancy or habitation shall be provided with an ample supply of pure and wholesome water.

4614.3 PROTECTION OF POTABLE WATER SUPPLY: See Section 4620.

4614.4 VACUUM BREAKERS AND AIR GAPS: See Section 4620.

4614.5 WATER SERVICE PIPE:

(a) The underground water service pipe and building sewer shall be not less than 5 feet apart horizaontally and shall be seperated by undisturbed compacted earth. The water-service pipe may be placed in the same trench with the building sewer provided the following conditions are satisfied:

(1) The water-service pipe and all other pipe or conduit, shall be placed on a solid shelf excavated at one side of the common trench, above the sanitary sewer line, with a minimum of twelve inches between pipes or conduits.

(2) The number of joints in the service pipe shall be kept to a minimum.

(3) The materials and joints of sewer and water-service pipe shall be installed in such manner and shall possess the necessary strength and durability to prevent the escape of solids, liquids, and gases, therefrom, under all known adverse conditions such as corrosion, strains due to temperature changes, settlement, vibrations and superimposed loads.

(b) STOP-AND-WASTE VALVE COMBINATION: Combination stop-and-waste valves and cocks shall not be installed in an underground service pipe.

(c) PRIVATE WATER SUPPLY: No private water supply shall be interconnected with any public water supply.

4614.6 WATER PUMPING AND STORAGE EQUIPMENT:

(a) PUMPS AND OTHER APPLIANCES: Water pumps, tanks, filters, water softeners, water vending machines, home water purifiers, and all other appliances and devices shall be protected against contamination.

(1) All water softeners, water vending machines, home water purifiers and all other appliances and devices

shall bear the NSF Seal of Approval.

(2) All water softeners shall comply with NSF Standard 44.

(3) All water vending machines, home water purifiers and all other appliances and devices shall comply with one of the following NSF Standards: 42, 53 or 58.

(b) WATER-SUPPLY TANKS: Potable-water-supply tanks shall be properly covered and screened to prevent the entrance of foreign material or insects into the water supply. Soil or drainage lines shall not pass directly over such tanks.

(c) CLEANING, PAINTING, REPAIRING WATER TANKS: A potable-water-supply tank used for domestic purposes shall not be lined, painted, or repaired with any material which will affect either the taste or the potability of the water supply when the tank is returned in service. Tanks shall be disconnected from the system during such operations, to prevent any foreign fluid or substance from entering the distribution piping.

4614.7 WATER-SUPPLY HOUSE TANKS:

(a) WHEN REQUIRED: When the water pressure from the community mains during flow is insufficient to supply all fixtures freely and continuously, the rate of supply shall be supplemented by a gravity house tank or booster system.

(b) SURGE TANKS: In any structure that requires an auxiliary pump to supplement the available water supply, such pump shall be supplied from a surge tank to be supplied with water from public or private main through a float valve. Upon acceptance by both the local water company and the administrative authority, the requirement for a surge tank may be waived where controlled pumps are provided.

(c) AUXILIARY PRESSURE: SUPPLEMENTARY TANK:

(1) If the residual pressure in the system is below the minimum allowable at the highest water outlet when the flow in the system is at peak demand, an automatically controlled pressure tank or gravity tank shall be installed, of sufficient capacity to supply sections of the building installation which are too high to be supplied directly from the public water mains.

(2) Low Pressure Cut-Off: When a booster pump is used on an auxiliary pressure system and the possibility exists that a pressure of five pounds per square inch or less may occur on the suction side of the pump, a low pressure cut-off shall be installed on the booster pump to prevent the creation of negative pressure on the suction side of the water system.

(3) Similar arrangements may be provided with the approval of the Plumbing Official.

(d) SUPPORT: All water-supply tanks shall be supported in accordance with the Building Code or other regulations which apply.

(e) OVERFLOW FOR WATER-SUPPLY TANKS: Overflow pipes for gravity tanks shall discharge to an approved point of disposal. Rainwater gutters discharging into a street gutter are not considered approved points of disposal. Adequate overflow pipes properly screened against the entrance of insects and vermin shall be provided.

(f) HOUSE TANK SUPPLY: The water-supply inlet within the house tank shall be at an elevation not less than is required for an air gap in an open tank with overflow, but in no case shall the elevation be less than four inches above the overflow. If a drop pipe is added to the ball cock or filling device an air inlet shall be inserted in the drop pipe at least two inches above the overflow.

(g) DRAINS: Water-supply tanks shall be provided with valved drain lines located at their lowest point and discharged as an indirect waste or as required for overflow pipes in Paragraph 4614.7(e).

(h) SIZE OF OVERFLOW: Overflow drain openings for water supply tanks shall be not less than twelve square inches of free opening.

(i) PRESSURE TANKS: Pressure tanks used for supplying water to the domestic water distribution system, combined supply to fire standpipes and domestic water systems, or to supply standpipes for fire equipment only, shall be equipped with an accessible water and pressure gauge.

4614.8 WATER DISTRIBUTION PIPE, TUBING AND FITTINGS:

(a) (1) Materials for water distributing pipes and tubing shall be brass, copper, cast iron water pipe, polybutelene, galvanized steel (cold water only), or CPVC plastic with appropriate fittings.

(2) All steel pipe and fittings shall be hot dipped galvanized (zinc coating) and shall meet the requirements of ASTM Standards A53 or A120. All steel piping shall be marked continuously along the barrel with the name of the manufacturer, place of origin, ASTM Standard and Schedule of pipe.

(3) Copper pipe and tubing below ground shall be Type K or Type L.

(4) Copper pipe and tubing above ground may be Type K, Type L or Type M.

(5) Plastic pipe and fittings may be used for water only in accordance with Table 46-C.

(b) (1) Pipes conveying fire and domestic water shall not be installed underneath concrete slab on the ground in any location inside the building walls.

(2) The looping of copper annealed-soft tubing and polybutylene water piping beneath the ground floor slab will be permitted in single story buildings or multi-story single family residences and the pipe shall be encased in plastic pipe sleeves, its total length to include the turn to above the slab.

EXCEPTION: In multi-story buildings, domestic water pipes of copper or polybutylene may be installed below the ground floor slab providing the water pipe does not exceed 1½" diameter and is encased in a sleeve of PVC sized 2" larger than the water pipe encased, having an angle no greater than one 45 degree fitting and not exceeding 40 feet of its developed length, with the encased water distribution pipe removable for replacement.

(3) Fittings shall not be permitted below the ground floor slab.

(4) The minimum wall thickness of the plastic sleeve shall be 1/32-inch.

(5) Such piping and fittings may be installed in concrete trenches with removable covers.

(c) (1) Water service and distribution pipe shall be electrically isolated from all other pipe, conduit, soil pipe, building steel and steel reinforcing except where electric ground is otherwise required by this Code, and shall also be separated from such metallic members and from any other materials of construction where damage by friction, heat and abrasion may be anticipated.

(2) Where dissimilar metals are used in the piping system which are not considered compatible on the electromotive scale, insulating dielectric fittings between the two dissimilar metals shall be provided. Copper adapters or heater tees with brass nipples may be used as connectors to hot water heaters or like equipment (without using the insulating dielectric fittings required in this section).

(d) (1) Domestic cold water piping placed above a roof or within 10 inches below a roof shall be suitably insulated with approved materials.

(2) Hot and cold water piping, underground or within partitions, shall be separated and not physically connected.

4614.9 PLASTIC PIPE AND FITTINGS PRESSURE RATED FOR WATER SERVICE PIPE:

(a) In Table 46-C these numbers are listed under "Materials" column which represent the ASTM designation numbers assigned to these materials by the joint ASTM-NSF-PPI committee to assist in quick, easy identification of the materials. The numbers appear as a part of the marking on the pipe and/or tubing. These and no others are approved.

(b) (1) All plastic pipe and fittings approved in Table 46-C shall be properly marked as specified by their respective standards.

(2) All material shall be installed as recommended by the manufacturer and/or the Plastic Pipe Institute.

(3) No materials shall be co-mingled within the same system except which are specifically approved in writing by the respective Standards.

(4) All water service piping shall have a minimum working pressure of 160 pounds per square inch, with permanent identification markings. (Schedule 40.)

(5) All plastic water service piping shall have a minimum cover of 12 inches of backfill. PVC water service piping may continue and turn vertically to the service valve for a height not greater than 4 feet.

(c) No existing metallic water service piping used for electrical grounding shall be replaced with non-metallic pipe or tubing until other grounding means are provided which are satisfactory to the proper administrating authority having jurisdiction.

4614.10 ALLOWANCE FOR CHARACTER OF WATER:

(a) SELECTION OF MATERIALS: When selecting the material and size for water-supplying pipe, tubing, or fittings, due consideration shall be given the action of the water on the interior and of the soil, fill or other material on the exterior of the pipe. No material that would produce toxic conditions in a potable-water-supply system shall be used for piping, tubing or fittings.

(b) Used Piping: No piping material that has been used for other than a potable-water-supply system shall be reused in the potable-water-supply system.

4614.11 WATER SUPPLY CONTROL:

(a) Each building shall have a separate main water control valve, independent of the meter valve. Each apartment or store in a building shall have separate independent control valve or valves located close to the distribution main and individual fixture control valves controlling all the fixtures in such apartment or store. Main control valves shall be located at or near the foundation line outside the building above the ground or in a separate approved box with cover.

(b) Supply lines taken from pressure or gravity tanks shall be valved at or near the tank. Tanks in connection with a domestic water system shall have a drain cock installed on the discharge side of the valve.

(c) All single fixtures and groups of fixtures in hotels, office buildings, hospitals, clinics, places of public assembly, manufacturing plants and warehouses shall have separate fixture control valves and a single control valve for each group of fixtures in a single or adjacent room. Each water storage tank shall have an individual control valve and draw off valve.

(d) A shut-off valve minimum size three-quarter-inch, shall be provided in the cold water branch line, accessible and adjacent to each water-storage tank of each water heater.

(e) Sillcocks for all Group "H" occupancies of more than two units served by a single water service shall be separately and individually valved or otherwise arranged to shut off the supply to the sillcocks without interrupting water supply to the resident units. All store or commercial hose bibbs shall be valved.

(f) Any device, fixture or appliance using potable water shall be connected at a point in the water system so as not to be dependent upon any other fixture supply valve for water supply. Such device or appliance shall be independently valved. Clamp-on type valve shall be prohibited.

(g) (1) LINE VALVES: Valves in the water-supply distribution system, including hot water heaters and group shut-off valves, except those immediately controlling one fixtures supply, when fully opened shall have a cross-sectional area of the smallest orifice of opening through which the water flows at least equal to 80 percent of the cross-sectional area of the nominal size of the pipe in which the valve is installed. Valves shall be rated for

125 psi minimum.

(2) All valves in the water-supply distribution system shall be accessible for service and maintenance.

4614.12 WATER SUPPLY DISTRIBUTION:

(a) WATER-SERVICE PIPE: The water-service pipe from the street main to the water-distribution system for the building shall be of sufficient size to furnish an adequate flow of water to meet the requirements of the building at peak demand, and in no case shall be less than three-quarters-inch nominal diameter. If flushometers or other devices requiring a high rate of water flow are used, the water-service pipe shall be designed to supply this flow.

(b) DEMAND LOAD: The demand load in the building water-supply shall be based on the number and kind of fixtures installed and the probable simultaneous use of these fixtures.

TABLE 46-Q
MINIMUM WATER PIPE SIZE

No. of Fixture Units Flush Tank Water Closet		Diameter of Water Pipe	Recommended Meter size	Approx. Pressure Loss, Meter and 100' of Pipe	No. of Fixture Units Flush Valve Water Closet	
Copper	Galvanized	Inches	Inches	PSI	Copper	Galvanized
18	—	3/4	5/8	30	—	—
—	15	3/4	5/8	30	—	—
19-55	—	1	1	30	—	—
—	16-36	1	1	30	—	—
—	—	1	1	30	9	—
56-85	—	1 1/4	1	30	—	—
—	37-67	1 1/4	1	30	—	—
—	—	1 1/4	1	30	10-20	—
—	—	1 1/4	1	30	—	14
86-225	—	1 1/2	1 1/2	30	—	—
—	68-175	1 1/2	1 1/2	30	—	—
—	—	1 1/2	1 1/2	30	21-77	—
—	—	1 1/2	1 1/2	30	—	15-52
226-350	—	2	1 1/2	30	—	—
—	176-290	2	1 1/2	30	—	—
—	—	2	1 1/2	30	78-175	—
—	—	2	1 1/2	30	—	53-122
351-550	—	2	2	30	—	—
—	291-450	2	2	30	—	—
—	—	2	2	30	176-315	—
—	—	2	2	30	—	123-227
551-640	—	2 1/2	2	30	—	—
—	451-580	2 1/2	2	30	—	—
—	—	2 1/2	2	30	316-392	—
—	—	2 1/2	2	30	—	228-343
641-1340	—	3	3	22	—	—
—	581-1125	3	3	22	—	—
—	—	3	3	22	393-940	—
—	—	3	3	22	—	344-785

1. **NOTE:**This table is applicable to only the most favorable conditions, where water main pressure does not fall below 50 p.s.i. at any time.

2. In general for 3- or 4-story buildings, or where main pressure falls below 50 p.s.i., the next larger size group should be used.

3. Minimum water service shall be ¾" to the conrol valve.

4. All secondary or submeters, backflow assemblies shall be at least equal to the nominal size of the water line in which the devices are installed.

5. *One-half inch water piping distribution may be used to service not more than 2 fixtures from a ¾" water service (reference Section 4614.13).

4614.13 PROCEDURE IN SIZING THE WATER DISTRIBUTION SYSTEM OF A BUILDING:

(a) The sizing of the water distribution system shall conform to good engineering practices.

(b) Methods used to determine the pipe sizes shall be approved by the Plumbing Official and shall be in accordance with the Standards set forth in Section 402 or in the following Tables:

TABLE 46-R1

SIZE OF FIXTURE SUPPLY: The minimum size of a fixture-supply pipe from the riser or main to the wall opening shall be as follows:

Type of Fixture or Device	Pipe Size (Inches)
Bath tubs	1/2
Bidet	1/2
Combination sink and tray	1/2
Drinking fountain	3/8
Dishwasher (Domestic)	1/2
Hot water heaters	3/4
Ice Maker	1/2
Kitchen sink, residential	1/2
Kitchen sink, commercial (over one compartment)	1/2
Lavatory	1/2
Laundry tray, 1, 2 or 3, compartments	1/2
Shower (single head)	1/2 Minimum
Sinks (service, slop)	1/2
Sinks flushing rim	1
Urinal (flush tanks)	1/2
Urinal (direct flush valve)	3/4
Water closet (flush tank type)	1/2
Water closet (flush valve type)	1
Hose bibbs	1/2

TABLE 46-R2

WATER CONSUMPTION IN PLUMBING FIXTURES

	Maximum Flow Rate or Volume	
Fittings Fixture	Residential Use	Commercial & Public Use
Water Closets		
One-Piece	1.6 gpf*	
Two-Piece	1.6 gpf*	1.6 gpf*
Handicap with Flushometer		1.6 gpf*
Flushometer Valve (floor mount)		1.6 gpf*
Flushometer Valve (wall mount)		1.6 gpf*
Urinal		
Standard		1.0 gpf*
Handicap		1.6 gpf*
Faucets		
Sink	2.5 gpm**	2.0 gpm**
Lavatory	2.0 gpm**	0.25 gpc or 0.5 gpm**
Showerheads	2.5gpm**	2.5 gpm**

Notes:

* Tolerances shall be as specified in either ANSI A112.19.2 (1990) or A112.19.19.6 as applicable.

** The values given are based on a test pressure of 60 psig (flowing) in accordance with ANSI/ASME A112.18.1.

Abbreviations: gpm = gallons per minute; gpf = gallons per flush; gpc = gallons per cycle.

A group of not more than two fixtures shall be connected to a half-inch, cold water supply. Hose bibbs shall not be considered a plumbing fixture.

4614.14 MINIMUM PRESSURE: Minimum fairly constant, service pressure, at the point of outlet discharge shall be not less than 8 psi for all fixtures except for direct flush valves, for which it shall be not less than 15 psi, and except where special equipment is used requiring higher pressure. In determining the minimum pressure, allowance shall be made for the pressure drop due to friction loss in the piping system during maximum demand periods as well as head, meter, and other losses in the system.

4614.15 HAZARD AND NOISE: Water pipe installations shall be adequately protected from water hammer by use of air chambers or other approval devices. Air chambers shall be installed in such manner that will permit draining without disconnecting fixture supply. Air chambers or shock absorbers shall be installed and air chambers shall be not less in volume than a 12-inch length of pipe one size larger than the pipe it serves.

4614.16 HOT-WATER DISTRIBUTION: The sizing of the hot-water distribution piping shall conform to good engineering practice.

4614.17 SAFETY DEVICES:

(a) PRESSURE-RELIEF VALVE: Pressure-relief valves shall be installed for all equipment used for heating or storage of hot water. The rate of discharge of such valve shall limit the pressure rise for any given heat input within ten percent of the pressure at which the valve is set to open.

(b) TEMPERATURE RELIEF VALVES: Temperature relief valves shall be installed for equipment used for the heating or storage of domestic hot water. Each temperature relief valve shall be of the reseating type and be rated as to its BTU capacity. In all cases the BTU rating of the temperature relief valve shall be greater than the BTU input rating of the appliance. (See Table 46-S).

(c) APPROVALS: Combination pressure and temperature relief valves and separate pressure and temperature relief valves, which have been tested and approved by, or meet the specification requirements of the American Gas Association, A.S.M.E., or other recognized approval authorities, shall be considered acceptable.

(d) RELIEF-VALVE LOCATION:

(1) Combination pressure and temperature valves, or temperature relief valves, shall be installed so that the temperature sensing element is immersed in the hottest water within the top six inches of the tank.

(2) There shall be no check-valve or shut-off valve between a relief-valve and the heater or tank for which it is installed.

(3) Pressure-relief valves may be located adjacent to the equipment they serve.

(e) RELIEF OUTLET WASTES:

(1) The outlet of a pressure, temperature, or other relief valve shall not be connected to the drainage system as a direct waste.

(2) The valve discharge outlet pipe shall not be smaller than the valve to which it is connected.

(3) The outlet pipe shall not be trapped and shall be installed to drain dry away from the valve to the riser.

(f) DRIPS — LOCATION FOR BUILDINGS: Each temperature and pressure relief valve or combination thereof shall be provided with a drip pipe connected to the valve discharge outlet. Drip pipes shall discharge as follows:

(1) For hot water storage tanks placed above the roof: as in (2) and (3) or upon the roof.

(2) In cases where a building covers an entire lot: to any suitable plumbing fixture or floor drain terminating above the floor level except a water closet, urinal, bidet, bath or shower.

(3) In all other buildings except those described in the foregoing; to an observable point outside a building. The terminus of all drip pipes shall be without a thread. Where terminated outside a building: pointing down to within six inches of ground level.

(g) RELIEF VALVE DISCHARGE PIPING: Relief valve discharge pipe shall be sized for capacity, length, and connection size of the valve to be installed and shall not be smaller than the valve outlet connection. The size of the manifold pipe shall be determined by the cumulative B.T.U. total of the appliances served thereby and shall be sized as follows:

Up to	127,000 B.T.U.	½ inch I.D.
Above	127,000 to 340,000 B.T.U.	3/4 inch I.D.
Above	340,000 to 600,000 B.T.U.	1 inch I.D.
Above	600,000 B.T.U. shall discharge independently	

This table shall apply to single or manifold pipe and the length of the piping shall be considered. Reducers shall be with smooth transition and without abrupt shoulders.

(h) SHOWER TEMPERATURE CONTROL DEVICES:

(1) The temperature of mixed water to multiple (gang) showers shall be controlled by a master thermostatic mixing valve, or such showers may be individually controlled by an anti-scald valve of the pressure balancing or thermostatic mixing type.

(2) All Showers and bath and shower combinations shall be protected with a control valve of the pressure balance, the thermostatic mixing or the combination pressure balance/thermostatic type. Handle position stops shall be adjusted in accordance with manufacturer's instructions at time of installation to a maximum mixed water outlet temperature of 120 degress fahrenheit.

4614.18 STORAGE TANKS:

(a) (1) APPLICABLE REQUIREMENTS: All storage tanks for domestic hot water shall meet the applicable A.S.M.E. and listed requirements of Table 46-C.

(2) Hot water storage tanks shall also be installed with heat traps as per State of Florida Energy Code.

(b) MARKING: Any tank hereafter installed for the storage of domestic hot water shall have clearly and indelibly stamped in the metal of the tank, or marked upon a plate welded thereto, or otherwise permanently affixed, the maximum allowable working pressure and the hydrostatic test pressure which the tank is designed to withstand, and the year of manufacture. Such marking shall be placed in an accessible position so inspection and reinspection shall be readily accomplished.

(c) MINIMUM PRESSURES: The minimum hydrostatic test pressure shall be 300 lbs. per square inch and the working pressure shall be not more than 42½ percent of the indicated hydrostatic test pressure.

(d) DRAIN COCK: All storage tanks shall be equipped with an adequate accessible drain cock.

(e) (1) WATER HEATER DRAIN PANS: All water heaters installed above the ground floor space or in attics or ceiling areas shall be installed in an approved drain pan with minimum 2" high sides.

(2) A two-inch minimum clearance shall be provided between the drain pan sides and the heater. The drain pan shall be equipped with a ¾" minimum size drain line connected to bottom of pan so that no more than ¼" of water will stand in the pan, and the drain shall be visible in the heater pan.

(3) Drain lines for heater safe pans shall not receive condensate, waste, or drainage from any other device, equipment, or fixture.

(4) On multiple connections, each pan drain shall run a minimum of 6" down before entering the main riser.

(5) Drain size for multiple connections shall be as follows:

(aa) 2 to 3 drain pans shall waste into a 1" pipe.

(bb) 4 to 10 drain pans shall waste into a minimum 1¼" pipe.

(cc) Over 10 drain pans shall waste into a minimum 1½" inch pipe.

(6) P & T relief lines and safe pan units shall not use common riser.

(7) Drain lines shall be installed as per Sec. 4614.17(f).

4615 SEPTIC TANKS AND DRAINFIELDS

4615.1 SEPTIC TANKS AND DRAINFIELDS: All septic tanks and drainfields shall be designed in accordance with the requirements of and approved by the Broward County Health Department, Florida Department of Health and Rehabilitative Services.

4616 SUPPLY AND DISPOSAL WELLS

4616.1 POTABLE WATER SUPPLY WELLS:

(a) All premises intended for human habitation or occupancy shall be provided with a supply of pure and wholesome water.

(b) (1) Well casing shall be continuous of new pipe and shall terminate not less than 30 feet below grade in a suitable aquifer.

(2) Pipe 6 inches or less in diameter shall be galvanized or approved PVC.

(3) Well shall be developed and free of all loose sand and stone.

(c) Draw down shall not be excessive.

(d) A tee, of the same size as the casing, shall be installed on the top of the well to allow for proper inspection, introduction of disinfecting agents, and for measurements of depth and static water level.

(e) A soft seat valve of 200 pounds water test, either spring-loaded or flapper type, shall be installed as close to the well as is practicable. Check valves shall be all brass up to and including two-inch size and for three inches or over may be brass or iron body.

(f) The suction line shall be of a size to furnish water in sufficient volume and adequate pressure.

(g) The suction line from the well to the pump shall not be less than one-inch size, shall pitch toward the well and shall contain no loops or high points. Suction pipe 40 feet or more in length shall be increased to the next pipe size.

(h) A union or slip coupling shall be installed in the suction line just before the pump.

(i) Piping from well pump to hydropneumatic tank or other approved water system pressuring device shall not be smaller than the discharge outlet size of the pump.

(j)A gate valve, with handle removed, shall be installed in the piping between the pump and tank, where the tank is more than 42-gallon size. All tank installations shall be provided with a minimum ¾-inch valve on the discharge side of such tank.

(k) A hydropneumatic tank or other approved water system pressurizing device shall be of a size to prevent excessive cycling of the pump by providing a draw-down of six gallons of water while maintaining an operating range of 20 to 40 pounds per square inch water pressure.

(1) For a hydropneumatic tank the minimum size for each single family residence shall be 42-gallon capacity.

(2) When the yield or storage capacity of a well is limited, or if additional storage is necessary, hydropneumatic tanks of larger storage capacity may be required.

(l) A pressure switch and air volume control or other approved means of providing a balance of air and water throughout the water supply system shall be adjustable to correspond to the minimum and maximum operating pressures.

(m) The pump and tank system shall be subject to such tests as will effectively disclose all leaks and defects.

(n) The pump and water pressurizing system shall be installed with regard to space as to be reasonably accessible for repair.

(o) Wells shall be so located as to be free of danger of contamination from unsafe water supply and shall be at least 75 feet from a septic tank, drain field, soakage pit or discharge well and of sufficient depth to provide pure and wholesome water.

(p) Before a new potable water supply well, or one which has been repaired, is placed in use, it shall be disinfected in accordance with the method approved by the Division of Health having jurisdiction and shall be pumped clear of the disinfecting agent after disinfection has been completed.

(q) A water supply well for domestic purposes shall terminate not less than 30 feet below grade unless a lesser depth is specifically approved by the Division of Health.

(r) The type and capacity of the pump, equipment, suction and pressure lines and tank shall be not less than specified in Table 46-X.

(s) No well shall be located within any building or under the roof or projection of any building or structure, unless specifically approved by the Plumbing Official.

(t) (1) A concrete pad, 18 inches in diameter, a minimum of four inches thick, shall be poured around the well casing of both driven and drilled wells.

(2) Such pad shall be placed on grade and poured with 4 inch by 4 inch wire mesh and the surface shall slope outwardly. The well casing shall extend above the pad to permit disinfection.

(3) Rotary drilled wells shall be provided with a casing as set forth in Section 4616.1(b) and the annular space between the bored hole and the casing shall be filled with a neat cement grout.

4616.2 WORKING CODE: Any person, firm or corporation submitting application to the Plumbing Official for a plumbing permit for a well installation shall have approval from the Florida Department of Health and Rehabilitation Services, Division of Health, showing that all requirements of the Florida Department of Health and Rehabilitation Services, Division of Health, have been met. Plumbing permits shall be required before work is started and the permit card shall be displayed on the job at all times.

4616.3 WATER SUPPLY WELLS FOR IRRIGATION AND PRIVATE SWIMMING POOLS: Water supply wells for irrigation purposes and for private swimming pools shall be as set forth in Section 4616.1(a), (b), (c), (d), (e), (r), (s) and (t), and shall be so located as to be free of danger of contamination from unsafe water supply and shall be at least 75 feet from a septic tank, drain field, soakage pit, or discharge well and of sufficient depth to provide pure and wholesome water.

4616.4 CLOSED WELL SYSTEMS:

(a) Location of air conditioning supply wells shall be as distant as practicable or as necessary from disposal wells to minimize cross-circulation.

(b) Air conditioning supply wells shall be located not less than 25 feet horizontally from a septic tank, drain field or soakage pit.

TABLE 46-X

(Predominately for Flush Tanks)

TANK AND PUMP SIZE REQUIREMENTS

Fixture Units	Supply Required G.P.H.	Diameter of Suction	Diameter Pressure Pipe	Diameter Service Pipe	Size of Tanks	HP	Families	Stores	Well Size
23	720	1	3/4	3/4	42	½	1	-	1 ½
30	900	1 1/4	1	1	82	3/4	1	-	2
40	200	1 1/4	1	1	120	3/4	1	-	2
11	720	1	3/4	3/4	42	½	-	1	1 ½
24	900	1 1/4	1	3/4	82	3/4	2	2	2
37	1300	1 ½	1 1/4	1	120	3/4	3	3	2
45	1500	1 ½	1 1/4	1	220	1	4	4	2
53	1650	2	1 1/4	1 1/4	220	1	5	5	2
62	1860	2	1 1/4	1 1/4	220	1 ½	6	6	2
71	2130	2	1 ½	1 1/4	315	1 ½	7	7	2 ½
80	2400	2	2	1 ½	315	2	8	8	2 ½
89	2600	2	2	1 ½	525	2	9	9	2 ½
98	2700	2	2	1 ½	525	3	10	10	3

EXCEPTIONS: Variance form the above table may be permitted provided that the detailed plans and calculations are submitted to the Plumbing Official for approval. Such calculations shall be based on table 46-Q and B.M.S. 66 National Bureau of Standards Publication.

4616.5 DISPOSAL AND DISCHARGE WELLS:

(a) (1) A discharge well shall be drilled to an aquifer yielding water having chloride content of not less than 1,500 PPM.

(2) A discharge well for a public swimming pool shall, if such stratum is not available, be deeper than any supply well in the area.

(3) A discharge well for an area drain, rain water, or roof water disposal shall be preceded by a settling tank of approved design.

(b) Disposal wells shall be approved by the Florida Department of Health and Rehabilitation Services, Division of Health, before a permit is issued.

4617 FIRE-EXTINGUISHING APPARATUS

4617.1 Standpipes, yard hydrants and other fire-extinguishing apparatus shall be as set forth in Chapter 38.

4617.2 A permit for a standpipe system shall be required as set forth in Sub-section 4601.5 and inspection shall be as set forth in Sub-section 4601.6.

4617.3 In trash and linen chutes, sprinklers shall be provided as set forth in Sub-Section 3801.4 of this Code and an accessible approved indicating-type valve shall be provided to control the supply to each riser.

4618 SWIMMING POOLS

Swimming pools shall be installed and maintained as set forth in Chapter 50.

4619 TRAILER COACHES AND TRAILER PARKS

4619.1 GENERAL:

(a) The design and installation of toilets and other plumbing facilities within trailer parks for the accommodation, use and parking of independent and dependent trailer coaches, shall be as set forth herein.

(b) Trailers shall not be used for living purposes unless parked at a site approved for that class of trailer.

(c) The owner of a trailer and the owner, operator or lessee of the trailer park shall be responsible for the sanitation of the trailer and the sanitation in connection with such trailer shall be as set forth herein.

4619.2 DEFINITIONS:

BRANCH SERVICE LINE: That portion of the water distributing system extended from the park service main to a trailer site and includes connections, devices and appurtenances.

DEPENDENT TRAILER COACH: Any trailer coach that has a toilet and a bathtub or shower, or any trailer coach which does not provide a plumbing system suitable for connection to the park sewerage system.

INDEPENDENT TRAILER COACH: Any trailer coach that has a toilet and a bathtub or shower. This term shall include mobile homes and trailers which are properly in accordance with provisions of Chapter VIII, Florida State Sanitary Code.

PARK SANITARY DRAINAGE SYSTEM: The entire system of drainage piping used to convey sewerage or other wastes from the trailer drain connection to the trailer site trap to a public sewer or private sewage disposal system.

PARK WATER MAIN: That portion of the water distributing system which extends from the street main, water meter, or other source of supply to the branch service lines.

SERVICE CONNECTION: That portion of the water distributing system which extends from the termination of the park branch service line to the inlet fitting at the trailer.

TRAILER: The term TRAILER shall include a mobile home, travel trailer, truck coach and/or recreation vehicle where such vehicle is used as a dwelling or sleeping place.

TRAILER COACH: Any vehicle used, or so constructed as to permit its being used, as a conveyance upon the public streets and highways, and constructed in such a manner as will permit occupancy thereof as a dwelling or sleeping place for one or more persons.

TRAILER DRAIN CONNECTION OR HOSE CONNECTION: The removable extension, part of which shall be flexible, connecting the trailer coach outlet to the park sewer inlet.

WATER DISTRIBUTING SYSTEM: All of the water supply piping within a trailer park extending from the main public supply, or other source of supply to, but not including the trailer service system, and shall include branch service lines, fixtures, devices and appurtenances.

TRAILER CAMP: This term shall be used in accordance with the definition contained in Section 513.01, Florida Statutes, the terms trailer park and mobile home park as hereinafter used shall be considered synonymous with trailer camp.

TRAILER COACH SPACE: A plot of ground within a trailer park designated for the accommodation of one trailer coach.

REFUSE: All solid waste except body wastes, including garbage, rubbish and ashes.

4619.3 TRAILER PARKS:

(a) TRAILER SITES:

(1) Trailer sites for independent trailers shall provide a gas and watertight connection for sewage disposal which shall be connected into an underground sewage collection system as set forth in this section and chapter.

(2) Trailer sites for dependent trailers shall provide public toilet and bath facilities within 200 feet, and as set forth herein.

(3) Where trailer sites are intended and approved for both independent trailers and dependent trailers, such sites shall provide the facilities for both.

(b) SANITARY FACILITIES REQUIRED FOR DEPENDENT TRAILERS: The minimum number of fixtures provided shall be as follows:

Women:	1 water closet for each 15 women	**Men:**	1 water closet for each 20 men
	1 lavatory for each 20 women		1 lavatory for each 20 men
	1 shower bath for each 20 women		1 shower bath for each 20 men
			1 urinal for each 25 men

For completely sewered trailer parks, the toilet facilities shall be as follows:

Women:	1 water closet	**Men:**	1 water closet
	1 lavatory		1 lavatory
	1 shower		1 urinal
			1 shower
for each 100 trailers or fraction thereof.			

(c) REQUIRED LAUNDRY FACILITIES: For each 25 trailer coach spaces there shall be provided one hot and cold water supply and one drainage outlet. A 2-compartment laundry tray shall be provided for each wringer-type washing machine installed and a minimum of one 2-compartment laundry tray shall be provided where automatic washers are used.

(d) In determining the number of persons, the occupant content of each trailer shall be taken as three persons.

4619.4 PERMIT REQUIRED:

(a) It shall be unlawful to construct, enlarge, alter, repair, move, remove or demolish any trailer park plumbing facility without first having filed application and obtained a plumbing permit therefor from the Building Official except that no permit will be necessary for the repair of leaks, unstopping of sewers or waste pipes, repairing faucets or valves or cleaning of septic tank. Plans and specifications shall be submitted with the application for new facilities or major alterations to existing facilities and such plans and specifications shall be in detail and shall clearly describe the following:

(1) A plan of the park, drawn to scale, indicating the spaces, areas, site or portion of the park for the parking of trailers and designating thereon whether such site is for a dependent or independent trailer or both.

(2) Detailed description, specification and location of the park sewerage and drainage system.

(3) Detailed description, specifications and location of water supply lines and source of water or details of water treatment plant, if independent source is used.

(b) Plans submitted with application for permit shall require approval of the Plumbing Official and/or Florida Department of Health and Rehabilitation Services, Division of Health.

(c) Plumbing required herein shall comply with all applicable plumbing and health ordinances and regulations.

4619.5 MATERIALS:

(a) All plumbing materials, fixtures and appliances shall comply with the standards set forth in Table 46-C.

(b) All piping material in the park drainage system shall comply with the materials set forth in Sub-section 4604.3 and shall be of not less diameter than set forth in Table 46-Y.

TABLE 46-Y

Size of Soil Pipe (inches) (Based upon Slope of 1/8" per foot)	Maximum Number of Trailers Individually Vented System	Maximum Number Trailers Loop or Circuit Vented
3	2	0
4	20	12
5	42	25
6	80	55
8	175	166
10	325	270

4619.6 DRAINAGE INSTALLATION:

(a) Each trailer shall be considered as 9 fixture units in determining discharge requirements in design of sewage disposal systems.

(b) Branch lines or sewer laterals to individual trailer sites shall be not less than 3 inches in diameter and capped while not in use.

(1) For properly trapped and vented trailers such laterals shall terminate with a sweep into which shall be caulked one 3-inch sanitary tee terminating 4 to 6 inches above grade with a cleanout caulked in the top.

(2) For trailers not properly trapped and vented each sewer lateral shall terminate with a 3-inch P-trap into which shall be caulked a 3-inch sanitary tee the center line of the branch terminating 4 to 6 inches above grade with a cleanout caulked in the top. Such branch line shall not extend more than 15 feet measured horizontally, from a vented sewer without a re-vent. No trap shall be more than 24 inches below grade.

A vented sewer shall be deemed to mean that it shall be loop or circuit vented and shall be in accordance with Table 46-Y.

(c) All vent pipes shall be located at least ten feet from an adjoining property line and shall extend at least ten feet above ground level. All vent pipes shall be strapped and supported by at least the equivalent of 4 inch by 4 inch post securely anchored in the ground. Supports shall be of rot and deterioration resistant material.

(d) To provide the shortest possible trailer drain connection between the trailer outlet and sewer inlet, all sewer laterals shall terminate at least 12 inches outside of the left wheel and within the rear third of the trailer coach.

(e) Cleanouts shall be not less in size than the line they serve, but in no event need they be larger than 6 inches. A cleanout shall be provided at the upper terminal of each park drainage system, and at intervals of not more than 75 feet in straight runs. Cleanouts shall also be located at any point in the line where a deviation occurs in excess of 45 degrees from a straight line. Cleanouts shall be accessible and brought to grade.

(f) Drain connections shall slope continuously downward and form no traps. All pipe joints and connections shall be installed and maintained gas and water tight.

(g) No sewage, waste water, or any other effluent shall be allowed to be deposited on the surface of the ground.

4619.7 WATER DISTRIBUTING SYSTEM:

(a) Every trailer site shall be provided with an individual branch service line delivering safe, pure, and potable water. The outlet of the branch service line shall terminate on the same side of the site as the trailer sewer lateral.

(b) Each trailer park water distributing system shall be so designed and maintained as to provide a pressure of not less than 20 psi at each trailer site under normal operating conditions.

(c) The water distributing system shall be designed as otherwise set forth in this Chapter. The quantity of water required to be supplied to each trailer site shall be as required for nine-fixture units. The minimum size pipe in the water distributing system shall be not less than three-quarter inch diameter.

(d) When a trailer coach is physically connected to the park distributing system, a separate service shut-off valve and an approved manufactured backflow preventer shall be installed on the branch service line, at or near, the service connection to each trailer. (See Section 4620.)

(e) The service connection shall be not less than ½-inch diameter. Approved flexible tubing is permitted. Fittings at either end shall be of a quick disconnecting type not requiring any special tools or knowledge to install or remove. Water supply lines to each trailer site shall have the point of connection with the individual trailer in either a horizontal or downward position.

4619.8 CONNECTIONS TO SERVICE FACILITIES: Trailer drain connections shall be of approved semi-rigid and non-collapsible hose having smooth interior surfaces and not less than three-inch inside diameter. Drain connections shall be equipped with a standard quick disconnect screw or clamp-type fitting, not less in size than the trailer outlet. Drain connections shall be gas tight and no greater in length than necessary to make the connection between the trailer coach outlet and the sewer inlet on the site.

4619.9 MAINTENANCE: All required devices or safeguards shall be maintained in good working order. The owner, operator, or lessee of the trailer park or his designated agent shall be responsible for their maintenance.

4619.10 INSPECTION:

(a) The Plumbing Official shall periodically inspect the trailer and trailer park sanitary facilities for compliance with the provisions of this section. A decal or other device indicating approval for the trailer sanitary facilities and connection of each trailer to the park water and sewage system shall be placed on the trailer adjacent to the sanitary connection.

(b) The requirements of this section shall apply to existing trailer and trailer park water and sewage facilities as provided for in Paragraph 4601.1(d).

(c) Permits shall be secured in accordance with Sub-section 4601.5 for the installation, alteration and repair of any trailer park plumbing facilities.

4620 CROSS CONNECTION, BACKFLOW AND BACK-SIPHONAGE

4620.1 GENERAL:

(a) It is the intent of this section to recognize that there are varying degrees of hazard to potable water within the water main and water supply systems, and it is the intent to apply the principle that the degree of protection should be commensurate with the degree of hazard.

4620.2 PURPOSE:

(a) To protect the water supply within the premise or private property against actual or potential backflow by requiring such air gaps, vacuum breakers, backflow preventers, and other special devices as required by this section in order to provide protection from the danger created by cross connections.

(b) To establish a cross connection management and backflow prevention program.

4620.3 CONTROL:

(a) Cross connection management and backflow prevention requires cooperation between water purveyors, public health officials, the Plumbing Officials and the consumer.

(b) The responsibilities and duties of each shall be as set forth in this section and other applicable regulations.

4620.4 RESPONSIBILITIES:

(a) ENFORCEMENT: The Plumbing Official shall enforce the provisions of this Code so as to ensure the potability of the consumer's water supply, from the point of entrance of the public water supply to the extremities of the consumer's water system. The Plumbing Official shall have primary enforcing responsibility of new and existing installations, alterations and repairs to the consumers water systems.

(b) WATER PURVEYOR: The Water Purveyor is primarily responsible for the prevention of contamination and pollution of the public water mains as per Florida Administrative Code 17-555. Such responsibility begins at the point of origin of the public water supply and includes adequate treatment facilities and water mains, and ends at the point of delivery to the consumer's water system. (See definitions, Sec. 4602.) The Water Purveyor has secondary supervisory responsibility to the Plumbing Official for new and existing installations, alterations and repairs to the consumers water systems.

(c) CONSUMER: The Consumer has the prime responsibility of preventing contaminants and pollutants from entering his/her water system, and from entering the public water main or water source from his/her water system. The Consumer shall protect his/her water system against actual or potential cross connections, to prevent backflow, as required by this Code and other applicable regulations. He shall assure that all protective devices are tested and maintained in the working condition required. He shall assure the necessary plumbing permits are obtained for new water supply system installations, and for alterations or repairs to existing systems, as required by this Code.

(d) BACKFLOW PREVENTION DEVICE TECHNICIAN: When employed by the consumer or the water purveyor to inspect, test, repair, overhaul or maintain backflow prevention devices, the technician shall make certified reports of such work to the Consumer, Plumbing Official, and Water Purveyor. Such reports shall include the name of the premises, service address, location of the device on the premises, type of work performed, type of device, size of device, manufacturer, model number, serial number, line pressure at time of test and include the list of replacement parts if used, such report shall be filled out on a standard backflow device test report form if one is not provided.

4620.5 DUTIES AND INSPECTIONS:

(a) The Plumbing Official, the Health Officer, the Water Purveyor, or their authorized representative shall have the right to enter any building, structure or premises to conduct a survey for purposes of detecting prohibited cross connections.

(b) Nothing herein shall relieve the Consumer of the responsibility for conducting, or causing to be conducted, periodic surveys of water use practices on his premises to determine whether there are actual or potential cross connections in the Consumer's water system through which contaminants or pollutants could flow back into a public water supply or the Consumer's potable water system.

(c) It shall be the duty of the Plumbing Official to cause inspections to be made of all properties containing potable water systems where backflow through a possible cross connection is deemed possible. The frequency of inspections and re-inspections based on potential health hazards involved shall be as established by this section. On request, the Consumer shall furnish to the inspection agency any pertinent information regarding the water system on such property.

(d) These regulations shall be uniform, taking into account the varying degrees of hazards for various premises, and shall properly utilize airgaps of preventive principles, devices, tests, maintenance and repair, as contained in ASSE 1001, ASSE 1011, ASSE 1012, ASSE 1013, ASSE 1015, ASSE 1020, ASSE 1024, ASSE 1025 and ASSE 1035 or as contained in AWWA C506. Other devices may be approved by the Board.

(e) The Plumbing Official shall notify the Consumer of the preventive actions required. The Consumer has the right of appeal.

(f) Water service shall be discontinued after notice to the Consumer if a violation of this section exists on the premises and such other precautionary measures shall be taken as are deemed necessary to eliminate any danger to the potable water supply. Water service shall not be restored until the danger has been eliminated in compliance with the provisions of this Section.

4620.6 TYPE OF PROTECTION REQUIRED:

(a) ISOLATION: Every water outlet or connection to any device, fixture, equipment or situation shall be protected with the minimum required air gap whenever possible.

(1) Where it is not possible to provide a minimum required air gap, the potable water supply system shall be protected with the following minimum approved device.

(aa) Low inlet to receptacles under non-continuous pressure — Atmospheric vacuum breaker.

(bb) Low inlet to receptacles under continuous pressure — Pressure vacuum breaker.

(cc) Outlets with hose threads, under non-continuous pressure — Atmospheric vacuum breaker, permanent non-removable type. Except for automatic clothes washing machines.

(dd) Lawn sprinkler system under non-continuous pressure — Atmospheric vacuum breaker.

(ee) Lawn sprinkler systems under continuous pressure — Pressure vacuum breaker.

(ff) Systems subject to back pressure with a pollutant hazard — Double check valve assembly.

(gg) Systems subject to back pressure with a contaminant hazard — Reduced pressure backflow preventer.

(hh) Where hot and cold water valves are connected to supply tempered water to another valve for use in fixtures or where cross flow may occur, check valves or combined valve and check devices shall be provided.

4620.7 INSTALLATION OF BACKFLOW PREVENTERS:

(a) GENERAL: All devices shall be accessible. They shall not be installed with any actual or potential unprotected bypass. Any bypass installed shall be protected with the same minimum approved device as the main.

(b) Atmospheric Vacuum Breaker: Atmospheric vacuum breakers shall be installed with the critical level at least six inches above the flood level rim or highest point of discharge. Such devices shall be installed on the discharge side of the last control valve to the fixture and no shut off valve or faucet shall be installed downstream of the device. Flush valve vacuum breakers shall be installed a minimum of six inches above the fixture flood level rim.

(c) Pressure Type Vacuum Breakers: Pressure type vacuum breakers shall be installed at least twelve inches above the flood level rim.

(d) Double check and Reduced Pressure Devices: Such devices shall be installed at least twelve inches above the floor or exterior grade.

(e) The shutoff valves used as an integral component of Approved Backflow Prevention Assemblies shall be of the resilient seat type as defined by AWWA #C509-87 Standard.

4620.8 INSPECTIONS, TESTS AND MAINTENANCE:

All inspections, tests and maintenance shall be performed by a certified backflow prevention device technician. Such work shall require a plumbing permit and include the requirements as set forth under Section 4620.4(d), other than public water main system. Such work shall be at the expense of the consumer.

(a) ISOLATION INSPECTIONS:

(1) Purpose: The degree of hazard shall be determined by such inspections. Should any device or plumbing changes be required, such work shall be completed within ten working days and a follow up

inspection shall be made within ten working days thereafter. The Plumbing Official shall be notified at the time of inspection if the degree of hazard poses an imminent health hazard and the proper relative action shall be taken.

(2) Frequency: An isolation inspection shall be performed annually or more if needed, on all potable water systems.

(3) EXCEPTIONS:

(aa) Isolation inspections on buildings of group occupancy having single family or duplex family uses may be performed by the owner. If the owner chooses to employ someone to perform this inspection that individual shall be a certified backflow prevention device technician.

(bb) Isolation inspection on new work, under construction, shall be performed by the Plumbing Official and passed before a Certificate of Occupancy is issued.

(4) Proposed Construction:

(aa) All plans for new construction shall be reviewed by the Plumbing Official to determine the type of protection required, in accordance with this Section.

(b) TESTING OF BACKFLOW PREVENTERS: All devices shall be tested upon initial installation and annually or more if needed.

(1) Visual "Tests" for non-testable devices shall be made at the time of isolation inspection and subject to the requirements of this Section.

(c) MAINTENANCE OF BACKFLOW PREVENTERS:

(1) Any device that fails a visual or operational test shall be replaced or repaired within 10 working days and re-tested with ten days thereafter.

(2) The Plumbing Official shall be notified at the time of test if a device fails and said device is protecting an imminent health hazard.

(3) Devices that are replaced shall be replaced with a device that conforms with this Section.

(4) Devices that are Repaired:

(aa) Only original manufacturers parts are to be used.

(bb) Assembly design shall not be changed.

CHAPTER 47

GAS

4701 GENERAL
4702 STANDARDS
4703 PERMITS
4704 INSPECTION

4701 GENERAL

4701.1 SCOPE: The design, installation, tests and operation of appliances, apparatus, accessory devices and systems using manufactured gas, natural gas, bottle gas or liquefied petroleum gas (L. P.) or mixtures thereof for heat, light and power and the transportation storage, handling, selling, offering for sale or installing of equipment using such gases shall be as set forth herein.

4701.2 OTHER APPLICABLE REGULATIONS: Persons, firms, or corporations engaged in the transporting, storing, handling, selling, offering for sale or installing equipment using liquefied petroleum gas shall comply with Chapter 527, 1969 Florida Statutes and 1970 amendment to Sub-section (1) of Section 527.02.

4701.3 ELECTRICAL CONNECTIONS: All electrical connections and wiring shall comply with Chapter 45 herein. Gas piping shall not be used for electrical ground.

4701.4 OCCUPANT HAZARD: Where heat-producing apparatus is installed in locations where the occupants of the space for reasons of age or physical limitations may, in the opinion of the inspection authority, be required to be protected by additional safeguards, controls and devices shall be designed and installed, to be inaccessible or inoperative to unauthorized persons and protective guards or screens installed to prevent physical contact with heated parts.

4701.5 PORTABLE APPLIANCES: Only appliances which are fully portable in nature shall be connected with gas hose. Gas hose shall not be used or substituted for required tubing and appliance connectors of flexible metal tubing and fittings. Appliances equipped with a control valve or valves which permit complete shut off of the gas supply shall not be connected with gas hose. This requirement does not apply to hand torches, gas irons and similar equipment. Where a gas-hose connection is made, a gas shut-off valve shall always be provided within convenient reaching distance of the operator, on rigid supply piping where the hose is attached; and any valve on the inlet of the appliance shall be removed. Gas hose shall be of adequate capacity, gas tight, and so designed as to permit the secure attachment to the appliance of a threaded connection or a metal clamp, and no rubber slip connections shall be permitted. Under no circumstances shall gas hose be concealed from view or used in a concealed location. Where gas hose is used, it shall be of the minimum practical length, and shall not extend from one room to another or pass through any walls, partitions, ceiling or floors.

4701.6 GAS PIPING IN MULTI-FAMILY RESIDENTIAL AND COMMERCIAL BUILDINGS:

(a) In multi-family residential buildings and commercial buildings all gas piping shall be rigid pipe as described in National Fire Protection Association Standard No. 54, Section 2.6.1 (a) except the following:

(1) Appliance connectors not exceeding six feet in length and located in the same room with the appliance may be semi-rigid tubing as described in National Fire Protection Association Standard No. 54, Section 2.6.1 (b).

(2) Semi-rigid tubing as described in National Fire Protection Association Standard No. 54, Section 2.6.1 (b) may be used to connect individual valves or meters to supply lines where such tubing is provided protection from physical damage.

4701.7 SHUT-OFF VALVES:

(a) In multi-family residential units and commercial buildings control valves for branch lines to each unit occupancy shall be provided and protected from physical damage.

(b) Each valve shall be legibly marked by the owner so that the unit which it serves can be readily identified.

(c) When service is discontinued or interrupted the following safety precautions shall be taken:

(1) Where meters are provided, the gas shut-off valve shall be locked in the closed position by the serving gas supplier or the supply line shall be plugged or capped or the meter plugged or capped gas-tight at the discharge outlet.

(2) Where control valves only are provided, they shall be locked in the closed position by the owner or the line shall be plugged or capped gas-tight on the discharge side of the valve.

(3) The valve controlling the discontinued service line shall be labeled with a durable plastic or metal tag bearing the legend.

"Out-of-Service. Do Not Disturb or Change the Condition of this Valve Under Penalty of Law"

The tag shall be attached to the valve with a non-removable connector.

(d) (1) Every gas appliance connected to a gas line shall have an accessible manual shut-off valve installed upstream of the union or connector and within six feet of the appliance it serves.

(2) When the appliance is disconnected the gas line shall be plugged or capped gas-tight on the discharge side of the valve.

(e) Liquefied petroleum gas systems shall be provided with emergency shut-off valving at the tank.

(f) Emergency shut-off valves for individual units and individual buildings as required by National Fire Protection Association Standard No. 54, Section 2.11.2 (a) and (b) shall be provided and protected from physical damage.

4702 STANDARDS

The following Standards are hereby adopted, as set forth in Section 402:

4702.1 Standard for the Installation of Gas Appliances and Gas Pipe, NFPA 54.

4702.2 Standard for the Storage and Handling of Liquefied Petroleum Gases, NFPA 58.

4702.3 National Fuel Gas Code, ANSI Z223.1-1988.

4703 PERMITS

4703.1 It shall be unlawful to commence work on any gas appliances, apparatus, accessory devices or systems or perform any work covered by this Chapter without first having filed application and obtained a permit therefore and paid the required fee, except that no permit will be necessary for the repair of leaks in an appliance and in the appliance connection. It is the responsibility of the owner to see that such permit is obtained and that all work on or within his property related to gas facilities shall be performed by qualified workers as defined and regulated by applicable licensing ordinances. The word "work" shall mean to include connections to and disconnections from any gas system and opening or closing valves which are a part of the gas system. Violations of the requirements of this Sub-section shall be deemed tampering as prohibited by applicable ordinances.

4703.2 Application for gas permit will be accepted only form those persons currently licensed in this field and for whom no revocation or suspension of license is pending.

4703.3 Each application for a gas permit shall be accompanied by plans and specifications to fully and clearly illustrate sufficient detail and date to show the nature, character and location of the proposed work.

4704 INSPECTION

4704.1 Upon the presentation of proper credentials, the duly authorized inspector may enter at any reasonable time, any building, structure or premises for the purpose of inspection to prevent violation of this Code.

4704.2 The inspector is hereby empowered to disconnect or cause to have disconnected any gas burning appliance which does not meet the requirements of this code or which is installed in violation of the Standards prescribed in this Code. Where the inspector finds a hazardous condition warranting such action he may, in writing, direct the person, firm or corporation supplying the gas to disconnect the service from the source of supply and service shall not be restored until the hazard shall have been eliminated and the inspector has approved the resumption of service.

CHAPTER 48
MECHANICAL SYSTEMS

4801 GENERAL ADMINISTRATIVE
4802 DEFINITIONS
4803 MECHANICAL VENTILATION
4804 AIR CONDITIONING AND REFRIGERATION
4805 EQUIPMENT
4806 DUCTS
4807 PIPING
4808 WEATHERPROOFING AND INSULATION
4809 MAINTENANCE

4801 GENERAL ADMINISTRATIVE

4801.1 TITLE, PURPOSE AND SCOPE:

(a) TITLE: This Chapter shall be known as "The South Florida Mechanical Code for Broward County" and may be cited as such or as the "Mechanical Code".

(b) PURPOSE: The purpose of this Chapter is to provide certain minimum standards, regulations and requirements for safe and adequate design, methods of construction and uses of materials, mechanical apparatus and equipment to secure the expressed intent for reasons of public health, welfare and safety.

(c) SCOPE:

(1) The provisions of this Chapter shall apply to the installation of mechanical systems, including alterations, repairs, replacement, equipment, appliances, fixtures, fittings and/or appurtenances thereto, including ventilating, heating, cooling, air conditioning and refrigeration systems, medical gasses, and other energy-related systems.

(2) All portions of buildings customarily occupied by human beings shall be provided with ventilation by openings to the exterior as set forth in Part III — "Requirements Based on Occupancy," or by mechanical ventilation.

(3) It is not the intent of this Code to require air conditioning in any specific building. However, when required and purchased by the owner, all air conditioning and refrigeration systems and equipment shall be as herein set forth and existing installations not conforming with the requirements of this Chapter shall be made to comply, when relocated, or when altered or repaired, the cost of which exceeds 25 percent of the value of the existing installations.

4801.2 MECHANICAL INSPECTION DEPARTMENT:

(a) MECHANICAL INSPECTORS: The Mechanical Inspection Department will consist of a Chief Mechanical Inspector, a Mechanical Plans Examiner, and one or more Mechanical Inspectors. The Chief Mechanical Inspector may hold any of all of these positions. The Chief Mechanical Inspector, construed to mean the Chief or Head of the Division or Department of Mechanical Inspectors shall have the sole authority to interpret the South Florida Mechanical Code in his jurisdiction.

EXCEPTION: Except as allowed in Section 203.

(b) CERTIFICATION: Personnel of the Mechanical Inspection Department shall be certified in accordance with Sections 201.5 and 201.6 of this Code.

(c) RIGHT OF ENTRY: Upon presentation of proper credentials, the Mechanical Inspector may enter,

at any reasonable time, any building, structure or premises for the purpose of inspection or to prevent violations of this Mechanical Code.

(d) STOP-WORK ORDERS: Whenever any mechanical work is being done contrary to the provisions of this Mechanical Code or is being improperly installed or may create a structural or health hazard or nuisance, the mechanical inspector may order such work stopped or may order the violation corrected within a reasonable period of time, by notice in writing served on the person or persons engaged in the doing or causing of such work to be done; and such persons shall immediately stop such work until arrangements in compliance with this Mechanical Code and satisfactory to the Mechanical Inspector have been made, at which time he may order the work to proceed.

(e) CONCEALED WORK: The Mechanical Inspector may order portions of a building or structure to be exposed for inspection when, in his opinion, there is good reason to believe that the mechanical systems or equipment, or parts thereof, concealed therein are in an unsafe or dangerous condition, or that there is willful or negligent concealment of a violation of this Mechanical Code.

(f) OCCUPANCY: Whenever any building or portion thereof is being used or occupied contrary to the provisions of this Mechanical Code, the Chief Mechanical Inspector shall report such violation to the Building Official and the Building Official shall order such use or occupancy discontinued and the building or portion thereof vacated as set forth in Sub-section (d) above.

4801.3 PERMITS:

(a) PERMITS REQUIRED: A permit, as set forth in Chapter 3, shall be required for the installation, alteration, or major repair of any air conditioning, refrigeration or other mechanical system. A permit shall not be required for repairs that do not change the location, size, or capacity of a compressor, coil, or duct.

(b) APPLICATIONS: Application for permit will be accepted from only qualified persons or firms. Qualifications of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of contractors.

(c) PLANS: Application for permit shall be accompanied by sufficient description to clearly define the proposed work. When the proposed work is for the installation or major alteration of an air conditioning system of one ton or more capacity or is constructed to two or more separately occupied areas, application for permit shall be accompanied by plans describing the proposed work. When the proposed work serves an occupant content of 100 or more persons, or has a value of $50,000 or more or when the mechanical system(s) with a per system capacity of more than 15 tons or for any structure greater than 5,000 square feet in area designed for public assembly, the plans shall be prepared by and bear the impress seal of a professional engineer, registered in the State of Florida. Applications for permits for installation of medical gas systems shall be accompanied by sufficient drawings to clearly define the work. When the estimated cost of medical gas, oxygen, steam, vacuum, toxic air filtration or haylon systems exceed $5,000 the plans shall be prepared by and bear the impress seal of a professional engineer, registered in the State of Florida, who is competent in this field of expertise.

(d) PRECONTRACT EXAMINATION OF PLANS: Preliminary plans may be submitted by the designer to the Chief Mechanical Inspector before a contract for the proposed work is entered into by the owner. It is the duty of the Chief Mechanical Inspector to cooperate with owners, designers and contractors to provide precontract examination of plans and specifications, to insure the sufficiency and Mechanical Code compliance of such plans before final contracts for construction are made. Application for mechanical permit may not be required for such examination.

(e) EXAMINATION OF PLANS: The Chief Mechanical Inspector or Mechanical Plans Examiner shall examine all plans and applications for permits. If the application or plans do not conform to the requirement of all pertinent laws or regulations, the Chief Mechanical Inspector shall reject such application in writing,

stating the reasons therefore. Plans which are rejected, as stated hereinabove, shall be returned for correction. Penciled notations on mechanically reproduced plans may be accepted for only minor corrections. If the application, plans and specifications, upon examination, are found to comply with the requirements of the Mechanical Code, the plans shall be signed and marked as approved.

4801.4 PERMIT FEES: Permit fees shall be in accordance with Sections 303.1, 303.2 and 303.3 of this Code.

4801.5 INSPECTION:

(a) SCHEDULE: The Chief Mechanical Inspector may, at the time the permit is issued, determine the mandatory inspection schedule based upon the complexity of the system. However, the schedule shall be no less than:

(1) Before insulation or otherwise concealing any portion of the system.

(2) Final Inspection.

(b) INSPECTIONS: Mechanical Inspections by Certified Mechanical Inspectors shall be required on all systems. Window air conditioning units in Group I Occupancy may be inspected by other certified Inspectors designated by the Building Official.

(c) Inspections shall be made according to the approved plans, specifications, the South Florida Building Code and its adopted standards.

4801.6 STANDARDS:

(a) STANDARDS ADOPTED: The following standards are hereby adopted, as set forth in Section 402:

(1) Safety Code for Mechanical Refrigeration	ANSI/ASHRAE 15
(2) Power Piping	ANSI B 31.1
(3) Storage and Handling of Liquefied Petroleum Gases	NFPA 58
(4) Installation of Air Conditioning and Ventilating Systems	NFPA 90 A
(5) Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal and Conveyance	NFPA 91
(6) Removal of Smoke and Grease-laden Vapors from Commercial Cooking Equipment	NFPA 96
(7) Smoke and Heat Venting Guide	NFPA 204
(8) Water Cooling Towers	NFPA 214
(9) Standard for the Prevention of Dust Explosions in Wood Working and Wood Manufacturing Plants	NFPA 664
(10) Standards for Natural and Mechanical Ventilation	ASHRAE 62
(11) Chimneys, Fireplaces, Vent and Solid Fuel Burning Appliances	NFPA 211

(b) AUTHORITY HAVING JURISDICTION: In NFPA pamphlets where interpretive powers are vested in the inspection authority, it shall be construed to mean the board of Rules and Appeals as set forth in Section 203.

(c) APPLICATION: NFPA pamphlet 90A applies to all Occupancies other than Group I and NFPA pamphlet 90B shall apply to only Group I Occupancies.

(d) STANDARDS OF GOOD PRACTICE: The published "Standards" of the National Fire Protection Association and the handbooks published by the American Society of Heating Refrigerating and Air conditioning Engineers shall be accepted as standards of good practice.

4801.7 DISTRIBUTION OF APPROVED DRAWINGS:

(a) QUANTITY: Two complete sets of drawings shall be submitted with the application for permit.

(b) DISTRIBUTION: The Building Official shall retain one set of the approved plans and the other set shall be kept at the building site, open to inspection of the Building Official at all reasonable times. The Building Official may stop the work if such plans are not available at the building site.

(c) PUBLIC RECORD: Approved plans and/or amendments thereto retained by the Building Official shall become a part of the public record provided, however, that they be considered instruments of service and confidential records of their author, that they shall be open to the public only for inspection, that the Building Official may permit bona fide owners or designers, employed by such owners, to inspect the plans when not available from their author; or the Building Official may permit the plans to be copied by the owner in event of the author's death or inability of the author to supply copies.

4801.8 ALTERNATE MATERIALS AND TYPES OF CONSTRUCTION: The provisions of this Mechanical Code are not intended to prevent the use of types of construction or materials or methods of design as an alternate to the standards herein set forth, but such alternates may be offered for approval, and their construction shall be set forth in this Sub-section.

(a) STANDARDS: The types of construction or methods of design referred to in this Mechanical Code shall be considered as Standards of Quality. New types of construction or materials or methods of design shall be at least equal to these standards for the corresponding use intended.

(b) APPLICATION: Any person desiring to use types of construction or materials or methods of design not specifically mentioned in this Mechanical Code shall file with the Chief Mechanical Inspector authentic proof in support of claims that may be made regarding the sufficiency, and request approval and permission for use. The Chief Mechanical Inspector shall approve such alternates if it is clear that the Standards of the Mechanical Code are at least equaled. If, in the opinion of the Chief Mechanical Inspector, the Standards of the Mechanical Code will not be satisfied by the requested alternate, he shall refuse approval.

(c) APPEAL: Any person, whose request for alternate types of construction, materials or methods of design has been refused by the Chief Mechanical Inspector, or any person in whose considered opinion an action by the Chief Mechanical Inspector in approving or disapproving construction under this Mechanical Code does not satisfy the Standards of this Code for reasons of safety or quality, may appeal to the Board of Rules and Appeals by written request to the Secretary of the Board and such written request shall be transmitted to the Board at once.

(d) REPEATED TESTS: The Chief Mechanical Inspector may require tests of equipment, method, device, or appurtenance to be repeated if, at any time, there is reason to believe that an approval method, device, equipment, or appurtenance no longer conforms to the characteristics on which its approval was based.

4801.9 WORKMANSHIP: All mechanical work shall be done in a workmanlike manner and in compliance with the provisions of this Mechanical Code.

4801.10 WIND REQUIREMENTS: All mechanical work shall be anchored to comply with Section 2309.

4802 DEFINITIONS

Unless otherwise expressly stated, all words other than herein shall have the meaning implied by their context in the Code or their ordinarily accepted meanings in the construction industry; words used in the present tense shall include the future; words in the masculine gender shall include the feminine and neuter; the singular number shall include the plural; and the plural number shall include the singular.

Wherein a definition set forth in this Chapter varies from a definition set forth in Chapter 4 herein, the definition set forth as follows shall be applicable to only this Chapter 48:

ACCESSIBLE: (See Section 401).

FLEXIBLE DUCT CONNECTOR: A flexible portion of a duct system, one end of which is attached to a rigid branch or main duct, the other end of which is attached to an air terminal device.

PLENUM:A compartment or enclosed space to which one or more ducts may be connected or that shall receive air for the purpose of collection, disbursement or treatment.

4803 MECHANICAL VENTILATION

4803.1 GENERAL:

(a) MECHANICAL VENTILATION: Mechanical ventilation shall be forced ventilation supplying outside air or air conditioning as set forth in this Chapter.

(b) VENTILATION REQUIRED: Required forced ventilation supplying outside air shall be in operation where the building or portion thereof is occupied by human beings, and each room or space shall be separately considered, except that closets and similar minor spaces connected to the properly ventilated room need not be individually ventilated.

(c) EXCEPTIONS: The Chief Mechanical Inspector may waive or vary the requirements for forced ventilation and the supply of outside air or the exhaust of noxious, hazardous, or otherwise objectionable fumes or vapors, subject to the consideration of hazards, arrangements of building components and equipment, and of special equipment for specific conditions of use.

4803.2 REQUIRED VENTILATION:

(a) VENTILATION REQUIREMENTS: Subject to the consideration of and as allowed in the standards of good practice as set forth in Sub-section 4801.6, except as follows:

(1) (AA) ASHRAE 62 shall apply to all indoor or enclosed spaces that people may occupy, except where other applicable standards and requirements dictate larger amounts of ventilation.

(bb) Where the velocity at the intake exceeds 10 feet per second, the intake shall be placed not less than 8 feet above the floor directly beneath.

(2) (aa) In all buildings used for storage or handling of automobile operating under their own power and in all buildings where flammable liquids are used or stored, exhaust ventilation shall be provided to produce one complete change of air every 10 minutes, with the exception of single family garages.

(bb) Such exhaust ventilation shall be taken from a point at or near the floor.

(3) In buildings or portions thereof used for dry cleaning plants, there shall be a complete change of air every 3 minutes.

(4) (aa) All toilet rooms not having an outside operable window sized as required by other sections of this Code shall be provided with a mechanical exhaust system to produce one complete change of air every 3 minutes, except that where the ventilating air has been conditioned there shall be a complete change of air every 7.5 minutes.

(bb) For the purposes of this paragraph the term "toilet rooms" shall be construed to also mean bathrooms, shower rooms, service sink rooms and janitors' closets.

(cc) In public toilet rooms ventilation shall be by an approved mechanical exhaust system discharging outside the building.

(dd) Mechanical exhaust under this section shall be an independent system and shall not be recirculated.

(5) In below-grade vaults and equipment rooms, unless continuous ventilation is provided, there shall be a complete change of air every 3 minutes during periods of human occupancy.

(6) (aa) In paint spray areas and lay-up areas of fiberglass boat manufacturing places and similar

hazardous locations, there shall be a complete change of air every minute.

(bb) The area to be considered in calculating the ventilation required shall be defined as a minimum of 20 feet in all horizontal directions from the work and 14 feet in a vertical direction.

(7) Fans and duct systems required to comply with 4801.6(a)(9) - (NFPA-664) shall have the fan located beyond the air cleaning equipment to handle only cleaned air.

(b) EXHAUST DISCHARGE: Ducts from kitchen range hoods, bathroom exhausts and dryers, where duct connections are provided, shall discharge to the outside of the building. All clothes dryers that are vented types shall be vented to the exterior of the building. All exhaust air ducts other than bathroom shall be sealed to the roof jacks, wall caps or any device that accepts duct work. See Section 4806.3(n).

(c) DESIGN BASIS: Where minimum mechanical facilities are based on numbers of persons, the number of persons shall be taken as that reasonably anticipated and the number of persons anticipated shall be shown on plans for the proposed work.

(d) (1) DUCT TERMINATION: All extensions of ventilation openings through a flat roof shall be terminated not less than 8" above the roof surface.

(2) All terminations will comply with Section 4610.1(d)(1) and (2).

(3) All extensions of ventilation openings through a sloped roof (2½ in 12 or greater) shall be terminated not less than four (4) inches above the roof's finished roof surface.

4804 AIR CONDITIONING AND REFRIGERATION

4804.1 WINDOW TYPE AIR CONDITIONING UNITS: All individual air conditioning units installed in walls or windows shall be securely anchored to the walls by approved methods. Units installed over public property, paths of egress or more than 10 feet above grade shall be secured to the structure by bolts or screws to resist horizontal wind loads. Such units cantilevering more than 8" on the exterior of a building shall be supported by steel angle brackets secured by bolting. Bolts to masonry shall be set in lead shields or similarly rot-resistant fastenings.

4804.2 FIRE-RESISTIVE RATINGS:

(a) Where walls and ceilings are required by this Code to be fire-resistive, the ducts and other appurtenances of an air conditioning or ventilating system shall comply with Section 3703.6, other applicable Sections of this Code, and the Standards set forth herein.

(b) Such wall and ceiling assemblies shall be constructed in accordance with the conditions of the approved fire test made with such assemblies.

(c) Fiberglass and flexible Class I air duct may be used where a one-hour fire-resistive roof/ceiling or floor/ceiling assembly is required if all duct openings are protected with Type BZZU ceiling air diffusers or Type CABS ceiling dampers, as used in the UL Fire Resistive Directory.

(d) The architect shall be responsible for the design of fire resistive walls, floor/ceiling assemblies, roof/ceiling assemblies and horizontal and vertical smoke barriers. The architect shall show the necessary horizontal and vertical fire separations and the hourly requirements of the fire separation on the floor plans and in the building sections. Fire-resistive assemblies, such as shown in the UL Fire Resistance Directory or Table 37 of this Code, shall be identified by its design number or specification as well as by its hourly rating.

(e) The engineer or system designer shall show on the plans openings and duct penetrations of required fire-resistive walls, partitions, ceilings and smoke barriers. The engineer or system designer shall show on the mechanical plans the location and mounting details of all automatic fire doors, fire dampers, ceiling radiation dampers and other fire protection means incorporated in the HVAC system.

4804.3 SIGNS REQUIRED:

(a) Each refrigerating system shall be provided with legible and securely attached permanent sign indicating thereon the name and addresses of the manufacturer and installer, the kind and total number of pounds of refrigerant required in the system for normal operations, and the refrigerant leak field test pressure applied.

(b) It shall be the duty of the person in charge of the premises on which a refrigerating system containing more than 50 pounds of refrigerant is installed, to maintain a conspicuously posted card as near as practicable to the refrigerant compressor giving directions for the operation of the system, including precautions to be observed in case of a breakdown or leak as follows:

(1) Instruction for shutting down the systems in case of emergency.

(2) The name, address and day and night telephone numbers for obtaining service.

(3) The name, address and telephone number of the Building Official and instructions to notify said Building Official immediately in case of emergency.

(c) Where multiple installations exist in a single location, both the electrical disconnect and corresponding heating, ventilation and air conditioning equipment shall be labeled to identify the apartment, office, bathroom or area they serve.

4804.4 OUTSIDE AIR SUPPLY:

(a) All air conditioned or mechanically refrigerated spaces normally occupied by persons shall be provided with outside air at a rate of not less than that prescribed in ASHRAE 62.

(1) EXCEPTION: Outside air shall not be required where a unit or units serve a single family residence of Group I Occupancy.

(2) EXCEPTION: Outside air shall not be required for single-family units of Group H Occupancy where such single-family unit is served by a closed system for that unit only and the unit has not less than 2 exterior walls and complies with Section 1305 herein.

(b) The point of air intake shall be a minimum of 10 feet developed distance from any vent terminal of a sanitary plumbing system or any exhaust system.

(c) Outside air supply ducts shall be constructed of metal, and installed according to SMACNA/HVAC "Duct Construction Standards - Metal and Flexible".

4804.5 COOLING TOWERS:

(a) The recommendations in the Standards for Water Cooling Towers, NFPA 214, as set forth in Section 402, shall be used as a guide to the fire protection of water cooling towers.

(b) Cooling towers of combustible construction shall be protected with automatic sprinkler devices as set forth in N.F.P.A. 214.

4804.6: Walk-in Coolers and Freezers

Walk-in Coolers and Freezers shall comply with the provisions of Sections 3505.3(b)(2), 4606.2 and 4801.6(a)(1) within the South Florida Building Code.

4805 EQUIPMENT

4805.1 GENERAL:

(a) Air conditioning, heating and mechanical systems shall be designed and equipment selected in accordance with good engineering practice and the principles and standards set forth in Section 4801.6.

(b) The design of and selection of equipment and materials for air conditioning and heating systems shall be in compliance with the energy conservation provisions set forth in Chapter 49.

(c) All roof mounted equipment shall meet the requirements of Sections 3409.1 and 3401.8(e).

(d) Conversion of old refrigerant to new refrigerant shall require a permit, and such conversions shall comply with all requirements of ASHRAE 15. Plans shall accompany the application for permit, and such plans shall be prepared, signed, dated and sealed by a Professional Engineer where such proposed work meets or exceeds that provided for in 4801.3(c) of this Code.

(1) The following three U.L. Standards for Safety for the field conversion of refrigeration and air conditioning equipment shall apply to all equipment that was previously U.L. Listed:

(aa) UL 2170 - Construction and Operation Requirements for Field Conversion/Retrofit of Products to Change to an Alternate Refrigerant.

(bb) UL 2171-Insulating Material and Refrigerant Compatibility Requirements for Field Conversion/Retrofit of Products to Change to an Alternate Refrigerant.

(cc) UL 2172 - Refrigerant Field Conversion/Retrofit Safety Requirements - Procedures and Guidelines.

4805.2 USED OR SECOND-HAND EQUIPMENT: It shall be unlawful to purchase, sell, or install used equipment or material for mechanical installations unless it complies with the minimum standards set forth in this Code.

4805.3 USE OF EQUIPMENT: All new and used equipment and material shall be installed and utilized in accordance with the manufacturer's recommendations.

4805.4 MIX-MATCHING OF EQUIPMENT:

(a) NEW INSTALLATIONS:

(1) In installations of unitary equipment, nothing shall be added to or deleted from the equipment which will invalidate the UL label.

(2) When there is mix-matching of equipment, it shall be the responsibility of the designer of the system that the equipment will function without damage to the components and will meet the quantities stated in the permit application.

(b) REPLACEMENT EQUIPMENT:

(1) When a component of an existing system is replaced and there has been no problem with the system other than the component being replaced, it shall be replaced with a piece of equipment as near as possible in design and capacity to the piece of equipment being replaced. When a question arises about capacity, Item (2) of "New Installations" shall prevail.

4805.5 INSTALLATION:

(a) Piping, insulation, devices, appurtenances, or equipment shall not be located in a manner to interfere with the normal operation of windows, doors, or other exit openings.

(b) Piping, insulation, devices, appurtenances, or equipment shall not be located in a manner to interfere with the normal operation or maintenance of other mechanical equipment or electrical equipment.

(c) Equipment, devices, appurtenances and incidental piping shall be so placed and installed that adequate room and space is available for proper operation, inspection, service, repair and replacement.

(d) Every attic installation in new construction in which mechanical equipment is installed shall be accessible by an opening and passageway as large as the largest piece of the equipment and in no case less than 22x36 inches continuous from the opening to the equipment and its controls. The opening to the passageway shall be located not more than 20 ft. from the equipment measured along the centerline of such passageway. Every passageway shall be unobstructed and shall have solid continuous flooring not less than 24 inches wide from the entrance opening to the equipment. On the control side and other sides where access

is necessary for servicing the equipment a level working platform extending a minimum of 30 inches from the edge of the equipment with a 36 inch high clear working space shall be provided. Top or bottom service equipment shall have a full clearance above or below the unit for component removal.

(1) All attic installations shall comply with Chapter 49, (State of Florida Model Energy Efficiency Code for Building Construction.

(e) Grade level equipment shall be installed on an approved preformed base, a structural frame, or a concrete base extending at least 2 inches larger than the equipment on all sides, except when anchoring is to be on the outside of the equipment, the slab shall be 4 (four) inches larger than the equipment and extending not less than 2 inches above adjoining ground.

4805.6 PROTECTION: All mechanical equipment subject to damage by any type of vehicle shall be protected as follows:

(a) The mechanical equipment shall be installed a minimum of five (5) feet from any driveway, street, alley, parking space, loading and unloading areas for vehicles, fire lanes and dumpster containers.

(b) If the five (5) feet clearance cannot be achieved then posts shall be provided at the corner and at a maximum spacing of three feet on center therefrom until such ten (10) foot clearance on that side is provided for.

(1) The center of all posts shall be placed a minimum of 2'-0"' from such mechanical equipment of any appurtenances therefrom.

(2) All posts shall be of either the removable barrier type or the fixed barrier type.

(3) All posts shall be of 4" nominal diameter schedule 40 hot dipped galvanized steel pipe conforming to A.S.T.M. A120-79. All pipe shall be filled solid with 3,000 p.s.i. concrete at 28 days and the end of such post shall be crowned 2" minimum. All posts shall be painted with a safety yellow paint.

(4) All posts for removable barriers shall be a minimum length of 5'-0" with a minimum of 3'-6" extending above the adjacent finished grade. For all posts at removable barriers provide a nominal 5" diameter by 3'-4" schedule 40 hot dipped galvanized steel pipe sleeve conforming to A.S.T.M. A120-79 set 4" above the adjacent finished grade to the top of the pipe sleeve. Provide a ¾" diameter by 8" long galvanized steel bolt with a nut at 1'-6" above the bottom of and through the sleeve. Provide a minimum 1'-4" by 1'-4" by 2'-0" deep concrete pod of 3,000 psi concrete at 28 days at each pipe sleeve at a maximum of 3" below the finished grade. Slope the concrete at the area 3" wide by 3" high around the pipe sleeve perimeter so as to shed the water form the pipe sleeve. All fill and/or soil below the concrete pod shall be well compacted.

(5) All posts for fixed barriers shall be a minimum length of 6'-6" with a minimum of 3'-6" extended above the adjacent finished grade. All posts at fixed barriers shall have a concrete pod 1'-4" by 1'-4" by 1'-0" deep minimum of 3,000 psi at 28 days concrete at a maximum of 3" below the finished grade. Slope the concrete area at the area 3" wide by 3" high around the fixed pipe so as to shed water from the fixed pipe. All fill and/or soil below the concrete pod shall be well compacted.

(6) Removable barriers shall be mandatory where it is necessary that the mechanical equipment be accessible or readily accessible for the purpose of maintenance, repairs and/or replacement.

(c) Alternate methods complying with 4801.8 may be used.

4806 DUCTS AND SYSTEMS

4806.1 GENERAL:

(a) This section applies to duct systems for the movement of air or materials in air conditioning, heating, ventilating, exhaust, or conveying systems. All ducts and ductwork shall conform to the standards outlined herein.

(b)(1) No corridor, stair enclosure, passageway, or path of egress in a building, any part of which is normally used for sleeping purposes, shall be used for the supply, return, or exhaust air system serving adjoining areas other than toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces opening directly on the corridor, nor shall any air conditioning or refrigeration equipment be installed therein. Buildings constructed and supervised under the Department of Health and Rehabilitative Services need not comply with this Sub-paragraph.

(2) In Group H Occupancies, the provisions of this paragraph shall not prohibit the use of corridors as a source of make-up air through normal leakage around doors.

(3) In Group I Occupancies, the provisions of this paragraph shall not prohibit the use of corridors or stairs as a path of return air to an air handling unit. In individual tenancy occupying more than one floor, the use of stairs as path of return air to an air handling unit shall not be prohibited.

(4) Air conditioning and air handling installations in Group I Occupancies shall be located and ducted in such manner as to prevent possible carbon monoxide emission in enclosed garages from entering other areas of the building.

(c) No attic, basement, or concealed space in a building shall be used as an integral part of a duct system unless such spaces conform to all the requirements for ducts, except where in compliance with NFPA 90A Section 2-3.10.

(d) The use of polyvinyl chloride or CPVC shall be prohibited from being used in plenums including machinery rooms that are used for plenums.

#1 EXCEPTION: Low voltage wiring will be permitted in a plenum in Group G Occupancy with open floor area in excess of 20,000 square feet, providing the quantity of low voltage wiring does not exceed ½ percent of the volume of the concealed ceiling space; providing that a smoke detection system is installed in accordance with NFPA 72E, and in accordance with the listing of the detection devices; that the smoke detection system will sound a general alarm and will indicate at the main annunciator panel when device has been triggered and/or alarmed; and that a heat detection device limits the temperature in the ceiling plenum to 125° Fahrenheit. The smoke and heat detection devices shall shut down the air moving equipment.

#2 EXCEPTION: Liquidtight flexible metal conduit coated with P.V.C. shall be allowed under raised floors in computer rooms used for data processing equipment when the raised floor is in compliance with Sec. 2-2 of NFPA 75; the air conditioning system is in compliance with Sec. 7-1 of NFPA 75 "STANDARD for the PROTECTION of ELECTRONIC COMPUTER/DATA PROCESSING EQUIPMENT; and the wiring and ventilation under the raised floor are in compliance with Article 645 of NFPA 70 "NATIONAL ELECTRIC CODE."

(e) For the purpose of this section, attached garages of H or I Occupancy shall be considered J Occupancy.

(f) Closets for air handling units in the residential portions of H and I Occupancies are not considered return air plenums and are to be used solely for the installation of the air handling unit and or water heater.

4806.2 DESIGN: Design of duct systems shall be in accordance with accepted engineering practice. Duct systems designed in accordance with ASHRAE, "Handbook and Product Directory" or American Conference of Governmental and Industrial Hygienists, "Industrial Ventilation, a Manual of Recommended Practice" are prima facie evidence of accepted engineering practice.

4806.3 CONSTRUCTION:

(a) Ducts shall be constructed of metal, or other incombustible materials, installed, supported and reinforced, to provide structural strength and durability at least equal to the requirements set forth in the SMACNA/HVAC "Duct Construction Standards - Metal and Flexible, 1985 Edition," SMACNA "Fibrous Glass Duct Construction Standards," or NAIMA "Fibrous Glass Duct Construction Standards", NAIMA

"Fibrous Glass Duct Construction with 1½" Duct Board," NAIMA Fibrous Glass Residential Duct Construction Standard," and ASHRAE Handbooks listed in Table 4-A. Ducts shall not be constructed of Gypsum Board.

EXCEPTIONS:

(1) Return air ducts in air conditioning systems required to comply with NFPA 90B.

(2) Ceilings used as return air plenums.

(3) Walls and ceilings of Mechanical Equipment Rooms used as return air plenums.

(b) Materials for fabrication of air duct systems shall meet the listing requirements of Underwriter Laboratories Standard UL-181, "Factory Made Air Duct Materials and Air Duct Connectors".

(c) All ducts shall be constructed of materials and construction quality as set forth in its class as outline in UL-181.

For the purpose of these requirements, materials are classified as follows:

Class 0 – Air-duct materials and connectors having a fire hazard classification of zero.

Class 1 – Air-duct materials and connectors having a flame-spread rating of not over 25 without evidence of continued progressive combustion and a smoke-developed rating of not over 50.

Class 2 – Air-duct materials and connectors having a flame-spread of not over 50 without evidence of a continued progressive combustion and a smoke-developed rating of not over 50 for the inside surface and not over 100 for the outside surface.

(1) Ducts in Group I Occupancies shall be minimum of Class 2 air-duct material.

(2) Ducts in Group H and Commercial occupancies shall be minimum Class 1 air duct material but shall not exceed 250 degrees F. Temperature. Maximum pressure and velocity for duct material shall be as per U.L. 181.

(3) Industrial or medium and high pressure commercial duct systems shall be minimum of Class 0 air-duct material when duct temperatures exceed 250 degrees F.

(d) Ducts shall be tight throughout in accordance with SMACNA standards with no openings except those essential to the required functioning of the system.

(e) Fibrous glass ductwork shall not be used outdoors or under the following conditions:

(1) In or under concrete foundation slabs.

(2) When air temperature exceeds 250 degrees F.

(3) Kitchen or fume exhausts or to convey solids or corrosive gasses.

(4) Above the recommended velocities or pressures.

(5) Immediately adjacent to heating coils operating above 250 degrees F.

(6) For vertical risers serving more than two stories.

(7) In mechanical equipment rooms without adequate protection against possible damage.

(f) Fibrous glass ductwork or duct coverings shall not extend through walls or floors required to be fire-stopped; they shall be interrupted at fire dampers and fire doors. Metal sleeves for fire dampers should extend minimum 3 inches past each side of the wall to facilitate attachment of duct sections.

(g) Electric resistance heaters located in fibrous glass duct systems shall be installed in a sleeve of galvanized sheet metal having a minimum thickness of 18 gage and extending 6 inches beyond each side of the heater.

(h) Closure systems utilizing pressure sensitive tapes shall conform to UL181A-P-Underwriters Laboratories closure systems for use with air ducts and connectors.

(I) All rigid and flexible glass duct shall bear a factory applied UL-181 label indicating the class with which it complies.

(j) Ducts embedded in or under concrete slabs shall be of sufficient structural strength and shall be covered on all sides with not less than 4 inches of concrete. Exhaust ducts constructed with PVC schedule 40 pipe, below the slab, shall be installed according to the manufacturer's specifications and may omit the 4 inch concrete encasement where permitted by manufacturer's specifications.

(1) Ducts shall not pass through a structural element unless the element is designed for passage.

(2) All ducts shall be sloped to an accessible plenum for drainage of condensate.

(3) Ducts shall be properly sealed and secured prior to pouring the concrete encasement.

(k) Ducts shall not be installed in such a manner as to impair the effectiveness of the fireproofing around steel or iron of structural members.

(i) Each joint of round metal duct shall be secured against disarrangement with not less than three sheet metal screws except that in buildings of Group I Occupancy where approved tape is used to seal and secure the joints, such sheet metal screw will not be required.

(m) Each joint in flexible duct shall be installed in accordance with UL approval.

(n) All clothes dryer vents shall be constructed of a minimum 26 gauge metal pipe and having a smooth interior surface, or other approved metal materials and installed and utilized in accordance with manufacturers recommendations. When specific dryers are not being installed the minimum size of the exhaust duct shall be 4 inches I.D. The maximum length shall not exceed 25 feet from dryer location to wall, roof cap or engineered exhaust system. There shall be a deduction of 2½ feet for each 45 degree bend and 5 feet for each 90 degree bend.

4806.4 SUPPORTS:

(a) Ducts shall be suitably protected when placed in locations where they may be subject to damage or rupture.

(b) Hangers or brackets for supporting ducts shall be of flat metal, angle iron, or other approved materials, adequately spaced to securely support, or hang the ductwork.

(c) "Hangers, saddles and other supports for flexible ducts shall meet the duct manufacturer's recommendations and shall not be less than 26 gauge, one and one half (1½) inches wide metal strap or #12 gauge wire with 26 gauge one and one half (1½) inch wide saddle minimum, and capable of carrying a minimum of one and one half times the installed weight of the duct and of sufficient width to prevent restriction of the internal duct diameter.

4806.5 FLEXIBLE DUCT CONNECTORS: Flexible duct connectors which do not pass through floors of buildings need not conform to the requirements for ducts if they conform to the following provisions:

(a) Connectors not exceeding 8 inches in diameter shall conform to the requirements for Class 2 connectors when tested in accordance with UL-181.

(b) Connectors exceeding 8 inches in diameter shall conform to the requirements for Class 1 connectors when tested in accordance with UL-181.

(c) Connectors shall not be used as main ducts and each connector from a main duct to an air terminal shall not exceed 14 feet in length.

(d) Connectors shall not pass through any wall, partition, or enclosure of a vertical shaft which is required to have a fire resistance rating of two hours or more.

(e) Connectors shall be installed as straight as possible with no deformation which reduces the cross sectional area.

(f) Connectors used in concealed spaces consisting in part of combustible materials shall also pass the 15-minute flame penetration test for Class 2 air ducts as described in Section 7 of UL-181.

(g) Cylindrical sheet metal collars shall be provided as all junctions with flexible connectors.

4806.6 FLEXIBLE DUCTS: Flexible ducts shall be installed in accordance with the UL restrictions of length and duct class and shall be installed according to SMACNA/HVAC "Duct Construction Standards – Metal and Flexible, 1985 Edition," or other approved engineered methods.

4806.7 VIBRATION ISOLATION CONNECTORS: Vibration connectors in duct systems shall be made of woven material or approved flame proofed fabric or shall consist of sleeve joints with packing or other approved non-combustible materials. Vibration isolation connectors shall not exceed 10 inches in length.

4806.8 SMOKE DAMPERS AND AIR DUCT SMOKE DETECTORS:

(a) Smoke Damper – A leakage rated damper intended for use in heating, ventilating and air conditioning (HVAC) systems. Smoke dampers are intended to restrict the spread of smoke in HVAC systems that are designed to be automatically shut down in the event of a fire or to control the movement of smoke within a building when the HVAC system is operational in engineered smoke control systems.

(1) Smoke dampers shall be classified and labeled in accordance with UL 555S, Standard for Safety-Leakage Rated Dampers For Use in Smoke Control Systems.

(2) Smoke dampers shall be installed where required by 4801.6(a)(4) (NFPA 90A), NFPA 101 and other adopted standards of this Code.

(3) Smoke dampers shall be installed according to the approved manufacturer's detailed directions.

(4) Suitable access doors with tightly fitted covers shall be provided to make them accessible for inspection and maintenance.

(b) Air Duct Smoke Detector. A device used to detect the presence of smoke in the airstream of duct work sections of the HVAC air handling system. Air Duct Smoke Detectors are for the primary purpose of controlling blowers and smoke dampers of air conditioning and ventilating systems to prevent distribution of smoke and gaseous products.

(1) Air Duct Smoke Detectors shall be listed, maintained, tested and installed according to the manufacturer's recommendations, NFPA 72E "Automatic Fire Detectors, Chapters 8 & 9," and NFPA 90A.

(AA) Initial testing and installation of Duct Smoke Detectors shall be responsibility of the Mechanical Department.

(2) Air Duct Smoke Detectors shall be installed in all new and replacement air handling units, air conditioning units, package units and fans where required by NFPA 90A and NFPA 101 and meet all requirements of NFPA standards.

(AA) Air Duct Smoke Detectors are designed to be used in air handling systems having a certain range of air velocities. The detector installed shall be listed for the duct air velocities of the designed system.

(bb) Each system designer shall specify on the plans the type of smoke detector to be installed.

(3) Suitable access doors with tightly fitted covers shall be provided to make the detectors accessible for inspection and maintenance.

4806.9 FIRE DOORS: Ducts shall not pass through fire walls unless unavoidable. When ducts or the outlets from or inlets to them pass through fire walls, they shall be provided with automatic fire doors approved for the protection of openings in fire walls (Class A openings on both sides of the walls) through which they pass.

4806.10 FIRE DAMPERS:

(a) Approved fire dampers shall have the following performance characteristics:

(1) The shall provide a practical barrier to passage of air when in the closed position.

(2) They shall remain in the closed position under fire conditions.

(3) They shall be constructed, listed and labeled in accordance with UL 555.

(AA) Fire dampers installed in systems that continue to operate when smoke or heat from a fire is detected, shall be labeled for use in dynamic systems as required by U.L. 555.

(bb) Fire dampers installed in systems that shut down when smoke or heat from a fire is detected shall be labeled for use in static or dynamic systems as required by U.L. 555.

(4) They shall be so installed as to stay in place at the protected opening even though the duct is disrupted during a fire, such as by the use of a substantial sleeve or frame secured by perimeter angles on both sides of the opening. Fire dampers shall be installed in accordance with the conditions of their approval and the manufacturer's instructions.

(5) Suitable access doors with tightly fitted covers shall be provided to make them accessible for inspection and maintenance.

(6) They shall have either a 1 or 3 hour standard fire protection rating in accordance with UL 555 for fire dampers.

(7) Fire dampers provided in branch ducts used solely for exhaust of air to the outside shall be installed in such a way that they will not interfere with the flow of air in the main duct.

(b) Fire dampers shall be installed under the following conditions:

(1) Ducts passing through fire resistive walls or partitions requiring a fire rating of one or more hours.

(2) Ducts penetrations of required fire rated shafts.

(3) Fresh air intakes near or below ground, combustible roof level, or in the vicinity of combustible buildings or hazardous facilities, shall be protected with approved fire dampers at the outside wall line.

(4) Approved fire dampers shall be provided in all air transfer openings in partitions required to have a fire resistance rating.

(c) EXCEPTIONS: Fire dampers are not required in the following:

(1) Ducts having a cross sectional area less than twenty (20) square inches.

(2) Where horizontal branch ducts connect to multi-story vertical ducts in which the air flow is upward and sub-ducts at least 22 inches in length are carried up inside the riser from each inlet.

(3) In I-Occupancy, attic fan installations where installed in a fire-rated ceiling or roof assembly, a firestat shall be installed to shut off the fan and a fusible link to close the ceiling opening.

(4) Fire dampers are not required in Group I Occupancy except in the supply and return duct openings through required one-hour fire-resistive construction between an attached garage and the residence. In lieu of the required fire dampers at existing Group I Occupancy construction, a smoke detector may be provided wired to shut off the fan. These duct smoke detectors shall be located in the supply duct.

4806.11 FIRE DOORS AND FIRE DAMPERS CLOSING MECHANISM: Fire doors and fire dampers shall be arranged to close automatically and remain tightly closed upon the operation of a fusible link or other approved heat actuated device located where readily affected by an abnormal rise of temperature in the duct or wall opening. Fusible links shall have a temperature rating approximately 50℉ (28℃) above the maximum temperature that would normally be encountered with the system in operation or shut down, but not less than 160℉ (71℃).

EXCEPTION: When fire dampers are installed as part of an engineered smoke control system, fusible links shall have a temperature rating approximately 50℉ (28℃) above the operation temperature for which the smoke control system is designed but not to exceed 285℉ (141℃).

4806.12 CEILING RADIATION DAMPERS: A specialized form of a heat stop installed in the air distribution portion of a fire-rated floor/ceiling or roof/ceiling assembly: the sole purpose of which is to help maintain the fire endurance rating of the assembly. Ceiling radiation dampers shall be tested in accordance with UL 555C-Standard for Safety-Ceiling Dampers-First Edition or Canadian UL Standard CAN 4-S112.2-M84 which is Standard Method of Fire Test of Ceiling Firestop Trap Assemblies.

(a) Ceilings radiation dampers are classified into three different types as listed in the UL Fire Resistance Directory – January 1987:

(1) Ceiling Air Diffuser (BZZU) – a diffuser or grill with factory installed material which serves as a heat transmission barrier under fire conditions.

(2) Ceiling Damper (CABS) – a damper designed to function as a heat barrier in air duct outlets or air handling openings penetrating fire resistive membrane ceilings.

(3) Air Terminal Unit (BZGU) – a plenum slot diffuser with factory installed protection material which acts as a heat transmission barrier.

(b) All ceiling radiation dampers shall be installed and utilized in accordance with the manufacturers installation instructions as approved by UL. When manufacturers recommendations require a thermal blanket, such blanket shall be marked "Accessory Thermal Blanket" designated by type of damper, model number and damper size.

(c) Ceiling radiation dampers shall be installed under the following conditions:

(1) Openings or ducts penetrating the fire resistive ceiling membrane which is a required part of a fire rated floor/ceiling or roof/ceiling assembly according to their listing in:

(AA) UL "Fire Resistance Directory:

(bb) Gypsum Association "Fire Resistance Design Manual"

(cc) Other assemblies tested by an approved testing laboratory by recognized standards.

(dd) EXCEPTION: Openings in ceilings having a cross sectional area less than twenty (20)square inches in each 100 square feet.

4806.13 REMOVAL OF SMOKE AND GREASE-LADEN VAPORS FROM COMMERCIAL COOKING EQUIPMENT:

(a)(1) The design, installation and use of exhaust components including hoods, grease removal devices, exhaust ducts, dampers, air moving devices, auxiliary equipment and fire extinguishing equipment for the exhaust system and cooking equipment used therewith in commercial, industrial, institutional and similar cooking applications shall comply with the Standards set forth in Section 4801.6 except as set forth herein.

EXCEPTION: The requirements of 4806.13 need not comply with 4801.6(a)(6) for new construction if all of the following criteria are met and installation complies with 4806.14.

(aa) One residential four burner range.

(bb) Two fire extinguishers (Location and type to be determined by fire department).

(cc) One story recreation building or club house associated with a rental or condominium apartment project of Group H or I Occupancy.

(dd) Kitchen area a maximum of 80 square feet.

(ee) Adjoining dining room with a maximum of 750 square feet and a maximum 50 person occupancy.

(2) The requirements of this Sub-section shall not apply to hoods and ducts to carry off heat only from kitchen units such as dishwashers, coffee urns, water heaters and similar kitchen equipment where smoke or grease-laden vapors are not anticipated.

(3) Cooking equipment used in process producing smoke or grease-laden vapors shall be equipped with an exhaust system having a hood or canopy, a duct system, grease removal equipment and fire extinguishing equipment as set forth herein.

(b) LOCATION:

(1) Such hoods shall not be raised more than 7 feet from the floor.

(2) The length and width of kitchen hoods shall extend a minimum of 6 inches beyond the appliance over which they are installed.

EXCEPTION: Six-inch extension is not required when the appliance is adjacent to a wall.

(3) Range hoods shall be not less than two feet high to provide a reservoir to confine momentary bursts of smoke and steam until the exhaust system can evacuate the hood.

(4) Range hoods shall be located as low as possible to increase their effectiveness.

(5) Exhaust connections to range hoods shall be made at the top and/or back of the hoods.

(c) GAS APPLIANCE VENTS: Vents of gas-burning cooking appliances other than ovens shall extend through or beyond the grease screen or filter and shall be further regulated as set forth in Chapter 47.

(d) HOOD DESIGN:

(1) Hoods over kitchen cooking equipment shall be constructed of and be supported by steel not lighter than No. 18 Manufacturers Standard Gage, stainless steel not lighter than No. 20 Manufacturers Standard Gage or of other approved material of equivalent strength, fire, and corrosion resistance.

(2) Hoods shall have continuous external liquid tight welded joints.

(3) Hoods shall be installed to provide 18 inches clearance from all unprotected combustible material.

(4) Range or grease filters or equally effective grease traps shall be installed in all commercial use installations and shall be of non-combustible construction, proportioned not to decrease the air velocity in the duct below the limit set forth in Section 4806.13(e)(8).

(5) The average air velocity across the face of any hood in the exhaust system shall be not less than 100 feet per minute unless the hood is constructed and tested in accordance with UL 710 and certified by a national recognized testing agency.

(e) DUCTS:

(1) Ducts shall comply with the Standard set forth in Section 4801.6(a)(6) and shall also comply with Appendix A of the referenced Standard applicable to clearance required to unprotected combustible construction.

(2) Ducts shall lead as directly as possible to outside.

(3) The ducts shall constitute an independent system in no manner connected with any other ventilating system.

(4) Hand-holes, for inspection and cleaning purposes, equipped with tight-fitting sliding or swinging doors and latches, shall be provided in horizontal sections of exhaust ducts. Such openings should be at the side of the horizontal run in order to prevent dripping of residue. Spacing of such openings shall not exceed 20 feet.

(5) Vertical risers located outside of buildings shall be adequately supported by the exterior walls. Risers located inside of buildings shall be enclosed in a shaft of fire-resistive material, as set forth in Part V herein, extending continuously through the roof.

(6) At the base of each vertical riser, a residue trap shall be provided with provisions for cleanout.

(7) Exhaust ducts shall not pass through fire walls. Where ducts pass through partitions of combustible construction, the clearance shall be 18 inches unless insulated to provide at least one-hour fire-resistive protection in which case the clearance may be reduced to three inches.

(8) Duct systems shall create a conveying air velocity in the exhaust system of not less than 1500 feet per minute and not more than 2200 feet per minute.

4806.14 SHELVING, HOODS AND VENTILATING DUCTS FOR DOMESTIC RANGES:

(a) Range hoods, where installed, shall be vented to the outside of the building with an incombustible duct.

(b) Range hoods and ducts shall have tightly-fitted joints and be metal of not less thickness than 26 U.S. Standard Gauge.

(c) Ductless range hoods may be installed.

(d) Ducts from residential kitchen range-hoods or ventilating systems shall comply with the Standard set forth in Section 4801.6(a)(5).

(e) The requirements set forth in this Sub-section shall apply to only such ranges as are within a single residential unit.

4806.15 EXHAUST SYSTEMS FOR FLAMMABLE VAPORS: Exhaust systems for flammable vapors shall comply with the Standard set forth in Section 4801.6(a)(5).

4807 PIPING

4807.1 GENERAL:

(a) GENERAL: All steel and wrought iron pipe shall be at least standard weight pipe or tubing of equivalent working pressure and tensile strength. Pipe or tubing shall be reamed after cutting to not less than full internal dimensions.

(b) PIPE SUPPORTS:

(1) Piping shall be installed without undue strain and stresses and provisions shall be made for expansion, contraction and structural settlement.

(2) All suspended piping shall be supported with "clevis type" or other approved metal hangers with steel rods. Perforated metal strap, wire and similar materials shall not be used.

(3) Hangers, supports, rods and anchors shall be metal of sufficient strength to support the pipe, contents and pipe covering in proper alignment and to prevent rattling.

(4) Hangers and anchors shall be securely attached to the building construction.

(5) Vertical, copper, steel and plastic piping shall be supported at every other story height.

(6) Horizontal steel pipe shall be supported with maximum support spacing as set forth in Table 48-A.

TABLE 48-A

Nominal Pipe Size (Inches)	Maximum Span (Feet)	Minimum Rod Diameter (Inches)
1/2	5	1/4
3/4	6	3/8
1	7	3/8
1 1/2	9	3/8
2	10	3/8
3	12	1/2
3 1/2	13	1/2
4	14	5/8
5	16	5/8
6	17	3/4
8	19	7/8
10	22	7/8
12	23	7/8

(7) Horizontal copper pipe shall be supported with maximum support spacing as set forth in Table 48-B.

TABLE 48-B

Nominal Pipe Size (Inches)	Maximum Span (Feet)	Minimum Rod Diameter (Inches)
1/2	5	1/4
3/4	5	3/8
1	6	3/8
1 1/4	7	3/8
1 1/2	8	3/8
2	8	3/8
3	10	1/2
4	12	1/2

(8) Horizontal SDR and SCH 40 plastic pipe shall be supported with maximum support spacing as set forth in Table 48-C.

TABLE 48-C

Nominal Pipe Size (Inches)	Maximum Span (Feet)	Minimum Rod Diameter (Inches)
1/2	3.5	1/4
3/4	3.5	1/4
1	4.0	1/4
1 1/2	4.5	3/8
2	4.5	3/8
3	5.5	3/8
4	6.26	3/8
5	6.50	1/2
6	6.75	1/2
8	7.5	5/8
10	7.75	5/8
12	8.0	3/4

(9) Horizontal SCH 80 plastic pipe shall be supported with maximum support spacing as set forth in Table 48-D.

TABLE 48-D

Nominal Pipe Size (Inches)	Maximum Span (Feet)	Minimum Rod Diameter (Inches)
1/2	3.5	1/4
3/4	4.0	1/4
1	4.5	1/4
1 1/2	5.0	3/8
2	5.0	3/8
3	6.0	3/8
4	7.5	1/2
5	8.0	1/2
6	8.5	5/8
8	9.0	5/8
10	9.5	3/4
12	10.0	3/4

(c) PIPING THROUGH WALLS, FLOORS, ETC.: Piping passing through walls, ceilings, floors, in or under concrete slabs, beams, or any portion of the building structure shall be free to expand and contract and shall not be embedded in plastic, concrete or masonry. Such piping shall be provided with sleeves or thimbles when passing through concrete or masonry walls, ceilings, floors or beams, and such sleeves or thimbles shall be at least three-eighths (3/8) inch larger than the outside diameter of the pipe plus the insulation. Openings through wooden floors, ceilings, walls and beams shall be at least three-eighths (3/8) inch larger than the outside diameter of the pipe or the pipe plus insulation. No piping shall be installed in a concrete slab or in the ground under a slab. See Exception 4807.7(b).

EXCEPTION: In industrial and public utility facilities it shall be acceptable for specified piping to be located in the ground below a slab in buildings of E, F or J Occupancy when the installation plans bear the

seal of a Florida Registered Professional Engineer.

(d) WELDING: Where welding is used as a means of connection of branches to mains, provisions shall be made for the expansion of the pipe at this point so that undue stresses or strains shall not be placed on the welds or piping.

(e) COLD WATER SUPPLY TO HOT WATER TANK: The cold water supply to a hot water tank shall be discharged within 3 inches of the bottom of the tank either by direct connection at this point or by means of a pipe or tube inside the tank. There shall be installed on the cold water line close to the tank a hand shut-off valve and a back flow preventer in accordance with Section 4620.

(f) PIPE, FITTINGS, VALVES AND FLANGES:

(1) All threads on pipe, fittings, valves, flanges and similar appurtenances shall conform to American Standard for Pipe Threads, ANSI B2.1 and shall be made up with an approved thread compound or lubricant.

(2) Required gaskets shall be made of material approved for the pressure and temperature to which they are to be subjected. Rubber shall not be used where pressure exceeds 15 psig steam and 125 psig water or on temperature greater than 250 degrees F.

(3) Flanges, screw type, cast iron or steel, or of the forged integral type may be used up to their working pressure and temperature ratings. All companion flanges shall have matching facing and drilling.

(4) All pipe fittings and valves shall be of the type designed for the pressures and temperatures of the installation.

4807.2 CONDENSATE DRAIN PIPING AND INDUSTRIAL WASTES:

(a) Special consideration shall be given to the disposal of waste and over-flow water, and means of disposal shall be subject to approval of the Plumbing Official. Condensate drain piping and industrial wastes shall be in accordance with Sections 4603.10, 4606.7 and 4611.4. A condensate pump may be used as an alternate method of condensate removal if the condensate pump is properly sized and installed according to manufacturer's recommendations, and the condensate pump shall be equipped with a factory installed micro switch/float switch wired to shut down the air conditioner in case of condensate pump failure.

(b) When indoor air conditioning equipment is installed in concealed attic or ceiling spaces or crawl space, an auxiliary drain pan shall be required; and shall be a minimum of 1 inch deep and 1 inch larger than the unit in width and length on all sides and shall be constructed of not less than No. 24 gauge galvanized sheet metal. All indoor air conditioning equipment with an auxiliary drain pan underneath shall have a separate condensate drain line terminating over a shower, tub, sink, lavatory, or any other interior or exterior locations where the condensate flow would be noticed, but not do damage; a float switch or an approved listed switching device to control overflow may be used in auxiliary drain pans in lieu of an auxiliary drain line and shall be wired to shut down the air conditioning system when the switch opens. When such auxiliary drain pan is used with a float switch or an approved listed switching device, such auxiliary drain pan shall be provided with a means of draining for servicing purposes.

EXCEPTION: A shallow fan coil unit containing a built-in auxiliary drain connection can be installed within a furred down ceiling without an auxiliary drain pan. The connection for the auxiliary drain line shall terminate below the ceiling at a point where the water from it would be noticed and will not cause any structural damage, if it is not possible to terminate over a shower, tub, sink, lavatory or any other exterior locations where the condensate flow would be noticed, but not do damage.

(c) All condensate piping except auxiliary pan condensate lines shall be adequately insulated where damage to property or equipment may result from sweating or where the condensate piping is installed in attic or crawl space.

4807.3 CHILLED WATER PIPING: All chilled water piping and fittings shall be of wrought iron, steel, copper, brass or polyvinyl chloride plastic (PVC) Schedule 40 Type I normal impact, polyvinyl chloride plastic (PVC) Schedule 80 Type I normal impact, pressure rated cement asbestos epoxy lined pipe or Type 3003-0 aluminum tubing.

(1) IDENTIFICATION: All piping and fittings shall be marked to indicate type, weight or pressure as applicable.

(2) All plastic pipe shall be installed and supported in accordance with the manufacturer's recommendations and/or the Plastic Pipe Institute in such a manner as to give protection from physical damage to the piping and shall not be used as a connection material to heating devices, nor other equipment where temperature and/or vibration could affect the piping.

4807.4 CONDENSER WATER PIPING:

(a) Condenser water piping shall be of the same quality and installed in the same manner as required in Section 4807.3 of this Code.

NOTE: Sizes larger than 6" should be governed by manufacturer's recommendations.

(b) BLEED-OFF: All cooling tower bleed-off lines shall be extended to a sanitary sewer drain or storm sewer drain. Such drain shall not in any case be allowed to drain into yards, streets or alleys, or on the roof of a building.

(c) INSTALLATION: Cooling towers shall be provided with a direct connection to a water supply through an individual float control valve. The control valve shall terminate not less than three inches above the highest possible water level in the cooling tower pan. A convenient means shall be provided, either a gate valve or a capped nipple, for draining or flushing the tower.

4807.5 MAKE-UP WATER PIPING:

(a) From an approved back-flow preventer installed as required by Section 4620 of this Code, to the inlet on a boiler, chiller, or other water-using device covered by this Code, the piping shall be as hereinbefore specified for chilled water piping, except on boilers operating above 250 degrees F. or 100 PSIG pressure, the make-up water line shall be black iron or wrought iron pipe conforming to Schedule 80 of American Standard on Wrought-Steel and Wrought-Iron Pipe ANSI B.36.10 and extra-heavy iron or steel fittings.

(b) Protection of portable water supply shall be in accordance with Section 4620 of this Code.

4807.6 FUEL PIPING: All gas fuel piping shall be in accordance with Chapter 47 of this Code. All fuel oil piping shall be wrought iron, steel, or copper. Piping shall be joined by threading, welding, or brazing.

4807.7 REFRIGERANT PIPING:

(a) All refrigerant piping and equipment shall be sized, installed, tested, and placed in operation in accordance with the "American National Standard for Mechanical Refrigerating Equipment." ANSI B31.5 and ASHRAE STANDARD – Safety Code for Mechanical Refrigeration" ANSI/ASHRAE 15.

(b) The looping of copper tubing beneath the ground floor slab will be permitted in single-story buildings or multi-story single family residences, but the suction line shall be insulated and the liquid line shall be enclosed in a plastic sleeve or insulated the total length to include the turn to above the slab. Concealed or non-removable joints shall not be permitted below the ground floor slab.

EXCEPTION: In multi-story buildings, refrigerant piping of copper may be installed below the ground floor slab providing the pipe does not exceed one and five eighths (1 5/8) inch O.D. and is encased in a sleeve of PVC Schedule 40 sized 2" larger than the pipe and insulation encased, having an angle no greater than 45 degrees, with no joints permitted below the ground floor slab, and with the encased refrigerant piping removable for replacement. Sleeved underground refrigerant lines shall be dry, sealed and watertight with approved materials and methods at all times after the sleeving is installed.

(1) Sleeved underground refrigerant lines shall be dry, sealed and watertight with approved materials and methods at all times after the sleeving is installed.

(c) SPECIFIED MINIMUM REQUIREMENTS FOR REFRIGERANT PIPE AND TUBING:

(1) No less than Schedule 80 wall thickness carbon steel or wrought iron pipe shall be used for Group 2 and Group 3 refrigerant liquid lines for sizes 1 inches and smaller. No less than Schedule 40 wall thickness carbon steel or wrought iron pipe shall be used for Group 1 refrigerant liquid lines 6 inches and smaller, Group 2 and Group 3 refrigerant liquid lines sizes 2 inches through 6 inches, and Group 1, Group 2, and Group 3 refrigerant vapor lines 6 inches and smaller. Butt-welded carbon steel and butt-welded wrought iron pipe shall not be used for refrigerant liquid lines. Cast iron pipe shall not be used for Group 1, Group 2, or Group 3 refrigerant lines.

(2) Standard iron pipe size copper and red brass (not less than 80 percent copper) pipe may be used and shall conform to "Standard for Seamless Copper Pipe," ANSI H26.1, and "Standard for Seamless Red Brass Pipe," ANSI H27.1.

(3) Water tube size hard copper tubing used for refrigerant piping erected on the premises shall conform to "Standard for Seamless Copper Water Tube," ANSI H23.1, for dimensions and specifications, except that copper tubing with outside diameter of 1/4 inch and 3/8 inch shall have a minimum nominal wall thickness of not less than 0.030 inch and 0.034 inch respectively.

(4) Soft annealed copper tubing used for refrigerant piping erected on the premises shall not be used in sizes larger than one and five eighths (1 5/8) inch standard size (1.625 outside diameter). Mechanical joints shall not be used on soft annealed copper tubing on sizes larger than 7/8 inch standards size (0.875 outside diameter).

(5) Copper tubing joints used in refrigerating systems containing Group 2 or Group 3 refrigerants shall be brazed. Soldered joints shall not be used in such refrigerating systems.

(6) Type 3003-0 aluminum tubing with high pressure fittings may be used with all refrigerants except methyl chloride, and those others known to attack aluminum.

(d) JOINTS AND REFRIGERANT CONTAINING PARTS IN AIR DUCTS: Joints and all refrigerant containing parts of a refrigerating system located in an air duct of an air conditioning system carrying conditioned air to and from humanly occupied space shall be constructed to withstand, without leakage, a temperature of 700 degrees F.

(e) EXPOSURE OF REFRIGERANT PIPE JOINTS: Refrigerant pipe joints erected on the premises shall be exposed for visual inspection prior to being covered or enclosed.

(f) STOP VALVES:

(1) GENERAL REQUIREMENTS: All systems containing more than 6 pounds of a Group 2 or 3 refrigerant, other than systems utilizing non-positive displacement compressors, shall have stop valves installed as follows:

(AA) Each inlet of each compressor, compressor unit, or condensing unit;

(bb) Each discharge outlet of each compressor, compressor unit, or condensing unit, and each liquid receiver.

(2) SYSTEMS CONTAINING 100 POUNDS OR MORE OF REFRIGERANT: All systems containing 100 pounds or more of a refrigerant, other than systems utilizing non-positive displacement compressors, should have stop valves in addition to those in paragraph (1), on each inlet of each liquid receiver except that none shall be required on the inlet of a receiver in a condensing unit nor on the inlet of a receiver which is an integral part of the condenser.

(3) Stop valves used with soft annealed copper tubing or hard drawn copper tubing 7/8 inch standard size (0.875 outside diameter) or smaller shall be securely mounted, independent of tubing fastenings or supports.

(4) Stop valves shall be suitably labeled if their purpose is not obvious. Numbers may be used to label the valves provided a key to the numbers is located near the valves.

(g) LOCATION OF REFRIGERANT PIPING:

(1) Refrigerant piping crossing an open space which affords passageway in any building shall be not less than 7½ feet above the floor unless against the ceiling of such space and chemically isolated from lime bearing structural member.

(2) Free passageway shall not be obstructed by refrigerant piping. Refrigerant piping shall not be placed in any elevator, dumbwaiter, or other shaft containing a moving object, or in any shaft which has openings to living quarters or to main exit hallways. Refrigerant piping shall not be placed in public hallways, lobbies, or stairways, except that such refrigerant piping may pass across a public hallway if there are no joints in the section in the public hallway, and provided nonferrous tubing of 1 inch nominal diameter (1-1/8-inch outside diameter) and shall be contained in a rigid metal pipe.

(3) Where piping passes through concrete or masonry walls, ceilings, floors or beams, such piping shall be provided with sleeves or thimbles which shall be at least 3/8" larger than the outside diameter of the piping plus the insulation. All voids between piping and casing shall be adequately enclosed with an approved material.

(4) When the length below ground of exterior refrigerant piping exceeds two feet, piping shall be buried minimum 12 inches below grade.

(5) Openings not exceeding 20 square inches in cross-sectional area per 100 square feet for refrigerant piping may be installed through fire-resistive floor systems and through concrete slabs without having to comply with enclosure requirements of Sec. 1807.2 if such lines are carried in an approved rigid and tight continuous fire resistive pipe duct or shaft having no openings into floors not served by the refrigerating system. The pipe duct or shaft shall be vented to the outside.

(h) REFRIGERANTS:

(1) Refrigerants and refrigerant blends shall be classified and designated according to ASHRAE 34 - Number Designation and Safety Classification of Refrigerants.

4807.8 MEDICAL GAS PIPING: All medical gas piping shall be installed in accordance with the requirements of NFPA 99.

4807.9 STEAM AND HOT WATER PIPING:

(a) All steam and hot water piping shall be at least Schedule 40 pipe. Brass or copper pipe, copper or steel tubing and CPVC plastic piping can be used in hot water installations if the system is designed to operate within the pressure and temperature ratings of the material.

(b) BRANCH MAIN STRESS: Where the main steam supply or hot water supply piping or the main return piping of a system is divided into two (2) or more branch mains or returns, such branches from the main piping shall be taken off with tees and elbows or "Y" branch fittings, installed and connected so that there are no undue stresses or strains from pipe fittings or threads at the point or points of junction of the piping. Bull head tee connections where the two branch connections are taken from the run of the tee are prohibited in steam piping.

4807.10 TESTS AND INSPECTIONS: Work shall not be concealed prior to inspection and tests. All pipe of all piping systems except cast iron and plastic as approved in this Code, shall be tested with nitrogen, compressed air or other inert gas (not oxygen) or hydrostatically at a minimum of 1½ times the operating

pressure. Approved plastic piping shall be tested at 1½ times the operating pressure of the system.

4808 WEATHERPROOFING AND INSULATION

4808.1 WEATHERPROOFING:

(a) All ducts installed outside buildings and exposed to the elements shall be weatherproofed.

(b) All ducts installed outside buildings shall be galvanized coated metal, stainless steel, aluminum or copper.

(c) Metal ducts externally insulated shall have this insulation protected with a covering of weatherproof membrane, mastic coating or approved product.

4808.2 INSULATION:

(a) All equipment, ducts and piping of mechanical systems shall be insulated to conserve energy, prevent condensation, and prevent injury from burns.

(b) All sheet metal outside air ducts passing through conditioned spaces shall be insulated.

(c) Cooling ducts in any unconditioned area shall be insulated and provided with a vapor barrier to prevent condensation.

(d) Ductwork insulation may be applied to the exterior surface of the duct or may be applied as an interior liner to the duct.

(1) When interior liner insulation is used, the maximum recommended duct velocity is not to exceed the insulation manufacturer's recommendation.

(2) Lining and adhesives for ducts shall have a flame-spread rating not over 25 without evidence of continued progressive combustion and with a smoke-developed rating not higher than 50.

(3) Tests shall be in accordance with ASTM C-411-61 (Hot Surface Performance of High Temperature Thermal Insulation) at a minimum test temperature of 250 degrees F.

(4) Linings shall be interrupted at the area of operation of a fire damper or fire door.

(5) Linings shall be interrupted for a minimum of 6 inches downstream in the vicinity of heat sources in a system involving electric resistance. Linings shall be interrupted for a minimum of 18 inches upstream and 30 inches downstream in the vicinity of heat sources for fuel burning heaters.

(6) Where lining is interrupted, insulation shall be applied externally to the duct, with sufficient lap to prevent condensation.

(e) Duct, equipment and pipe covering shall be thermal insulation of an approved type installed in accordance with manufacturer's instructions.

(f) Duct, equipment and pipe covering in spaces used as plenums or part of a duct system shall have a flame-spread rating of not over 25 and SDR of 50.

(g) All ducts, equipment and piping which operate at temperatures in excess of 120 degrees F. shall have sufficient thermal insulation to limit the exposed surface temperature to 120 degrees F. (vapor barrier not required).

4809 MAINTENANCE

4809.1 Mechanical apparatus, equipment and installations as are required or regulated in this Mechanical Code, now existing or hereinafter installed, shall be maintained by the user in a safe condition and all devices and safeguards maintained in good working order.

4809.2 Mechanical apparatus, equipment and installations shall be maintained by the user in a clean condition, free from accumulations of oily dirt, waste, and other debris.

4809.3 No alterations or additions shall be made which will reduce or obstruct the accessibility or space provided for maintenance of mechanical apparatus, equipment or installations.

4809.4 Upon the presentation of proper credentials, the duly authorized inspector may enter at any reasonable time, any building, structure, or premises for the purpose of inspections to prevent violation of this Code.

4809.5 The inspector shall cause to be discontinued the operation of any mechanical apparatus, equipment or system which does not meet the requirements of this Code or which is installed and operated in violation of the standards prescribed in this Code.

CHAPTER 49
SOUTH FLORIDA BUILDING CODE

State of Florida
Model Energy Efficiency Code
for Building Construction

As of ..... April 1, 1986
the State Energy Code will be a part of the Broward County Edition of the South Florida Building Code, but by reference only and will remain Chapter 49. The Board of Rules and Appeals will not issue future revisions to the State Energy Code – they will have to be obtained from:

Florida Department of Community Affairs
Codes and Standards Section
2571 Executive Center Circle, East
Tallahassee, FL 32301 Phone: (904) 487-1824

Broward County Board of Rules and Appeals
955 S. Federal Highway
Ft. Lauderdale, Florida 33316

PART XIV
SPECIAL SUBJECTS
CHAPTER 50
SWIMMING POOLS AND SPAS

5001 GENERAL
5002 DESIGN
5003 CONSTRUCTION DETAILS
5004 WATER SUPPLY AND DISPOSAL
5005 EQUIPMENT
5006 INSPECTION

5001 GENERAL

5001.1 All Public and Residential swimming pools and spa pools shall comply with the requirements herein.

5001.2 STANDARDS: The following Standards are hereby adopted as set forth in Section 402 of this Code:

(a) Public swimming pools and public spas shall comply with Chapter 10D-5, Florida Administrative Code, "Swimming Pools and Bathing Places" of the State of Florida Department of Health and Rehabilitative Services.

(b) Residential swimming pools shall comply with Section 2 (Dimensional Design) of the National Spa and Pool Institute Standard "Minimum Standards for Residential Pools."

(c) Residential Spa pools, Hot Tubs, Hydrotherapy pools and Swim spas, herein called spas, shall comply with National Spa and Pool Institute Standard, "Minimum Standards for Spa Pools."

(d) Herein the word pool(s) or spa(s) shall imply Residential swimming pool(s) or Residential spa pool(s).

5001.3 DEFINITIONS: For the purpose of this Chapter, certain terms are defined as follows:

(a) IN GROUND POOL – Any pool the sides of which rest in partial or full contact with the earth.

(b) NON-PERMANENT POOL – Any pool that is so constructed that it may be readily disassembled for storage and reassembled to the original integrity.

(c) NON-SWIMMING AREA – Any portion of a pool where water depth, underwater ledges or similar obstructions would prevent normal swimming activities.

(d) ON GROUND POOL – Any pool the sides of which rest entirely above the surrounding earth.

(e) PERMANENT POOL – Any pool constructed in the ground, or in a building in such a manner that prohibits ready disassembly for storage.

(f) SPECIAL PURPOSE POOL – Any pool operated as a treatment pool for special therapeutic purposes, wading, decorative or any non-recreational function.

(g) PUBLIC POOL – Any pool, other than a residential pool, which is intended to be used collectively by a number of persons for swimming or bathing and is operated by any owner, lessee, operator, licensee, or concessionaire, regardless of whether a fee is charged for such uses.

(h) RESIDENTIAL POOL – Any pool, permanent or non-permanent, which is intended for non-commercial use as a swimming pool by an individual, family, or living unit members and their guest(s), and shall not serve any type of cooperative housing or joint tenancy of number of living units as specified in Sub-section 10D-5.91 (20) of the Florida Administrative Code.

(i) THERAPEUTIC POOL – Any pool that complies with the following minimum criteria:

(1) ON GROUND Pool (5001.3 (d)).

(2) The maximum depth shall not exceed three feet.

(3) The maximum volume shall not exceed 800 gallons.

(4) The unit shall be prewired for plug-in installations.

(j) VERTICAL – Not more than one foot horizontally for each 5' vertically from a plumb line.

(1) The mid-point of the operating range of the skimmer(s).

(2) The height of the overflow rim where pools have overflow systems.

5001.4 CONSTRUCTION: Other sections of this Code, specifically Part VI, Engineering and other Construction Regulations, shall also apply to all pools.

5001.5 ELECTRICAL:

(a) Any portable piece of pool equipment or pool appliance using electricity for energy shall be designed and tested in conformance with nationally recognized standards of performance and safety.

(b) The equipment shall be certified by an approved testing agency having reinspection service.

(c) The seal of approval of the testing and reinspection agency shall be permanently and legibly affixed to the equipment in a conspicuous location.

(d) In the event the approval is based on limitations of use, a permanent, and legible labeling of the equipment stating such limitations shall be affixed to the equipment in a conspicuous location as provided in the Standard set forth in Section 5001.2 (b).

5002 DESIGN

5002.1 PERMITS:

(a) Permit requirements and application for permits for the construction, installation, alteration or major repair of a swimming pool shall be set forth in Sections 301 and 302.

(b)A permit to construct or operate a Public swimming pool, bath house or related appurtenance shall not be issued until approved by the Florida Department of Health and Rehabilitation Services, Division of Health.

(c) Therapeutic pools as set forth in Section 5001.3(I) shall be exempt from permit requirements when placed on grade or grade-supported slabs (floors).

5002.2 MINIMUM REQUIREMENTS: Every swimming pool design shall admit to rational analysis according to accepted engineering principles.

5002.3 PROFESSIONAL DESIGN:

(a) Plans shall be prepared by and bear the impress seal of a registered Professional Engineer for the following:

(1) A public pool as defined by the Florida Department of Health and Rehabilitation Services, division of Health.

(2) Any pool requiring special consideration due to unstable soil or unusual ground water conditions.

(3) Plans for swimming pools other than set forth in Sub-paragraphs (1) and (2) above shall be prepared by and near the impress seal of a Registered Professional Engineer or a Registered Architect.

(b) Therapeutic pools, as set forth in Section 5001.3(I), shall be exempt from professional design requirements except when not placed on grade-supported slabs (floors).

5002.4 HYDROSTATIC UPLIFT:

(a) Any pool to be constructed in an area where ground water at the existing ground water level creates hydrostatic pressure against the pool structure shall be designed to prevent flotation and to resist the hydrostatic uplift forces on the bottom of the pool and lateral earth forces on the walls.

(b) Design criteria shall be taken when the pool is empty and the ground is at existing ground water level at the site.

(c) A hydrostatic relief valve or other device capable of preventing the pool water from being pumped to a level lower than the surrounding ground water may be considered in the design, but such devices shall not be credited for more than two feet of the difference of head between the pool bottom and the existing ground water level.

(d) The design of the pool walls and bottom slab for hydrostatic pressure and lateral pressure of adjacent soil with ground water at existing ground water level may be based on an increase of 33 1/3 percent of the allowable stresses set forth in this Code for the material used.

(e) Dewatering shall consist of a 1½" threaded fitting and plug in the bottom of the main drain of the pool.

5002.5 MINIMUM EQUIPMENT:

(a) (1) Main drain outlet(s) in pools shall be located at the lowest point in the pool in all cases except for On-Ground pools as set forth in Section 5001.3 (d).

(2)A gate or plate with an open unobstructed area of at least four times the area of the pipe to which it discharges shall be placed over the main outlet and securely fastened in a manner requiring tools for removal.

(3) Suction outlet(s) in pools 4' or less in depth shall provide a means for preventing entrapment by one of the following methods:

(aa) Anti-vortex type drain plate.

(bb) Dual outlets (on pools 4' or less, main drain to skimmer).

(cc) Installation of an atmospheric break.

(4) Main suction outlets shall draw from the lower 25 percent of the pool.

(5) Separate therapy suction outlets shall comply with (3) and (4) above.

(b) The recirculation inlet or inlets shall be sized and spaced to produce uniform circulation of the incoming water throughout the pool. There shall be at least one inlet for each 350 square feet of pool water surface, or fraction thereof. The entire recirculation inlet piping system shall be of such size that the velocities do not exceed 10' per second using the design flow. Suction lines shall not exceed 5' per second using the design flow during the filtration period. Where the main outlet is used for the return, it shall be counted as an inlet but sized as a suction line.

(c)A suitable hair and lint strainer of a type specifically made for this service shall be placed in the suction line ahead of the pump. This device shall have an easily removable screen that shall have a free area of five times the cross sectional area of the suction line.

(d) The filter system may be omitted in favor of a flow through system. A flow through system shall have the following minimum requirements.

(1) The water must flow through the system at a minimum turnover rate of at least once every 12 hours.

(2) Water shall be introduced at the lowest point in the pool through the main outlet which shall be used as an inlet but sized as an outlet or other approved inlets in the floor of the pool.

(3) Water shall be overflowed into a gutter, as described in Section 5005.2(a) and located at the

furthest end or area of the pool from the main outlet. Skimmers may be permitted in lieu of overflow gutters where the skimmers are sized to provide flow capacity equal to the turnover rate.

(4) The discharged water shall be wasted into a salt water well, waterway, or other approved method substantiated by test and approved by the Building Official.

(e) A vacuum fitting or surface skimmer shall be provided on all pools and shall be a minimum of 1½" diameter and located not more than 18 inches below the water level of the pool in an accessible position.

(f) A separate valve or multi-port valve shall be installed on all suction lines (except pools that are 4' or less in depth) in an accessible location outside the walls of the pool.

(g) A recirculation pump capable of a turnover rate of once every 2 hours for spa pools.

(h) A filter as set forth in Section 5005.1 shall be provided.

5002.6 DIMENSIONAL DESIGN:

(a) Minimum dimensions for public pools shall comply with the Standards set forth in Section 5001.2(a).

(b) Minimum dimensions for residential pools with or without diving equipment shall comply with the Standard set forth in Section 5001.2.

(1) Such pools shall have no projecting angles or ledges from the walls except steps or ladders for ingress and egress.

(2) Therapy seats, where installed, shall be recessed into the sides of such pools not more than 20" below the pool water level and in such a manner as to clearly distinguish such underwater obstructions from pool areas which persons may dive.

(3) Extended steps used as benches shall be allowed if properly marked to clearly designate as an underwater obstruction.

(4) No underwater obstructions shall be provided except as set forth herein.

5003 CONSTRUCTION DETAILS

5003.1 GENERAL:

(a) Reinforced concrete shall comply with

Chapters 23, 24, and 25 and shall be Portland cement concrete having a 28-day compressive strength of not less than 2500 psi.

(b) Reinforced concrete shall have not less reinforcing in both directions than the minimum set forth in the Standard in Sub-paragraph 2502.1 for temperature reinforcing.

(c) Reinforcing bars shall have not less than 3" of concrete cover when placed in contact with earth and not less than 2" from any formed or troweled surface.

(d) Surrounding areas and/or walkways shall be constructed so as to not drain into the pool.

5003.2 UNIT MASONRY WALLS: Unit masonry walls of swimming pools shall be designed and constructed as set forth in Chapters 23, 24, and 27. Block shall be two-cell block laid with nominal 8" thickness in the wall and all voids shall be poured full with concrete having a minimum strength of 2500 psi or 28 days, and containing no aggregate larger than will pass a #3 sieve. Filling of voids will proceed in stages not to exceed 24" in height, or at least 12 times dimension of void, whichever is the greater. Concrete shall be thoroughly rodded into voids. Walls with a height greater than 3'4" shall have a minimum vertical steel of #3 bars, 16" o.c.

5003.3 PNEUMATICALLY PLACED CONCRETE: Pneumatically placed concrete shall be as set forth in Sub-paragraph 5003.1 and 5003.2 except that walls shall have a minimum thickness of 6" at the bottom and 4" at the top with reinforcing centered therein.

5003.4 OTHER MATERIALS:

(a) Other methods of construction of steel, plastic, aluminum and rot and corrosion-resistive materials may be used for private pool subject to rational analysis based on accepted engineering principles and approved by the Building Official.

(b) Concrete placed by hand against the natural earth or forms on one side only, shall comply with Chapters 23, 24 and 25 shall be of Portland cement concrete having a 28-day compressive strength of not less than 3000 psi. Floors shall have a minimum thickness of 6" and walls shall have a minimum thickness of 8". All steel shall be accurately located and securely tied. Screeds shall be set prior to inspection so that the concrete thickness may be checked. All concrete placed in this manner must be thoroughly consolidated to eliminate honeycomb.

5003.5 WATER TIGHTNESS: Any completed pool shall be watertight.

5003.6 WALKING SURFACES: The surfaces of walks, curbs, steps and other walking areas shall be such as to be resistant to slipping.

5004 WATER SUPPLY AND DISPOSAL

5004.1 APPLICATION OF PLUMBING: Permits shall be required for the actual connections to a potable water supply and sanitary sewer and shall be in accordance with the technical requirements of Chapter 46.

5004.2 WATER SUPPLY:

(a) Each pool shall be designed so that make-up water may be added to the pool for recirculation systems as set forth in Chapter 46, the water supply shall be clean and meet bacterial requirements for a domestic water supply. It shall be clear and reasonably free from objectional minerals, or the necessary filtration or other equipment shall be provided to correct such deficiencies.

(b) Where water wells are used as a source of water, the color shall not exceed 100, and the iron content 0.3 parts per million before filtration. Raw water not meeting these requirements shall be given approved preliminary treatment prior to its introduction to the pool.

(c) To eliminate a cross connection, an atmospheric break shall be provided between the pool water and each water line connected to a municipal or other public supply. Filling by hose from an approved permanent syphon breaker or a permanent over-rim fill spout piped to the nearest source of water will be acceptable.

5004.3 DISPOSAL:

(a) A method of disposing of backwash shall be provided by one of the following methods, except that backwash water from pressure diotamite filters so piped to permit pressure backwash to waste and shall be deployed to a separation tank or settling basin before the final disposal by methods below:

(1) By disposal to sewers, either publicly or privately owned, carrying sanitary or storm sewage or to a disposal well, where approved by the authority having jurisdiction.

(2) By disposal to a soakage pit having a volume as set forth in Table 50-A, and an effective depth not greater than 5' below grade. A drainage pit, consisting of a trench filled with washed ballast rock, may be used in lieu of soakage pit provided that the rock has not less than 50% voids, that the volume of the rock be not less than twice that set forth for the soakage pit, that the pit be covered with 30 pound asphalt saturated felt for a distance of 3' out each side and the effective depth shall be not greater than 5' below grade.

(3) By disposal to an open waterway, bay or ocean where permitted by the approving authority.

(4) Where sufficient pervious area exists remote from water supply wells, disposal systems, soakage pits, septic tanks, drain fields and non-tidal bodies of water; such pervious area may be used for the disposal of backwash water.

(5) By disposal to a drain field, size of the drain field shall be as set forth in Table 50-A.

(b) In any filter system not employing pressure backwash, the contents of the filter tank may be emptied to the ground surface where the capacity of the filter tank does not exceed 30 gallons.

5004.4 MAINTENANCE OR SERVICE:

(a) The drainage of pools shall require a permit other than during initial construction.

(1) Shall be to storm sewers or any open body of water, if available within 300 feet of property.

(2) Where storm sewers or other open bodies of water are not available within 300 feet of the property, disposal of this water to the swale adjacent to the property shall be permitted during the maintenance and service of the pool.

5005.1 5005 EQUIPMENT

(a) FILTRATION EQUIPMENT:

(1) Filtration equipment for public pools shall be in accordance with the Standards set forth in Sub-paragraph 5001.2(a).

(2) Filtration equipment for residential pools shall be in accordance with the Standards set forth in Sub-paragraph

5001.2(b) and the provisions set forth herein.

(b) PRESSURE SAND AND ANTHRACITE FILTERS:

(1) Filtration Rate: Filter capacities on recirculation systems utilizing sand and gravel or anthracite filters, either gravity or pressure, shall be based on a maximum filtration rate of 3 gallons per square foot per minute.

(2) Backwash: Facilities shall be provided for backwashing the filters at a rate of not less than 15 gallons per minute per square foot of filter area. A minimum backwash rate of 12 gallons per minute per square foot will be permitted on anthracite filters.

(3) Filter media: The filtering materials shall consist of at least 24" depth of screened sharp filter sand or crushed quarts with an effective size of 0.4 mm to 0.5 mm and a uniformity coefficient of 1.5 to 2.0. This filter media shall be supported by at least 12" of graded gravel to distribute water effectively and uniformly during filtration and backwashing. A reduction in depth or an elimination of gravel may be permitted where equivalent performance and service are demonstrated. If anthracite is used as a filter media in lieu of sand, the effective size shall be 0.6 mm to 0.7 mm with a uniformity coefficient of 1.5 to 2.0.

(4) Freeboard: There shall be a sufficient freeboard above the surface of the filter media to the overflow troughs or pipes of rapid filters to permit 50 percent expansion of the media during the backwash cycle.

(5) Appurtenances: Each filter tank over 24" in diameter shall be equipped with a standard 11" x 15" manhole and cover. The filter system shall be equipped with influent and effluent pressure gauges, across each filter, backwash sight glass, and air bleed device.

(6) Inlet baffle: An inlet baffle or diverter shall be provided on each filter tank to distribute the incoming water evenly over the sand bed.

(7) Underdrain: The filter underdrain system shall be of corrosion-resistant durable material so designed and constructed to collect water during filtration and to distribute water evenly during backwashing.

(8) Pump: The pump shall be designed to handle the required recirculation flow against a total dynamic head of a minimum of 60' and also furnish the required backwash flow against at least 40' of total dynamic head.

(9) Piping and Valves: The filtering system shall be designed with necessary valves and piping to permit filtering to pool, vacuum to waste, backwashing individual filters to waste, isolation of individual filter

and complete drainage of the system. Overall layout shall permit necessary maintenance, operation and inspection.

(10) Steel Tanks: Steel filter tanks shall be of welded sheet steel construction and shall be hydrostatically tested to a minimum pressure of 50 psi.

(11) Other materials: Tanks constructed of materials other than steel must comply with all requirements of this section, and may be used subject to submission of rational engineering data and approval by the Building Official. They must be tested as required in (10) above.

(12) Approval: All filters approved for use under this section must also bear the seal of approval or indicate to the satisfaction of the Building Official that it complies with the appropriate standards of the National Sanitation Foundation.

(c) HI-RATE SAND FILTERS:

(1) Hi-rate sand filters: These filters shall be of an approved design and type filter in which the total sand bed is used as a filter, and not the top surface alone. They shall be of a type listed by N.S.F. and they shall be capable of at least the same water clarity as the approved sand filters.

(2) Pressure hi-rate sand filters shall have a maximum filtration and backwash rate not to exceed 20 gpm per square foot of filter area.

(3) Filtering materials shall consist of suitable grades of screened sharp silica sand with effective size of particles of sand from .4 to .5 mm and a uniformity coefficient of 1.5 to 2.0.

(4) They shall be sufficient freeboard above the surface of the sand and below the overflow troughs or pipes of the filter to permit a 30 percent expansion of the sand during backwash cycles and to prevent loss of sand during these cycles.

(5) A pressure gauge shall be installed to indicate when the filter is dirty and requires cleaning.

(6) A sight glass shall be installed on the backwash line to indicate clarity of the effluent water.

(7) A manhole suitable to have complete access and service the parts of the filter 28 square inches minimum shall be provided on all tanks.

(8) An indirect underdrain shall be provided to prevent loss of sand and re-entry of sand into the pool and evenly distribute the backwash water.

(9) An inlet baffle or device shall be provided on each filter tank to distribute the incoming water evenly over the sand bed.

(10) The filtering piping shall be so designed that there will be a provision for vacuuming to waste, vacuuming while filtering, pressure backwash, and the normal filtration cycle.

(11) The pump for this system shall be capable of full design flow at a design head of at least 60¼ T.D.H.

(12) Filters shall be designed and installed so as to permit easy access for normal maintenance and any repairs or replacements required.

(13) Air bleed, each pressure filter tank, shall be designed and constructed to remove the air from the tank by an approved method or device.

(14) Steel Tanks: Steel filter tanks shall be of welded sheet steel construction and shall be hydrostatically tested to minimum pressure of 50 psi.

(15) Other Materials: Tanks constructed of materials other than steel must comply with all requirements of this section, and may be used subject to submission of rational engineering data and approval by the Building Official. They must be tested as required in (14) above.

(16) Approval: All filters approved for use under this section must also bear the seal of approval or indicate to the satisfaction of the Building Official that it complies with the appropriate standards of the National Sanitation Foundation.

(d) DIATOMACEOUS EARTH FILTERS:

(1) Filter rate: Filter capacities on recirculation systems utilizing diatomaceous earth filters, either vacuum or pressure shall be based on a maximum filtration rate of 2 gallons per square foot per minute.

(2) Filter tanks and septa: The filter and all component parts shall be of such material, design and construction to withstand normal continuous use without significant deformation, deterioration, corrosion or wear which would adversely affect filter operation. The filter area shall be determined on the basis of effective filtering surfaces with no allowance given for areas of impaired filtration, such as broad supports, folds or portions.

(3) Precoat: Provision shall be made to introduce the diatomaceous earth into the filter in such a way as to evenly precoat the filter septum or element(s) at the beginning of the filter cycle.

(4) Backwash: There shall be provision made on pressure filters for removing the cake by either reverse-flow backwash or simple disassembly. Vacuum filters shall be washed in place.

(5) Disassembly: Filters shall be so designed and installed so as to allow adequate room and permit ready disassembly and removal of filter elements.

(6) Inlet Baffle: An inlet baffle shall be required to distribute the incoming water evenly and protect against the erosion of the filter cake. Other devices may also be used.

(7) Pumps: On pressure diatomite filters the pumps shall be designed to handle the required recirculation flow against a total dynamic a total dynamic head of 60¼ minimum; however, lower or higher head requirement may be used if hydraulically justified by designing engineer. The recirculation pump on vacuum filters shall be designed to handle the necessary flow against a minimum head of 50¼.

(8) Gauges: Filters shall be equipped with a pressure or vacuum gauge(s) and such gauge(s) shall be located to determine the need for cleaning.

(9) Piping and Valves: The filtering system shall be designed with the necessary piping and valves to permit filtering to pool, vacuuming through filter or to waste, backwash or other method of cleaning, and a method to introduce filter aid to precoat the filter.

(10) Steel Tanks: Steel filter tanks shall be of welded sheet steel construction and shall be hydrostatically tested to a minimum pressure of 50 psi.

(11) Other Materials: Tanks constructed of materials other than steel must comply with all requirements of this section, and may be used subject to submission of rational engineering data and approval by the Building Official. They must be tested as required in (10) above.

(12) Approval: All filters, approved for use under this section must also bear the seal of approval or indicate to the satisfaction of the Building Official that it complies with the appropriate standards of the National Sanitation Foundation.

(13) Air Bleed: Each pressure filter tank shall be designed to remove air from the tank by an approved method or device.

(14) Number of Units: No more than two filter units may be used on any one filter system.

(e) CARTRIDGE FILTERS:

(1) Filtration Rate: Filter capacities on recirculation systems utilizing cartridge filters, either pressure or vacuum, shall be based on a maximum filtration rate of 1.0 gallons per minute per square foot of actual filter area for pleated or surface cartridges; and a maximum of three gallons per minute per square foot of

outer surface area on depth-type cartridges.

(2) Cartridges: The cartridges must be manufactured of materials which will not impart a toxic or harmful material into the water and shall be suitable for a potable water supply. Only cartridges with the same approved amount of surface filter area (or more) as the cartridges originally approved for use in the filter may be used as replacement cartridges.

(3) Pump: The pump shall be designed to handle the required recirculation flow against a minimum total dynamic head of 50¼.

(4) Filters shall be so designed and installed to permit ready disassembly and removal of cartridges for cleaning.

(5) Filters shall be equipped with pressure or vacuum gauge and such gauge shall be located to determine the need for cleaning.

(6) Steel filter tanks shall be of welded sheet construction and shall be hydrostatically tested to a pressure of 50 psi.

(7) Air Bleed: Each pressure filter tank shall be designed to remove air from the tank by an approved method or device.

(8) Piping and Valves: The filtering system shall have the necessary valves and piping to permit filtering to pool, vacuuming to pool or waste, and complete drainage of filter tank.

(9) Other Materials: Tanks constructed of materials other than steel must comply with all requirements of this section, and may be used subject to submission of rational engineering data and approved by the Building Official. They must be tested as required in (6) above.

(10) Approval: All filters and cartridges approved for use under this Section must also bear the seal of approval or indicate to the satisfaction of the Building Official that it complied with the appropriate standards of the National Sanitation Foundation.

(f) PUMPS:

(1) Pumps shall be capable of filtration and backwash at a head pressure and rate suitable for the filter and piping

system.

(2) Valves, pumps, filters and other equipment shall be installed to be readily accessible for operation, maintenance and inspection.

(3) Below ground installations shall be provided with an access cover.

(4) If the pit and/or cover or below ground installation is not watertight, the pit shall have an approved drainage.

(g) AIR RELIEF: Each pressure filter tank shall be designed and constructed to remove air from the tank by an approved method or device.

(h) OTHER EQUIPMENT: Other types of filtration equipment may be used if shown by test to be equal in efficiency as compared to other approved systems in this chapter.

5005.2 SURFACE SKIMMING:

(a) For swimming pools with 800 square feet or less of surface area, an overflow gutter extending across the entire width of the pool at one end, shall be built into the wall at the water surface. For pools with 800 square feet to 1600 square feet of surface area, an overflow gutter shall be built across the entire width of the pool at both ends. For pools with over 1600 square feet of surface area, there shall be provided a minimum of 2.5 lineal feet of scum gutter per 100 square feet of pool surface area. The overflow gutter shall also serve as a hand-hold. The opening into the gutter shall be not less than 4" at the throat and the interior

of the gutter not less than 3" wide. The bottom of the gutters shall slope uniformly to drains with a slope of not less than 1/8" per foot. One drain shall not serve in excess of 15' of scum gutter. The drains shall be provided with outlet pipes at least 2" in diameter and shall have a clear opening in the grating at least equal to the cross sectional area of the outlet pipe. Roll-out type scum gutter shall be not less than 8" in width and the lip shall be designed to serve as a hand-hold.

(b) Skimmers may be used in lieu of overflow gutters on swimming pools provided acceptable hand-holds are installed. All skimmers shall have Dade County Product Approval or a nationally recognized testing laboratory approval. At least one skimming device shall be provided for each 800 square feet of surface area or fraction thereof. Skimmers shall be located to provide the most satisfactory skimming action. Hand-holds shall consist of a bull-nosed coping not over 2½" thick for the outer 2" or an equivalent approved hand-hold, which may consist of a textured non-slip deck surface. The hand-hold must be no more than 9" above the normal water line. Skimming devices may be built into the pool wall and where used shall meet the following general specifications:

(1) The rate of flow through the skimming devices should be adjustable up to at least 50% of the swimming pool filter system.

(2) Skimmers shall be automatically adjustable to variation in water level over a range of 3".

(3) An easily removable or changeable basket or screen shall be provided to trap large solids.

(4) The overflow weir shall be of a length to maintain a rate of flow of at least 20 gallons per minute per lineal foot of weir lip and be a minimum of 6" in width.

5005.3 PIPING:

(a) MATERIALS:

(1) The materials of swimming pool piping shall be as set forth herein. The following materials may be used for pool piping as indicated, providing they comply with the minimum standards set forth in Section 4604 for such materials.

Copper (shall be accessible for repair or maintenance) Type K or L	All lines
Brass pipe or tubing	All lines
Stainless Steel, AISI, type 300 series	All lines
Monel	All lines

(2) Thermoplastic pipe and fittings may be used as follows:

(aa) Acrylonitrile-Butadiene-Styrene (ABS) shall conform to the Standard for NBS PS 18, as set forth in Section 402. ABS pipe shall be limited to waste and dewatering usage only.

(bb) Polyvinyl chloride (PVC) piping shall conform to the Standard for Poly (Vinyl Chloride) (PVC) Plastic Pipe (Schedules 40, 80 and 120), NBS PS21, as set forth in Section 402.

(cc) Polyethylene, Series 3, shall conform to the Standard NBS PS10, as set forth in Section 402. Polyethylene piping shall be limited to waste and dewatering usage only.

(dd) All thermoplastic pipe shall be continuously marked on opposite sides setting forth size, type, schedules, U.S. Commercial Standard and bearing the National Sanitation Foundation (NSF-pw) seal of approval.

(ee) Fittings for PVC and ABS pipe shall be Schedule 40. Fittings for Polyethylene pipe shall be of the insert type with two all stainless steel clamps per connection. All fittings shall be marked with the National Sanitation Foundation (NSF-pw) seal of approval.

(3) Where dissimilar metals are used in pool piping and filter piping which are not considered compatible on the electromotive scale, insulating dielectric fittings between the two shall be provided.

(b) INSTALLATIONS:

(1) Pool piping shall be as set forth herein and shall comply with the following minimum requirements of this Code: Sections 4603.2 through 4603.16; 4063.20, 4605.1,.2,.3,.5,.7; 4606 deleted; 4607.2 (a) (1); 4609.1,.2,.3,.4; 4614.4 and .17.

(2) Thermoplastic pipe and fittings shall be installed and supported in accordance with manufacturer's recommendations and as set forth herein.

(3) Except where supported directly on rock or compacted fill, pipe and fittings shall be supported around pool perimeter by approved pipe hangars or concrete column pedestals which shall be secured to the pool wall at maximum 5' centers. Valves, check valves, pump streamers and other piping devices shall be supported directly.

(4) Short Radius 90 degree piping elbow fittings 2½ inches and smaller shall not be installed on any suction piping below grade.

(5) All suction piping shall be not less than 2" in diameter.

(c) APPROVED EQUIPMENT: All pool equipment used for water care or treatment shall bear the seal of approval of the National Sanitation Foundation or other approved testing laboratory and/or shall conform to approved U.S. Commercial Standards, and/or shall conform to the Standards as set froth in Paragraph 5001.2 (a).

5005.4 DIVING BOARDS:

(a) A diving board shall not be installed in a pool where greatest depth is less than 8'. A depth of not less than 8'6" shall be required for a one-meter board. A depth of not less than 10' shall be required for a 3-meter board. The deepest section of the pool shall be not closer than 10' from the deep end where the board is attached, and the break point in slope shall be 5' or deeper at a distance of 20 or more feet from the deep end wall. The diving board shall be so placed that the lateral distance between the center of the diving board and a side wall shall be at least 7'6", and the board shall extend at least 2' from the deep end wall.

(b) All diving board installations and diving bowl configurations, slopes, etc. shall meet the minimum Standards as set forth in the National Spa and Pool Association "Minimum Standards for Residential Swimming Pools."

5005.5 WALL AND FLOOR SLOPES: Walls and floors of all swimming pools shall conform with the provisions of the Standards set forth in Sub-paragraph 5001.2.

5005.6 LADDER: Ladder pools having a depth greater than 3½' shall be provided with either a ladder or steps in the shallow end or side of pool.

5005.7 POOL HEATER:

(a) Gas-fired swimming pool heaters and swimming pool boilers shall comply with all applicable national standards requirements including A.G.A. and ASME standards. Oil-burning equipment shall be approved by Underwriters' Laboratories, Inc. or other nationally recognized testing agency. All equipment shall carry the corresponding pending seal of approval by the appropriate agencies and shall be installed in accordance with the other applicable requirements of the Code.

(b) Pool-heating equipment shall have not less than 70 percent thermal efficiency across the unit for fossil-fueled units and electrical units.

(c) Water heaters and boilers shall be provided with a thermostatic or high temperature control with a maximum temperature of 15 degrees F. or other acceptable overheat protection device.

(d) Installations shall be designed so that the heated water entering the pool shall be not over 110 degrees F.

5006 INSPECTION

Inspections shall be requested by the permit holder and made by the inspection official for the following:

5006.1 ELECTRICAL: A permit shall be required for, and the Electrical Inspector shall require, inspection of all wet and dry niche pool lights, pump motors and other electrical equipment and accessories installed in conjunction with all pools and such electrical work and inspection shall be as set forth in Chapter 45.

5006.2 POOL PIPING:

(a) A permit shall be required for (Plumbing Official shall require inspection of the installation of the water supply) circulation and disposal as set forth in this Chapter.

(b) Pool pressure piping, filter installation and waste disposal shall be tested and approved with all joints visible.

(c) The entire pool pressure piping system, including the main drain, shall be tested with a water test of a minimum of 40 psi and proved tight before being covered or concealed.

(d) All other piping shall be tested in accordance with accepted practice.

5006.3 POOL: The Building Official shall require inspection for the following:

(a) All reinforcing before any concrete is placed for floor, walls and decks.

(b) Final Inspection: Complete written or verbal instructions shall be provided to the owner or owner's agent in the operations of the filter system, backwash operation, requirements for pool cleanliness, techniques for adding required chemicals to maintain water balance and use of test kit(s).

CHAPTER 51
FIRE SUPPRESSION – LIFE SAFETY SYSTEM

5101 SCOPE
5102 FIRE SPRINKLER SYSTEM
5103 FIRE ALARM SYSTEM
5104 FIRE DETECTION SYSTEM
5105 CENTRAL CONTROL SYSTEM
5106 VOICE COMMUNICATION SYSTEM
5107 SMOKE CONTROL
5108 ELEVATORS
5109 EMERGENCY SYSTEMS
5110 EXITS
5111 BUILDINGS OVER 50 FEET TO 75 FEET IN HEIGHT

5101 SCOPE

5101.1

(a) New buildings or buildings altered to increase the area or height of any Occupancy to more than 50 feet in height, as measured vertically from grade to the top of the main roof exclusive of a mechanical penthouse, shall conform to the special requirements of this Chapter in addition to the other applicable provisions of this Code.

(b) Grade shall be the average elevation of the ground, paved or unpaved, adjoining a building or structure at each exterior wall line; this excludes berming or man-made mounds.

(c) EXCEPTION:

(1) Parking garages shall comply with the requirements of Sub-paragraph 3801.3 (e) (3) of this Code.

(2) Group J Occupancies.

(3) Section 5111 herein.

5102 FIRE SPRINKLER SYSTEM

5102.1 The entire building shall be protected by an automatic sprinkler system complying with the Standard "Installation of Sprinkler Systems," NFPA No. 13, as set forth in Section 401 of this Code and as follows:

(a) (1) The automatic sprinkler system may be supplied from the standpipe risers where such standpipe risers are required by Sub-section 3803.2 of this Code and, where standpipes are not required, may be provided with sprinkler feed risers with Fire Department connections sized and located as set forth for Standpipes in Chapter 38 of this Code.

(2) In buildings having more than one standpipe riser, such risers shall be interconnected at one of the first three floors in an accessible location as defined in NFPA 13 and 14.

(3) Interconnect lines shall be sized the same as the risers.

(4) Combined automatic sprinkler and standpipe risers shall not be interconnected by sprinkler system piping.

(b) (1) Branch lines, cross mains and feed mains shall be taken off the riser at the floor served.

(2) Where more than one riser is required, branches, cross mains and feed mains on alternate floors shall be from different risers or branches may be used as loops and connected to each riser at each floor.

(c) (1) There shall be a post indicator valve and check valve on the sprinkler supply line located outside the building.

(2) There shall be an approved indicating valve at each riser position as to isolate each riser from the interconnect.

(3) Such approved indicating valves shall be provided with a tamper indicator monitored at the tamper panel of the Central Control Station.

(4)(aa) At each connection to each riser, there shall be an approved indicating valve with a tamper indicator and also a flow switch, both monitored at the Central Control Station.

(bb) Where branches are looped, such approved indicating valves shall be required only at the floor main.

(5) Water flow devices shall actuate a local alarm on the floor at which water flow is detected. In buildings over 50 feet and under 75 feet, the water flow device shall sound a general building alarm.

(d) Solder connections may be used in copper piping provided the solder used is not less in thermal strength than 95 percent tin and five percent antimony.

(e) Pitching of water lines is not required.

(f)(1) Where more than one fire pump is provided each pump shall be independently driven.

(2) Fire pumps, unless approved to be engine-driven, shall have electric-motor drives.

(3) Fire pumps, and transfer and signaling devices for fire pumps, where dependent on electric energy, shall be supplied by both normal and emergency electric generation service, as set forth in Section 5109 herein.

(g)(1) Where protection by water may be ineffective or undesirable in buildings, or areas thereof, other approved systems may be substituted, as set forth in Section 3802 of this Code.

(2) In hospitals, sprinklers shall not be required in operating rooms, delivery rooms, nurseries, X-ray and therapy equipment rooms, cardiac and intensive care rooms, provided that these rooms, are protected with an automatic fire detection system which will respond to visible or invisible particles of combustion.

(3) Automatic fire sprinklers may be omitted, when approved by the building official, in any area or room where sprinklers are considered undesirable because of the nature of the contents provided that the areas of rooms are protected with an approved automatic fire detection system which will respond to visible or invisible particles of combustion.

(h)1½ inch hose and hose cabinets as required in Sub-section 3803.7, may be omitted provided that each standpipe outlet is equipped with a 2½ inch hose valve, a 2½ inch by 1½ inch reducer and a cap with attachment chain.

(i)(1) A single source water supply shall be considered to comply with the reliability requirements of the Standard where experience has shown that interruption in service is unlikely to exceed eight hours per year.

(2) Where the out-time is likely to exceed eight hours per year, a secondary supply shall be provided.

(3) Where a secondary supply of water is required, an on-site supply of water equal to a 20-minute demand or 15,000 gallons on a combined sprinkler and standpipe system, which is smaller, shall be provided.

(4) The supply shall be available automatically when the principal supply fails.

5102.2 EXCEPTIONS:

(a) Exterior open balconies need not be sprinkled.

(b) Transformer vaults shall not be sprinkled.

(c) Incombustible stair shafts require sprinklers under each landing accessible from two or more sides or areas, but where such landings are accessible from only one side or area, sprinklers are required only at the top and bottom of the shaft.

(d) In all buildings in Group H Occupancies totally or partially sprinkled as required in Chapter 51, sprinklers shall not be required in closets not over 24 square feet nor bathrooms not over 55 square feet after deduction of floor area of tub and shower.

(e) In auditoriums with fixed seating, and gymnasiums used for no other purposes, in one story buildings of any height.

5102.3 Buildings with sprinkler systems installed in accordance with this Section 5102 shall be considered to be fully sprinklered.

5103 FIRE ALARM SYSTEM

5103.1

(a) A manually operated Fire Alarm System shall be provided.

(b) The alarm system shall comply with either the Standard for Central Station Protective Signaling System for Guard, Fire Alarm and Supervisory Service, NFPA No. 71; the Standard for Local Protective Signaling System for Watchman, Fire Alarm and Supervisory Service, NFPA No. 72A; or the Standard for Auxiliary Protective Signaling Systems for Fire Alarm Service, NFPA No. 27B, as set forth in Section 402 of this Code.

(c) The alarm system shall also comply with the installation requirements provided in Sub-section 3126.2 of this Code.

(d) The operation of the manual fire alarm shall annunciate at a Central Control Station and shall activate a Voice Communication System, as set forth in Section 5106 herein.

(e) All alarm signaling devices on each floor shall activate the alarm device on the signaling floor only and annunciate at the Central Control Station with the further provision that any or all such alarm devices shall be operable from the Central Control Station.

5104 FIRE DETECTION SYSTEM

5104.1

(a) An approved system providing automatic detection of products of combustion other than heat shall be installed in every mechanical equipment room and in the return portion of every air-conditioning and mechanical ventilation system that serves floors other than the floor upon which such equipment is located.

(b) Elevator lobbies and entrance areas to elevators shall be provided with smoke sensing devices complying with the American National Standards Institute Elevator Safety Code A17.1, with Supplements, as set forth in Section 402 of this Code, and the activation of such devices shall automatically operate the alarm system.

5104.2 Smoke detectors shall:

(a) Be located at each floor or lobby opening into a stair tower or elevator shaft as provided in the Standard set forth in paragraph 5104.1(b) herein.

(b) Be set to operate at no less sensitivity than as provided in the Standard set forth in paragraph 5104.1(b) herein.

(c) Activate the alarm system, annunciate at a Central Control System and shut off all ducts or mechanical devices not a part of the smoke Control provisions set forth in Section 5107 herein.

5104.3 In generator rooms, trash rooms, and cooking areas, rate-of-rise heat detectors may be utilized in lieu

of smoke detectors.

5105 CENTRAL CONTROL STATION

5105.1 A Central Control Station for Fire Department operations shall be provided in a location at or near the main entrance to the building.

5105.2

(a) The Central Control System shall contain the Fire Detection System and Alarm System panels, a public telephone for emergency use (not coin-operated), sprinkler valve detector indicators, water-flow detector indicators and mechanically ventilating system for smokeproof enclosure annunciators.

(b) The annunciator panel at the Central Control Station shall provide both visible and audible alarms and shall monitor and indicate:

(1) The water-flow signaling devices including trash and laundry chute sprinklers.

(2) The supervisory switches of the branch lines, risers, trash and laundry chute supplies and the suction side of the fire pump.

(3) The fire alarm signaling devices by floor and shall also operate the fire alarm sounding devices.

(c) The panel for the supervisory switches and the water-flow signaling devices shall signal the central Fire Department serving the area, or an approved, monitored, emergency service center.

5106 VOICE COMMUNICATION SYSTEM

5106.1

(a) There shall be two separate, continuously activated, electronically-supervised Voice Communications Systems provided in all buildings 75 feet and over in height; one two-way system for Fire Department use and the other a public address system between the Central Control Station and the following areas:

(1) Elevators, elevator lobbies, corridors and stairways.

(2) Every residential unit or apartment and all hotel and guest rooms shall be within audible range of the Public Address System.

(b) Where approved, the Fire Department System may be combined with the Public Address System.

(c) The Fire Department shall have provision to override the Public Address System in all areas.

(d) Wiring for telephones and Fire Department system shall be so arranged that open circuits or short circuits on individual units will not interfere with communication with any other floor.

5107 SMOKE CONTROL

5107.1 The Standards in this Chapter and Section 402 are established as minimum criteria and all mechanical smoke control systems shall comply with the performance smoke test criteria herein.

(a) Emergency smoke control systems installed, whether required or not required by the South Florida Building Bode, shall comply with Chapter 51 for installation and testing criteria.

(b) Group A and B Occupancies, churches, synagogues, theaters, gymnasiums, sport arenas, one story exceeding 50 feet in height, with no intermediate floors other than mezzanines or balconies shall be exempt from Sec. 5107 Smoke Control.

(c) H.R.S. Regulations shall supersede all other references for hospitals.

5107.2 NATURAL VENTILATION:

(a) Operable windows shall provide minimum areas for light and ventilation as set forth in Part III of this Code. Requirements based on occupancy, except as otherwise provided herein.

(b) Operable windows or removable panels in buildings exceeding 50 feet in height shall be at the rate

of 20 square feet per 40 linear foot of exterior wall at every story and shall have a first opening a minimum of 10 feet from each corner or intersecting pair of walls and 40 feet on center thereafter and shall provide cross ventilation.

(c) Only corridors leading to an exit shall be mechanically ventilated.

(1) Smoke fans for smoke control in corridors shall be sized using the largest gross floor volume (in cubic feet) at ambient temperature of 78° Fahrenheit at one atmosphere pressure according to the following equations:

V_t = Total largest gross floor volume

Exhaust Fan Volume = 0.20 V_t = CFM

Supply Volume = 0.15V_t = CFM

(aa) Under fire conditions, the exhaust air shall terminate directly outside without recirculation to other sections of the building.

(1) Termination of smoke exhaust system shall be:

(2) Above the highest roof level

(3) Remote from supply

(4) Remote from other openings on the roof; such that the recirculation of smoke to other sections of the building shall be inhibited.

(bb) Such smoke control equipment is connected to the emergency power generation system and shall be capable of operating five floors of mechanical exhaust and supply simultaneously.

(cc) The mechanical portion of a mechanical ventilation system shall be tested in accordance with Section 5107.6.(d)Such windows or panels shall have minimum dimension of 22 inches, and minimum openable area of five square feet.

(e) Such panels shall be clearly identified as required by the Fire Department.

(f) Removable panels shall be of tempered glass or any other material meeting the wind load requirements of this Code.

(g) Any other design which will provide equivalent results may be used subject to approval of authority having jurisdiction and based on performance test criteria herein.

(h) Breaking of the glass shall not constitute a removable panel.

(i) Cross ventilation, in the context of Chapter 51, will be defined as unobstructed openings in opposing but not adjacent walls or in adjacent walls having an angle not greater than 135° between them.

(j) Group H Occupancy need not comply with 5107.2, but shall comply with Section 5107.5(h).

(k) Smoke detectors shall be installed in corridors in accordance with NFPA-72E.

5107.3 MECHANICAL VENTILATION:

(a) Smoke and other products of combustion shall be exhausted by mechanical smoke control supply and exhaust systems provided that:

(1) Under fire conditions, the exhaust air shall terminate directly outside without recirculation to other sections of the building.

(aa) Termination of smoke exhaust systems shall be:

(bb) Above the highest roof level

(cc) Remote from supply

(dd) Remote from other openings on the roof; such that the recirculation of smoke to other sections of the building shall be inhibited.

(2) Such smoke control equipment is connected to the emergency power generation system and shall be capable of operating a minimum of five floors of mechanical exhaust and supply simultaneously.

(3) Smoke fans for smoke control systems in buildings shall be sized; using the largest gross floor volume (in cubic feet) at ambient temperature of 78° Fahrenheit at one atmosphere pressure according to the following equations;

V_t = Total largest gross floor volume

Exhaust Fan Volume = 0.67 V_t = CFM

Supply Volume = 0.50 V_t = CFM

5107.4 Where mechanical equipment is used for the removal of products of combustion, provisions shall be made for remote operation (from the Central Control Station) by over-riding the automatic controls.

5107.5 SPECIFIC REQUIREMENTS FOR OCCUPANCY FOR BUILDINGS OVER 50 FEET:

(a) A Occupancy shall comply with 5107.3.

(b) B Occupancy shall comply with 5107.3.

(c) C Occupancy shall comply with 5107.3.

(d) D Occupancy shall comply with 5107.3.

(e) E Occupancy shall comply with Chapter 10.

(f) F Occupancy shall comply with 5107.2 or 5107.3.

(g) G Occupancy shall comply with 5107.3.

(h) H Occupancy:

(1) All enclosed corridors lobbies and common areas shall comply with 5107.2 and/or 5107.3, and 5107.6.

(2) Dormitories, rooming houses, fraternity houses and similar uses which provide accommodations for more than six persons per room shall comply with 5107.3.

(i) I Occupancy shall comply with 5107.2.

(j) J Occupancy shall comply with 5107.2 or 5107.3.

(k) Each Occupancy in building of mixed Occupancies shall comply with requirements for its specific type as outlined above.

5107.6 TEST CRITERIA FOR MECHANICAL SMOKE CONTROL SYSTEMS:

(a) Prior to testing of the smoke control system, engineer of record shall certify to the appropriate officials that the entire smoke control system has been tested, balanced and installed in accordance with his design plans and specifications and this Code.

(b) The following shall be notified so that they may witness the system's performance test:

(1) Engineer of record or agent.

(2) Building contractors.

(3) Owner's representative.

(4) Fire Service.

(5) Building Department having jurisdiction.

(c) The engineer or his representative shall supply a plan of the floor or zone layout including cubic area and smoke bomb size and locations accepted by testing authority. Bomb placement and size shall be sufficient to give even disbursement in area being tested.

(d) Sufficient smoke must be generated to produce at least double the volume of the smoke zone being tested.

(e) Timing of the test begins when the smoke bombs are ignited. Smoke control system shall activate within 30 seconds.

(f) Quantity of smoke shall obscure an exit sign from 3 feet within 3 minutes. Design quantity of smoke shall be obtained within 5 minutes.

(g) In cases where smoke is being exhausted so quickly that obscurity cannot be obtained and sufficient smoke has been generated to fill the test area, the system will be considered to be acceptable, if smoke can be observed moving toward the exhaust grills.

(h) Within ten minutes of the start of the test, the exit sign must be legible from 20 feet.

(i) If no exit sign is presented, any object may be used for distance measurement (i.e., door, column).

(j) During the test, no smoke may migrate to other zones.

(k) All testing shall be done under the supervision of mechanical inspector and fire inspector having jurisdiction and final acceptance of the smoke control system, and shall be his responsibility.

(l) All smoke generating devices shall be supplied by the owner or his designer and shall meet with the approval of the fire inspector having jurisdiction.

(m) Required tests:

(1) Test one shall be performed with system in automatic mode. Upon automatic activation of the test floor, four additional floors shall be activated manually.

(2) Test two shall be performed in full automatic mode.

(3) All fire zones which are not typical to any other zone shall be tested independently.

(4) More than one typical zone may be required to be tested.

(n) The engineer of record must certify, in writing, that the system is designed and installed and will function as required by the Broward County Edition of the South Florida Building Code and its adopted standards; and submit plans and specifications including design criteria incorporating volumetric flows, volumes and pressures as a record for testing procedures.

5108 ELEVATORS

5108.1 Elevators shall be arranged for Fire Department use as set forth in the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks, ANSI A17.1, as set forth in Section 402 and referenced in paragraph 3201.2(a) of this Code.

5109 EMERGENCY SYSTEMS

5109.1

(a) A permanently installed emergency power generation system conforming to the National Electric Code, NFPA No. 70, as set forth in Section 402 of this Code, shall be provided in all buildings more than 50 feet in height, and located at an elevation not less than the elevation above MSL required by the National Flood Insurance Program, or encased in a waterproof vault with no openings below the required elevation.

(b)(1) Such systems shall be equipped with suitable means for automatically starting the generator-set upon failure of the normal electrical service and for automatic transfer and operation of all required electrical functions at full power within 60 seconds of such normal service failure.

(2) Two independently operated transfer switches shall be provided; one for the fire pump and the other for elevators, emergency lighting and required mechanical ventilation.

(3) Transfer switches shall provide approved means to manually transfer from emergency to normal operation.

(c) Except in hospitals, systems control, with manual start and transfer features, shall be provided at the Central Control station.

(d) An on-premises fuel supply sufficient for not less than 24 hours full-demand operation of the system shall be provided.

(e) All power, lighting, signal and communications facilities provided in this Chapter and in Chapters 31 and 32 of this Code shall be transferable to the Emergency power system.

(f) The power requirements shall be determined so as to provide service to, but not limited to, the following:

(1) Fire Alarm System.

(2) Exit and Emergency lighting.

EXCEPTION: Rechargeable battery-operated emergency lighting and battery back-up exit lights, independent of the emergency generator, will be permitted in tenant spaces and according to NFPA 70 701-11(F) in lieu of generator.

(3) Fire Protection Equipment.

(4) Required Mechanical Ventilation.

(5) Fire Department Use Elevators.

(6) Water flow indicators and supervisory switches.

(7) Fire Pump.

(8) Voice Communication System.

(9) Mechanical vestibule stairshaft and detector systems, where required.

(g) Emergency power generating equipment, including transfer switches, shall be inspected semi-annually at full generating load under the direction and supervision of Fire Department personnel and all such equipment shall operate to their satisfaction and approval.

(h) All mechanical smoke removal systems shall be inspected semi-annually under the direction and supervision of Fire Department personnel and all such equipment shall operate to the approval design criteria.

5110 EXITS

5110.1 All stairway doors which are locked from the stairway side, including vestibule doors which lead to the smokeproof tower, shall have the capacity of being unlocked remotely upon a signal from the Central Control Station. Loss of power shall cause such doors to unlock.

EXCEPTION: D Occupancy shall be exempt from this section.

5111 BUILDINGS MORE THAN 50 FEET TO 75 FEET IN HEIGHT

(a) New buildings of any group of Occupancy more than 50 feet in height and which are less than 75 feet in height shall be governed by the requirements of this Section and those set forth in Paragraphs 5101.1(a) and (b) of this Chapter.

(b) Except as provided in other applicable Chapters of this Code, the general requirements for such buildings shall be limited to those set forth in;

(1) Section 5102 – FIRE SPRINKLER SYSTEM.

(2) Section 5103 (a) (b) (c)–FIRE ALARM SYSTEM

(3) Section 5107 – SMOKE CONTROL SYSTEM.

(4) Section 5108 – ELEVATORS.

(5) Section 5109 – EMERGENCY SYSTEMS.

(6) Section 5110 – EXITS



CHAPTER 52
SOUTH FLORIDA FIRE CODE
TABLE OF CONTENTS

5201 ADMINISTRATION 52-1
5202 ORGANIZATION AND AUTHORITY 52-2
5203 DUTIES AND PROCEDURES 52-4
5204 SPECIAL PROCEDURES 52-6
5205 COMPLIANCE WITH ORDERS AND NOTICES 52-7
5206 PERMITS AND CERTIFICATES 52-8
5207 FEES 52-9
5208 DEFINITIONS 52-9
5209 STANDARDS 52-27
5210 GENERAL PROVISIONS FOR FIRE SAFETY/LIFE SAFETY REQUIREMENTS FOR BUILDINGS 52-31
5211 FIRE PROTECTION 52-31
5212 GENERAL PRECAUTIONS AGAINST FIRE 52-35
5213 EXITS AND FIRE ALARM SYSTEMS 52-39
5214 SPECIAL OCCUPANCY USES AIRPORTS, HELIPORTS, HELISTOPS AND AIRCRAFT HANGARS 52-40
5215 ASSEMBLY, PLACES OF 52-40
5216 AUTOMOBILE WRECKING YARDS, JUNKYARDS AND WASTE-MATERIALS HANDLING PLANTS 52-42
5217 BOWLING AND SIMILAR RECREATIONAL ESTABLISHMENTS 52-43
5218 ADULT CONGREGATE LIVING FACILITIES 52-44
5219 CHILD/ADULT CARE FACILITIES 52-44
5220 MARINAS, MARINE TERMINALS PIERS, WHARVES, BOAT STORAGE FACILITIES, AND PRIVATE BOAT DOCKING FACILITIES 52-44
5221 GARAGES 52-45
5222 LUMBER YARDS AND WOODWORKING PLANTS 52-45
5223 TIRE REBUILDING PLANTS 52-45
5224 SPECIAL PROCESSING/FLAMMABLE FINISHES 52-46
5225 FRUIT RIPENING PROCESSES 52-46
5226 FUMIGATION AND THERMAL INSECTICIDAL FOGGING 52-46
5227 MAGNESIUM 52-48
5228 ORGANIC COATINGS, MANUFACTURE OF 52-48
5229 PLASTIC PROCESSING AND FABRICATION 52-48
5230 WELDING OR CUTTING, ACETYLENE GENERATORS AND CALCIUM CARBIDE 52-50
5231 SPECIAL EQUIPMENT/BAKING AND DRYING OVENS 52-50
5232 MECHANICAL REFRIGERATION 52-51
5233 OIL BURNING EQUIPMENT 52-52
5234 SPECIAL SUBJECTS/COMBUSTIBLE FIBERS 52-52
5235 COMPRESSED GASES FOR MEDICAL USE 52-54

5236 CRYOGENIC FLUIDS 52-54
5237 EXPLOSIVES AND BLASTING AGENTS 52-60
5238 FIREWORKS 52-62
5239 FLAMMABLE AND COMBUSTIBLE LIQUIDS 52-65
5240 HAZARDOUS MATERIALS 52-74
5241 HIGH PILE COMBUSTIBLE STOCK 52-91
5242 LIQUEFIED PETROLEUM GASES 52-93
5243 MATCHES 52-95
5244 MOTION PICTURE PROJECTION 52-96
5245 MOTION PICTURE FILM, CELLULOSE NITRATE 52-97
5246 CELLULOSE NITRATE PLASTIC (PYROXYLIN), STORAGE AND HANDLING 52-97
5247 PESTICIDES 52-97
5248 PREVENTION OF DUST EXPLOSION 52-99
5249 VEHICLES AND VESSELS 52-99
5250 TENTS AND AIR-SUPPORTED STRUCTURES 52-100
5251 MOBILE HOMES AND RECREATIONAL VEHICLE PARKS 52-103
5252 GENERAL STORAGE 52-103
5253 FIRE-EXTINGUISHING APPARATUS 52-104
5254 FIRE SUPPRESSION LIFE SAFETY SYSTEM 52-106
5255 RACETRACKS AND STABLE FACILITIES 52-107

CHAPTER 52
SOUTH FLORIDA FIRE CODE

5201 ADMINISTRATION

5201.1 TITLE

This chapter shall be known as the **SOUTH FLORIDA FIRE CODE**, may be cited as such, and will be referred to herein as "this Fire Code".

5201.2 INTENT

(a) It is the intent of this code to prescribe regulations to provide certain minimum standards, provisions, and requirement for safe and stable design, methods of construction and uses of materials consistent with nationally recognized good practice for the safeguarding, to a reasonable degree of life and property from hazards of fire and explosion, arising from the storage, handling, and use of hazardous substances, materials and devices, and from conditions hazardous to life or property in the use or occupancy of buildings or premises.

(b) Where no specific standards or requirements are specified in this Fire Code or contained within other applicable laws or adopted codes or ordinances, compliance with the standards of the National Fire Protection Association or other nationally recognized fire safety standards as are approved by the Fire Code Committee, shall be deemed as prima facie evidence of compliance with this intent.

5201.3 SCOPE

(a) The provisions of this Fire Code shall supplement any and all laws relating to fire safety and shall apply to all persons without restrictions, unless specifically excepted.

(b) Where there is a conflict between a general requirement and a specific requirement for an individual occupancy, the specific requirement shall be applicable.

5201.4 APPLICABILITY OF THIS FIRE CODE

(a) This Fire Code shall apply to both new construction and existing buildings, structures and conditions.

(b)(1) This Fire Code recognizes that it is not always practical to apply any or all of the provisions of this Fire Code to existing buildings. Physical limitations may require a disproportionate effort or expense with little increase in life safety.

(2) Prior to applying the minimum provisions of this Fire Code to an existing building, the Fire Chief shall determine that a threat to life safety or property exists.

(3) If a threat to life safety or property exists, the Fire Chief shall apply the applicable provisions of the Fire Code to the extent practical for existing buildings, to assure a reasonable degree of life safety and safety of property; or the Fire Chief shall fashion a reasonable alternative which affords an equivalent degree of life safety and safety to property. The decision of the Fire Chief may be appealed pursuant to the provisions contained in the South Florida Building Code, Broward County Edition.

(4) Existing facilities may be given reasonable time to comply with the rules and standards of applicable fire codes. Said time shall not exceed six months from the date of inspection with which to comply with such rules and standards.

(aa) One extension, not to exceed six months, may be authorized by the Fire Chief or designee if reasonable progress towards compliance is demonstrated by the facility owner.

(5) Existing apartment buildings as defined in N.F.P.A.-101, Chapter 19, built after June 1, 1972, under the South Florida Building Code, Broward County Edition, shall be deemed an equal alternate to the

requirements of Chapter 19 of N.F.P.A.-101, if all dwelling units are equipped with smoke detectors placed as required in the Code. Such smoke detectors shall be connected to the house electric power and shall have battery backup. Where multiple detectors are required in a single dwelling unit to comply with this section, such detectors need not be interconnected. In buildings having three stories or less with direct access to the outside, battery operated smoke detectors shall be considered an approved detection device and the requirements of N.F.P.A.-101-19-3.4.2.1. shall not apply. Nothing in this paragraph will exempt any building from compliance with the South Florida Building Code, Broward County Edition in effect at the time of its construction.

(c) When used in this Fire Code, the term Fire Chief shall refer to Chief of the Fire Department or his authorized designee, who is responsible for the enforcement of the Fire Code.

(d) When used in this Fire Code, the term Fire Code Committee shall refer to a committee appointed by the Chairman of the Board of Rules and Appeals, in accordance with Section 5204.3.

5202 ORGANIZATION AND AUTHORITY

RESPONSIBILITY FOR ENFORCEMENT

5202.1 The Fire Chief shall be the principle enforcing officer of this Fire Code with the responsibility for the administration and enforcement of this Fire Code. Under his direction, the fire department shall enforce all local ordinances of the jurisdiction pertinent to:

(a) The prevention of fires.

(b) The suppression or extinguishing of fires.

(c) The storage, use and handling of explosive, flammable, combustible, toxic, corrosive and other hazardous gaseous, solid and liquid materials.

(d) The inspection of equipment and maintenance of automatic, manual and other fire alarm systems and fire extinguishing equipment.

(e) The maintenance and regulation of fire escapes.

(f) The maintenance of fire protection and the elimination of fire hazards on land and in buildings, structures and other property, including those under construction.

(g) The means and adequacy of each exit in the event of fire or similar emergency, from factories, schools, hotels, lodging houses, asylums, hospitals, churches, halls, theaters, amphitheaters and all other places in which people work, live or congregate from time to time for any purpose.

(h) The investigation of the origin, cause, and circumstances of fire.

5202.2 No enforcing agency may issue any permit for construction, erection, alteration, repair, or demolition until the local building official, in conjunction with the appropriate fire safety inspector, has reviewed the plans and specifications for such proposal and both officials have found the plans to be in compliance with the South Florida Building Code, Broward County Edition, and the applicable fire safety standards as determined by the local authority in accordance with this Fire Code and Chapter 633, Florida Statutes. In the event that agreement cannot be reached between the Building and Fire Officials, the dispute shall be referred to the Fire Code Committee for review and recommendation to the Broward County Board of Rules and Appeals in accordance with Section 5204.3.

5202.3 Industrial construction on sites where design, construction, and fire safety are supervised by appropriate design and inspection professionals and which contain adequate in-house fire departments, is exempt; subject to local government option, from review of plans and inspections, providing owners certify that applicable codes and standards have been met and supply appropriate approved drawings to the building department. The enforcing agency shall issue a permit to construct, erect, alter, repair, or demolish any building when the plans and specifications for such proposal comply with the provisions of this Fire Code and

Chapter 633, F.S.

5202.4 From time to time, when necessary, the Fire Code Committee may request from the Board of Rules and Appeals and/or the director, general releases and procedures pertaining to specific occupancies or operations under the provisions of this Chapter. Such general releases and procedures, when drafted, will be a matter of public record and on file in the office of the Board of Rules and Appeals. The intent of such general releases and procedures will be to clarify the requirements of this Fire Code and maintain a consistent enforcement and public education program.

5202.5 BUREAU OF FIRE PREVENTION

(a) A Fire Prevention Bureau is established within the fire department, under the direction of the Fire Chief, which shall consist of such fire department personnel as may be assigned thereto, by the Fire Chief, in accordance with the requirements prescribed herein. The function of this bureau shall be to assist the Fire Chief in the administration and enforcement of the Fire Protection Provisions of this Chapter.

(b) Personnel assigned to the bureau as Fire Inspectors must be State Certified Firefighters, State Certified Fire Inspectors, certified by the Board of Rules and Appeals (South Florida Building Code Sec. 201.7). For certification and recertification refer to Florida State Statute 633.

EXCEPTION 1: Those municipalities currently utilizing Broward or State Certified Fire Inspectors, with a minimum of three (3) years experience with that fire department, at the time of adoption of this Fire Code, shall be certified under this Fire Code.

EXCEPTION 2: At Fire Chief's discretion, a person may be given up to eighteen (18) months to become a Florida Certified Firefighter, from the date of hire.

5202.6 PERSONNEL

(a) The Fire Chief may designate a member of the department to exercise the powers and perform the duties of the Chief. He may also be known as Fire Marshal.

(b) The Fire Chief may also delegate to the Bureau of Fire Prevention, such members of the fire department as may from time to time be necessary, in accordance with Section 5202.5 of this Fire Code.

5202.7 ENFORCED REMOVAL OF PROHIBITED CONDITIONS

(a) Payment of any fine shall not preclude the removal of any violation of this Fire Code.

(b) When the Fire Chief, or his duly authorized representative has cause to believe that any requirement of this Fire Code is being violated, he is hereby authorized to gather any evidence or photographs necessary to substantiate proof that a violation of this Fire Code exists.

5202.8 AUTHORITY TO ENTER PREMISES

(a) The Fire Chief, or any fire inspector or officer, thereof, may at all reasonable hours, enter any building or premises for the purposes of making any inspection or investigation, which under the provisions of this Fire Code, he or they may deem necessary.

(b) The Fire Chief, or any inspector or officer, thereof, shall be permitted by the owner, lessee, manager, or operator of any building or premises, at the time and for the purpose stated in this Section.

(c) It shall be unlawful for any person or persons to deny access to the duly authorized representative of the Fire Chief, onto any premises, for the purpose of inspection or investigation.

EXCEPTION: Inspections of private residential dwelling units as prescribed in Sec. 5203.1.

5202.9 LIABILITY FOR DAMAGES

This Fire Code shall not be construed to hold the enforcing jurisdiction responsible for any damage to persons or property by reason of the inspection or re-inspection authorized herein or failure to inspect or re-inspect or the permit issued as herein provided or by reason of the approval of any equipment authorized

herein.

5202.10 SAVINGS CLAUSE

If any provision of this Fire Code or the application thereof, to any person or circumstance is held invalid, the remainder of the Fire Code and the application of such provision to other persons or circumstances, shall not be affected thereby.

5203 DUTIES AND PROCEDURES

5203.1 INSPECTION OF BUILDINGS AND PREMISES

(a) It shall be the duty of the Fire Chief of the Fire Department to inspect or cause to be inspected by the officers or members of the Fire Prevention Bureau, as often as may be necessary, but not less than annually, during normal business hours, for the establishment in question, all buildings and premises, including common or public areas of condominium buildings, except the interior of private residential dwelling units, (unless invited therein by the owner or occupancy thereof), as well as all public aisles, corridors, halls, rooms, storage areas, or other nonresidential areas of such buildings, for the purpose of ascertaining and causing to be corrected, any condition liable to cause fire or any violation of the provisions or intent of this Fire Code, and to otherwise enforce any violation of this Fire Code. Whenever the Fire Chief of the Fire Department determines that a violation exists, the person responsible for maintaining the building or area where such violation exists, shall be given reasonable written notice of such violation, and if the violation continues, a presumption of a violation of the Fire Code, shall be created against the person responsible for maintaining the building or area where such violation exists.

(b) If the Fire Chief finds a hazardous condition, which presents immediate danger to life, he shall be authorized to order the hazard removed or remedied immediately, and shall be empowered to order the closing of the building or place where such danger to life violation exists, until such time as same has been corrected. Any failure of immediate compliance shall empower the Fire Chief finding such hazardous condition creating immediate danger to life, to close such building or cause same to be closed and the people herein evacuated and barred from reentering until such time as such immediate danger to life has been corrected.

(c) The Fire Chief is given the authority to order any gas company, power company, or other utility company, to disconnect its service to any building or buildings containing gas or power installations, where such installations, in the opinion of the Fire Chief, creates an immediate danger to life, and to otherwise close or evacuate such building and to bar reentry thereto, until such installation is repaired or replaced and such hazard to life ceases to exist.

(d) The Fire Chief upon the complaint of any person or whenever he shall deem it necessary, shall inspect any buildings and premises within their jurisdiction.

(e) Approval of Fire Department accessibility and all tests of fire alarm detection and suppression systems, smoke evacuation systems and life safety systems shall be conducted prior to final structural inspection and issuance of Certificate of Occupancy. (See Sec. 305.2(d)).

(f) Rejections must include specific reference to the Code Section upon which rejection is based in writing.

5203.2 ORDERS TO ELIMINATE DANGEROUS OR HAZARDOUS CONDITIONS

Whenever the Fire Chief, as mentioned in Sec. 5203.1, shall find in any building or upon any premises, dangerous or hazardous conditions or materials, including, but not limited to violations of the requirements encompassed in Chapter 633, Florida Statutes, or the following Paragraphs, he shall order such violations and dangerous conditions or materials removed or remedied.

(a) Dangerous or unlawful amounts of combustible or explosive or otherwise hazardous materials.

(b) Hazardous conditions arising from defective or improperly installed equipment for handling or using combustible or explosive or otherwise hazardous materials.

(c) Dangerous accumulation of rubbish, wastepaper, boxes, shavings, or other flammable materials.

(d) Accumulations of dust or waste material in air conditioning or ventilation systems or of grease in kitchen or other exhaust ducts.

(e) Obstructions to, on, or under fire escapes, stairs, passageways, or doors, liable to interfere with the operations of the fire department or egress of occupants; locked exits shall constitute an unsafe condition. Exception: unless permitted by Code.

(f) Obstruction to windows. Where windows are required to provide the second means of escape from a room or area, the following are prohibited.

(1) Bars that cannot be opened from the inside.

EXCEPTION: Only one **(1)** window is required to meet the above where two **(2)** windows are in the same room or area.

(2) Other obstructions such as security grills.

(g) Any building or other structure which, for want of repairs, lack of adequate exit facilities, automatic or other fire alarm apparatus or fire extinguishing equipment, or by reason of age or dilapidated condition, or from any other cause, create a hazardous condition.

(h) Any building or structure vacated or unoccupied shall be properly secured to prevent entry by unauthorized persons.

(i) The improper storage, transporting or handling of all classes of flammable or combustible liquids or otherwise hazardous substances any place within the enforcing jurisdiction.

5203.3 SERVICE OF ORDERS

(a) The service of the orders authorized under **Section 5203.2** shall be made upon the owner, registered agent, occupant or other person responsible for the conditions, either by delivering a copy of the same to such person or by delivering the same and leaving it with any person in charge of the premises, or, in case no such person is found upon the premises, by affixing a copy thereof in a conspicuous place on the door to the entrance of such premises. Whenever it may be necessary to serve such an order upon the owner, registered agent, occupant or other person responsible of any premises, such order may be served wither by delivering to and leaving with such a person, a copy of such order, or, if such owner, registered agent, occupant or other person responsible is absent from the jurisdiction of the officer making the order, by sending such copy by registered or certified mail to the owner's, registered agent, occupant or other person responsible last known post office address.

(b) If buildings or other premises are owned by one person and occupied by another under lease or otherwise, the orders issued in connection with the enforcing of this fire code shall apply to the occupant thereof, except where the rules or orders require the making of additions to or changes in the premises themselves, such as would immediately become real estate and be the property of the owner of the premises; in such cases the rules or orders shall affect the owner and not the occupant.

(c) Such orders shall be final in nature and shall be complied with after service thereof within the time specified therein and in the manner specified therein by the Fire Chief.

5203.4 INVESTIGATION OF FIRES

The Fire Chief shall investigate the origin, cause, and circumstances of every fire occurring in the enforcing jurisdiction. Such investigations shall begin immediately upon the occurrence of a fire, and the Fire Chief shall be immediately notified of the facts; he shall take charge immediately, of the physical evidence, shall notify the proper authorities designated by law, to pursue the investigation of such matters, and shall

further cooperate with the authorities in the collection of evidence and in the prosecution of the case.

5204 SPECIAL PROCEDURES

5204.1 BUILDING PERMITS, PLAN REVIEW AND NEW CONSTRUCTION INSPECTION

(a) Prior to the issuance of any permit for construction, erection, alterations, repair, or demolition, the Fire Chief shall review all plans in conjunction with the Building Department. One and two family detached residential dwelling units shall not be subject to plan review by the Fire Chief as described in this section or inspection by the Fire Chief as described in F.S. 633.081.

(b) Fire Department acceptance of fire and life safety features in buildings after performance objectives are met is required, prior to certificate of occupancy being issued.

(c) Rejections must include specific reference to the Code Section upon which rejection is based in writing.

5204.2 ALTERNATE MATERIALS AND METHODS OF DESIGN AND/OR NEW MATERIALS, PROCESSES OR OCCUPANCIES WHICH MAY REQUIRE PERMITS

(a) The Fire Code Committee may make recommendations to modify this Fire Code in writing to the Broward County Board of Rules and Appeals. Alternative requirements shall not result in a level of fire protection to life, safety, or property less stringent than the standards set forth in this Fire Safety Code.

(b) The Fire Chief may modify any of the provisions of this Chapter upon application in writing by the owner or lessee or his duly authorized representative where there are practical difficulties in the way of carrying out the strict letter of this Fire Code, provided the alternative requirements shall not result in a level of fire protection to life, safety, or property less stringent than the standards set forth in this Chapter.

(1) Where technical documentation or tests are required by the Fire Chief or Fire Code Committee, these shall be prepared by a professional engineer registered in the State of Florida, a certified testing laboratory or a recognized fire safety specialty organization acceptable to the Fire Chief.

(2) The cost of all tests or reports shall be borne by the owner or person in possession or control of the building, structure or condition.

(3) The Fire Code Committee shall recommend to the Broward County Board of Rules and Appeals, after giving affected persons an opportunity to be heard; any new materials, processes or occupancies which shall require permits, in addition to those now enumerated in this Chapter 52.

5204.3 FIRE CODE COMMITTEE

(a) In order to determine the suitability of alternate materials and types of construction, to provide for reasonable interpretation of the provisions of this Fire Code and to assist in the control of the Life/Safety in buildings and structures, there is hereby created a Fire Code Committee, to make recommendations to the Broward County Board of Rules and Appeals.

(b) MEMBERSHIP: Fire Code Committee shall consist of:

One (1) mechanical engineer, Florida P.E.
One (1) architect ,Florida Registered
One (1) fire sprinkler contractor
One (1) handicapped representative
One (1) master electrician
Four (4) fire service (certified)
Two (2) fire service members of the Board of Rules and Appeals
One (1) contractor certified to install fire alarms
One (1) general contractor
One (1) electrical engineer, Florida P.E.

One (1) mechanical contractor
One (1) consumer advocate
One (1) structural engineer
One (1) chief plumbing inspector

(1) In Sec. 5204.3(c) — Membership, such membership of the Fire Code Committee will be for one year (with members being able to succeed themselves through reappointment by the Broward County Board of Rules and Appeals' Chairman), and that all members, including the Chairman of the Fire Code Committee be selected by the Chairman of the Board of Rules and Appeals. The Chairman of the Fire Code Committee shall be a fire service member of the Broward County Board of Rules and Appeals.

(2) Such recommendations of membership to serve on the Fire Code Committee shall be recommended by letter (including a resume) of each appointee. Appointees shall be recommended to the Board of Rules and Appeals by the League of Cities, Broward County Commission, Fire Service, Organizations, and Industry.

(c) The Fire Code Committee shall be a committee serving and performing its duties and functions under the jurisdiction and supervision of the Broward County Board of Rules and Appeals. The Broward County Board of Rules and Appeals may interpret the provisions of the Fire Code to cover a special case if it appears that the provisions of said law do not definitely cover the point raised, or that the intent of the law is not clear, or that ambiguity exists in the wording; but it shall have no authority to grant variances where the said law is clear and specific.

(1) Where interpretive powers are vested in the inspection authority by federal, state, county and municipal laws and ordinances, or nationally accepted standards and codes, it shall be construed to mean the Broward County Board of Rules and Appeals.

5204.4 DUTIES:

(a) APPEAL FROM DECISION OF FIRE CHIEF AND/OR BUILDING OFFICIAL: The Fire Code Committee shall review all appeals from the decisions of the Fire Chief and/or Building Official wherein such decision is on matters regulated by this Fire Code from any person, aggrieved thereby.

(b) PROCEDURE FOR APPEALS: The Fire Code Committee shall review the appeal prior to hearing by the Broward County Board of Rules and Appeals and shall make recommendations to the Broward County Board of Rules and Appeals for resolution of the appeal. The Broward County Board of Rules and Appeals shall then hear the appeal and make a final ruling.

5205 COMPLIANCE WITH ORDERS AND NOTICES

5205.1 UNLAWFUL CONTINUANCE OF FIRE/LIFE SAFETY HAZARD

Any person or persons operating or maintaining any occupancy, premises or vehicle subject to this Code who shall permit any fire and/or life safety hazard to exist on premises or property under their control, and who shall fail to take immediate action to abate such hazards, when ordered or notified to do so by the Fire Chief or designee, shall be guilty of a second degree misdemeanor. Criminal enforcement of this Code shall remain with local law enforcement departments and officials charged with enforcement of laws of the State.

5205.2 COMPLIANCE WITH VIOLATION NOTICES

A building, structure, occupancy, premises or vehicle shall not be used when in violation of this Code as noted on a violation notice affixed under Section 5203.2.

5205.3 REMOVAL OR DESTRUCTION OF SIGNS OR TAGS

(a) It shall be unlawful to remove or tamper with any seal, warning tag or lock placed on an article, appliance, vehicle, meter, tank, or building by the building and zoning department or the fire department,

without first obtaining permission to do so by the authority having jurisdiction.

(b) It shall be unlawful for any person to tamper with or change the position of any utility valve, switch, wiring, piping, meter or connection or alter any utility service in any way, unless properly authorized to do so.

5205.4 PROCEDURES IN COUNTY COURT/CODE ENFORCEMENT BOARD

(Existing Buildings)

When charges are filed based upon a violation under this Code, such charges prepared under the direction of the city, state or county attorney, shall be heard by a county judge or Code Enforcement Board, within the time limit prescribed under county court procedures or Code Enforcement Board. Such conditions shall constitute an immediate danger to life.

5206 PERMITS AND CERTIFICATES

5206.1 GENERAL

(a) A permit shall constitute permission to properly maintain, store or handle materials, or to conduct processes, which produce conditions hazardous to life or property, used in connection with such activities. Such permit shall not be transferable, and any change in use or occupancy of premises shall require a new permit.

(b) Before a permit may be issued, the Fire Chief or his designee, shall inspect and approve the containers, vehicles, buildings or storage places to be used. In cases where laws or regulations, enforceable by departments other than the fire prevention bureau are applicable, joint approval shall be obtained from all departments concerned.

(c) All applications for a permit required by this Section, shall be made to the fire prevention bureau. Applications for permits shall be accompanied by such plan as may be required by the Fire Chief.

(d) Permits shall at all times be kept on the premises designated therein, and shall at all times be subject to inspection by any officer of the fire or police or building departments.

(e) One (1) permit only shall be required by establishments dealing in, or using, explosives or hazardous materials to be kept in the establishment at any one (1) time, but each of the materials shall be listed in the permit.

(f) Permits shall be required for the following:

(1) Cellulose nitrate plastics (pyroxylin) as specified in Section 5246.2.

(2) Compressed gases as specified in Section 5235.3.

(3) Explosives as specified in Section 5237.4.

(4) Fireworks as specified in Section 5238.6.

(5) Reserved for future use.

(6) Hazardous materials as specified in Section 5240.3.

(7) Liquefied petroleum gases and compressed natural gas as specified in Sections 5242.2 and 5242.15. **EXCEPTION**: Portable cylinders 20 lbs. or less for portable equipment.

(8) Places of assembly as specified in Sections 5215.1 and 5215.2. Certificate of Occupancy and or Occupational License shall constitute a permit.

(9) General precautions against fire as specified in Section 5212.1(a).

(10) Tents and air-supported structures as specified in Section 5212.2(c).

(11) Remove or abandon, flammable or combustible tank as specified in this Section. Refer to 301.1(j) of the South Florida Building Code.

(12) Welding or cutting, acetylene, generator and calcium carbide, as specified in Section 5230.1.

(13) Storage of flammable and combustible liquids and solids as specified in Section 5239.3.

EXCEPTION: Less than 15 gallons stored in one and two family detached residential dwelling units shall not require a permit.

(14) Open burning as specified in Section 5212.1(a)(1).

(15) Carnivals, circuses and other special events.

5206.2 FEES

(a) FEE REQUIRED: Fees may be required for Annual Fire Inspections, Plans Review, Permits and Certificate Applications as set forth in Sections 5203, 5204 and 5206, as well as special testing and inspections of but not limited to, systems and equipment as set forth herein. As provided in H.B. 1337, 633.081(1), Chapter 87.287 F.S.

(b) FEE SCHEDULE: Fee Schedules are revised periodically and may vary between jurisdictions. For Specific information, regarding current fee schedules and requirements, contact the Fire Chief and/or Building Department within your jurisdiction.

5206.3 COMPLIANCE

(a) The issuance or granting of a permit or certificate shall not be deemed or construed to be a permit for, or an approval of, any violation of this Fire Code.

(b) Compliance with this Fire Code is the responsibility of the permit holder and/or owner.

5206.4 REVOCATION OF PERMITS

Any permit or certificate issued under Section 5206.1 may be suspended or revoked when it is determined by the Fire Chief that:

(a) It is used by an applicant other than the person to whom the permit or certificate was issued.

(b) It is used for a location other than that for which it was issued.

(c) Any of the conditions or limitations set forth in the permit or certificate have been violated.

(d) The applicant fails, refuses or neglects to comply with any order or notice duly served upon him under the provisions of this Code within the time provided therein.

(e) There has been any false statement or misrepresentation as to a material fact in the application or plans on which the permit or application was based.

5207 FEES

5207.1 Local jurisdiction Fire Prevention Bureau and Building Departments shall set their own fee schedules.

5208 DEFINITIONS

ACIDis a chemical compound of hydrogen with one or more nonmetals, which yields hydrogenions, and exhibits a pH of less than 3 in aqueous solution.

ADULT CONGREGATE LIVING FACILITY (Florida State Statues 400-402) is any building or buildings, section of a building or distinct part of a building, residence, private home, boarding home, home for the aged, or other place, whether operated for profit or not, which undertakes through its ownership or management to provide, for a period exceeding 24 hours, housing, food service, and one or more personal services for one or more adults, not related to the owner or administrator by blood or marriage, who require such services. (Refer to Definitions Florida State Statutes 400-402.)

AEROSOL is a material which is dispensed from its container as a mist, spray or foam by propellant under pressure.

AGA shall mean American Gas Association.

AIA shall mean American Insurance Association.

AIR-REACTIVE MATERIALS are materials including pyrophoric materials which are capable of spontaneous ignition or other dangerous reaction upon exposure to dry or moist air.

AIR-SUPPORTED STRUCTURE is any structure constructed of lightweight fabric or film or any combination thereof which derives its sole support and stability from internal inflation pressure.

ALKALI – See **BASE**

ALTERATIONis any change or modification of construction, space arrangement and/or occupancy of a building, or decreasing or not increasing the area or cubic contents thereof.

ANHYDROUSis without water, not containing water.ANSI shall mean American National Standards Institute.

APARTMENT BUILDING includes buildings containing three or more living units with independent cooking facilities, whether designated as apartment house, tenement, garden apartment, and condominium, or by any other name.

API shall mean American Petroleum Institute.

APPROVED: Approved by the Fire Chief, or his designee, other authority given jurisdiction by this Fire Code.

AREAas applied to the dimensions of a building means the horizontal projected area of the building at grade.

ASHRA shall all mean American Society of Heating, Refrigerating and Air Conditioning Engineers.

ASME shall mean American Society of Mechanical Engineers.

ASTM shall mean American Society for Testing Materials.

ASPHALT KETTLE is any vessel or container used to process heat, hold for heating or dispense flammable or combustible roofing materials that are in liquid form or will take that form as a result of being exposed to such vessel or container.

ASSEMBLY BUILDING: A building used in whole or in part, for the gathering of persons for such purposes as deliberation, worship, entertainment, amusement or awaiting transportation.

ATMOSPHERIC TANK is a storage tank which has been designed to operate at pressures from atmospheric through 0.5 psig as measured from the top of the tank.

ATRIUM: A vertical opening within a building that communicates between floors, is enclosed by a roof at its highest point and is bound by enclosing walls a minimum of 30 feet apart.

AUTHORITY HAVING JURISDICTION is the Fire Chief or his duly authorized representative and/or Broward County Board of Rules and Appeals.

AUTOMATIC FIRE ALARM SYSTEM is a system which automatically detects a fire condition and actuates a fire alarm signaling device.

AUTOMATIC FIRE CHECK is a device listed for installation in communicating piping carrying an explosive vapor/air mixture to prevent a flashback from reaching the tanks or equipment in the piping system. These devices shall be equipped with special elements for arresting the explosion wave which may be already established in a pipe. These devices shall contain automatically operated shutoff valve to stop flow of vapor/air mixture in event of a flashback and continued burning at the arrester element. The shutoff valve shall be capable of annual reset.

AUTOMATIC FIRE-EXTINGUISHING SYSTEM is an approved system of devices and equipment

which automatically detects a fire and discharges an approved fire extinguishing agent onto or in the area of a fire.

AWNINGis any fixed rooflike structure, cantilevered or otherwise entirely supported from a building, so constructed and erected as to permit its being readily and easily moved within a few minutes time to close an opening, or rolled or folded back to a position flat against the building or a cantilevered projection thereof, or is detachable.

BALCONYthat portion of a seating space of an assembly room, the lowest part of which is raised four feet or more above the level of the main floor.

BALCONY, is an exterior exit, a landing or porch projecting from the wall of a building, where serving as a required means of egress the long side shall be at least 50 percent open and the open area above the guard rail shall be so distributed as to prevent the accumulation of smoke or toxic gases.

BASE is a chemical compound of a metal and the hydroxide (OH-) ion in aqueous solution, which exhibits a pH of greater than 11. An alkali.

BASEMENT that portion of a building between floor and ceiling, which is so located that one-half or more of the clear height from floor to ceiling is below grade.

BELOW GROUND CONTAINER is storage installation in which the maximum liquid level in the container is below the surrounding grade or below a backfill berm, which is at least 10 feet wide at the top and then slopes away from the container at a natural angle of repose or is retained 10 feet from the container by a retaining wall and constructed of earth, concrete, solid masonry or suitable material to prevent the escape of liquid.

BLASTING AGENT is any material or mixture consisting of a fuel and oxidizer intended for blasting, not otherwise classified as an explosive, in which none of the ingredients as classified as explosives, provided that the finished product as mixed and packaged for use or shipment cannot be detonated by means of a No. 8 test blasting cap when unconfined. Materials or mixtures classified as nitrocarbonitrates by the Department of Transportation regulations shall be included in this definition.

BLASTING CAP is a shell closed at one end and containing a charge of detonating compound which is ignited by a safety fuse. It is used for detonating explosives.

BLEACHERSare seating facilities without backrests in which an area of 3 square feet or less is assigned per person for computing the occupant load.

BOILOVERis the expulsion of crude oil (or certain other liquids) from a burning tank in which the light fractions of the crude oil burn off, producing a heat wave in the residue which, on reaching a water strata, may result in the expulsion of a portion of the contents of the tank in the form of a froth.

BOILING POINT is the boiling point of a liquid at a pressure of 14.7 psia. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for purposes of this classification, the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Products ASTM D86-82 may be used as the boiling point of the liquid.

BTUshall mean British Thermal Unit the heat necessary to raise the temperature of one pound of water one degree Fahrenheit.

BUILDING is a structure which encloses space; a structure which gives protection or shelter for any occupancy. The term "building" shall be construed as if followed by the phrase "or part thereof". When separated by fire walls, each portion so separated shall be deemed a separate building.

BULK OXYGEN SYSTEM is an assembly of equipment, such as oxygen storage containers, pressure regulators, safety devices, vaporizers, manifolds and interconnecting piping, which has a storage capacity at normal temperature and pressure of:

1. More than 12,000 cubic feet of oxygen connected in service or ready for service,

or

2. More than 25,000 cubic feet of oxygen, including unconnected reserve on hand at the site.

The bulk oxygen system terminates at the point where oxygen at service pressure first enters the supply line. The oxygen may be stored as a liquid or gas in either stationary or portable containers.

BULK PLANT is that portion of a property where refined flammable or combustible liquids are received by tank vessel, pipeline, tank car or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids in tank vessel, pipeline, tank car, tank vehicle or container.

BULLET RESISTANT is a material and construction method capable of preventing penetration of a 180 grain, 3 caliber, soft-nose, hunting type bullet when propelled at a maximum velocity of 2700 feet per second.

BUREAU OF FIRE PREVENTION is the fire prevention bureau of the jurisdiction.

CGA shall mean the Compressed Gas Association.

CABANA: Shall mean bath cabins, together with only such accessories as board-walks, terraces, sun decks, rubbing rooms and toilet rooms.

CANOPY is any fixed rooflike structure not movable, like an awning and which is cantilevered or in whole or in part self-supporting, but having no side walls or curtains other than valances not more than 18-inches deep. Lean-to canopies, fixed umbrellas and similar structures are included in this classification. Structures having side walls or valances more than 18-inches deep, shall be classified as a tent or cabana as set forth herein.

CARGO TANK is any container having a liquid capacity in excess of 120 gallons used for the carrying of flammable or combustible liquids, LP gas, or hazardous chemicals and mounted permanently or otherwise upon a tank vehicle. The term "cargo tank" does not apply to any container used solely for the purpose of supplying fuel for propulsion of the vehicle upon which it is mounted.

CAUSTIC is a common name for hydroxides such as sodium and potassium hydroxides and for the strongly corrosive solutions they produce when dissolved in water.

CELLULOSE NITRATE PLASTICS (PYROXYLIN) is any plastic substance, material or compound, other than cellulose nitrate film covered by Section 5245 or guncotton or other explosive covered by Section 5237, having cellulose nitrate as a base, or whatever name known, when in the form of blocks, slabs, sheets, tubes or fabricated shapes. For requirements, see Section 5246.

CENTRAL SUPPLY is that portion of the system which normally supplies the piping systems.

CHIEF OR CHIEF OF THE FIRE DEPARTMENT is the chief officer of the fire department, or his authorized representative, serving the jurisdiction.

CHIEF OF THE BUREAU OF FIRE PREVENTION is the head of the fire prevention bureau.

CLOSED CONTAINER is a container so sealed by means of a lid or other device that liquid, vapor or dusts will not escape from it under ordinary conditions of use or handling.

COMBUSTIBLE shall mean capable of undergoing combustion.

COMBUSTIBLE FIBERS are readily ignitable and free-burning fibers, such as cotton, sisal, henequen, ixtle, jute, hemp, tow, cocoa fiber, oakum, baled waste, baled wastepaper, kapok, hay, straw, excelsior, Spanish moss and other like materials.

COMBUSTIBLE FIBER STORAGE BIN is a metal or metal-lined container with a capacity not exceeding 100 cubic feet and equipped with a self-closing cover.

COMBUSTIBLE FIBER STORAGE ROOMS are rooms with a capacity not exceeding 500 cubic feet separated from the remainder of the building by a one-hour occupancy separation constructed as specified in this Code.

COMBUSTIBLE LIQUID is a liquid having a flash point at or above 100 degrees F. Combustible liquids shall be subdivided as follows:

CLASS I: See Flammable Liquids.

CLASS II liquids shall include those having flash points at or above 100 degrees F. and below 140 degrees F.

CLASS III-A liquids shall include those having flash points at or above 140 degrees F. and below 200 degrees F.

CLASS III-B liquids shall include those liquids having flash points at or above 200 degrees F.

COMBUSTIBLE WASTE MATTER shall mean magazines, books, trimmings from lawns, trees, flower gardens, pasteboard boxes, rags, paper, straw, sawdust, packing material, shavings, boxes and all rubbish and refuse that will ignite through contact with flames of ordinary temperatures.

COMBUSTION is any chemical process that involves oxidation sufficient to produce light or heat.

COMMODITY is the combination of product, packing material and container.

COMMON RADIATION SOURCE MATERIALS are radioisotope other than fissile materials, which are in common usage in various medical and industrial testing and measuring situations.

COMPRESSED GAS is any mixture or material having in the container either an absolute pressure exceeding 40 pounds per square inch at 70 degrees F., or an absolute pressure exceeding 104 pounds per square inch at 130 degrees F., or both; or any liquid flammable material having a vapor pressure as defined in this Section exceeding 40 pounds per square inch at 100 degrees F.

CONVERSION OIL BURNER is a burner for field installation in heating appliances such as boilers and furnaces. It may be furnished with or without a primary safety control. Under special circumstances it may be installed for firing ovens, water heaters, ranges, special furnaces and the like. A burner of this type may be a pressure atomizing gun type, a horizontal or vertical rotary type or a mechanical or natural draft vaporizing type.

CONVERSION RANGE OIL BURNER is an oil burner designed to burn kerosene, range oil or similar fuel. This burner is intended primarily for installation only in a stove or range, a portion or all of which originally was designed for the utilization of solid fuel and which is flue-connected.

CORRIDOR is a path of egress connecting more than one room or occupied space on any one floor; a hallway.

CORROSIVE MATERIALS are those solids, liquids or gases which when in contact with living tissue will cause destruction or irreversible alteration of such tissue by chemical action. Examples include acid, alkaline or caustic materials.

COURTis an open, uncovered, and unoccupied space, unobstructed to the sky, bounded on two or more sides by exterior building walls.

COURT(enclosed) is a court bounded on all sides by the exterior walls of a building or exterior walls and lot lines on which walls are allowable.

CRUDE PETROLEUM is hydrocarbon mixtures that have a flash point below 150 degrees F.

CRYOGENIC FLUIDS are those fluids that have a normal boiling point below -150 degrees F.

CRYOGENIC IN-GROUND CONTAINER is a container in which the maximum liquid level is below the normal surrounding grade and is constructed essentially of natural materials such as earth and rock and dependent upon the freezing of water-saturated earth materials for its tightness or impervious nature.

CRYOGENIC VESSEL is any pressure vessel, low-pressure tank or atmospheric tank designed to contain a cryogenic fluid on which venting, insulation, refrigeration or a combination of these is used in order to maintain the operating pressure within the design pressure and the contents in a liquid phase.

DECOMPOSITION is the breaking apart of molecules into elements or simpler compounds.

DECORATIVE MATERIALS are materials such as curtains, draperies, streamers, surface coverings applied over the building interior finish for decorative, acoustical or other effect, and also cloth, cotton batting, straw, vines, leaves, trees, moss, and plastics used for decorative effect, but they shall not include floor coverings, ordinary window shades nor materials 1/40 of an inch or less in thickness applied directly to and adhering tightly to a base.

DEFLAGRATION is an exothermic reaction such as the extremely rapid oxidation of a flammable vapor in air, in which the reaction progresses through the material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

DETONATING CORD is a flexible cord containing a center core of high explosives which when detonated will have sufficient strength to detonate other cap-sensitive explosives with which it is in contact.

DETONATION is an exothermic reaction characterized by the presence of a shock wave in the material which establishes and maintains the reaction. The reaction zone progresses through the material at a rate greater than sound. The principal heating mechanism is one of shock compression. Detonations have an explosive effect.

DETONATOR is a component (such as a blasting cap or an electric blasting cap) in an explosive train which is capable of initiating detonation in a subsequent high explosive component.

DIP TANK is a tank, vat or container of flammable or combustible liquid in which sections or materials are immersed for the purpose of coating, finishing, treating or similar processes.

DISPERSAL AREA, SAFE is an area which will accommodate a number of persons equal to the total capacity of the stand and building which it serves such that a person within the area will not be closer than 50 feet from the stand or building. Dispersal area capacity shall be determined by allowing 3 square feet of net clear area per person.

D.I.S.S. DIAMETER INDEX SAFETY SYSTEM is the system outlined in Compressed Gas Association Pamphlet V-5.

DISTILLERY is a plant or that portion of a plant where liquids produced by fermentation are concentrated and where the concentrated products may also be mixed, stored or packaged.

DISTRIBUTING PLANT: A facility, the primary purpose of which is the distribution of gas, and which receives LP-Gas in tank car, truck transport or truck lots, distributing this gas to the end use by portable container (packaged) delivery, by tank truck or through gas piping. Such plants have bulk storage (2,000 gallons water capacity or more) and usually have container filing and truck loading facilities on the premises. Bulk plants are considered as being in this category. Normally no person other than plant management or plant employees have access to these facilities.

DISTRIBUTING POINT: A facility other than a distributing plant or industrial plant, which normally receives gas by tank truck, and which fills small containers or the engine fuel tanks of motor vehicles on the owner of the facility or his employees have access, is considered to be a distribution point. An LP-Gas service station is one type of distributing point.

DRY CLEANING is the process of removing dirt, grease, paints and other stains from wearing apparel,

textiles, fabrics, rugs or other material by the use of nonaqueous liquids (solvents), and it shall include the process of dyeing clothes or premises. Any such facility having LP-Gas storage of 100 gallons or more water capacity, and to which persons other than the other fabrics or textiles in a solution of dye colors and nonaqueous liquid solvents.

DUST is pulverized particles which, when mixed with air in the proper proportions, become explosive and may be ignited by a flame or a spark or other source of ignition.

DWELLINGis a building occupied exclusively for residential purposes and serving not more than two housekeeping units used for cooking, living or sleeping purposes.

DWELLING UNIT is any building or portion thereof which contains living facilities, including provisions for sleeping, eating, cooling and sanitation as required by this Code, for not more than one family.

EGRESS: See **MEANS OF EGRESS**.

ELECTRICAL FIRE CODE is the National Electrical Fire Code promulgated by the National Fire Protection Association.

ELECTRICAL BLASTING CAP is a shell containing a charge of detonating compound designed to be fired by an electric current.

ELECTROSTATIC FLUIDIZED BED is a container holding powder coating material which is aerated from below so as to form an air-supported expanded cloud of such material which is electrically charged with a charge opposite to the charge of the object to be coated. Such object is transported through the container immediately above the charges and aerated materials in order to be coated.

EXISTING: That which is already in existence at the date when this Fire Code goes into effect, as, existing buildings, structures or exit facilities.

EXIT: See **MEANS OF EGRESS**.

EXIT ACCESS: See **MEANS OF EGRESS**.

EXIT COURT is a yard or court providing egress to a public way for one or more required exits.

EXIT DISCHARGE: See **MEANS OF EGRESS.**

EXIT PASSAGEWAY is an enclosed means of egress connecting a required exit or exit court with a public way.

EXPLOSION is an effect produced by the sudden violent expansion of gases, which may be accompanied by a shockwave and/or disruption of enclosing materials or structures. An explosion may result from: (1) Chemical changes such as rapid oxidation (deflagration), decomposition of molecules and runaway polymeriation (usually detonations); (2) physical changes (e.g. pressure tank ruptures), or (3) atomic changes (nuclear fission or fusion).

EXPLOSIVEis any chemical compound or mechanical mixture that is commonly used or intended for the purpose of producing an explosion, that contains any oxidizing and combustible units or other ingredients in such proportions, quantities, or packing, that an ignition by fire, by friction, by concussion, by percussion or by detonator of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects or of destroying life and limb.

FIRE APPARATUS is a vehicle such as a fire pumper, aerial ladder truck, elevated platform, rescue squad, fire boat or similar firefighting or rescue equipment.

FIRE APPLIANCE is apparatus or equipment provided or installed for use in the event of an emergency.

FIRE ASSEMBLY is the assembly of a fire door, fire window, or fire damper, including all required hardware, anchorage, frames and sills.

FIRE BARRIER is a line or barricade designed to keep unauthorized persons out of the area of a fire.

FIRE CHIEF: See **CHIEF**

FIRE DEPARTMENT is any regularly organized fire department, fire protection district or fire company regularly charged with the responsibility of providing fire protection to the jurisdiction.

FIRE DEPARTMENT HOSE CONNECTION is a connection through which the fire department can pump water.

FIRE DOOR is a door and its assembly so constructed and placed as to give protection against the passage of fire.

FIRE HAZARD is any thing or act which increases or may cause an increase of the hazard or menace of fire to a greater degree than that customarily recognized as normal by persons in the public service regularly engaged in prevention, suppressing or extinguishing fire; or which may obstruct, delay, hinder or interfere with the operations of the fire department or the egress of occupants in the event of fire.

FIRE LANE is a road, path or other passageways developed to allow the passage of fire apparatus through congested areas.

FIRE NUISANCE is any thing or any act which is annoying, unpleasant, offensive or obnoxious because of fire.

FIRE POINT is the lowest temperature of a liquid in an open container at which vapors are evolved fast enough to support continuous combustion.

FIRE-RESISTIVE is the ability to resist fire and prevent its spread as regulated in this Fire Code.

FIRE-RESISTIVE RATING is the time in hours that a material or construction will withstand a standard fire exposure as defined in this Fire Code and its adopted standards.

FIRE SEPARATION is construction of rated fire resistance or the maintenance of clear area to resist the spread of fire.

FIRE WINDOW is a window assembly, including frame, wired glass and hardware, which meets the fire protective requirements for the location in which it is to be used.

FIREWORKS: As defined by State of Florida.

"Fireworks" means and includes any combustible or explosive composition or substance or combination of substances or, except as hereinafter provided, any article prepared for the purpose of producing a visible or audible effect by combustion, explosion, deflagration, or detonation. The term includes blank cartridges and toy cannons in which explosives are used, the type of balloons which require fire underneath to propel them, firecrackers, torpedoes, skyrockets, roman candles, daygo bombs, and any fireworks containing any explosives or flammable compound or any tablets or other device containing any explosive substance.

"Fireworks" does not include sparklers approved by the Division of the State Fire Marshal pursuant to S. 791.013; toy pistols, toy canes, toy guns, or other devices in which paper caps containing twenty five hundredths grains or less of explosive compound are used, providing they are so constructed that the hand cannot come in contact with the cap when in place for the explosion; and toy pistol paper caps which contain less than twenty hundredths grains of explosive mixture, the sale and use of which shall be permitted at all times.

FLAME ARRESTER is a device approved for installation in piping which carries a flammable vapor/air mixture to prevent a flashback beyond the point of installation. Flame arresters installed under this definition shall be installed only in such locations specifically approved by the listing agency.

FISSILE MATERIALS are radioisotopes which may undergo a nuclear fission reaction, and are usually found only at reactor sites, or as part of a nuclear weapon.

FLAME RETARDANT is any approved chemical, chemical compound or mixture which when applied in an approved manner to any fabric or other material will render such fabric or material incapable of supporting combustion.

FLAME SPREAD is the propagation of flame over a surface.

FLAMMABLE ANESTHETIC is a compressed gas which is flammable and administered as an anesthetic and shall include among others, cyclopropane, divinyl ether, ethyl chloride, ethyl ether and ethylene.

FLAMMABLE CRYOGENIC FLUIDS are those cryogenic fluids which are flammable in their vapor state.

FLAMMABLE GAS is a gas which is flammable in mixture of 13 percent or less (by volume) with air, or the flammable range with air is wider than 8 percent, regardless of the lower limit.

FLAMMABLE LIQUID is any liquid having a flash point below 100 degrees F. and having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100 degrees F. Class I liquids shall include those having flash points below 100 degrees F. and may be subdivided as follows:

Class I-A shall include those having flash points below 73 degrees F. and having a boiling point below 100 degrees F.

Class I-B shall include those having flash points below 73 degrees F. and having a boiling point at or above 100 degrees F.

Class I-C shall include those having flashpoints at or above 73 degrees F. and below 100 degrees F.

FLAMMABLE MATERIAL is (1) any material that will readily ignite from common sources of heat; (2) any material that will ignite at a temperature of 600 degrees F. or less.

FLAMMABLE SOLID is a solid substance, other than one classified as an explosive, which is liable to cause fires through friction, or as a result of retained heat from manufacture or which has an ignition temperature below 212 degrees F., or which burns so vigorously or persistently when ignited so as to create a serious hazard. Finely divided solid material which when dispersed air as a vapor cloud may be ignited and cause an explosion are flammable solids.

FLASH POINT is the minimum temperature at which a liquid gives off vapors in sufficient concentrations to form an ignitable mixture with air near the surface of the liquid.

FLOOR AREA, GROSS gross floor area shall be the floor area within the perimeter of the outside walls of the building with no deduction for corridors, stairs, closets, thickness of wall, columns, or other features. Where the term area is used in this Fire Code, it shall be understood to be gross area unless otherwise specified. In theaters, assembly halls and similar occupancies, balconies, galleries, stages, and mezzanine floors which are not enclosed; shall be considered as adding to the floor area.

FLOOR AREA, NET net floor area shall be the actual occupied area, not including accessory unoccupied area or thickness of walls.

FLUIDIZED BED is a container holding powder coating material which is aerated from below so as to form an air-supported expanded cloud of such material through which the preheated object to be coated is immersed and transported.

FOLDING AND TELESCOPING SEATING is a structure that is used for tiered seating of persons and whose overall shape and size may be reduced, without being dismantled, for purposes of moving or storing.

FOOTBOARDS are that part of a raised seating facility other than an aisle or cross aisle upon which the occupant of the stands walks to reach a seat or upon which he may rest his feet.

FUEL BREAK is a strip or block of land on which the vegetation has been permanently modified so that fires burning into it will not propagate across it.

FUEL OIL is kerosene or any hydrocarbon oil conforming to nationally recognized standards and having a flash point not less than 100 degrees F.

FUMIGANT is any substance which by itself or in combination with any other substance emits or liberates a gas, fume or vapor used for the destruction or control of insects, fungi, vermin, germs, rodents or other pests and shall be distinguished from insecticides and disinfectants.

FUMIGATION is the use of any substance which emits or liberates a gas, fume or vapor used for the destruction or control of insects, fungi, vermin, germs, rodents or other pests, and shall be distinguished from insecticides and disinfectants.

GARAGE is a building or portion thereof in which a motor vehicle containing flammable or combustible liquids or gas in its tank is stored, repaired or kept.

GRADE: The average elevation of the ground, paved, adjoining a building or structure, at the center of each exterior wall line.

GRANDSTANDS are tiered or stepped seating facilities wherein an area of more than 3 square feet is provided for each person.

GUARD is a vertical barrier erected along exposed edges of stairways, balconies, etc.

GUEST: (a) In connection with multiple-family occupancies means a person hiring a room for living and/or sleeping purposes;

(b) In connection with single family and two family occupancies means a person sharing single-family accommodations without profit on those accommodations.

GUNPOWDER is any of various powders used in firearms and small arms ammunition as propelling charges.

HANDRAIL is a bar, pipe or similar member designed to furnish persons with a handhold. (A handrail, if of suitable design, may also serve as a part of a guard).

HAZARDOUS AREAS are areas of structures, buildings or parts thereof, used for purposes that involve combustible, flammable, or explosive products or materials which are likely to burn with extreme rapidity or which may produce poisonous fumes or gases, including highly toxic, or noxious alkalies, acids, or other liquids or chemicals which involve flame, fume, explosive, poisonous or irritant hazards.

HAZARDOUS CHEMICAL REACTION is any reaction which generates pressure or by-products which may cause injury, illness or . harm to humans, domestic animals, livestock or wildlife.

HAZARDOUS FIRE AREA is any land which is covered with grass, grain, brush or forest, whether privately or publicly owned, which is so situated or is of such inaccessible location that a fire originating upon such land would present an abnormally difficult job of suppression or would result in great and unusual damage through fire or resulting erosion. Hazardous fire areas shall be designated by the Chief on a map. This map shall be maintained in the office of the Chief.

HAZARDOUS MATERIALS are those materials, chemicals or substances which are flammable, or which may self-react or react with other materials to cause fires or explosions, or which by their presence create or augment a fire or explosion hazard, or which by their toxicity, radioactivity or any other physical, chemical or nuclear property when contained or when involved in an unauthorized release may cause danger to life or create a serious health hazard. Hazardous materials shall include such materials as compressed gases, cryogenic fluids, flammable liquids, combustible liquids, flammable solids, corrosives, oxidizing

materials, reactive and unstable materials, highly toxic, poisonous and radioactive materials as classified in Section 5240, Division whether the materials are in usable or waste condition.

HEIGHT, BUILDING is the vertical distance from grade, at the center of each exterior wall line, to the highest finished roof surface of a flat roof or to the average level of a gable or hip roof. NOTE: The berming/sloping of the ground immediately adjacent to the exterior wall lines of a building or structure, which, in the opinion of the authority having jurisdiction would reduce the effectiveness of emergency equipment and/or operations shall not be permitted.

HIGH-PILED STORAGE is combustible materials in closely packed piles more than 15 feet in height or combustible materials on pallets or in racks more than 12 feet in height. For certain special-hazard commodities such as rubber tires, plastics, some flammable liquids, idle pallets, etc., the critical pile height may be as low as 6 feet.

HIGH-RISE is any building whose height reduces the effectiveness, or nullifies the use of standard ground based emergency equipment and/or operations; and which requires special considerations given to movement of occupants, control of fire and smoke, communications, elevators, emergency planning and overall system reliability.

HIGHLY TOXIC MATERIALS are materials, including those materials classified as "Poison B" by the Department of Transportation, with a health hazard of 3 or 4 when rated in accordance with N.F.P.A. 704.

HIGHLY TOXIC PESTICIDE is any pesticide which is required by federal regulation to bear a skull and crossbones and be labeled with the word "POISON".

HIGHWAY is any public street or public road.

HORIZONTAL EXIT is a means of passage from one building into another building occupied by the sane tenant, or from one section of a building into another section of the same building occupied by the same tenant through a separation wall having a minimum fire resistance of 2 hours.

HOTELis any building containing 10 or more rooms, intended or designed to be used or which are used, rented or hired out to be occupied, or which are occupied by persons for sleeping purposes by paying guests.

HYPERGOLIC MATERIALS are any materials which are capable of igniting spontaneously upon contact with another substance.

I.C.C. CONTAINER is any container approved by the Interstate Commerce Commission for shipping any liquid, gaseous or solid material of flammable, toxic or other hazardous nature.

I.M.E. shall mean Institute of Makers of Explosives.

INCINERATORis a structure, or portion thereof, container, device or other appliance designed, used or intended to be used for the disposal of combustible rubbish by burning.

INERT is possessing little or no tendency to undergo chemical change. Unreactive.

INHABITED BUILDING is a building regularly occupied in whole or in part.

JURISDICTIONshall mean the legally constituted authority which has adopted this Fire Code as law or ordinance.

JURISDICTIONAL AREA is the Territory of the state, county, city or district adopting this South Florida Fire Code, Broward County Edition.

LABELEDis equipment or material to which has been attached a label, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling is indicated compliance with nationally recognized standards or tests to determine suitable usage in

a specified manner.

LIQUID is a material which has fluidity greater than that of 300 penetration asphalt when tested in accordance with approved standards. When not otherwise identified, the term "liquid" is both flammable and combustible liquids.

LISTED is equipment or materials included on a list published by a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states that equipment or materials meet nationally recognized standards and has been tested and found suitable for use in a specified manner.

LIQUEFIED PETROLEUM GAS (LP-GAS) is any material which is composed predominantly of the following hydrocarbons or mixtures of them: propane, propylene, butane (normal butane or isobutane) and butylenes.

LIQUEFIED PETROLEUM GAS EQUIPMENT is all containers, apparatus, piping (not including utility distribution piping system) and equipment pertinent to the storage and handling of liquefied petroleum gas. Gas-consuming appliances shall not be considered as being liquefied petroleum gas equipment.

LODGING HOUSE is any building containing less than 10 rooms, intended or designed to be used or which are used rented or hired out, or which are occupied for sleeping purposes by 2 or more paying guests.

LOW PRESSURE TANK is a storage tank designed to withstand an internal pressure of above 0.5 psig but not more than 15 psig.

MAGAZINE is any building or structure used for the storage of explosives.

MAGNESIUM is the pure metal and alloys of which the major part is magnesium.

M.C.A. shall mean the Manufacturing Chemists Association.

MEANS OF EGRESS: A means of egress is a continuous path of travel from any point in a building or structure to the open air outside at ground level and consists of three separate and distinct parts: (a) the way of exit access, (b) the exit, and (c) the means of discharge from the exit. A means of egress comprises the vertical and horizontal means of travel and may include the room space, doorway, corridor, hallway, passageway, stairs, ramps, lobby, escalator, and other paths of travel.

(a) EXIT ACCESS is that portion of a means of egress which leads to an entrance to an exit.

(b)EXIT is that portion of a means of egress which is separated from the area of the building from which escape is to be made by walls, floors, doors or other means which provide the protected path necessary for the occupants to proceed with reasonable safety to the exterior of the building at the exit discharge.

NOTE: An interior aisle, corridor, hallway or other means of travel used to reach an exit door or doorway is not an exit except where the maximum allowable distance of travel to an exit is exceeded, at which point the aisle or corridor shall be treated as part of an exit or is so located, arranged, and enclosed as to constitute an integral part of an exit facility.

(c)EXIT DISCHARGE is that portion of a means of egress between the termination of the exit at the exterior of the building and ground level.

MERCANTILE OCCUPANCY is the occupancy or use of a building or structure or any portion thereof for displaying, selling or buying of goods, wares or merchandise.

MEZZANINE is an intermediate floor placed in any story or room. When the total area of such mezzanine floor exceeds 33-1/3 percent of the total floor area in that room or story in which the mezzanine floor occurs, it shall be considered as constituting an additional story. The clear height above or below a mezzanine-floor construction shall not be less than seven feet.

MIXTURE is a variable composition of elements, compounds or both that have not combined chemically. The components of a mixture preserve their own individual identities and they can be separated by physical means.

MONOMERis a liquid or gaseous hydrocarbon or substituted hydrocarbon material, the molecules of which will under certain conditions, undergo a chain-reaction called polymerization to form large molecules called polymers. Some monomers are unstable and will spontaneously polymerize, while others require heat, pressure, a catalyst or a combination of these to initiate the reaction.

NEW is that which is constructed, erected, or installed subsequent to the date to which this Fire Code goes into effect.

N.F.P.A. shall mean the National Fire Protection Association.

NITRO-COMPOUNDis organic material, usually a hydrocarbon, which has been treated with nitric and sulfuric acid (nitrated) to produce a flammable substance containing its own oxygen source. Most will explosively decompose producing a detonation.

NONCOMBUSTIBLE shall have the same meaning as incombustible. See **INCOMBUSTIBLE**.

NONFLAMMABLE MEDICAL GAS is a compressed gas which is nonflammable and used for therapeutic purposes and shall include, among others, oxygen and nitrous oxide.

OCCUPANCYAs used in this Fire Code, pertains to and is the purpose for which a building is used or intended to be used. Occupancy is not intended to include tenancy or proprietorship.

OCCUPANCY CLASSIFICATION for the purpose of this Fire Code, certain occupancies are defined. (South Florida Building Code, Chapters 6 through 15, Part 3.

OIL-BURNING EQUIPMENT is an oil burner of any type together with its tank, piping, wiring, controls and related devices and shall include all oil burners, oil-fired units and heating and cooking appliances but exclude those exempted by Section 5233.

OIL-FIRED UNIT is a heating appliance equipped with on or more oil burners and all the necessary safety controls, electrical equipment and related equipment manufactured for assembly as a complete unit. This definition does not include kerosene stoves or oil stoves.

OPEN-AIR GRANDSTANDS AND BLEACHERS are seating facilities which are located so that the side toward which the audience faces is unroofed and without an enclosing wall.

OPERATING LINE is a group of separated operating buildings of specific arrangement used in the assembly, modification, reconditioning, renovation, maintenance, inspection, surveillance, testing or manufacturing of explosives.

ORGANIC COMPOUND is a carbon-based compound.

ORGANIC COATING is a liquid mixture of binders such as alkyd, nitrocellulose, acrylic or oil and flammable and combustible solvents such as hydrocarbon, ester, ketone or alcohol, which when spread in a thin film converts to a durable protective and decorative finish.

OUTSIDE STAIRS include stairs in which at least one side is open to the outer air.

OWNER: The term shall include his duly authorized agent, a purchaser, devisee, fiduciary, property holder or any other person, firm or corporation having a vested or contingent interest, or in case of leased premises, the legal holder of the lease contract, or his legal representative, assign or successor.

OXIDIZING MATERIALS are substances that readily yield oxygen to stimulate combustion.

PANIC HARDWARE is a bar or panel extending not less than 2/3 of the width of the door and placed at heights suitable for the service required; not less than 30 nor more than 44 inches. Such bar or panel shall cause the door latch to release when pressure, not to exceed 15 pounds is applied to the releasing device in

the direction of exit travel.

PENTHOUSE: An enclosed one-story structure extending above the roof of a building not exceeding 25 percent of the area of the roof at the level on which such penthouse or penthouses are located.

PERMANENT STANDS are those seating facilities which remain at a location for more than 30 days.

PEROXIDE FORMING CHEMICAL is a chemical which, when exposed to air will form explosive peroxides which are shock sensitive.

PERSON: A natural person, his heirs, executors, administrators, or assigns, and also includes a firm partnership, or corporation, its or their successors or assigns or the agent of any of the aforesaid.

PERSON, AMBULATORY is one who is capable of leaving a fire area within a reasonable length of time without assistance of any kind in event of an emergency.

PERSON, NON-AMBULATORY is one who is incapable of leaving a fire area within a reasonable length of time without assistance in event of an emergency.

PESTICIDE is any substance or mixture of substances, including fungicides, intended for preventing, destroying, repelling or mitigating any pest and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant. Products defined as drugs in the Federal Food, Drug and Cosmetic Act are exempt. (Also see Highly Toxic Pesticide.)

pH is a number which represents hydrogen-ion concentration or activity in gram equivalents per liter and used in expressing both acidity and alkalinity on a scale whose values run from 0 to 14, with 7 representing neutrality, numbers less than 7 increasing acidity, and numbers greater than 7 increasing alkalinity; also, the condition represented by such a manner.

PIPED DISTRIBUTION SYSTEM is a central supply system with controlling equipment and a system of piping extending to one or more points where liquids or gases are used and a suitable station outlet valve is located at each use point.

PLATFORM: A portion of an assembly room which may be raised above the level of the assembly floor and which may be separated from the assembly space by a wall and proscenium opening provided the ceiling above the platform shall be not more than five feet above the proscenium opening.

POISONOUS GAS is any gas of such nature that a small amount of the gas when mixed with air is dangerous to life. Poisonous gas shall include any material required to bear a United States Department of Transportation Poison A label and any Highly Toxic Material which is a gas at standard temperature and pressure. See definition of Highly Toxic Materials and Section 5240.

POLYMERIZATION is a chemical reaction in which two or more small molecules combine to form larger molecules that contain repeating structural units of the original unit.

PORTABLE TANK is any closed vessel having a liquid capacity over 60 U.S. gallons and not intended for fixed installation.

PRESSURE DELIVERY SYSTEM OR REMOTE PUMPING SYSTEM is any method of transferring flammable or combustible liquids from underground storage tanks to the fuel tanks of motor vehicles whenever the pump is located elsewhere other than in the dispenser. above 15 psig.

PRIMARY CONTAINMENT means the first level of containment, i.e. the inside portion of that container which comes into immediate contact on its inner surface with the material being contained.

PRIVATE STAIRWAY is a stairway serving one tenant only and for general public use.

PROCESSING PLANT is that portion of a property in which flammable or combustible liquids or other hazardous materials are mixed, heated, separated or otherwise processed as principal business, but shall not include plants defined herein as refineries.

PROPRIETARY INFORMATION means information regarding compounds or ingredients used in a process or production which do not qualify as trade secrets but which provides an industry or business with a competitive advantage.

PROSCENIUM WALL is a fire resistive wall which separates a stage or enclosed platform from the public or spectator area of an auditorium or theater.

PROTECTED COMBUSTIBLE FIBER STORAGE VAULT is a room with a capacity exceeding 1000 cubic feet separated from the remainder of the building by a two-hour occupancy separation constructed as specified in this Code and provided within an approved automatic sprinkler system.

PUBLIC CONVEYANCE is any railroad car, street car, cab, bus, airplane or other vehicle which is carrying passengers for hire.

PUBLIC LODGING — See Florida State Statutes 509.13(4a & b).

PUBLIC NUISANCE is the existence of dry and drying weeds, rubbish and waste material on property, lands or premises which are dangerous or injurious to that or neighboring property, lands or premises and which are detrimental to the welfare of the occupants or residents of the vicinity.

PUBLIC WAY is any parcel of land unobstructed from the ground to the sky, more than ten (10) feet in width, appropriated to the free passage of the general public.

PYROPHORIC MATERIALS are any materials which are capable of spontaneous ignition upon exposure to dry or moist air.

RADIOACTIVE MATERIAL is any material or combination of materials that spontaneously emits ionizing radiation.

RAILWAY is any steam, electric or other railroad or railway which carries passengers for hire.

RAMP is an inclined floor surface.

REACTIVE MATERIALS are those materials which can enter into a hazardous chemical reaction with other stable or unstable materials.

REFINERY is a plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline or other hydrocarbon sources.

REMOTE PUMPING SYSTEM: See **PRESSURE DELIVERY SYSTEM**.

REPAIR: The replacement of existing work with the same kind of material for the purpose of its maintenance, but not including additional work that would affect structural, sanitary or fire-resistive safety or facilities for means of egress.

REQUIRED is a mandatory provision of this Fire Code.

REVIEWING STANDS are elevated platforms accommodating not more than 50 persons. Seating facilities, if provided, are normally in the nature of loose chairs. Reviewing stands accommodating more than 50 persons shall be regulated as grandstands.

SADT is Self-Accelerating Decomposition Temperature.

SAFE DISPERSAL AREA: See **DISPERSAL AREA, SAFE**.

SAFETY CAN is an approved container of not over 5-gallon capacity having a spring-closing lid and spout cover.

SAFETY FACTOR is the ratio of the design burst pressure to the maximum working pressure and shall be not less than four.

SECONDARY CONTAINMENT means that level of containment that is external to and separate from primary containment.

SECURE is safe from intrusion or contained separately to prevent mixing with other materials.

SEGREGATEDis storage in the same area but physically separated from other materials by adequate space, walls or partitions and in accordance with the manufacturer's recommendations.

SELF-CLOSING as applied to a fire door or other opening protector, means normally closed and equipped with an approved device which will insure closing after having been opened for use.

SERVICE STATION, AIRCRAFT, is that portion of an airport or heliport where flammable or combustible liquids used as aircraft fuel are used and dispensed into fuel tanks of an aircraft and shall include all facilities essential thereto.

SERVICE STATION, AUTOMOTIVE: A building or portion thereof where gasoline, oil and greases are supplied and dispensed to the motor vehicle trade, also where fire, battery, washing, polishing and lubrication services are rendered and minor adjustments are made.

SERVICE STATION, MARINE, is that portion of a property where liquids used as fuels are stored and dispensed from fixed equipment on shore, piers, wharfs or floating docks into the fuel tanks of self-propelled craft and shall include all facilities used in connection therewith.

SERVICE STATION, SELF-SERVICE, See 4A-16.70 (1) State Fire Marshal Rules and Regulations.

SHALL as used in this Fire Code means mandatory.

SHOULD is intended to indicate recommendations or that which is advised but not required.

SMALL ARMS AMMUNITION is any shotgun, rifle, pistol or revolver cartridges.

SMOKE DETECTOR is a device which senses visible or invisible particles of combustion.

SMOKING is the carrying or use of lighted pipe, cigar, cigarette or tobacco in any form.

SPECIAL INDUSTRIAL HIGH EXPLOSIVE DEVICE is any explosive powerpack containing an explosive charge in the form of a cartridge or construction device. The term includes but is not limited to explosive rivets, explosive bolts, explosive charges for driving pins or studs, cartridges for explosive-actuated power tools and charges of explosives used in jet tapping of open-hearth furnaces and jet perforation, of oil well casings.

SPECIAL INDUSTRIAL HIGH-EXPLOSIVES MATERIALS are sheets, extrusions, pellets and packages of high explosives containing dynamite, trinitrotoluol, pentaerythritol tetranitrate, cyclotrimethylenetrinitrarime or other similar compounds used for high-energy-rate forming, expanding and shaping in metal fabrication and for dismemberment and quick reduction of scrap metal.

SPRAY BOOTH is a power ventilated structure of varying dimensions and construction provided to enclose or accommodate a spraying operation and to confine and limit the escape of spray vapor and residue and to exhaust it safely.

SPRAYING AREA is any area in which dangerous quantities of flammable vapors or combustible residues, dusts or deposits are present due to the operation of spraying processes.

SPRAYING ROOMS are rooms designed to accommodate spraying operations and shall comply with the South Florida Building Code requirements for a Group E, Division 2 Occupancy.

SQUIB-ELECTRICis a device similar in appearance to an electric blasting cap which, upon activation by an electric current, produces a deflagration instead of a detonation.

STAGE, GENERAL: A stage is a partially enclosed portion of an assembly room or building, cut off from the audience section of a proscenium wall, which is designed or used for the presentation of plays, demonstration, or other entertainment. Stages shall be classified as working stages or non-working stages.

STAGE, WORKING: A working stage is a partially enclosed portion of an assembly room or building, cut off from the audience section by a proscenium wall, and which is equipped with scenery loft, gridiron,

fly-gallery, and lighting equipment, and the depth from the proscenium curtain to the back wall is 15 feet or more.

STAGE, NON-WORKING: A non-working stage is a partially enclosed portion of an assembly room or building, cut off from the audience section by a proscenium wall, and which is not equipped with the equipment common to the working stage (such as fly-gallery, gridiron, scenery loft or lighting equipment) and of such dimension that any such equipment cannot be installed (but flat scenery may be used on such stage. The depth of a non-working stage shall be not more than 15 feet from the proscenium wall to the back wall.

STANDPIPE SYSTEM is a wet or dry system of piping, valves, outlets and related equipment designed to provide water at specified pressures and installed exclusively for the fighting of fires and classified as follows:

CLASS I is a wet or dry standpipe system equipped with 2 ½ inch outlets for use by fire departments or trained personnel.

CLASS II is a wet standpipe system directly connected to a water supply and equipped with 1 ½ inch outlets intended for use by the building occupants.

COMBINED SYSTEM is a system of water piping which serves 2-½ inch hose outlets for use by the fire department and also supplies water to fire sprinklers.

STORAGE the occupancy or use of a building or structure or any portion thereof for the storage of goods, wares, merchandise, raw materials, agricultural, or manufactured products, including parking garages, or the sheltering of livestock and other animals, except when classed as a high hazard occupancy.

STORY:

(a) That portion of a building included between the uppermost surface of any floor and the uppermost surface of the floor or room next above.

(b) That portion of building between floor and ceiling which is so located that more than half of the clear height from floor to ceiling is above grade.

See **BASEMENT**

(c) In a residential-type apartment occupied by a single tenant in which the area of the upper floor does not exceed two-thirds of the area of the main floor, such upper floor shall not be considered a story.

See also **MEZZANINE**

See also **PENTHOUSE**

STP(Standard Temperature and Pressure) is a temperature of 0 degrees C and an atmospheric pressure of 1 atmosphere (760mm Hg).

STREETis any public or private thoroughfare such as, but not limited to, streets, alleys, avenues, land, places, terraces, and roofs, and which is more than 20 feet in width and dedicated or deeded to the public for public use.

STREET FLOOR is any story or floor level accessible from the street or from outside the building at ground level with floor level at main entrance not more than three risers above or below ground level at these points, and so arranged and utilized as to qualify as the main floor. Where due to differences in street levels there are two or more stories accessible from the street, each is a street floor for the purpose of this Fire Code. Where there is no floor level within the specified limits for a street floor above or below ground level, the building shall be considered as having no street floor.

STRUCTUREis that which is built or constructed, or any piece of work artificially built up or composed of parts joined together in some definite manner, the use of which requires more or less permanent location

on the ground, or which is attached to something having a permanent location on the ground. The term shall be construed as followed by the words "or part thereof."

SYSTEM is any assembly of any equipment consisting of the container or containers, appurtenances, pumps, compressors and connecting piping.

TANK is a vessel containing more than 60 gallons.

TANK VESSEL is any vehicle other than railroad tank cars and boats, with a cargo tank mounted thereon or built as a integral part thereof used for the transportation of flammable or combustible liquids, LP gas, or hazardous chemicals. Tank vehicles include self-propelled vehicles and full trailers and semi-trailers with or without motive power and carrying part or all of the load.

TENT is any temporary structure, enclosure or shelter constructed of canvas or pliable material supported by any manner except by air or the contents it protects. Intended for use at a location for not more than 30 days.

TEST BLASTING CAP NO. 8 is one containing two grams of a mixture of 80 percent mercury fulminate and 20 percent potassium chlorate or a cap of equivalent strength.

THERMAL INSECTICIDAL FOGGING is the use of insecticidal liquids which are passed through thermal-fog-generating units where they are, by means of heat, pressure and turbulence, transformed and discharged in the form of fog or mist that is blown into the area to be treated.

TOXIC MATERIALS: Refer to Highly Toxic Materials.

U.L. Inc. shall mean the Underwriters Laboratories, Inc.

UNAUTHORIZED DISCHARGE means any release or emission of any material in a manner which does not conform to the provisions of this Fire Code and/or other applicable public health and safety regulations.

UNIT OF EXIT WIDTH — See NFPA, Life Safety Fire Code 101

UNPROTECTED COMBUSTIBLE FIBER STORAGE VAULT is a room with a capacity not exceeding 1000 cubic feet separated from the remainder of the building by a two hour occupancy separation constructed as specified in this Code and provided with approved safety vents to the outside.

UNSTABLE (Reactive) LIQUID is a liquid which in a pure state or as commercially produced or transported will vigorously polymerize, decompose, condense or will become self reactive under conditions of shock, pressure or temperature. See also definition of "liquid."

UNSTABLE MATERIALS are those materials, other than explosives, which in the pure state or as commercially produced will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor or in the presence of contaminants or in contact with noncompatible materials.

U.S.B.M. shall mean the United States Bureau of Mines.

VAPOR AREA is any area containing quantities of flammable vapors. The Chief may determine the extent of the vapor area, taking into consideration the characteristics of the liquid, the degree of sustained ventilation and the nature of the operations.

VAPOR BALANCE SYSTEM is a system designed to capture and retain, without processing, vapors displaced during the filling of tanks and containers or during the fueling of vehicles.

VAPOR PRESSURE is the pressure measured in pounds per square inch (absolute) exerted by a volatile fluid as determined by ASTM Standard No. D323-72, Vapor Pressure of Petroleum Products (Reid Method).

VAPOR-PROCESSING SYSTEM is a system designed to capture and/or retain vapors displaced during the filling of tanks of containers or during fueling of vehicles, and process vapors by use of mechanical

and/or chemical means. Examples are: Systems using blower assist for capturing vapors, refrigeration, absorption and combustion systems for processing vapors.

VAPOR-PROCESSING UNIT is the actual vapor-processing equipment in one contiguous unit in an isolated or separated area. The term "vapor-processing unit" shall not include such items as in-line flame arresters, in-line fire checks, pressure vacuum valves, in-line check valves or flow regulators at the dispenser.

VAPOR RECOVERY SYSTEM is a system designed to capture and retain vapors displaced during filling of tanks or containers or during the fueling of vehicles. The system may be a vapor balance system or other approved system.

VAPOR TRANSFER EQUIPMENT is the components of a vapor-processing system, a vapor balance system, or other approved system which is designed to capture, transfer and prevent emission of vapors or liquids displaced during filling of tanks or containers or during the fueling of vehicles. Examples are the vapor/liquid-dispensing nozzle, vapor transfer lines, and tank vents.

VERTICAL OPENINGS is an opening through a floor or roof.

WATER-REACTIVE MATERIALS are those materials which explode, violently react, produce flammable, toxic or other hazardous gases or evolve enough heat to cause self-ignition or ignition of nearby combustibles upon exposure to water or moisture.

WIRE GLASS where referred to shall be minimum ¼-inch thick and shall be installed in steel frames.

YARDS: Means the open spaces required adjacent to lot lines, under the Zoning Regulations, for the control of the density of building, and such yards shall be unobstructed from the ground to the sky except as provided herein.

5209 STANDARDS

For the purpose of this Code, all standards not specified herein shall be in accordance with those accepted by N.F.P.A. #101, 1985 Edition for existing and N.F.P.A. #101, 1994 Edition for new occupancies and buildings plus this Code, and the State Fire Marshal's Rules and Regulations as prescribed.

(a) This Section catalogues by name and address, those agencies, associations, institutes and others who are referred to in this Fire Code by name, initials or symbols.

(b) This Section also lists those agencies, associations, institutes and others whose technical services 0are available to owners, designers, builders and Fire Officials.

(c) This Section sets forth the date of adoption or date of reference of the Standard applicable to Chapter 52 of the South Florida Fire Prevention Code, Broward Edition.

(d) The Standards set forth in this Section are hereby adopted to supplement, but not supersede, the requirements otherwise set forth in Chapter 52 of the South Florida Fire Prevention Code, Broward Edition.

(e) The provisions of the Standards shall be applicable to only the subject of references in that portion of the Fire Code in which the Standard is referenced; and where the Standard may appear to regulate other topics specifically covered by Chapter 52 of the South Florida Fire Prevention Code, Broward Edition.

(f) Only that portion of the Standards directly applicable and where portions of the referenced documents deal with prefatory or extraneous matter such as purchaser's rights, purchasing agreements, appearance of products, test reports and similar matters, such prefatory and extraneous matter shall not be considered mandatory.

(g) Where the method of installation of equipment is not specified in this Fire Code or in the Product's Approval, the installation shall be in accordance with manufacturer's specifications or recommendations.

(A) The following standards of the National Fire Protection Association, Battery-March Park, Ma. 02269, are hereby adopted by reference as if fully set forth herein:

NOTE: The following standards marked with an "**F**" are standards for the Fire Code. All other standards will be for both Building and Fire Code.

F NFPA 10-1994	Portable Fire Extinguishers.
F NFPA 11-1994	Low Expansion Foam and Combined Agent Systems.
F NFPA 11-A-1994	Medium and High Expansion Foam Systems.
NFPA 12-1993	Carbon Dioxide Extinguishing Systems.
NFPA 12A-1992	Halon 1301 Fire Extinguishing Systems.
NFPA 12B-1990	Halon 1211 Fire Extinguishing Systems.
NFPA 13-1994	Installation of Sprinkler Systems.
NFPA 13D-1994	Sprinkler Systems in One and Two Family Dwellings and Mobile Homes.
NFPA 13R-1994	Sprinkler Systems in Residential Occupancies up to Four Stories in Height.
NFPA 14-1993	Installation of Standpipe and Hose Systems.
NFPA 15-1990	Water Spray Fixed Systems for Fire Protection. Foam-Water Spray Systems.
NFPA 16-1995	Deluge Foam-Water Sprinkler Systems and
NFPA 17-1994	Dry Chemical Extinguishing Systems.
NFPA 20-1993	Installation of Centrifugal Fire Pumps.
NFPA 22-1993	Water Tanks for Private Fire Protection.
NFPA 24-1995	Installation of Private Fire Service Mains.
NFPA 30-1993	Flammable and Combustible Liquids Code.
F NFPA 30A-1995	Automotive and Marine Service Station Fire Code.
NFPA 31-1992	Installation of Oil Burning Equipment.
NFPA 32-1990	Dry-Cleaning Plants.
NFPA 33-1995	Spray Application Using Flammable and Combustible Materials.
NFPA 34-1995	Dipping and Coating Processes Using Flammable or Combustible Liquids.
F NFPA 35-1995	Manufacture of Organic Coatings.
NFPA 37-1994	Installation and Use of Stationary Combustion Engines and Gas Turbines.
NFPA 40-1994	Storage and Handling of Cellulose Nitrate Motion Picture Film.
F NFPA 40E-1993	Storage of Pyroxylin Plastic.
F NFPA 43A-1990	Storage of Liquid and Solid Oxidizing Materials.
F NFPA 43D-1994	Storage of Pesticides in Portable Containers.
F NFPA 45-1991	Fire Protection for Laboratories Using Chemicals.
F NFPA 46-1990	Storage of Forest Products.
NFPA 50-1990	Bulk Oxygen Systems at Consumer Sites.
NFPA 50B-1994	Liquefied Hydrogen Systems at Consumer Sites.
NFPA 51-1992	Design and Installation of Oxygen Fuel Gas Systems for Welding, Cutting and Allied Processes.
NFPA 51A-1989	Acetylene Cylinder Charging Plants.
F NFPA 51B-1999	Cutting and Welding Processes.
F NFPA 52-1995	Compressed Natural Gas (CNG) Vehicular Fuel Systems.
NFPA 54-1992	Natural Fuel Gas Fire Code.
NFPA 58-1995	Storage and Handling of Liquefied Petroleum Gases.
NFPA 68-1994	Venting of Deflagrations.
NFPA 69-1992	Explosion Venting Systems.
NFPA 70-1996	National Electrical Code.
NFPA 72-1993	National Fire Alarm Code.
NFPA 75-1992	Protection of Electronic Computer-Data Processing Equipment.
NFPA 80-1995	Fire Doors and Windows.

NFPA 82-1994	Incinerators, Waste and Linen Handling Systems and Equipment.
NFPA 85C-1991	Furnace Explosions/Implosions in Multiple Burner-Boiler Furnaces.
NFPA 86-1995	Ovens and Furnaces-Design, Location and Equipment.
NFPA 88B-1991	Repair Garages.
NFPA 90A-1993	Installation of Air Conditioning and Ventilating Systems.
NFPA 90B-1993	Installation of Warm Air Heating and Air Conditioning.
NFPA 91-1995	Installation of Exhaust Systems for Air Conveying of Materials.
NFPA 92B-1995	Smoke Management Systems in Malls, Atria and Large Areas.
NFPA 96-1994	Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment (Except Chapter 10).
NFPA 97-1992	Glossary of Terms Relating to Chimneys, Vents and Heat-Producing Appliances.
NFPA 99-1996	Health Care Facilities.
NFPA 99B-1995	Hypobaric Facilities.
NFPA 101-1985	Safety to Life From Fire in (Existing) Buildings and Structures.
NFPA 101-1994	Safety to Life From Fire in (New) Buildings and Structures.
NFPA 102-1995	Assembly Seating, Tents, and Membrane Structures.
NFPA 110-1996	Emergency and Standby Power Systems.
NFPA 111-1996	Stored Electrical Energy Emergency and Standby Power Systems.
F NFPA 150-1995	Fire Safety in Racetrack Stables.
NFPA 204M-1991	Smoke and Heat Venting.
NFPA 211-1992	Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances.
NFPA 214-1992	Water Cooling Towers.
NFPA 220-1995	Types of Building Construction.
NFPA 231-1995	General Storage.
NFPA 231C-1995	Rack Storage Materials.
NFPA 231D-1994	Storage of Rubber Tires.
F NFPA 231E-1989	Storage of Bailed Cotton.
F NFPA 231F-1987	Rolled Paper Storage.
NFPA 241-1993	Construction, Alteration, and Demolition Operations.
NFPA 251-1995	Fire Tests of Building Construction and Materials.
NFPA 252-1995	Fire Tests of Door Assemblies.
NFPA 253-1995	Test for Critical Radiant Flux of Floor Covering Systems, Using a Radiant Heat Energy Source.
NFPA 255-1990	Test of Surface Burning Characteristics of Building Materials.
NFPA 256-1993	Methods of Fire Tests of Roof Coverings.
NFPA 257-1990	Fire Tests of Window Assemblies.
NFPA 303-1995	Marinas and Boatyards.
NFPA 307-1995	Marine Terminals, Piers and Wharves.
F NFPA 385-1990	Tank Vehicles for Flammable and Combustible Liquids.
F NFPA 386-1990	Portable Shipping Tanks for Flammable and Combustible Liquids.
NFPA 395-1993	Storage of Flammable and Combustible Liquids on Farms and Isolated Sites.
F NFPA 403-1993	Aircraft Rescue and Firefighting Services at Airports.
F NFPA 407-1990	Aircraft Fuel Servicing.
NFPA 409-1995	Aircraft Hangars.
NFPA 418-1995	Roof-Top Heliport Construction & Protection.
F NFPA 480-1993	Storage, Handling & Processing of Magnesium.
NFPA 491M-1991	Hazardous Chemical Reactions.
F NFPA 495-1992	Explosive Materials Code.

NFPA 497B-1991	Classification of Class II Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.
NFPA 497M-1991	Classification Gases, Vapors and Dusts for Electrical in Hazardous (Classified) Locations.
F NFPA 654-1994	Prevention of Fire and Dust Explosions in Chemical, Dye, Pharmaceutical and Plastics Industries.
NFPA 664-1993	Fire and Explosions in Wood Processing and Woodworking Facilities.
NFPA 701-1989	Methods of Fire Tests for Flame-Resistant Textiles and Films.
NFPA 703-1995	Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials.
F NFPA 704-1990	Identification of the Fire Hazards of Materials.
NFPA 907M-1988	Investigation of Fires of Electrical Origin.
NFPA 1123-1995	Outdoor Display of Fireworks.
NFPA 1221-1994	Installation, Maintenance & Use of Public Fire Service Communications Systems.
FNFPA 1963-1993	Fire Hose Connections.

5209.2 The following standards of the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018, are hereby adopted by reference as if fully set forth herein:

A17.1-1984 Safety Fire Code for Elevators and Escalators.

5209.3 The following standards of the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017, are hereby adopted by reference as if fully set forth herein.

A17.1-1984 Safety Fire Code for Elevators and Escalators.

5209.4 The following laws, regulations, rules, and ordinances, as all of same may be amended from time to time, are hereby adopted by reference as if fully set forth herein:

Chapter 633, Florida Statutes, and all the rules and regulations promulgated thereunder by the State Fire Marshal.

Chapters 527, 791, & 806, Florida Statutes, and all the rules and regulations promulgated thereunder.

5210 GENERAL PROVISIONS FOR FIRE SAFETY
LIFE SAFETY REQUIREMENTS FOR BUILDINGS

5210.1 STANDARDS

(a) The standards of the National Fire Protection Association for Life Safety from fire as provided in NFPA 101, Life Safety Code, and all appendixes (as reference and guide), shall be a part of the minimum fire safety standards required for this Fire Code. The aforesaid standard is hereby adopted in its entirety and made a part of this Fire Code by reference, with the exception of the following:

The Rules of the State Fire Marshal, with referenced and adopted standards therein, shall be applied as Uniform Fire Standards to state-owned and state-leased buildings and spaces, and all other occupancies designated by the Legislature as subject to uniform fire safety standards, including but not limited to, developmental disability group homes, hospitals, nursing homes, rest homes, correctional facilities, public schools, public lodging establishments, public food-service establishments, elevators, migrant labor camps, mobile home parks, recreational vehicle parks, residential child and non-residential care facilities and self-service gasoline stations. Exception: The Uniform Fire Safety Standards of public schools, K-12 and community colleges shall be the fire safety standards that have been adopted by the State Board of Education for new and existing facilities.

(b) The above referenced NFPA 101, Life Safety Code, is published by the National Fire Protection Association. This publication may be obtained from The National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts.

5211 FIRE PROTECTION

5211.1 AUTHORITY AT FIRES AND OTHER EMERGENCIES

(a) The Fire Chief or his duly authorized representative shall be in charge at the scene of any fire, hazardous condition, or any other emergency that endangers life or property. He shall have the power and authority to direct any and all operations to such a degree as may be necessary to control the emergency. He shall investigate all incidents of fire, hazardous conditions, and any situation that endangers life or property. In the exercise of power, the Fire Chief or his representative may prohibit any person, vehicle, vessel or thing from approaching the scene and may remove, or cause to have removed, or prohibit from entering the area, any vehicle, vessel, thing, or person, from the scene of any emergency.

This action shall be based on the Fire Chief or his representative's opinion and judgement that such person, vessel or thing will impede or interfere with the operation of emergency personnel or equipment, or would cause that person, or other persons, to be in danger of loss of life or injury or cause damage to property.

(b)INTERFERENCE WITH FIRE DEPARTMENT AND OR CERTAIN ACTS PROHIBITED AT OR NEAR FIRES

Refer to Florida State Statute 806.10.

(c)AUTHORITY TO BARRICADE

The Fire Chief or other officer of the fire department in charge at the scene of an emergency shall have the authority to place ropes, guards, barricades or other obstructions across any street, alley, place or private property in the vicinity of such operation, so as to prevent accident or interference with the lawful efforts of the fire department to manage and control the situation and to handle fire apparatus.

5211.2 GENERAL PROVISIONS

(a) TAMPERING WITH FIRE EQUIPMENT

Refer to Florida State Statute 806.10(1)

(b) FOLLOWING OR PARKING NEAR FIRE APPARATUS

Refer to Florida State Statute 316.2025.

(c) CROSSING FIRE HOSE

No vehicle shall be driven over any unprotected hose of the fire department when laid out, without the consent of the fire department official in command.

(d) TAMPERING WITH FIRE HYDRANTS OR FIRE APPLIANCES OR OBSTRUCTING FIRE HYDRANTS, UNAUTHORIZED OPERATION OF HYDRANTS

(1) Refer to Florida State Statute 806.

(2) No person shall obstruct in any manner, the use of any fire hydrant, or have or place or cause to be placed, any material in front thereof from the curb line to the center of the street, within fifteen feet (15') from either side thereof, without adequate distance to rear of hydrant for operation and maintenance. Nor shall any person open or cause to be opened, any fire hydrant without the knowledge and consent of the Fire Chief.

(e) TAMPERING WITH BARRICADES, ETC.

No person, except a person authorized by the Fire Chief or public officer acting within the scope of his public duties, shall remove, unlock, destroy, tamper with or otherwise molest in any manner, any lock, gate,

door, barricade, chain, enclosure, sign, tag or seal which has been lawfully installed by the fire department or by its order or under its control.

(f) OBSTRUCTION OF FIRE PROTECTION EQUIPMENT

(1) No person shall place or keep any post, fence, vehicle, growth, trash, storage or other material or thing near any fire hydrant, fire department connection or fire protection system control valve that would prevent such equipment or hydrant from being immediately discernible or in any other manner deter or hinder the fire department from gaining immediate access to said equipment or hydrant. A minimum three foot (3') clear space shall be maintained around the circumference of the fire hydrants except as otherwise required or approved by the Fire Chief.

(2) Siamese connection on building must be kept accessible to the fire department at all times. There shall be a space four feet (4') on both sides of the center line of the Siamese that must be kept open at all times and posted, **"NO PARKING, FIRE DEPARTMENT CONNECTION."**

(g) EMERGENCY ACCESS FOR FIRE DEPARTMENT EQUIPMENT AND OPERATIONS.

NOTE: See local jurisdiction for local requirements.

(1) Property Access

(aa) Access bridges, where provided, shall be designed to accommodate fire apparatus weighing a minimum of 32 tons.

(2) Vehicular Access

(aa) Fire department access roads shall be provided for all buildings which have a setback of more than 150 feet from a public roadway, or have a setback of more than 50 feet (50') and are more than 30 feet (30') in height.

(bb) Where possible, a building shall be accessible to all elevations for Fire Department emergency use. In all cases, a minimum of one elevation shall be made accessible.

(cc) Where possible, access roads shall extend around the perimeter of the building.

(dd) Required access roads shall be provided with the inner edge of the roadway no closer than ten feet (10') nor further than thirty feet (30') from the building.

(ee) Dead-end roads exceeding 150 feet, shall have a turning area and be of a type and size approved by the Fire Chief. Dead-ends exceeding 300 feet shall have a turning area at the closed end, no less than 100 feet in diameter.

(ff) Fire access roads shall be surfaced with solid pavement, natural or concrete stones or by grass turf reinforced by concrete grids designed to accommodate fire apparatus weighing a minimum of 32 tons.

(gg) Fire access roads shall be a minimum of twenty feet (20') in width, shall have a minimum outside turning radius of fifty feet (50') with a twelve foot (12') clear sweep and shall have posted a minimum vertical clearance of fourteen feet (14').

(hh) Buildings having ramps and/or elevated roadways shall have posted weight limit signs showing maximum load capacity.

(ii) Fire access roads shall clearly mark the placement of landscaping, ground markings, and/or signs or as otherwise specified by the Fire Chief.

(jj) Parking or obstructions, a fire access road, lane or laddering area shall be prohibited.

(kk) Fire Lane Marking. All fire access roads; lanes shall be designated by yellow painting, striping, or marking of curbs and roadway between each fire lane; sign(s)shall be provided.

(ll) Fire Lane Sign(s) shall be eighteen inches (18") by twenty-four inches (24"), white background

with red letters, stating **"NO PARKING FIRE LANE by order of the Fire/Police Department"**. These signs shall be a maximum of seven feet (7') in height from the roadway to the bottom part of the fire lane's signs. Such signs shall face the traffic flow and be no further than 75 feet apart.

(3) Laddering Areas

EXCEPTION: One (1) story, one (1) and two (2) family dwellings, not part of a development on planned community, shall be exempt.

(aa) Laddering areas shall be a minimum of twenty-four feet (24') wide for a length of twenty-four feet (24') feet and shall have a cross slope of less than five percent.

(bb) Surface construction of laddering areas shall be the same as set forth in Section 5211.2(g)(2)(ff).

(cc) Laddering areas shall be constructed with the inner edge no closer than ten feet (10') nor further than thirty feet (30') from the building.

(4) Existing Buildings. The Chief or Fire Marshal shall have the authority to require fire department access be provided for existing building for firefighting and rescue operations.

(5) Maintenance. It shall be the responsibility of the property owner to maintain fire access roads, fire lanes, and laddering areas for emergency use at all times.

(6) Approved numbers or addresses shall be placed on all new and existing buildings in such position as to be plainly visible and legible from the street or road fronting the property. Said numbers shall contrast with their background.

(h) STANDBY FIRE WATCH

(1) Whenever in the opinion of the Fire Chief it is essential for public safety in any place of public assembly or any other place where people congregate, due to the number of persons, or the nature of the performance, exhibition, display, contest or activity, the Fire Chief may require the owner, agent or lessee to employ one or more certified Fire Inspectors or Firefighters, as required and approved by the Fire Chief, to be on duty at such place. Said Fire Inspectors/Firefighters shall be subject to the Fire Chief's and/or his designee's orders at all times, when so employed, and remain on duty during the times such places are open to the public, or when such activity is being conducted. Before each performance or the start of such activity, said Fire Inspector/Firefighter shall inspect all required fire/life safety equipment, to insure that such equipment is in proper working order, and shall keep diligent watch for any emergency that should arise. Should any emergency arise, the Fire Inspector/Firefighter shall take whatever action necessary to protect the occupants and public from injury or any life threatening condition.

(2) Whenever in the opinion of the Fire Chief or his designee, it is essential for public safety in any place of public assembly or any other place where people congregate, due to the number of persons, or the nature of the performance, exhibition, display, contest or activity, the Fire Chief may require the owner, agent or lessee to employ one or more certified Paramedics or certified EMT, as required and approved by the Fire Chief, to be on duty at such place. Said Paramedic(s) or EMT(s) shall be subject to the Fire Chief's and or his designee's orders at all times when so employed and remain on duty during the times such places are open to the public, or when such activity is being conducted. Said personnel shall keep diligent watch for any emergency that should arise. Should any emergency arise, the Paramedic/EMT shall take whatever action necessary to protect the occupants and public from injury or any life threatening condition.

(i) FIRE PROTECTION LIFE SAFETY SYSTEMS AND APPLIANCE APPLICABILITY

The following Sections shall apply to new and existing conditions, except that Paragraphs (1), (m) and (o) of this Section shall not apply where equivalent or more stringent legal requirements exist.

(j) INSPECTION OF PREMISES AND SPECIFICATION OF EQUIPMENT

(1) The Fire Chief and or his designee shall cause each commercial and industrial occupancy, place of assembly, hotel, multi-family house and trailer cap inspected for compliance with this Chapter of, this Code and any Municipal, County, and State Laws.

(2) Unless specifically provided for in this Chapter, manually operated fire alarm equipment and automatic fire detection systems shall be provided as specified by the applicable provisions of the National Fire Protection Association's Life Safety Code (101), this Code, uniform Fire Safety Standard of the State Fire Marshal, pertaining to that occupancy.

(k) EQUIPMENT MAINTENANCE AND TESTING

(1) It shall be the responsibility of the owner of the property to maintain all Life Safety systems such as but not limited to, automatic sprinkler systems, fire detection and fire alarm systems, smoke removal systems, voice/fire department systems, exit stairways, exit lighting and signs, fire doors, and other items of equipment in continuous and proper operating condition.

(2) All fire extinguishing equipment, fire detecting, smoke removal, mechanical stairway systems, generator and transfer switches, emergency lighting, and any and all life safety equipment shall be tested. Tests shall be conducted at least once a year or when required by this Fire Code or this Code, the Life Safety Code (NFPA 101), or when in the opinion of the Fire Inspector having jurisdiction, a test is necessary to assure proper operation.

(3) Cost for testing of all life safety equipment, fire detecting, fire extinguishing equipment, generator and transfer switches, smoke removal equipment, mechanical ventilated stairways, and emergency lighting and exit sign shall be the responsibility of the owner.

(4) All systems shall be under the supervision of a responsible person who shall insure proper inspection/tests to be made at specified intervals, and be responsible for any alteration and/or additions as required.

(5) Gauges and cylinder of fire extinguishing equipment in kitchen hood systems shall be so located as to permit them to be inspected. All gauges and cylinders shall not be located within ceilings or other concealed spaces.

(l) SPRINKLERS REQUIRED

Approved automatic fire sprinklers systems shall be installed in all buildings as required by Section 5253 and Section 5254 herein, and this Code, Chapters 38 and 51, Uniform Fire Safety Standards, the Life Safety Code (101), and State Fire Marshal's Uniform Fire Safety Standards.

(m) STANDPIPES REQUIRED

Fire standpipe systems shall be installed in all buildings as required by Sections 5253 and 5254 herein, and Chapters 38 & 51 of this Code, the Life Safety Code (101) and State Fire Marshal's Uniform Fire Safety Standards.

(n) BUILDINGS UNDER CONSTRUCTION

Buildings under construction shall comply with the requirements of this Code, Chapter 33, and the Life Safety Code (101) and NFPA 241, Building Construction and Demolition Operations.

(o) FIRE ALARM REQUIREMENTS

If a fire alarm system and/or suppression, except for single-family and duplex residential property, is disabled for any reason, while the building is occupied, the fire department shall be notified and a watch shall be required by this Code. This watch may be satisfied by the use of fire department personnel, private security services or other responsible persons as determined by the Fire Chief.

(p) PORTABLE FIRE EXTINGUISHERS

Fire extinguishers shall be installed as required by Section 5253 herein, and Chapter 38 of this Code, and the Life Safety Code (101). Installations of fire extinguishers shall be in accordance with the standards of the National Fire Protection Association's standard for the "Installation of Portable Fire Extinguishers", #10 and #10A, are adopted as part of this Fire Code.

(q) FIRE ACCESS PANELS

Buildings having exterior walls without openings shall be provided with access panels along street fronts and walls accessible for firefighting entrance to the building as follows:

(1) In buildings not exceeding 50 feet in height, access panels shall be in every story.

(2) Not less than one panel shall be located in each accessible wall and additional panels shall be provided so there shall be not more than 250 feet horizontally between such panels.

(3) Access panels shall be identified and easily openable.

(4) The bottom of the access panel shall be not higher than 36" and not lower than 26" above the floor level and with panels removed, the opening shall be not less than 36" wide and 58" high.

(5) Exterior walls shall be considered accessible where a side or rear yard is a minimum of 10 feet in width and is permanently unobstructed.

(r) For new construction, see Sec. 3127.2(h).

5212 GENERAL PRECAUTIONS AGAINST FIRE

5212.1 OPEN BURNING

(a) BONFIRES AND OUTDOOR FIRES

(1) Permit Required. For permits to kindle or maintain any bonfire or outdoor fire, see Section 5206.

(2) Location Restricted. Federal, State, County and Municipal laws or requirements shall be adhered to.

(3) Attendance of Open Fires. Bonfires and outdoor fires shall be constantly attended by competent person until such fire is extinguished.

(b) UNAUTHORIZED FIRES

No person shall kindle a fire upon the land of another without written permission of the owner thereof or his agent.

Burning of rubbish is hereby prohibited.

(c) HOT ASHES AND OTHER DANGEROUS MATERIALS

No person shall deposit hot ashes or cinders, or smouldering coals, or greasy or oily substances liable to spontaneous ignition, into any combustible receptacle or place the same within ten feet (10') of any combustible materials, except in metal or other noncombustible receptacles. Such receptacles, unless resting on a noncombustible floor or on the ground outside the building, shall be placed on noncombustible stands, and in every case shall be kept at least two feet (2') away from any combustible wall or partition or exterior window opening.

(d) BARBECUE GRILLS AND OUTDOOR COOKING

Barbecue grills and similar cooking equipment shall not be used on balconies, terraces, roofs or porches of buildings of more than one story. They shall be used only outside and at a safe distance (no less than ten feet (10') from the nearest building.

5212.2 COMBUSTIBLE AND FLAMMABLE MATERIALS

(a) ACCUMULATIONS OF WASTE MATERIALS

Roofs, courts, yards, vacant lots and open spaces shall be kept free and clear of deposits or accumulations of waste paper, hay, grass, straw, weeds, litter or combustible waste or rubbish of any kind. All weeds, grass, vines or other growth, when the same endangers property, or is liable to be fired, shall be cut down and removed by the owner of the property.

(b) HANDLING OF READILY COMBUSTIBLE MATERIALS

No person making, using, storing or having in charge or under his control any shavings, excelsior, rubbish, sacks, bags, litter, hay, straw, saw dust or combustible waste materials shall fail or neglect at the close of each day to cause all such material which is not compactly baled and stacked in an orderly manner to be removed from the building or stored in suitable vaults or in metal or metal lined, covered receptacles or bins.

(c) STORAGE OF READILY COMBUSTIBLE MATERIALS

(1) Permit required. No person shall store in any building or upon any premise in excess of two thousand five hundred (2,500) cubic feet in gross volume of combustible empty packing cases, boxes, barrels or similar containers, or rubber tires, or baled cotton, rubber or cork, sawdust or other similarly combustible material without a permit.

(2) Storage requirement. Storage in buildings shall be orderly, shall not be within two feet (2') of the ceiling, and not so located as to endanger exit from the building. Storage in the open shall not be more than twenty feet (20') in height, shall be so located with respect to adjacent buildings as not to constitute a hazard, and shall be compact and orderly.

(d) FLAMMABLE DECORATIVE MATERIALS IN BUILDINGS OF MERCANTILE AND INSTITUTIONAL OCCUPANCY

Flammable materials such as cotton batting, straw, dry vines, leaves, trees, artificial flowers or shrubbery, foam plastic materials, and other similar materials shall not be used for decorative purposes in show windows or other parts of mercantile and institutional occupancies unless first rendered flameproof in accordance with Sec. 5215.5.

(e) AWNINGS AND CANOPIES

(1) Awnings, canopies and similar products whether attached or detached from a building shall have a flame spread rating of 25 or less.

(2) In fire zones 1 and 2 structures utilizing thatched type roofs shall be limited to 800 square feet in total area of one structure or a cluster of smaller structures which will total 800 square feet. Height of building from finished grade to roof ridge shall not exceed eighteen feet (18'). The use of walls shall be limited to one side only with three sides being open. Said structure or cluster shall have a minimum separation of thirty feet (30') from any other structure. These structures shall be rendered flameproof in accordance with Sec. 5212.5.

EXCEPTION: Exterior window covering.

(3) All heating or cooking equipment shall be installed in accordance with this Code. No open flame or other device, emitting flame or fire, shall be used in or immediately adjacent to any tent or air supported structure, while open to the public.

(f) OPEN FLAMES OR LIGHTS RESTRICTED

No person shall take an open flame or light into any building, barn, vessel, boat or any other place where flammable, combustible or explosive material are kept.

5212.3 FIRE REPORTING AND FALSE ALARMS

(a) REPORTING FIRES

(1) In the event fire occurs on any property the owner or occupant shall immediately report such fire to the fire department.

(2) A fire shall mean any fire not used for cooking, heating or recreational purposes or one not incidental to the normal operations of the property.

(b) FALSE ALARMS

(1) For the purpose of this section a fire alarm shall be deemed and construed as being any act as follows:

The giving, signaling or transmission to any public fire station or company or to any officer or employee thereof, whether by telephone, spoken word or otherwise, information to the effect that there is a fire at or near the place indicated by the person giving, signaling or transmitting such information.

(2) It shall be unlawful for any person to give, signal or transmit or for any person to cause or permit to be given, signal or transmit in any manner any false alarm.

(3) It shall be unlawful for any person to tamper with or maliciously injure any fire alarm equipment maintained for the purpose of transmitting fire alarms.

(4) Nothing in this section shall prohibit the sounding of any such signal essential for the carrying on of any fire drill. The fire department shall be notified in advance when such signals are sounded.

(c) FALSE EMERGENCY CALL; DELAY IN REPORTING PROCEDURES

(1) It shall be unlawful for any person without reasonable cause to summon by outcry, ringing of bells, or otherwise make or circulate, or cause to be made or circulated, a false alarm of fire, or to summon a fire rescue emergency medical unit, when such person knows or has reason to know that services of the fire department or the fire rescue emergency medical unit are not needed.

(2) It shall be unlawful for any person to knowingly aid or abet the commission of any such act resulting in the services of the fire department or fire rescue emergency medical unit being summoned, when their services are not required.

(3) It shall be unlawful for any person to delay reporting immediately any fire discovered, to the fire department or the police department so that firefighting and rescue apparatus may be dispatched.

(4) It shall be unlawful for any person to delay reporting immediately, any alarm of fire in a building whether by phone or alarm device.

(d) AUTOMATIC DIALING ALARMS

Fire alarm systems employing direct circuit connection with signal receiving equipment in a remote station, such as a municipal fire alarm headquarters or fire station, shall not be permitted.

5212.4 USE OF EQUIPMENT, APPLIANCES AND DEVICES

(a) ELECTRICAL WIRING AND EXTENSION CORDS

(1) MAINTENANCE. It shall be unlawful to maintain any electrical wiring appliance, apparatus or device in violation of the National Electrical Code.

(2) FIRE HAZARD. When any hazardous electrical installation exists, the use of such installation shall be discontinued immediately.

(b) MAINTENANCE OF CHIMNEYS AND HEATING APPLIANCES

(1) All chimneys, smokestacks or similar devices for conveying smoke or hot gases to the outer air and the stoves, furnaces, restaurant-type cooking equipment, incinerators, fireboxes or boilers to which they

are connected shall be used constructed and maintained in such a manner as not to create a hazardous condition.

(2) Commercial and industrial-type incinerators used for burning of rubbish or other readily combustible solid waste material and incinerators shall be provided with approved spark arrestors or other effective means for arresting sparks and flying particles.

(c) TRAPDOORS AND PULL DOWNS TO BE CLOSED

All trapdoors, and pull down stairs, except those which are automatic in their operation, in any factory building or building used for storage shall be closed at the completion of the business of each day.

(d) SHAFTWAYS TO BE MARKED

Every outside window in building used for manufacturing purposes or for storage which opens directly on any hoistway or other vertical means of communication between two (2) or more floors in such building shall be plainly marked with the word "SHAFTWAY" in red letters at least six inches (6") high on a white background. Such warning sign is to be so placed as to be easily discernible from the outside of the building. Every door or window opening on such shaftway from the interior of the building, unless the construction of the partition surrounding the shaftway is of such distinctive nature as to make its purpose evident at a glance, shall be similarly marked, with the warning word "SHAFTWAY" so placed as to be easily visible to anyone approaching the shaftway from the interior of the building.

(e) USE OF TORCHES, FLAME OR SPARK PRODUCING DEVICES

Any person using torches or other flame or spark producing devices in or on any building, structure or area shall provide one approved fire extinguisher or water hose equipped with suitable nozzle, sufficient in length to reach all portions of the building or area, and connected to a water supply on the premises where said operation is performed.

Combustible material in the close proximity shall be protected against ignition by shielding, wetting or other means. In all cases, a watch shall be maintained in the vicinity of the operation for one-half hour after the torch, flame or spark producing device has been used.

(f) VACANT BUILDINGS

Every person owning or in charge or control of any vacant building shall remove therefrom all accumulations of flammable or combustible waste or rubbish and shall securely lock, barricade or otherwise secure all doors, windows and other openings thereof.

5212.5 SMOKING PROHIBITED

(a) "Smoking" shall mean and include the carrying of lighted pipe, cigar, cigarette, tobacco, or similar substances, in any form.

(b) Where conditions are such as to make smoking a fire hazard in any area of piers, wharves, warehouses, stores, industrial plants, institutions, places of assembly and in open spaces where combustible materials are stored or handled "No Smoking" signs shall be posted in each building, structure, room or place in which smoking shall be prohibited. Smoking may be permitted in specific safe locations, in any building, structure or place in which smoking may be permitted.

(c)"No Smoking" signs of approved size lettering and location required in accordance with Sub-section (b) of this Section shall read "By Order of the Fire Chief".

(d) It shall be unlawful for any person to remove any legally required "No Smoking" sign, or to smoke in any place where such signs are posted.

5213 EXITS AND FIRE ALARM SYSTEMS

5213.1 SCOPE

Exits serving every building, structure or confined area which is used or intended to be used at any time for human occupancy, shall be maintained in accordance with this Section, Section 5201.3 and Chapter 31.

Buildings or structures which are not provided with adequate egress are unsafe and shall be subject to the procedures specified in Section 5203.2.

No exit or part thereof shall be altered in any way unless approved by the Fire Chief.

No building shall hereafter be altered, so as to reduce the capacity of the means of egress, nor shall any change of occupancy be made in any building unless such building, conforms with the requirements of the Fire Code.

Detailed regulations for means of egress in all buildings and structures shall be maintained in accordance with Sections 5213, 5254 and Chapter 31 of this Code, the Life Safety Code 101, the State Fire Marshal Rules and Regulations, and Uniform Fire Code.

Detailed regulations for fire alarm systems all buildings and structures, where required, shall be in accordance with Sections 5213 and 5254 of this Fire Code, the Life Safety Code, N.F.P.A. 101, the State Fire Marshal's Rules and Regulations, Uniform Fire Code, and the following NFPA Standards.

NFPA-71 — Installation, Maintenance and Use of Central Station Signaling Systems for Central Station Service.

NFPA-72 — Installation, Maintenance and Use of Local Protective Signaling Systems.

NFPA-72E— Automatic Fire Detectors

NFPA-74 — Installation, Maintenance and Use of Household Fire Warning Equipment.

5213.2 DETAILED REGULATIONS — MEANS OF EGRESS

For the purpose of this section, N.F.P.A. 101, 1985 is hereby adopted. Wherever there is a conflict between N.F.P.A. 101, 1985, and the South Florida Building Code, Broward County Edition, the more stringent Code shall prevail.

5214 SPECIAL OCCUPANCY USES
AIRPORTS, HELIPORTS, HELISTOPS AND AIRCRAFT HANGARS

5214.1 SCOPE

This Section shall apply to all airports, heliports, helistops, and aircraft hangars.

5214.2 COMPLIANCE

Airports, heliports, helistops, and aircraft hangars shall meet the applicable standards as set forth in the following pamphlets:

NFPA 403, Aircraft Rescue and Firefighting Services at Airports and Heliports

NFPA 407, Aircrafts Fuel Servicing

NFPA 409, Aircraft Hangars

NFPA 418, Rooftop Heliport Construction and Protection

5214.3 MAINTENANCE

(a) Inspection of premises and, maintenance of equipment shall be as set forth in Sections 5211.2(j) and (k) Code.

(b) Helistop. No dispensing, transfer or storage of flammable or combustible liquids shall be permitted at a helistop.

(c) Federal Aviation Approval. Before operating helicopters from helistops and heliports, approval must be obtained from the Federal Aviation Agency.

5215 ASSEMBLIES, PLACES OF (GENERAL)

5215.1 PERMITS

For permits to operate a place of assembly, see Section 5206.1.

5215.2

(a) No place of assembly, shall be maintained, operated or used as such without a permit, except that no permit shall be required for any place of assembly used solely as a place of religious worship. A valid certificate of use and occupational license will constitute an adequate permit hereunder.

(b) No place of assembly which has received approval and licenses to operate for one purpose shall change the use of the occupancy for any other assembly purpose without first obtaining a permit form the fire department for such use.

5215.3 ATTENDANT

Every place of assembly shall be under the constant supervision of a competent adult on the premises during the time that the premises are open to the public.

5215.4 GENERAL

PURPOSE: For the purpose of this section, N.F.P.A. 101, 1985, is hereby adopted. Wherever there is a conflict between N.F.P.A. 101, 1985, and the South Florida Building Code, Broward County Edition, the more stringent code shall prevail.

5215.5 DECORATIVE MATERIALS

(a) No decorative material shall be used which, as applied, will ignite and allow flare to spread over the surface, or allows burning particles to drop when exposed to a match flame test applied to a piece removed from the material and tested in a safe place. The piece shall be held in a vertical position and the bottom edge exposed to a flame from a common match held in a horizontal position, one-half inch underneath the piece, and at a constant location for a minimum of fifteen (15) seconds.

(b) Treatments used to accomplish this flameproofing shall be renewed as often as may be necessary to maintain the flameproof effect.

(c) There shall not be suspended from or across any ceiling, draperies, mirrors or like material, in such a manner that in the event of fire or other calamity such material could drop and in so doing endanger the occupants thereof or interfere with the operation of the fire department. Only those materials approved by the fire prevention bureau, building division and/or current ruling of a recognized laboratory "Building Materials List" shall be permitted, when installed in an approved manner.

(d) Exit doors, lights and fire suppression and life safety, systems shall not be concealed or obstructed by any decorative material.

5215.6 PYROXYLIN-COATED FABRIC

Pyroxylin-coated fabric used as a decorative material in accordance with Section 5215.5 or a surface covering on fixed furnishings, shall be limited in amount to the following:

Such fabric containing 1.4 ounces or more of cellulose nitrate per square yard shall not be used in excess of a total amount equivalent to 1 square foot of fabric surface to 15 cubic feet of room volume. Each square foot of such fabric which contains 1.7 ounces or more of cellulose nitrate per square yard shall be counted as 2 square feet in making this computation.

(May be measured by folding a piece to five thicknesses and measuring to see if the thickness of five layers exceeds 1/8-inch).

5215.7 MOTION PICTURE SCREENS

In places of assembly, motion picture screens or screen masking shall not be used unless it is in compliance with Section 5215.5.

5215.8 ASSEMBLY SEATING

(a) Bonding of Chairs. All loose seats, folding chairs or similar seating facilities that are not fixed to the floor shall be bonded together in groups of not less than six.

EXCEPTIONS:

(1) When not more than 500 such seats, chairs or facilities are provided, bonding thereof may be deleted.

(2) The bonding of chairs shall not be required when tables are provided, as when the occupancy is used for dining or similar purposes.

(b) Securing of Chairs, Folding and Telescoping Seat seating, Reviewing Stands, Grandstands, and Bleachers. Refer to Section 10 and N.F.P.A. 102, Assembly Seating, Tents and Membrane Structures.

5215.9 PLAN OF EXITWAYS AND AISLES

A plan indicating seating arrangements, capacity, location and width of exitways and aisles leading, thereto shall be submitted for approval to the Fire Chief with an approved copy on display in the premises at all times.

5215.10 MAXIMUM OCCUPANT LOAD

(a) Posting of Room Capacity. In accordance with Section 5213.

(b) Overcrowding. No person shall permit overcrowding or admittance of any person beyond the approved capacity of any place of public assembly. Overcrowding conditions or obstruction in aisles, passageways or other means of egress; or any condition which constitutes a serious menace to life, shall be just cause for the performance, presentation, spectacle or entertainment to be stopped until such condition or obstruction is corrected.

5215.11 USE OF CANDLES AND OPEN FLAME, PERMITS

(a) For permits to use candles or open flames in assembly areas, see Section 5206.1.

(b) The use of open flame, burning candles, dry ice and smoke-making machines, shall not be permitted unless specifically approved by the Fire Chief.

5215.12 FIRE CONTROL

It shall be the duty of the owner and tenant of each building, or part of a building, occupied as a place of assembly to properly train sufficient regular employees in the use of fire appliances so that such appliances can be quickly placed into operation.

5215.13 STANDBY FIREWATCH

See Section 5211.2(h)(1).

5215.14 STANDBY RESCUE SERVICE

See Section 5211.2(h)(2).

5215.15 ASHTRAYS

Ashtrays. Where smoking is permitted, there shall be provided on each table and at other convenient places, suitable noncombustible ashtrays. Where smoking is prohibited, ashtrays shall be provided at all entrances.

5215.16 VEHICLES PARKED INSIDE PLACES OF ASSEMBLIES OR MALLS

No vehicle is to be parked inside a building used as a place of assembly. Exceptions:

(a) Vehicles parked for display purposes only.

(b) Vehicles parked temporarily for service purposes only, e.g. food distribution.

(c) When a vehicle is parked inside a place of assembly or mall, the following conditions shall be met.

(1) Fuel tanks shall be drained to less than ¼ of tank capacity.

(2) Fuel caps taped shut or fitted with a locking cap.

(3) Hot lead of battery disconnected.

5216 AUTOMOBILE WRECKING YARDS, JUNKYARDS AND WASTE-MATERIAL HANDLING PLANTS

5216.1 COMPLIANCE

Automobile wrecking yards, junkyards and waste-material handling plants shall conform to all other applicable requirements.

5216.2 OCCUPANCY AND LOCATION PERMITTED

(a) Automobile wrecking yards, junkyards and waste-material handling plants are prohibited unless specifically permitted within the jurisdictional area.

(b) If permitted, automobile wrecking yards, junkyards, and waste-material handling plants shall be located as not to endanger adjoining or adjacent properties.

5216.3 BURNING

The burning of wrecked or discarded automobiles or any parts thereof or junk or any waste material is prohibited, unless specifically permitted within the jurisdictional area.

5216.4 CONSTRUCTION AND PROTECTION

(a) Handling and storage of large quantities of wastepaper, rags or other combustible materials shall not be permitted in buildings of Type III, IV, or V construction unless the building is sprinklered. Vertical openings shall be enclosed in an approved manner.

(b) Packing rooms shall be separated from storage rooms by construction having a fire-resistive rating of not less than one (1) hour, with each opening protected with an approved fire assembly. Packing rooms shall be provided with exhaust systems of sufficient capacity to adequately remove dust and lint.

5216.5 FIRE DEPARTMENT ACCESS

Fire Department accessibility shall be provided throughout the entire property in accordance with Section 5211.2(g) of this Fire Code.

5216.6 WATER SUPPLY

Water supply for fire protection and hydrant locations shall be as prescribed in Section 3804 and local ordinances, and in accordance with nationally accepted standards.

5217 BOWLING AND SIMILAR RECREATIONAL ESTABLISHMENTS

5217.1 COMPLIANCE

Bowling and similar recreational establishments shall conform to all other applicable requirements of this Fire Code and State Fire Marshals Rules and Regulations.

5217.2 LANE/COURT RESURFACING

Resurfacing operations shall not be carried on while the establishment is open for business. The bureau of fire prevention shall be notified. Proper ventilation shall be provided. Heating, ventilating or cooling

systems employing recirculation of air shall not be operated during resurfacing operations or within one (1) hour following the application of flammable finishes. All electric motors or other equipment in the area which might be a source of ignition shall be shut down All smoking and use of open flames is prohibited during the application of flammable finishes and for four (4) hours thereafter.

5217.3 BOWLING PIN REFINISHING

(a) Pin refinishing involving the application of flammable finishes shall be done only in a special room meeting the provisions of this Section. Such room shall not be located below grade, nor shall it have communication with any pits, well, pockets or basements.

(b) All power tools in such special rooms shall be effectively grounded. A substantial metal box or other receptacle shall be provided for lathes and sanding or buffing machines to catch dust thrown off during operations. Contents shall be removed daily and disposed of safely.

(c) Storage of flammable or combustible liquids in special rooms shall not exceed a combined aggregate of sixty (60) gallons and shall be in original metal containers, or in approved safety containers not exceeding five (5) gallons individual capacity. A metal waste can with self-closing cover shall be provided for all waste materials and rags, and the contents shall be removed daily. Smoking shall be prohibited at all times in refinishing rooms, and the owner of such establishment shall be held directly responsible for enforcing this no-smoking rule.

5217.4 FIRE EXTINGUISHERS

Fire extinguishers shall be provided of a type and size specified to meet the hazard.

5218 ADULT CONGREGATE LIVING FACILITIES

STANDARDS

The Uniform Fire Safety Requirements pursuant to the provisions of 87-287 Laws of Florida, for Adult Congregate Living Facilities, Life Safety Code 101, and the South Florida Building Code, Broward County Edition shall be the requirements for this Fire Code, and the most stringent shall apply.

5219 DAY CARE FACILITIES

5219.1 CHILD STANDARDS

The Uniform Fire Safety Requirements, pursuant to the provisions of 87-287 Laws of Florida, for Child Care Facilities, Life Safety Code 101 and the South Florida Building Code shall be the requirements for this Fire Code, and the most stringent shall apply.

5219.2 ADULTS SCOPE

This division covers persons eighteen years or older in facilities designed for the purpose of providing care, maintenance and supervision.

(a) DEFINITIONS

Adult care means the care, protection, and supervision of an adult for a period of less than 24 hours a day on a regular basis which supplements for the adult, in accordance with his individual needs, daily care, enrichment opportunities, and health supervision and for which a payment fee or grant is made for care.

(b) COMPLIANCE

Adult day-care facilities shall be in accordance with Section 5219.1, except as otherwise set forth in this division.

(c) OCCUPANT LOAD

Occupant load shall be based on 20 net square feet per person including supervisory personnel.

(d) SMOKE DETECTORS

Smoke detectors shall be required. Detectors shall be of an approved type (110 volts), shall be installed without disconnect wall switches.

5220 MARINAS, MARINE TERMINALS, PIERS, WHARVES, BOAT STORAGE FACILITIES, AND PRIVATE BOAT DOCKING FACILITIES

5220.1 COMPLIANCE

(a) All marine facilities shall conform to the requirements of this Fire Code, Section 5239 Flammable and Combustible Liquids, and Section 5253 Fire Extinguishing Apparatus.

(b) N.F.P.A. #303, Fire Protection Standard for Marinas and Boatyards and N.F.P.A. #307, Construction and Fire Protection of Marine Terminals, Piers and Wharves, are hereby adopted in their entirety as part of this Fire Code.

5221 SERVICE OR REPAIR GARAGES

5221.1 CLEANING WITH FLAMMABLE LIQUIDS

No Class I liquid shall be used in any garage for washing parts or removing grease or dirt unless in a special closed machine approved for the purpose or in a separate, well ventilated room enclosed by walls having a fire resistance rating of not less than two (2) hours with openings therein protected by approved fire doors or fire windows, and with no opening from such room to any upper or lower story. Exhaust ventilation shall be provided to produce one complete change of air every ten (10) minutes.

5221.2 HANDLING OF GASOLINE AND OILS

(a) The fuel tanks of motor vehicles shall be filled directly through hose from approved pumps attached to approved portable tanks or drawing from underground storage tanks. Storage and handling of flammable or combustible liquids shall conform to Section 5239. The transfer of gasoline in any garage shall not be made in open container.

5221.3 FIRE EXTINGUISHERS

Fire extinguishers or other extinguishing apparatus shall be provided as prescribed in N.F.P.A. 10, Portable Fire Extinguishers.

5222 LUMBER YARDS AND WOODWORKING PLANTS

5222.1 OPEN YARD STORAGE

Standards for Recommended Safe Practices for Storage of Forest Products, NFPA 46, is hereby adopted in its entirety as a minimum requirement of this Chapter.

5222.2 WOODWORKING PLANTS

N.F.P.A. 664, Fire and Explosions in Wood Processing and Woodwork Facilities, is hereby adopted in its entirety as part of this Fire Code.

5223 TIRE REBUILDING PLANTS

5223.1 COMPLIANCE

Tire rebuilding plants shall conform to all other applicable requirements of this Fire Code as well as to the following provisions.

5223.2 CONSTRUCTION AND PROTECTION

Tire rebuilding plants shall comply with the requirements of this Code as to construction, separation and protection.

5223.3 BUFFING OPERATIONS

Buffing machines shall be located in a room separated from the remainder of the plant by construction

having a fire resistance rating of not less than one (1) hour, with each door opening protected by an approved self closing fire door.

Each machine shall be connected to an ample dust-collecting system discharging to a suitable container which shall be cleaned at frequent intervals.

5223.4 VENTILATION

Each room where rubber cement is used or mixed or flammable or combustible solvents are applied shall be equipped with mechanical or natural ventilation.

5223.5 USE AND STORAGE

Rooms for the use and storage or rubber cement and other flammable or combustible liquids shall conform to the requirements of Section 5239.

5224 FLAMMABLE FINISHES

5224.1 SPRAY FINISHES

Spraying of flammable or combustible materials shall be done in accordance with N.F.P.A. 33 "Spraying Application Using Flammable and Combustible Materials", and this Code.

EXCEPTION: Where quantity of spraying or dipping materials used in a day does not exceed two (2) quarts and the total amount of material stored does not exceed twenty (20) gallons, the Fire Chief may waive or vary these requirements, subject to the consideration of safety.

5224.2 DIP TANKS

Dipping operations, using flammable or combustible liquids shall be in accordance with N.F.P.A. 34, "Dipping and Coating Processes Using Flammable or Combustible Liquids", and this Code.

5224.3 ELECTROSTATIC APPARATUS

The minimum standards of the State Fire Marshal Rules & Regulations — Electrostatic Equipment is hereby adopted in its entirety.

5224.4 AUTOMOBILE UNDERCOATING

The minimum standards of the State Fire Marshals Rules and Regulations — Automobile Undercoating is hereby adopted in its entirety.

5225 FRUIT RIPENING PROCESSES

The minimum standards of the State Fire Marshals Rules and Regulations — Fruit Ripening Processes is hereby adopted in its entirety.

5226 FUMIGATION AND THERMAL INSECTICIDAL FOGGING

Businesses conducting fumigation and/or thermal insecticidal fogging shall notify the Fire Prevention Bureau in that jurisdiction in which the operation is to be performed, 24 hours prior to starting such operation.

EXCEPTION: In verifiable emergencies only, when twenty-four (24) hours advance notification is not possible, advance telephone or telegraph notice shall be made.

5227 MAGNESIUM

5227.1 SCOPE

This Section applies to the storage, handling and processing of magnesium, including the pure metal as well as those alloys of which the major part is magnesium.

5227.2 DEFINITIONS

For definition of **MAGNESIUM** see Section 5208.

5227.3 COMPLIANCE

Applications shall meet the N.F.P.A. 480, Storage, Handling and Processing of Magnesium.

5228 ORGANIC COATINGS, MANUFACTURE OF

5228.1 SCOPE

(a) This Section shall apply to (1) processes manufacturing protective and decorative finishes or coating (paints) for industrial, automotive, marine, transportation, institutional, household or other purposes, and (2) the handling of flammable and combustible liquids, certain combustible solids and potential dust explosion condition.

(b) This Section shall not apply to (1) processes manufacturing nonflammable or water-thinned coatings or (2) operations applying coating materials.

5228.2 DEFINITIONS

For definition of **ORGANIC COATING**, see Section 5208.

5228.3 COMPLIANCE

Applications shall meet the N.F.P.A. 35, Manufacture of Organic Coatings.

5229 PLASTIC PROCESSING AND FABRICATION

5229.1 SCOPE

(a) This Section shall apply to plastic and other organic peroxide processes and the storage, handling and use of the related materials.

(b) Standards adopted: The following standards of the National Fire Protection Association shall be the accepted standards required by this Fire Code:

(1) Storage, handling and use of flammable liquids shall be in accordance with Flammable and Combustible Liquids Code, N.F.P.A. 30, but shall not supersede any requirement as set forth in this Code.

(2) Installation of sprinklers shall be in accordance with Installation of Sprinkler Systems, N.F.P.A. 13.

(3) Electrical installations shall be in accordance with National Electric Code, N.F.P.A. 70.

(4) Dry chemical automatic extinguishing systems shall be in accordance with Dry Chemical Extinguishing System, N.F.P.A. 17.

(5) Carbon Dioxide extinguishing systems shall be in accordance with Carbon Dioxide Extinguishing Systems, N.F.P.A. 12.

(6) Blower and exhaust systems shall be in accordance with Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, N.F.P.A. 91.

(7) Fire hazards of the plastics manufacturing and fabricating industries N.F.P.A. 654, Prevention of Fire and Dust Explosions in the Chemical, Dye, Pharmaceutical and Plastics Industries shall supplement this Fire Code.

5229.2 PROCESS SEPARATED FROM SALES OR DISPLAY AREAS

(a) Process, lay-up and application of fiberglass shall be separated from sales or display area in a manner that is in accordance with this Code.

(b) Ceilings shall be of an approved fire resistive material in accordance with this Code, Chapter 37.

(c) Electrical tools shall be of the type designed for Class I areas as defined in N.F.P.A. 70, National Electrical Code.

(d) Grinding, buffering or other dust producing operations shall be performed with tools provided with an approved dust collecting system.

(e) Dispensing of Liquids:

(1) Class I and II flammable liquids shall not be drawn except in protected areas.

(2) Gravity discharge of Class I and II flammable liquids is prohibited except where the manufacturing process requires a gravity flow. Gravity flow shall be permitted only from vessels sufficient for not more than one (1) day operation.

5229.3 FIRE CONTROL

(a) Process, lay-up and application areas shall have an approved automatic fire protection system that is designed for high hazard occupancy as set forth in Section 5253 of this Fire Code.

(b) Carbon dioxide or dry chemical extinguishing systems shall be permitted only where such substitute may be required by a certain process.

5229.4 HOUSEKEEPING

(a) Aisles shall be kept clear and unobstructed.

(b) Hazardous waste materials shall be kept in closed containers appropriate for the use.

(c) Drippings shall not be allowed to accumulate in such a manner as to cause or contribute to the spread of fire.

(d) Flammable cleaning solvents shall be kept in an approved type of container with a self-closing lid.

5229.5 VENTILATION

In process areas or storage areas, a mechanical system of ventilation shall be installed, in accordance with the N.F.P.A. 91.

5229.6 EXITS

Exit facilities shall be provided and maintained in accordance with of this Fire Code. Precautions Against Fire, General.

5229.7 PRECAUTIONS AGAINST FIRE, GENERAL

(a) Smoking shall be prohibited and "No Smoking" signs posted in hazardous areas.

(b) Heating devices and processes producing temperature capable of igniting flammable vapors or materials shall be prohibited.

5230 WELDING OR CUTTING; ACETYLENE GENERATORS AND CALCIUM CARBIDE

5230.1 SCOPE

This Section shall apply to the use, storage, and operation of oxygen-fuel gas, gaseous fuels generated from flammable liquids under pressure, or electric arc welding or cutting, or any combination thereof and the storage of calcium carbide and gases used in welding, cutting or heat treating. The requirements of this Section shall be in accordance with federal, state, county, and municipal laws and ordinances and this Code.

(a) N.F.P.A. 51, Oxygen-Fuel Gas Systems for Welding, Cutting and Allied Processes, is hereby adopted in its entirety as part of this Fire Code.

(b) N.F.P.A. 51A, Acetylene Cylinder Charging Plants, is hereby adopted in its entirety as part of this Fire Code.

(c) N.F.P.A. 51B, Cutting and Welding Processes, is hereby adopted in its entirety as part of this Fire Code.

SPECIAL EQUIPMENT

5231 BAKING AND DRYING OVENS

5231.1 SCOPE

This Section shall apply to the location, construction, and operation of industrial baking and drying ovens which are heated with oil or gas fuel or which during operation contain flammable vapors from the products being baked or dried. It is the intent of this Section to provide requirements for the operation of these ovens within certain limitations of control depending on oven design, paint formulation and ventilation requirements, the disregard of which may cause them to function in an unsafe manner, thereby becoming liable to destruction by fire or explosion. In addition to the requirements of this Section, all industrial baking and drying ovens shall comply with the applicable provisions of NFPA 86, Ovens and Furnaces Design, Location, and Equipment.

5231.2 LOCATION AND CONSTRUCTION

(a) Ovens, oven heaters and related equipment shall be located with due regard to the possibility of fire resulting from overheating or from the escape of fuel gas or fuel oil and the possibility of damage to the building and injury to persons resulting from explosion.

(b) Ovens shall be located at or above grade, or, if in basements, at least 50 percent of the wall area of the room in which the oven is located shall be above grade.

(c) Ovens shall be so located as to be readily accessible for inspection and maintenance and with adequate clearances to permit the proper functioning of explosion vents. Roofs and floors of ovens shall be sufficiently insulated and ventilated to keep temperatures at combustible ceilings and floors below 160 degrees F.

(d) Ovens shall be constructed of noncombustible materials throughout except where the maximum oven-operating temperature is not over 160 degrees F. The amount of insulation used in oven panel construction shall be enough to prevent the outside surface temperature from exceeding 160 degrees F., or adequate guards shall be provided to protect personnel.

(e) Ovens which may contain flammable air-gas mixtures shall be equipped with relief vents for freely relieving internal explosion pressures.

(f) All duct work shall be constructed in accordance with N.F.P.A. 90A & 91.

5231.3 VENTILATION

(a) Ovens in which flammable or toxic vapors are liberated or through which products of combustion are circulated shall be ventilated by the introduction of a supply of fresh air and proper exhaust to outdoors. Discharge pipes shall not terminate within 10 feet measured horizontally from any door, window or wood frame walls of any building. Such oven ventilation shall be arranged to provide vigorous and well distributed air circulation within the oven and to insure that the flammable vapor concentration will be safely below the lower explosive limit at all times. Unless the oven is operated in accordance with specific approval specifying particular solvents and rate of ventilation, the rate of ventilation shall be not less than 10,000 cubic feet of fresh air per gallon of solvent evaporated in continuous process ovens and not less than 380 cubic feet per minute per gallon of flammable solvent evaporated in batch process ovens.

(b) Exhaust duct openings shall be located in the area of greatest concentration of vapors.

(c) All exhaust shall be by mechanical ventilation.

5231.4 SAFETY CONTROLS

(a) Safety controls, shall be sufficient in number and substantially constructed and arranged to maintain the required conditions of safety and prevent the development of fire and explosion hazards.

(b) Ventilation controls, suitably interlocked, shall be provided which will insure required ventilation of the system.

(c) Fuel safety controls, suitably interlocked and arranged to minimize the possibility of dangerous accumulations of explosive air fuel mixtures in the heating system, shall be provided.

(d) Excess temperature controls shall be provided to maintain a safe operating temperature within the oven.

(e) Conveyor interlocks shall be provided in conveyor ovens having a flammable vapor hazard, so that the conveyor cannot move unless ventilating fans are operating and discharging the required amount of air.

5231.5 FIRE CONTROL

(a) Ovens, furnaces and exhaust ducts containing or processing sufficient combustible materials to sustain a fire shall be equipped with automatic sprinklers.

(b) Approved portable fire extinguishers shall be installed near the oven, furnace, and related equipment to provide reasonable safety to persons and property. Evidence that approved portable fire extinguishers have been provided in accordance with NFPA 10, Portable Fire Extinguishers, shall be evidence that such portable fire extinguishers provide reasonable safety to persons and property.

5232 MECHANICAL REFRIGERATION

5232.1 MAINTENANCE

All refrigeration systems shall be maintained in a clean manner, free from accumulations of oil, dirt, waste and other debris, and shall be kept easily accessible at all times.

5232.2 INSTRUCTIONS

The person in charge of the premises on which a refrigeration system containing more than 50 pounds of refrigerant is installed shall place a card conspicuously and as near as practicable to the refrigerant condensing unit giving instructions for the operation of the system, including precautions to be observed in case of breakdown or leak, as follows:

(a) Instructions for shutting down the system in case of emergency.

(b) The name, address and day and night telephone numbers for obtaining service.

5232.3 EMERGENCY SIGNS

(a) Each refrigeration system shall be provided with an easily legible sign permanently attached and easily accessible, indicating thereon the name and address of the manufacturer or installer, the kind and total number of pounds of refrigerant contained in the system and the field test pressure.

(b) Systems containing more than 100 pounds refrigerant shall be provided with signs having letters not less than ½-inch in height designating the main shutoff valves to each vessel, main steam or electrical control, remote control switch and pressure-limiting device.

5232.4 AMMONIA DIFFUSION

Ammonia refrigerating plants containing more than 30 pounds of refrigerant shall be equipped with facilities for diffusing the ammonia vapors.

(a) Systems containing more than 30 pounds of refrigerant shall discharge to the outside of the building at least 2 feet above the roof and be so located that discharged refrigerants will not cause discomfort or harmful effects to persons or such discharge shall be into a tank of fresh water having a capacity of one gallon for each pound of refrigerant and used for no other purpose than ammonia absorption.

(b) Systems containing more than 100 pounds of refrigerant shall be provided with an approved fire department diffuser consisting of 2 ½-inch hose connections, mixing chamber and a permanent discharge connection to the sewer or drainage system.

(c) Control valves for diffusers shall be outside of the machinery room in a box protected against tampering. Such valve control box shall be plainly marked, **"FOR FIRE DEPARTMENT ONLY — AMMONIA CONTROL VALVES".**

5233 OIL BURNING EQUIPMENT

5233.1 SCOPE

This Section applies to oil burning equipment except combustion engines, oil lamps, and portable devices such as blow torches, melting pots and wood burners. The requirements of this Section shall be in accordance with federal, state, county, and municipal laws and ordinances and this Code

(a) N.F.P.A. 31, Installation of Oil Burning Equipment, is hereby adopted in its entirety as part of this Fire Code.

5234 SPECIAL SUBJECTS

COMBUSTIBLE FIBERS

5234.1 DEFINITION

Combustible fibers shall mean and include readily ignitable and free burning fibers, such as cotton, sisal, henequen, ixtle, jute, hemp, tow, cocoa fiber, oakum, baled waste paper, kapok, hay, straw, Spanish moss, excelsior, certain synthetic fibers, and other like materials. (Also refer to Sec. 5252 of this Fire Code).

5234.2 LOOSE STORAGE

(a) Loose combustible fibers (not in suitable bales or packages), whether housed or in open, shall not be stored within 100 feet of any building except as hereinafter specified.

(b) Not to exceed 100 cubic feet of loose combustible fibers may be kept in any building provided storage is in a metal or metal-lined bin equipped with a self-closing cover.

(c) Quantities exceeding 100 cubic feet of loose combustible fibers, but not exceeding 500 cubic feet, may be stored in rooms or compartments having floor, walls, and ceiling having a fire resistance rating of not less than one hour. Each opening into such rooms or compartments from other parts of the building shall be equipped with an approved fire door.

(d) Quantities exceeding 500 cubic feet of loose combustible fibers may be stored in approved vaults, constructed as follows:

(1) Storage vaults shall be located outside of buildings or if located inside shall be provided with approved safety vents to the outside.

(2) Walls, floors, and ceilings shall be constructed of approved noncombustible material. Roofs of outside vaults shall be of noncombustible material but may be so constructed as to readily give way in case of an internal explosion.

(3) Openings, if any between vault and main building shall be protected on each side of the wall by an approved fire door. Wall openings in outside vaults exposing other property (not sufficiently detached to be considered cut off), shall be protected by approved fire doors.

(4) Vaults located within buildings and exceeding 1,000 cubic feet storage capacity shall be protected by approved automatic sprinklers, carbon dioxide, or other approved inert gas systems.

(e) No more than 2,500 cubic feet of loose fibers may be stored in a detached building: suitably located, with openings properly protected against entrance of sparks. The "loose house" shall be used for no other purpose. Buildings shall be constructed of brick or other approved noncombustible material. Roofs of buildings shall be of noncombustible material but may be constructed as to readily give way in case of internal explosion.

5234.3 BALED STORAGE (Also refer to Sec. 5252 of this Fire Code)

(a) No single block or pile shall contain more than 25,000 cubic feet of fiber exclusive of aisles or clearances. Blocks or piles of baled fiber shall be separated from adjacent storage by aisles not less than 5 feet wide; or by flash fire barriers consisting of continuous sheets of noncombustible material extending from floor to a height of at least one foot above the highest point of the piles and projecting at least one foot beyond the sides of the piles.

(b) Sisal and other fibers in bales bound with combustible tie ropes, also jute and other fibers liable to swell when wet, shall be stored to allow for expansion in any direction without endangering building walls, ceilings or columns. Not less than 3 feet clearance shall be left between walls and sides of piles, except that if storage compartment is not more than 30 feet in width, one foot clearance at side walls will be sufficient, provided a center aisle not less than 5 feet wide is maintained.

(c) Not less than 3 feet clearance shall be maintained between sprinkler pipes and tops of piles.

5234.4 STORAGE OR AGRICULTURAL PRODUCTS

Unlimited quantities of hay, straw, and other agricultural products may be stored in or near farm buildings located outside closely built areas.

5235 COMPRESSED GASES FOR MEDICAL USE

5235.1 SCOPE

This article shall apply, to bulk oxygen systems and to the storage, handling, and use of compressed gases as defined herein. All fixed installations of nonflammable medical gases intended for sedation wherein the patient is not rendered unconscious, such as, but not limited to analgesia systems used for dentistry, podiatry and such other similar uses. Liquefied petroleum gases and compressed gases used in conjunction with welding or cutting operations are exempt from these provisions. Wherever the term "oxygen" occurs in this Section, the same requirements shall apply to systems for nitrous oxide.

The requirements of this section shall be in accordance with Federal, state, county and municipal laws and ordinances.

(a) South Florida Building Code, Broward County Edition, Chapters 46 and 48.

(b) The State Fire Marshal's Rules and Regulations, Fire Prevention — Compressed Gases, is hereby adopted in its entirety as part of this Fire Code.

(c) Cylinders shall be designed, constructed, tested and maintained in accordance with U.S. Department of Transportation (DOT) Specifications and Regulations, N.F.P.A. 99, HEALTH CARE FACILITIES, and N.F.P.A. 99B, Hypobaric Facilities, is hereby adopted in its entirety as part of this Fire Code.

5235.2 DEFINITIONS

For definitions of BULK OXYGEN SYSTEM, CENTRAL SUPPLY, D.I.S.S. DIAMETER INDEX SAFETY SYSTEM FLAMMABLE ANESTRIC, NONFLAMMABLE MEDICAL GAS AND PIPED DISTRIBUTION SYSTEM, see Section 5208.

5235.3 PERMITS

For a permit to store, handle or use flammable compressed gas or nonflammable compressed gas, see Section 5206, Permits and Certificates.

5236 CRYOGENIC FLUIDS

5236.1 SCOPE

This Section shall apply to the storage, handling and transportation of cryogenic fluids as defined herein. This Section is not intended to include liquefied petroleum gas as defined in this Fire Code.

5236.2 DEFINITIONS

For the definitions of BELOW GROUND CONTAINER, CRYOGENIC FLUIDS, CRYOGENIC IN-GROUND CONTAINER, CRYOGENIC VESSEL, FLAMMABLE CRYOGENIC FLUIDS, SAFETY FACTOR and SYSTEM, see Section 5208.

CONTAINER, as used in this Section, is any cryogenic vessel whether used for transportation or storage.

5236.3 APPROVAL OF CONTAINERS, EQUIPMENT AND DEVICES

(a) Joint approval of Fire Chief and Building Official shall be required for this Section.

(b) All containers, equipment and devices used for the storage, handling and transportation of cryogenic fluids shall be of a type, material, design, construction, and testing in accordance with nationally recognized standards.

(c) Containers, equipment or devices which are not in compliance with recognized standards for design and construction may be approved by the Fire Code Committee upon presentation of satisfactory evidence that they are designed and constructed for safe operation.

The following data shall be submitted to the Fire Code Committee with reference to the deviation from the standard with the application for approval.

(1) Type and use of container, equipment or device.

(2) Material to be stored, handled or transported.

(3) Description showing dimensions and materials used in construction.

(4) Design pressure, maximum operating pressure and test pressure.

(5) Type, size and setting of safety devices.

(6) Such other data as the Fire Code Committee may request.

5236.4 ELECTRICAL EQUIPMENT

(a) Electrical equipment shall conform to the provisions of the National Electrical Code.

(b) Lighting, including emergency lighting, shall be provided for fire appliances and operating facilities such as walkways, control valves and gages, as may be required.

5236.5 ELECTRICAL GROUNDING OR BONDING

Containers, systems and equipment used for flammable cryogenic fluids shall be grounded and/or bonded. Electrical grounding and/or bonding shall be provided by an approved system and shall comply with the National Electrical Code. Suitable means shall be taken to protect the system against corrosion, including corrosion caused by stray electrical currents.

5236.6 WARNING LABELS

Warning labels and signs shall be posted on containers and equipment and at such locations as may be prescribed by the Chief.

5236.7 DISPENSING AREAS

Dispensing of flammable cryogenic fluids, liquefied oxygen or liquid oxidizers shall be only at approved locations.

5236.8 STORAGE AREAS

Provisions shall be made in all flammable storage areas for controlling and extinguishing vent line fires.

5236.9 CONTAINER DESIGN, CONSTRUCTION AND TESTING

(a) Containers used for the storage and handling of cryogenic fluids shall be of approved materials and

design. Materials shall meet all requirements as set forth in the ASME Boiler and Pressure Vessel Code or shall be proven by test or listed in nationally recognized standards to have suitable mechanical properties for cryogenic use.

(b) Metallic containers shall be built, inspected and tested in accordance with applicable provisions set forth in the ASME Boiler and Pressure Vessel Code or with applicable provisions of API Standard 620, Recommended Rules for Design and Construction of Large, Welded, Low-pressure Storage. Tanks, depending upon temperature and pressure of product stored.

(c) Concrete containers shall be built in accordance with the applicable provisions of this Code. Barrier materials used, shall comply with the ASME Unfired Pressure Vessel Code.

5236.10 CONTAINER PRESSURE-RELIEF DEVICES

(a) All pressure containers shall be protected by a pressure relieving device or devices. If only one pressure relief device is used, it shall be set to operate at a pressure not to exceed the maximum allowable working pressure. Additional relief devices may be set to operate at a higher pressure but shall not exceed 150 percent of the maximum allowable working pressure.

(b) Containers subject to an exposure fire hazard shall be protected by pressure-relieving devices designed to protect against excessive pressure caused by fire exposure. Such devices shall be set to operate at a pressure not in excess of 110 percent of the maximum allowable working pressure and shall have a relieving capacity sufficient to prevent the pressure from rising more than 20 percent above the maximum working pressure. If only one device is used, it shall be set to operate at a pressure not to exceed the maximum allowable working pressure.

(c) Relief devices shall be located so that they are readily accessible for inspection and repair and shall be protected against tampering. All relief devices shall be so designed or located that moisture cannot collect and freeze in a manner which would interfere with proper operation of the device.

(d) No shutoff valve shall be installed between relief valves and container except that a shutoff valve may be used on multiple valve installations where the arrangement of the valves will provide full required flow through the relief devices at all times.

(e) Outer containers shall be equipped with pressurerelief devices to adequately protect the containers from excessive pressure.

(f) Heat exchangers and similar vessels shall be protected with a relieving device of sufficient capacity to avoid overpressure in cases of an internal failure.

(g) Safety relief valves shall normally be mounted in a vertical position and shall not be subject to low temperatures except when operating.

5236.11 PRESSURE-RELIEF PIPING

(a) All relief vent piping shall have at least the capacity of the relief valve and so arranged as not to unduly restrict the flow.

(b) Relief devices and/or relief device vent piping shall be so arranged that escaping gas will discharge unobstructed to the open air and not impinge on personnel, containers, equipment and structures or enter enclosed spaces.

(c) Vents shall be installed in such a manner as to exclude or remove moisture and condensation and to prevent malfunction due to freezing or icing. Drains shall be so installed as to prevent possible flame impingement on the container, piping, equipment and structures.

5236.12 INSULATION

Insulation for containers in oxygen service shall be noncombustible and shall be nonreactive with oxygen enriched air.

5236.13 MARKING ON CONTAINERS

Each container shall be identified by the attachment of a nameplate in an accessible place marked with the following information:

(a) Builder's name and date built.

(b) Nominal capacity, U.S. gallons.

(c) Maximum allowable working pressure.

(d) Maximum permissible specific gravity of liquid to be stored.

(e) Maximum level to which container may be filled with stored liquid.

(f) Maximum level to which container may be filled with water for test.

(g) Minimum temperature in degrees Fahrenheit for which container was designed.

5236.14 INSTALLATION OF ABOVE-GROUND CONTAINERS

(a) Containers shall be provided with substantial concrete or masonry foundations. Foundations and support shall be of material and design to withstand the low temperature effects of cryogenic fluid spillage. Structural steel supports, exceeding 18 inches in height, for flammable cryogenic fluid containers shall be protected with protective coating having a two-hour fire-resistive rating as specified in this Code.

(b) Horizontal containers shall be so mounted on foundations as to permit expansion and contraction. Every container shall be supported to prevent the concentration of excessive loads on the supporting portion of the shell. That portion of the container in contact with foundations or saddles shall be protected against corrosion.

(c) Secure anchorage or elevation of containers shall be provided in an area which may be subjected to flooding.

(d) Storage containers, piping, valves, regulating equipment and other accessories shall be protected against physical damage and against tampering.

(e) Containers shall be secured as may be necessary to prevent shifting or upset.

5236.15 DRAINAGE, DIKES AND WALLS FOR ABOVEGROUND CONTAINERS

(a) The area surrounding a container for cryogenic fluids shall be diked to prevent accidental discharge of fluids from endangering adjacent containers, buildings and equipment adjoining property or reaching waterways. These provisions may be altered or waived when determined by the Fire Code Committee that such containers do not constitute a hazard, after consideration of special features such as topographical conditions, nature of occupancy, proximity to buildings on the same or adjacent property, capacity and construction of containers and character of fluids to be stored.

(b) Where a drainage system is utilized to provide the required protection, such system shall comply with the following: Drainage shall be provided by a slope of not less than 1 percent away from the container towards an impounding basin or an approved means of disposal having a capacity equal to the container being served. This termination area and the route of the drainage system shall be so located that a fire occurring in the drainage system will not seriously endanger adjacent containers or property.

(c) Where diked areas are utilized to provide the required protection the following shall apply:

(1) More than one container may be installed in a single diked area, provided:

(aa) The usable volume of the enclosure shall be at least 100 percent of the capacity of the largest container enclosed.

(bb) Containers shall be elevated above grade so that cryogenic liquid will not reach the outside container wall in the event of a liquid spill, or

(cc) If cryogenic liquid can reach the outside container wall, the material that can be wetted by spilled liquid shall be suitable for use at the temperature of the liquid with the lowest normal boiling point within the enclosure.

(2) Dike walls shall be of earth or other materials compatible to the fluid stored, designed to be liquid tight and to withstand thermal shock.

(3) The dike and diked area shall be kept clean of all weeds, grass and other combustible material.

(4) Containers of cryogenic fluids shall not be located within dikes enclosing flammable or combustible liquid containers, LPG containers or compressed gas containers.

5236.16 LOCATION OF ABOVEGROUND CONTAINERS WITH RESPECT TO EXPOSURE

(a) A cryogenic fluid container or containers with an aggregate capacity in excess of 189,000 gallons (4500 bbl.) and their loading stations shall be located a minimum of 50 feet from buildings utilized for the production of such fluids. Such container or containers and their loading stations shall be located a minimum of 100 feet from above ground storage of flammable or combustible liquids and from any buildings of such construction or occupancy which constitute an exposure hazard to a container in the event of fire or explosion in said buildings. When the capacity is 189,000 gallons (4500 bbl.) or less, the distance required from above ground storage of flammable or combustible liquids and buildings which constitute an exposure hazard shall be based upon the capacity of the container or containers and the physical features of the installation, with 10 feet being the minimum distance allowed.

(b) The minimum distance from the edge of a flammable cryogenic container having a capacity in excess of 189,000 gallons to the nearest important building or group of buildings not associated with the cryogenic liquid plant or to the property line or public way shall be 200 feet, and in no case shall the distance from the dike surrounding the container or the distance from a drainage area be less than 100 feet from the nearest important building or group of buildings or the property line or public way.

(c) Containers and equipment used in the storage and handling of liquid oxygen shall be installed and maintained in accordance with N.F.P.A. 50, Bulk Oxygen Systems at Consumer Sites.

(d)A flammable cryogenic fluid container with a capacity of 189,000 gallons or less but more than 30,000 gallons shall be located not less than 100 feet from the nearest important building or group of buildings not associated with the cryogenic liquid plant or to the property line or public way, and in no case shall the distance from the dike surrounding the container or the distance from a drainage area be less than 100 feet from the nearest important building or group of buildings or the property line or public way.

(e) A flammable cryogenic fluid container with a capacity of 30,000 gallons or less shall be located in accordance with N.F.P.A. 50B, Liquefied Hydrogen Systems at Consumer Sites.

5236.17 INSTALLATION OF BELOWGROUND CONCRETE CONTAINERS

(a) Suitable test shall be conducted by qualified personnel at the site to determine whether the soil within the expected freezing zone around the container is of the frost-heave susceptible type. If it is determined that the soil is susceptible to ice-lens formation, selection backfill or sufficient width shall be placed around the vessel to prevent excessive pressure from acting on the container or suitable means taken to insure that the zone of freezing will not extend into the frost-heave susceptible soil.

(b) Belowground concrete containers shall be installed on foundations or supports of concrete, masonry piling, steel or a suitable foundation of aggregate which shall have been designed and constructed in accordance with this Code.

(c) The container storage area shall be fenced or otherwise protected where necessary. A minimum of two access openings shall be provided and they shall be sufficient size to accommodate emergency equipment.

5236.18 INSTALLATION OF CRYOGENIC IN-GROUND CONTAINERS

(a) Natural materials such as earth shall be proven to have adequate chemical and physical properties for the construction and operation of the container at the operating temperature.

(b) Containers shall be bottomed out in material naturally impermeable or made impermeable by artificial means.

(c) Any foundations, such as those for the superstructure or roof, shall be properly designed and constructed in accordance with this Code.

(d) The container storage area shall be fenced or otherwise protected where necessary. A minimum of two access openings shall be provided and they shall be of sufficient size to accommodate emergency equipment.

5236.19 LOCATION OF BELOWGROUND CONTAINERS WITH RESPECT TO EXPOSURE

The minimum distance from the edge of belowground and in ground flammable cryogenic containers to the nearest important building, property line or public way or from above ground flammable or combustible liquid storage shall be in accordance with the following table:

CONTAINER CAPACITY (GALLONS)	MINIMUM DISTANCE
Less than 500	5 feet
More than 500 to 1000	25 feet
Over 1000	50 feet

5236.20 LOCATION OF CONTAINERS WITH RESPECT TO DIKES

Containers of cryogenic fluids shall not be located within dikes enclosing flammable or combustible liquid containers, LPG containers or compressed gas containers.

5236.21 PIPING MATERIALS AND CONSTRUCTION

(a) All piping and materials such as gaskets, thread compound, etc., shall be suitable for the intended uses through the full range of pressure and temperature to which they will be subjected, maintaining a safety factor of four to one.

(b) The piping system shall be designed and constructed to provide adequate allowance for expansion, contraction vibration, settlement and fire exposure.

(c) Joints on all container piping and tubing over 2 inch nominal diameter shall be made by welding or with welding flanges. For nonflammable cryogenic fluids, joints may be screwed, welded, silver brazed or with welded flanges.

(d) Piping outside buildings may be either buried or above ground. In either case, it shall be well supported an protected against physical damage and corrosion.

(e) All piping and tubing shall be tested after installation at not less than one and one half times hydraulically or one and one-fourth times pneumatically the maximums working pressure and proven free of leaks.

5236.22 VALVES AND ACCESSORY EQUIPMENT

(a) All valves and accessory equipment shall be suitable for the intended uses at the temperatures of the application and shall be designed for not less than the maximum pressure and minimum temperature to which they may be subjected, maintaining a safety factor of four to one.

(b) Shutoff valves shall be provided on all container connections. Shutoff valves shall be located as close as practicable to the containers.

(c) All liquid and vapor connections on flammable cryogenic fluid containers, except relief and gauging connections over ½-inch pipe size, shall be equipped with check valves or a remotely controlled automatic, quick closing valve which shall remain closed except during operating periods.

(d) Shutoff valves shall be installed in the piping system as needed to limit the volume of liquids discharged in event of piping or equipment failure. Relief valves shall be installed between shutoff valves in all pipelines.

(e) All inlet connections except relief valves, liquid level gauging devices and pressure gauges on any container shall be labeled to designate whether they are connected to vapor or liquid space.

5236.23 LOADING AND UNLOADING AREA

Loading and unloading shall be performed in such a manner as not to create an unsafe condition.

(a) Movement of vehicles, starting of engines, loading and unloading operations shall be controlled by personnel responsible for this area.

(b) Loading and unloading of oxygen shall not be permitted in the vicinity of loading or unloading of gaseous or liquid fuel.

(c) Parked vehicles shall have wheel chocks in place.

5236.24 SOURCES OF IGNITION

(a) Flammable cryogenic fluids, cryogenic oxidizers, liquefied oxygen, flammable or combustible liquids shall not be loaded, unloaded, dispensed or handled where vapors may reach a source of ignition. Smoking shall be prohibited except in designated areas. "NO SMOKING" signs shall be conspicuously posted.

(b) Electric ground or bonding wires shall be connected prior to connecting transfer hoses and shall not be removed until after transfer hoses have been removed from flammable cryogenic vehicles, in accordance with N.F.P.A. 70.

5236.25 CONTAINERS — TANKS — VESSELS

Containers, tanks and vessels used for transporting cryogenic fluids shall meet all applicable requirements of the United States Department of Transportation.

5236.26 VEHICLES

Vehicles transporting cryogenic fluids and subject to requirements of this Fire Code shall:

(a) Be placarded at the front, rear and on each side identifying the product. Placards shall have letters not less than 4 inches high using approximately a inch stroke. Abbreviations shall not be used.

(b) In addition to the placard identifying the product, vehicle shall also bear other placards as may be required by the United States Department of Transportation; e.g., "FLAMMABLE GAS," "OXIDIZER," etc.

(c) Be equipped with not less than one approved-type fire extinguisher, minimum rating 20-B:C.

(d) Be equipped with adequate chock blocks.

5237 EXPLOSIVES AND BLASTING AGENTS

This section shall apply to the manufacture, possession, storage, sale, transportation and use of explosives and blasting agents. N.F.P.A. 495 Manufacture, Transportation, Storage, and Use of Explosive Materials are hereby adopted in its entirety as part of this Fire Code.

5237.2 EXCEPTIONS

(a) Nothing in this section shall be construed as applying to:

(1) The armed forces of the United States or the State militia.

(2) Explosives in forms prescribed by the official United States Pharmacopoeia.

(3) The sale, possession or use of fireworks.

(4) The possession, transportation and use of small arms ammunition.

(5) The possession, storage, transportation and use of not more than one pound of black sporting powder, 20 pounds of smokeless powder and 2000 small arms primers for hand loading of small arms ammunition for personal uses.

(6) The transportation and use of explosives or blasting agents by the United States Bureau of Mines, the Federal Bureau of Investigation, the United States Secret Service or Police and Fire Departments acting in their official capacities.

(7) Special industrial explosive devices which in the aggregate contain less than 50 pounds of explosives.

5237.3 DEFINITIONS

For definitions of BLASTING AGENT, BULLET RESISTANT, INHABITED BUILDING, EXPLOSIVES, GUNPOWDER, SPECIAL INDUSTRIAL HIGH-EXPLOSIVE MATERIAL and TEST BLASTING CAP No. 8, see Sec. 5208.

5237.4 PERMITS REQUIRED

(a) Permits shall be obtained:

(1) To manufacture, possess, store, sell or otherwise dispose of explosives or blasting agents.

(2) To transport explosives or blasting agents.

(3) To use explosives or blasting agents.

(4) To operate a terminal for handling explosives or blasting agents.

(5) To deliver to or receive explosives or blasting agents from a carrier at a terminal between the hours of sunset and sunrise.

(6) To transport blasting caps or electric blasting caps on the same vehicle with explosives.

(b) Permits required by Section 5237.4(a) of this section shall not be issued for:

(1) Liquid nitroglycerin.

(2) Dynamite (except gelatin dynamite) containing over 60 percent of liquid explosive ingredient.

(3) Dynamite having an unsatisfactory absorbent or one that permits leakage of liquid explosive ingredient under any conditions liable to exist during storage.

(4) Nitrocellulose in a dry and uncompressed condition in quantity greater than 10 pounds net weight in one package.

(5) Fulminate of mercury in a dry condition and fulminate of all other metals in any condition except as a component of manufactured articles not hereinafter forbidden.

(6) Explosive compositions that ignite spontaneously or undergo marked decomposition, rendering the products or their use more hazardous, when subjected for 48 consecutive hours or less to a temperature of 167 degrees F.

(7) New explosives until approved by the U.S. Department of Transportation, except that permits may be issued to educational, governmental or industrial laboratories for instruction or research purposes.

(8) Explosives condemned by the U.S. Department of Transportation.

(9) Explosives not packed or marked in accordance with the requirements of the U.S. Department of Transportation.

(10) Explosives containing an ammonium salt and a chlorate.

(c) No person shall keep or store, nor shall any permit be issued to keep or store, any explosives at any place of habitation or within 100 feet thereof.

(d) No person possessing a permit for storage of explosives at any place shall keep or store any greater amount or other kind of explosives than are authorized in such permit.

(e) The Fire Chief may require that any operations permitted under the provisions of Section 5237.4(a) 2 or 3 shall be supervised at any or all times by employees of the fire department designated by the Fire Chief to see that all safety and fire regulations are observed. Where, in the opinion of the Fire Chief, no undue hazard to life or property exists, the required supervision may be waived.

5237.5 BOND REQUIRED

Before a permit is issued, as required by Section 5237.4(a)(3), the applicant shall file with the jurisdiction a corporate surety bond in the principal sum of $100,000 or a public liability insurance policy for the same amount for the purposes of the payment of all damages to persons or property which arises from, or are caused by, the conduct of any act authorized by the permit upon which any legal judgment results. The Fire Chief may specify a greater or lesser amount when, in his opinion, conditions at the location of use indicate a greater or lesser amount is required. Public agencies shall be exempt from this bond requirement.

5237.6 GENERAL REQUIREMENTS

(a) The manufacture of explosives shall be prohibited unless such manufacture is authorized by the Fire Chief.

(b) The storage of explosives and blasting agents is prohibited within the limits established by law as the limits of the district in which such storage is to be prohibited, except for temporary storage for use in connection with approved blasting operations provided; however, this prohibition shall not apply to wholesale and retail stocks of small arms ammunition, explosive bolts, explosive rivets or cartridges for explosive-actuated power tools in quantities involving less than 500 pounds of explosive material.

(c) The Fire Chief may limit the quantity of explosives or blasting agents to be permitted at any location.

(d) No person shall possess, offer for sale, sell or display explosives or blasting agents at any location not authorized by permit issued by the Fire Chief.

5238 FIREWORKS

5238.1 DEFINITIONS

For definitions and state regulations of fireworks and sparklers refer to House Bill 548 adopted July 15, 1987.

5238.2 STORAGE OF SPARKLERS

(a) Sparklers shall not be stored or kept for sale in any store:

(1) In which paints, oils, or varnishes are manufactured or kept for use or sale unless the paints, oils, or varnishes are in unbroken containers.

(2) In which resin, turpentine, gasoline, or flammable substances, or substances which may generate vapors are used, stored, or offered for sale unless the resin, turpentine, gasoline, or substance is in unbroken containers.

(3) In which there is not at least one 2A-20BC fire extinguisher available in the area used for storage.

(b) When sparklers are in storage to be offered for sale at retail, a sign shall be conspicuously displayed over the entrance to the room in which the sparklers are stored which reads: "Caution Sparklers No

Smoking". No person shall be in such room while in possession of a lighted cigarette, cigar, or pipe, or open flame of any kind.

(c) Sales areas of sparklers shall not exceed 2% of the net floor space of the affected store, and in no case shall the gross weight of the displayed merchandise exceed 200 pounds. Any premises offering retail, storage, or wholesale of sparklers shall be sprinkled in accordance with N.F.P.A. 13.

(d) Storage of merchandise shall be in an approved manner and separated from other merchandise by at least one hour fire protection and a sprinkler system.

(e) Storage shall be remote from the public, and merchandising shall be conducted in an approved manner in order to control handling by the general public.

(f) All sales of sparklers and related items shall also meet the State Fire Marshal and local authorities regulations.

5238.3 STORAGE OF FIREWORKS

The storage of fireworks, except for temporary purpose during display, within the jurisdictional area may be prohibited by local zoning ordinances.

5238.4 MANUFACTURE OF FIREWORKS

The manufacture of fireworks is prohibited within Broward County.

5238.5 SALE AND DISCHARGE OF FIREWORKS

Except as hereinafter provided, it shall be unlawful for any person to store, to offer for sale, expose to store, expose for sale, sell at retail or use or explode any fireworks, provided that the Fire Chief may adopt reasonable rules and regulations for the granting of permits for supervised public displays of fireworks by municipalities, organizations, or groups of individuals. Such permits may be granted upon application to the Fire Chief to be held as provided herein and the filing of a bond by the applicant as provided hereinafter. Every such display shall be handled by a competent operator. All such displays shall be of such composition, character and so located, discharged, or fired as, in the opinion of the Fire Chief, after proper inspection, shall not be hazardous to property or endanger any persons. The Fire Chief is authorized to refuse to issue any permit when it is felt that the public safety would be endangered.

5238.6 REQUIREMENTS FOR FIREWORKS PERMIT

(a) Application for permit to operate a display of fireworks shall be made in writing to the Fire Chief at least thirty days (30) days prior to the event.

(b) Letters of application shall set forth and contain the following:

(1) The name, address and telephone number of the organization sponsoring the display.

(2) The name, address and telephone number of the Pyrotechnician. The Pyrotechnician must show competence through a reference acceptable to the Fire Chief.

NOTE: Pyrotechnician must be at least 21 years of age. Assistants must be at least 18 years of age.

(3) The date and time of day at which the display is to be held.

NOTE: Except where the Pyrotechnic Display is fixed and soundless in nature, no permits shall be issued for a display between 9:00 P.M. and 9:00 A.M. If the Pyrotechnic Display is fixed and soundless, no permit shall be issued for a display between 11:00 P.M. and 7:30 A.M. The time restrictions contained above shall not be applicable on January 1, July 4, and December 31, or any other time where specific permission to operate a display of fireworks is granted by the authority having jurisdiction.

(4) The exact location planned for the display:

(aa) No less than 200 feet from the nearest permanent building, public highway, railroad or other means of travel, and not within 500 feet of a school, theater, church, hospital, or similar institution.

(bb) No less than 50 feet from the nearest aboveground telephone or telegraph line, tree or other overhead obstruction.

(cc) The audience must be restricted behind a barrier, no less than 200 feet from the point at which the fireworks are to be discharged. Only authorized persons and those in actual charge at the display shall be allowed inside these lines or barriers during unloading, preparation, or firing of fireworks.

(5) The kind and number of fireworks to be discharge charged at the display:

(aa) Aerial Displays; size and number of each and type of bursts. (Multiple, Single, etc.)

(bb) Fixed Displays; size, type and description of these fixed displays.

(cc) Soundless Displays; Aerial or fixed and number and sizes of the displays.

NOTE: The promoter may submit a copy of his firing inventory to illustrate the above.

(6) The manner and place of storage of fireworks prior to the display.

NOTE: Before any permit for a pyrotechnic display shall be issued, the person making application shall furnish proof of financial responsibility to satisfy claims for damages to property or personal injuries arising out of any act or omission on the part of such person or any agent or employee thereof in such amount, character and form as the Chief determines to be necessary for the protection of the public. Copy of Certificate of Insurance naming local authority as additional insured. Minimum required amount $1,000,000.00 Bodily Injury. Minimum required $50,000.00 Property Damage per occurrence.

5238.7 ADDITIONAL REQUIREMENTS

(a) All fireworks that fire a projectile shall be set up so that the projectile will go into the air as nearly as possible in a vertical direction, provided that where such fireworks are to be fired beside a lake or other large body of water, they may be directed in such a manner that the falling residue from the deflagration will fall into said body of water.

(b) All mortars and racks must be secure prior to loading.

(c) A minimum of two 2A-20BC Fire Extinguishers shall be available in the area where fireworks are discharged. Additional extinguishing equipment may be required if conditions warrant.

(d) There shall be, at all times, no fewer than two operators of the display constantly on duty during the discharge, at least one of whom shall be certified.

(e) All fireworks at places of display shall be stored in manner and in a place secure from fire, accidental discharge, and theft, and in a manner approved by the Fire Chief.

(f) All fireworks that remain unfired after the display is concluded shall be immediately disposed of or removed in a manner safe for the particular type of fireworks. The debris from the discharged fireworks shall be properly disposed of by the operator before he leaves the premises.

(g) The Fire Chief may require one or more standby firewatch personnel, if conditions warrant. The expense of such personnel services shall be borne by the permit holder. Standby firewatch personnel, if required, shall be on duty from the time the fireworks are delivered at the site until the termination of the display and the removal of all fireworks and debris from the site.

(h) No fireworks display shall be held when the wind velocity is 20 miles per hour or more.

5238.8 SEIZURE OF FIREWORKS

The Fire Chief shall seize, take, remove, or cause to be removed at the expense of the owner all stocks of fireworks offered or exposed for sale, stored, or held in violation of this article.

5239 FLAMMABLE AND COMBUSTIBLE LIQUIDS

5239.1 STANDARDS

The Flammable and Combustible Liquids code, N.F.P.A. 30, the Installation of Oil Burning Equipment, N.F.P.A. 31, are hereby adopted.

5239.2 SCOPE

These provisions shall apply to new and existing buildings, equipment, and installations.

5239.3 CLASSIFICATION

(a) Flammable Liquids shall be as defined in NFPA 30.

(b) Combustible Liquids shall be as defined in NFPA 30.

(c) Any manufactured liquid or fluid commodity, such as, but limited to paint, varnish, dryer, cleaning solution and polishing liquid which contains certain flammable or combustible liquid as herein defined, shall be classified as being one of the classes defined in NFPA 30.

5239.4 DETAILED REGULATIONS — See References Chapters 4102.4(a) through 4102.4(j).

5239.5 WARNING LABELS

Warning labels shall conform with the Federal Hazardous Substance Labeling Act, applicable state laws and Identification of the Fire Hazard Materials N.F.P.A.

All flammable liquids, flammable and liquid compounds or mixtures manufactured, packaged or offered for sale shall be conspicuously marked or labeled in easily legible type which is in contrast by typography, layout or color with any other printed matter on the label.

EXCEPTION: Foods, drugs or cosmetics subject to the Federal Food, Drug and Cosmetics Act.

5239.6 WARNING SIGNS

(a) GENERAL — The Fire Chief may require warning signs as he deems necessary for the purpose of pointing out the hazards of storing or using flammable liquids.

(b) STYLE — Warning signs shall be of a durable material with red lettering on a white background and shall read DANGER FLAMMABLE LIQUIDS, to be identified as required by N.F.P.A. 704.

(c) LOCATION — Signs shall be posted in locations as directed by the Fire Chief.

5239.7 OPERATION OF HEATING, LIGHTING AND COOKING APPLIANCES

Heating, lighting or cooking appliances which utilize Class I liquids shall not be operated within a building or structure.

5239.8 UNLAWFUL SALES OF FLAMMABLE LIQUIDS

It shall be unlawful for any person to sell or offer for sale Class I or Class II liquids with a flash point of 110 degrees F., or less for the express purpose of domestic cleaning.

5239.9 CLEANING WITH FLAMMABLE LIQUID

Class I liquids and Class II liquids with a flash point below 110 degrees F. shall not be used within a building for washing parts or removing grease or dirt unless they are used in a closed machine approved for that purpose.

5239.10 WASTE PETROLEUM PRODUCTS AND FLAMMABLE OR COMBUSTIBLE LIQUIDS

Flammable or combustible liquids or any waste liquids containing crude petroleum or its by-products shall not be discharged into or upon any street, highway, drainage canal or ditch, storm drain, sewer or flood-control channel, lake or tidal waterway, or upon the ground.

5239.11 SOURCES OF IGNITION

In locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition.

5239.12 STORAGE AND DISPENSING OF FLAMMABLE LIQUIDS EXCEPT COMBUSTIBLE LIQUIDS

(a) PERMIT REQUIRED. No person shall have, store, or keep manufacture, use, sell or give away gasoline, benzene, naphtha, or other volatile substances except as provided in this section, and no permit shall be issued, where a permit is required, until after application therefore has been filed and considered, and the rules and regulations provided in this section have been complied with.

(b) APPLICATION. Application for permit shall be made to the building department of the city and the chief of the fire department in writing. Such application shall state the location of the building and the quantity of gasoline, benzene, naphtha or other volatile substance which is to be kept in storage or for sale; provided no provision in this section is intended to prohibit the carrying of gasoline in the fuel tanks of automobiles or other gasoline driven vehicles.

(c) UNDERGROUND TANKS, SIZE, DEPTH, LOCATION FOR RETAIL FILLING STATIONS, GARAGES OR ANY ESTABLISHMENTS SUPPLYING GASOLINE TO ANY GASOLINE DRIVEN VEHICLE OR EQUIPMENT. No gasoline, benzene, naphtha or other volatile substance shall be stored or kept, except in approved underground tanks, bearing the Underwriters' label, and not exceeding four thousand gallons capacity, except as hereinafter provided. The number of such approved tanks in any one location shall not exceed five. Such tanks shall not be banked less than two feet (2') apart, each tank shall be provided with a separate vent pipe on each tank, not less than one and one quarter inches in diameter, and such pipe shall extend not less than one foot six inches (1'6") above the highest part of the nearest building. Such storage shall be under the following regulations:

(1) All electrical connections around pump and tanks shall be approved by the electrical inspector.

(2) When tanks are to be installed, the same must not be less than 10 feet (10') from all walls of adjoining buildings that have basements or not less than five feet (5') from a building having no basement. The top of the tank must not be less than two feet six inches (2'6") below the grade level and covered with a concrete slab not less than six inches (6") in thickness and extending one foot six inches (1'6") over all edges of the tank. All pipe work must be uncovered until inspected by the Building, Fire and Plumbing Departments.

(3) Gasoline must be stored in underground tanks bearing an Underwriters' label. Any tank to be installed, having a storage capacity in excess of four thousand (4,000) gallons, but not more than twelve thousand (12,000) gallons, shall be jointly approved in writing by the Fire Chief, Building Official, and the director of building and zoning, after an appropriate review has been conducted. Such review includes, but is not limited to, an analysis of the proposed installation, location, distance separations, types of occupancies in the vicinity, tank corrosion protection and construction, and applicable zoning restrictions. For purpose of this Sub-section, a "location" is a parcel of land with a minimum of seventeen thousand five hundred (17,500) square feet, with a minimum street or waterway frontage of one hundred seventy five (175) feet. The maximum storage capacity of gasoline in any one location shall not exceed forty-eight thousand (48,000) gallons. When gasoline is stored in more than one location, tanks shall not be interconnected between locations. Airports may exceed the maximum storage capacity provided no single tank exceeds 25,000 gallons with a maximum capacity of 100,000 gallons per location.

(4) The maximum storage of gasoline on private property for use by the owner shall not exceed 1,000 gallons. This tank must be Underwriters approved and a permit for the installation shall be obtained from the Building Department. The installation shall be in compliance with other sections of this Fire code. Fire

extinguishing appliances required by the Fire Chief shall be installed in places designated to protect the hazard in the dispensing of such fuel. NOTE: See local jurisdiction for local requirements.

(5) Underground tanks installed in soil known to be unusually corrosive due to the conditions hereinafter set forth, shall be protected from corrosion based on evaluation and design by a Professional Engineer or Architect:

(aa) Low soil resistivity to current flow.

(bb) Very acid or very alkali soil.

(cc) Excessive anaerobic bacteria.

(dd) High water table.

(ee) Backfill and land fill areas with high organic content.

(ff) Location near waterfront areas.

(6) Underground tanks temporarily out of service shall immediately have the fill line gauge openings and pump suction capped and secured against tampering. The vent lines shall be left open. Underground tanks out of service for a period of one year, shall be removed.

(d) ONLY APPROVED PUMPS SHALL BE USED; GRAVITY FLOW PUMPS PROHIBITED. Gasoline shall be drawn from underground storage tanks by pumps bearing the label of Approved Testing Laboratory. The use of pressure systems or gravity flow type pump systems is prohibited.

(e) WARNING SIGNS OF VENDORS OF GASOLINE. Filling stations, garages, or any establishment supplying gasoline to any gasoline driven vehicle or equipment at their establishment, shall display warning signs approved by the Fire Chief. "No Smoking" signs must be displayed on each island of filling stations and in each bay.

(1) The signs must have letters at least two inches high and must be painted red on a white background.

(2) Signs must state "No Smoking".

(3) Additional signs may be required by the Fire Chief.

(f) AUTOMATIC DISPENSING UNITS. The installation and use of unattended dispensing devices for Class I flammable liquids is prohibited.

(1) MANUAL NOZZLES. The dispensing of Class I flammable liquid into the fuel tank of a vehicle or into a container shall be under the control of a competent attendant at all times, and said attendant shall be in the immediate vicinity of the vehicle or container at all times while said vehicle or container is being filled. The use of any device which permits the dispensing of Class I flammable liquids when the hand of the operator of the discharge nozzle is removed from the nozzle control lever, is hereby forbidden, except when using an automatic nozzle at an automotive service station as provided in Paragraph (2).

(2) AUTOMATIC NOZZLES. WITH LATCH-OPEN DEVICES. In lieu of being held open by hand, an approved automatic nozzle may be used for dispensing Class I liquid into the fuel tank of a vehicle. Such a nozzle shall have the latch open device as an integral part of the assembly and shall shut off the liquid reliably and positively when the gasoline tank is filled, when it falls from the filling neck of an automobile tank, when it is subject to rough usage such a dropping or lack of proper lubrication, or when an automobile is driven away while the nozzle is still in the tank. A competent attendant shall be in the immediate vicinity of the vehicle being filled by such an approved nozzle.

EXCEPTION: Self-service station pursuant to Chapter 526.141, Fla. Stat.

(g) DISPENSING OF FLAMMABLE LIQUIDS INTO PORTABLE CONTAINERS. It shall be unlawful to dispense or deliver any gasoline or other volatile flammable liquid having a flash point of less than

110 degrees Fahrenheit closed cup tester into portable containers, unless the container is of sound metal construction and has a tight closure with screwed or spring cover and is fitted with a spout or so designed that the contents can be poured without spilling. Such containers should be clearly marked with the name of the product contained therein.

(h) FLAMMABLE LIQUID STORAGE AT PORT EVERGLADES.

(1) Aboveground storage of flammable liquids shall only be permitted at Port Everglades.

(2) All flammable liquid storage tanks must be constructed, installed and maintained in accordance with the Port Everglades Authority Security Regulations.

5239.13 STORAGE AND USE OF COMBUSTIBLE LIQUIDS SHALL BE UNDER THE FOLLOWING REQUIREMENTS

(a) Where combustible liquids which do not emit a flammable vapor at a temperature of one hundred degrees Fahrenheit, are stored for private use, such as hotels, apartment buildings, laundries, bakeries and restaurants, they shall be stored in approved tanks as follows:

(1) If underground installation, it shall be according to the regulations governing the installation of gasoline tanks. Such tanks shall not exceed 4,000 gallon capacity. Vent pipes shall terminate outside the building at a point not less than three feet measured vertically or horizontally from any window or other building opening, and sufficiently above the ground to prevent their being covered with water, but in no case less than four feet above the ground.

(2) If aboveground installation, it may be stored in an approved tank having a capacity up to 550 gallons, or in an approved fire resistive tank enclosure assembly, in accordance with Sub-section 5239.15. Tanks having a capacity up to 275 gallons may be installed adjacent to buildings or the line of adjoining property. Tanks having a capacity of 276 gallons to 550 gallons shall be installed not less than five feet (5') from buildings or the line of adjoining property.

(b) Suitable pumps shall be provided to pump oil from the storage tanks to the burners, and such pumps shall be arranged so that dangerous pressure will not be produced in any part of the system.

(c) Combustible liquids storage for private use for dwellings may be stored in any underground or aboveground approved tank having a capacity up to 550 gallons. Tanks having a capacity up to 275 gallons may be installed adjacent to buildings or the line of adjoining property. Tanks having a capacity of 276 gallons to 550 gallons shall be installed not less than five feet from buildings or the line of adjoining property. Tanks with a capacity of 100 gallons or more shall be supported on iron pipe legs, or concrete cradle, set on a four inch (4") concrete pad so constructed as to be six inches (6") larger in length and width than the dimensions of the tank. Tanks with a capacity of less than 100 gallons may be securely fastened to the building with fabricated steel wall brackets one-fourth inch (¼") thick by two inches (2") wide, spaced a minimum of two feet (2') on center.

Tanks are to be set level, and if shims are required under one or more legs, pieces of metal must be employed; wood shims are not permitted.

A shut-off valve shall be provided in the burner supply line immediately adjacent to the gravity feed connection of a supply tank.

A tank shall be provided with a gauge to determine the liquid level. The fill opening shall be of such size and so located as to permit ready filling in a manner which will avoid spillage.

(d) Combustible liquids burning system for oil use shall be equipped with antiflooding devices. Such systems shall bear the label of an Approved Testing Laboratory. Delivering combustible liquids from tanks by pressure is prohibited, unless equipped with power pump on wagon. All piping, appliances, and other installations for use with combustible liquids shall comply with, and shall be installed, maintained and

regulated in conformity with, the recommendations of the National Fire Prevention Association as set forth in N.F.P.A. 31, and supplements thereto.

(e) Combustible liquid tank fill pipes shall be placed in the curb or other suitable places, and flush with such curb, so that fuel oil tank wagons, or any part of their equipment, shall not obstruct the sidewalk while making deliveries.

(f) Where combustible liquids of the above specifications is stored for private use for such as power plants, ice plants and other industrial plants, they may be installed above ground, according to the following table:

Capacity in gallons	To line of adjoining unprotected building or property which may be built upon	To line of adjoining protected buildings	To line of existing frame buildings
1,000	12 feet	8 feet	20 feet
2,000	20 feet	15 feet	40 feet
3,000	20 feet	15 feet	40 feet
10,000	30 feet	20 feet	50 feet

(g) Installation of combustible liquids tanks of greater capacity than specified in this table must be approved by the Fire Code Committee.

(h) Each aboveground tank shall be surrounded with an embankment or impervious dike not less than four feet high and capable of holding not less than one and one half times the capacity of the tank surrounded. Embankments or dikes shall be continuous, with no opening for piping or roadways. (Exception Section 5239.15.)

(i) All aboveground storage tanks shall be identified by a suitable sign which will state type of fuel and capacity of the tank.

(j) For diesel oil storage tanks in filling stations, see Sec. 5239.12.

5239.14 AUTOMOTIVE AND MARINE SERVICE STATIONS

N.F.P.A. 30A, Automatic and Marine Service Station Code is hereby adopted in its entirety as part of this Fire Code.

5239.15 ABOVEGROUND STORAGE AND DISPENSING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS

(a) Such storage shall comply with the following regulations.

(b) The provisions in this Section shall not supersede any zoning standard that might regulate or eliminate the use of aboveground storage tanks.

(1) PERMIT REQUIRED. No person shall have, store or keep, manufacture, use, sell, or give away gasoline, diesel fuel, benzene, naphtha, or other volatile substances, except as provided in this Sub-section or Sub-section 5239.12 and 5239.13 and no permit shall be issued where a permit is required, until after application therefore has been filed and considered, and the rules and regulations provided in this Section have been complied with.

(2) APPLICATION. See Paragraph 5239.12(b).

(3) ABOVEGROUND TANKS, size and location for retail service stations, agriculture, golf courses and other zoned establishments supplying fuel to any internal combustion engine or equipment. No gasoline,

diesel fuel, benzene, naphtha or other volatile substance shall be stored or kept aboveground, except in accordance with Sub-sections 5239.12 and 5239.13 or in approved fire resistive tank enclosure assemblies, with the primary tank bearing the Underwriters' label, and not exceeding twenty-two hundred (2,200) gallons capacity, except as is provided in Paragraph (ee). The number of such approved tank assemblies in any one location shall not exceed two (2). Such tank assemblies shall not be installed less than three feet (3') apart. Each tank assembly shall be provided with normal venting meeting the requirements of N.F.P.A. 30.

(aa) All electrical connections around pump and tank assemblies shall be approved by the electrical inspector. A clearly identified and easily accessible switch or circuit breaker shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency. Their location shall be acceptable to the Fire Code Official and the controls shall be more than twenty feet (20'), but less than one hundred feet (100') from the dispensers.

(bb) Tank assemblies shall not be installed less than ten feet (10') from nearest side of any public way, walls of buildings, or any building opening and not less than 15' from property lines. The Fire Code Official may require additional spacing, or deny a location based on estimated hazard, risk or local zoning regulations. The tank assembly shall be installed upon a minimum four inch (4") slab, meeting requirements of the manufacturer's specifications.

Each tank assembly shall be anchored to withstand uplifting by flooding or storm surges, including when the tank is empty.

Area around tank assembly shall be maintained free of combustible waste, debris and all types of storage.

Any tank assembly exposed to vehicular traffic shall have collision barrier posts installed on all corners and sides so exposed and shall not be spaced more than four feet (4') apart, center to center. Such posts shall be constructed and installed in accordance with Sub-paragraphs 4805.6(b)(1) through 4805.6(b)(6). Fire Code Official may require the installation of collision barrier posts, even if the clearance guidelines can be achieved as stated in Paragraph 4805.6(b).

(cc)A fire resistive tank enclosure assembly shall consist of a tank bearing an Underwriters' label which is protected by a monolithically poured six inch (6") thick, 3000 psi concrete encasement (all sides, top and bottom), and has its own integral weather protected secondary containment. It shall have been tested as a unit in accordance with UL 1709 for the tank and its contents. Such an enclosure may contain two separate tanks totaling not more than twenty-two hundred (2,200) gallons combined, containing different contents that are compatible, provided that the tanks are independent and do not share a common tank wall. The top of the tank shall be provided with an overspill reservoir manufactured as part of the tank, holding a minimum of seven (7) gallons, which drains back into the tank. The fill connection shall be equipped with a tight fill device for connecting the hose to the tank. The tank shall be fitted with a device which will alert the transfer operator by restricting the flow of liquid into the tank to a maximum rate of 2.5 gpm, when the fluid level reaches 90%, or automatically stops the delivery when the fluid level reaches 95%. The assembly must provide a secondary containment monitoring point for either visual or automatic monitoring, and a path by which any liquid leaking from any point of the primary tank may reach the monitoring point within 24 hours. Emergency venting shall comply with NFPA 30, except that no reduction shall be allowed for the installation. The tank assembly shall be California Air Resources Board (CARB) approved. Tank and tank enclosure openings shall be through the top only. Tank assemblies shall be labeled with tank capacity and contents in addition to complying with Paragraph 5239.12(e). Tank assemblies and appurtenances shall be maintained in proper operating condition. Any damage to the tank assembly shall be repaired immediately with materials having equal or greater strength and fire resistance. Tank assemblies which comply with the requirements of this Sub-sub-paragraph are exempt from Paragraph 5239.13(h).

(dd) The storage at Group I Occupancies of flammable or combustible liquids aboveground is specifically prohibited by Paragraph 5239.15(a).

EXCEPTION: Installation complying with Paragraph 5239.13(a).

(ee) Installations may comply with Paragraph 5239.13(f) by compliance with Sub-section 5239.15.

(ff) All tank design, appurtenances and plans shall be signed and sealed by a professional engineer.

(gg) Dispensing devices are allowed to be installed on top of the tank enclosure assembly. Any such device dispensing Class 1 liquids shall have installed on the fill hose, a U.L. listed emergency breakaway device designed not to lose liquid from either side of the breakaway point. All product piping attached to the tank enclosure assembly shall be double walled, and shall be installed by an authorized pollutant storage system specialty contractor. External piping leading away from the tank shall have a valve located within six inches (6") to the shell of the tank. Approved antisiphon devices shall be installed at each connection of piping to a tank when such piping extends below the level of the top of such tanks both internally and externally. All underground pipe work must be uncovered until inspected by building and fire departments, and other regulatory agencies.

(hh) Aboveground tank assemblies temporarily out-of-service for a period not exceeding ninety (90) days shall immediately have the fill, gauge openings and pump suction capped and secured against tampering. The vent lines shall be left open. Aboveground tank assemblies out-of-service for a period exceeding ninety (90) days, shall be removed.

(4) ONLY APPROVED PUMPS SHALL BE USED; GRAVITY FLOW PUMPS ARE PROHIBITED. Fuel shall be drawn from aboveground storage tanks by pumps bearing the label of Approved Testing Laboratory, such as Underwriters Laboratory, Inc. The use of pressure systems or gravity flow type pump systems is prohibited.

(5) WARNING SIGNS — Sub-paragraphs 5239.12(e)(1), 5239.12(e)(2) and 5239.12(e)(3), AUTOMATIC DISPENSING UNITS, Sub-paragraph 5239.12(f), MANUAL NOZZLES, Sub-paragraph 5239.12(f)(1), AUTOMATIC NOZZLES, Sub-paragraph 5239.12(f)(2), DISPENSING OF FLAMMABLE LIQUIDS INTO PORTABLE CONTAINERS, Sub-paragraph 5239.12(g) and NFPA 704 IDENTIFICATION OF THE FIRE HAZARDS OF MATERIALS.

(6) DISPENSING AREAS

(aa) Dispensing areas shall be provided with a vehicular driveway constructed of reinforced concrete. It shall be sloped to allow any accidental discharge from the dispensing of fluid to flow away from the dispenser or any building, and shall be subject to the approval of the Fire Code Official. This driveway shall be a minimum of twelve feet (12') wide and twenty feet (20') long, minimum. In every case, this driveway must be large enough that the fuel hose, when fully extended, does not reach the far edge of the driveway.

(bb)A fire extinguisher with a minimum classification 4A-60BC shall be provided and so located that it will be not more than one hundred feet (100') from any pump, dispenser, or fill-pipe opening.

5239.16 FLAMMABLE AND COMBUSTIBLE LIQUIDS DURING BUILDING CONSTRUCTION AND DEMOLITION

N.F.P.A. 241, Building Construction and Demolition Operations is hereby adopted in its entirety as part of this Fire Code.

5239.17 STORAGE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS ON FARMS AND ISOLATED CONSTRUCTION AREAS

N.F.P.A. 395, Storage of Flammable and Combustible Liquids on Farms and Isolated Construction Projects is hereby adopted in its entirety as part of the Fire Code.

5239.18 SCOPE

This division shall apply to those industrial plants where the use of flammable or combustible liquids is incidental to the principal business or where flammable or combustible liquids are used only in unit physical operations such as mixing, drying, evaporating, filtering, distillation and similar operations which do not involve chemical reaction.

Where portions of such plants involve chemical reactions such as oxidation reduction, halogenation, hydrogenation, alkylation, polymerization and other chemical processes, those portions of the plant shall be in accordance with Division 8, "Chemical and Processing Plants."

5239.19 INCIDENTAL STORAGE AND USE OF LIQUIDS

(a) GENERAL. This Section shall apply to those portions of an industrial plant where the storage and use of liquids are incidental to the principal business, such as automobile assembly, construction of electronic equipment, furniture manufacturing or similar operations.

(b) STORAGE OF LIQUIDS. Storage of Class I, II, and III-A liquids shall be in accordance with N.F.P.A. 30.

(c) USE OF LIQUIDS. The use of Classes I, II, and III-A liquids shall be in accordance with N.F.P.A. 30.

5239.20 VENTILATION

(a) OPEN SYSTEMS AND PROCESSES. Buildings, rooms or other enclosures in which Class I, II or III-A liquids are used or stored in open systems and processes shall be provided with ventilation in accordance with the provisions of this Section. Where natural ventilation is not sufficient under conditions to prevent the accumulation of flammable vapors, mechanical ventilation shall be provided and used.

(b) DESIGN. Design of ventilating systems shall take into account the relatively high specific gravity of the vapors. Openings to the outside for natural ventilation shall be 6 inches above floor level and shall be unobstructed except by louvers or coarse screens. Mechanical systems for removing flammable and combustible liquid vapors shall be designed and installed in accordance with the provisions of the Mechanical Code. (Chapter 48, So. Florida. Bldg. Code.)

5239.21 IGNITION SOURCES

Open flames, heating devices and processes employing temperatures capable of igniting vapors of Class I or Class II liquids shall be prohibited in buildings, rooms or other confined spaces in which Class I are used in the open or in which Class II or III-A liquids are used for the purpose of saturating, coating or otherwise treating goods or materials. Artificial lighting shall be by electricity only. Electrical devices shall be a type approved for such locations and shall comply with the applicable provisions of the National Electrical Code. Smoking shall be prohibited, and suitable signs to that effect shall be displayed.

5239.22 SEPARATION OF UNSTABLE LIQUIDS

Areas where unstable liquids are used or small-scale unit chemical processes are carried on shall be separated from the remainder of the building in conformance with Chapter 10 of this Code.

5239.23 DRAINAGE

(a) CONTROL OF DRAINAGE. Emergency drainage systems shall be provided to direct flammable or combustible liquid leakage and fire-protection water to a safe location. The industrial plant shall be designed and operated to prevent the normal discharge of flammable or combustible liquids into public waterways, public sewers or adjoining property.

5239.24 TANK VEHICLE AND TANK CAR LOADING AND UNLOADING

Tank vehicle and tank car loading and unloading facilities shall conform with N.F.P.A. 385, "Tank Vehicles for Flammable and Combustible Liquids."

5239.25 ELECTRICAL EQUIPMENT

GENERAL. All electrical equipment and wiring shall be installed in accordance with the National Electrical Code.

5239.26 REPAIRS TO EQUIPMENT

Hot work, such as welding or cutting operations, use of spark-producing power tools and chipping operations shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

5239.27 HOUSEKEEPING

(a) GENERAL. Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills shall be cleaned up promptly.

(b) ACCESS. Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of flammable or combustible liquid storage, use or any unit physical operation.

(c) DISPOSAL OF WASTE. Combustible waste material and residues in a building or unit operating area shall be kept to a minimum, stored in covered metal receptacles and disposed of daily. See Section 5212.2.

(d) MAINTENANCE OF YARDS. Ground area around buildings and unit operating areas shall be kept free of weeds, trash or other unnecessary combustible materials. See Section 5212.2.

5239.28 FIRE PROTECTION

(a) APPLIANCES. Where Class I, II, or III-A liquids are used or dispensed, fire-protection appliances shall be provided in accordance with Section 5212.2.

(b) ACCESS. Industrial plants shall be located so that each building or unit of equipment is accessible from at least one side for firefighting and fire-control purposes. Access shall be provided by unobstructed aisles whereby fire control apparatus may be brought to bear on any part of such Class I, II or III-A liquid storage or use.

(c) FIRE FLOW. Water shall be available in volume and at adequate pressure to supply water hose streams, foam producing equipment, automatic sprinklers or water-spray systems as the need is indicated by the special hazards of operation, dispensing and storage.

(d) SPECIAL EXTINGUISHING EQUIPMENT. Special extinguishing equipment such as that utilizing foam, inert gas or dry chemical shall be provided as the need is indicated by the special hazards of operation, dispensing and storage.

(e) SPECIAL HAZARDS. Where the need is indicated by special hazards of operation, liquid-processing equipment, major piping and supporting steel shall be protected by approved water-spray systems, deluge systems, approved fire resistant coatings, insulation or any combination of these.

(f) INSPECTING AND TESTING. All plant fire-protection facilities shall be adequately maintained, inspected and tested.

5239.29 CHEMICAL AND PROCESSING PLANTS SCOPE

This division shall apply to those plants or buildings which contain chemical operations such as oxidation,

reduction, halogenation, alkylation, polymerization, fractional distillation, where liquids are produced by chemical reactions or used in chemical reaction and other chemical processes.

EXCEPTION: Refineries or distilleries. See Division 9 of this Section.

5239.30 LOCATION

New chemical and processing plants are prohibited unless specifically permitted within the jurisdictional area.

5239.31 CONSTRUCTION

The requirements of this Section shall be in accordance with Federal, State, County and Municipal Laws and Ordinances, this Code and the applicable N.F.P.A. Codes.

5239.32 MAINTENANCE AND REPAIR

Hot work, such as welding or cutting operations, use of spark-producing power tools and chipping operations, shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

5239.33 ELECTRICAL EQUIPMENT

(a) GENERAL. All electrical equipment and wiring shall be installed in accordance with the National Electrical Code.

5239.34 FIRE PROTECTION

Fire protection shall be provided in accordance with Section 5211.

5239.35 VENTILATION

(a) GENERAL. Enclosed processing buildings for Class I or Class II liquids or other hazardous materials, shall be ventilated at a rate of not less than six air changes per hour. Where natural ventilation is inadequate, mechanical ventilation shall be provided in and use. Natural or mechanical ventilation shall discharge or exhaust to a safe location outside of the building. Provisions shall be made for introduction of makeup air in such a manner as to include all floor areas or pits where hazardous vapors may collect. Local or spot general ventilation may be needed for the control of special fire or health hazards. Such ventilation, if provided, can be utilized for up to 75 percent of the required ventilation (reference Chapter 48 of this Code).

(1) STANDARDS OF GOOD PRACTICE: The published "Standards" of the National Fire Protection Association and the handbooks published by the American Society of Heating, Refrigerating and Air Conditioning Engineers shall be accepted as standards of good practice.

5239.36 EXPLOSION RELIEF

Areas where Class I-A or unstable products are processed shall have explosion venting in according with the Section 5239.35(a) herein.

5239.37 STORAGE OF LIQUIDS

(a) TANKS. The storage of flammable and combustible liquids in tanks shall be in accordance with the applicable provisions of N.F.P.A. 30.

(b) SPECIAL TANKS. Day tanks, running tanks and surge tanks are permitted in process area.

(c) CONTAINERS. The storage of liquids in containers shall be in accordance with the applicable provisions of this Section.

5239.38 PIPING, VALVES AND FITTINGS

(a) GENERAL. Piping, valves and fittings shall be in accordance with this Section.

(b) CONNECTIONS Listed flexible connectors may be used where vibration exists or where frequent movement is necessary. Approved hose may be used at transfer stations.

(c)IDENTIFICATION Piping containing liquids shall be identified in accordance with N.F.P.A. 704, "Identification of the Fire Hazards of Materials."

5239.39 TRANSFER

The transfer of large quantities of Class I, II or III-A liquids shall be through piping by means of pumps, water displacement or inert gas. Except as required in process equipment, gravity flow shall not be used. Compressed air shall not be used as a transferring medium. Positive displacement pumps shall be provided with pressure relief discharging back to the tank or to pump suction.

5239.40 EQUIPMENT

Equipment shall be designed and arranged to prevent the unintentional escape of liquids and vapors and to minimize the quantity escaping in the event of accidental release.

5239.41 IGNITION SOURCES

Open flames, heating devices and processes employing temperatures capable of igniting the vapors of flammable products shall be prohibited in buildings, rooms and other confined spaces. Artificial lighting shall be by electricity only. Electrical devices shall be of type approved for such locations. Electrical devices shall be installed in accordance with the National Electrical Code.

5239.42 REFINERIES AND DISTILLERIES SCOPE

This division shall apply to a plant or portions of a plant in which flammable liquids are produced on a commercial scale from crude petroleum, natural gasoline or other hydrocarbon sources or where liquids produced by fermentation are concentrated and where concentrated products may also be mixed.

5239.43 LOCATIONS

New refineries and distilleries are prohibited unless specifically permitted within the jurisdictional area. If allowed, permits shall not be issued for the operation of a chemical plant, distillery, refinery or plant storing crude petroleum until approval has been given for the operation with respect to topography, nearness to places of assembly, residential or mercantile occupancy and adequacy of water supply for fire control.

5239.44 BULK PLANTS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

N.F.P.A. 30, Flammable and Combustible Liquids Code, is hereby adopted in its entirety as part of this Fire Code.

5239.45 DRY CLEANING PROCESSES

N.F.P.A. 32, Dry Cleaning Plants, is hereby adopted in its entirety as part of this Fire Code.

5240 HAZARDOUS MATERIALS

5240.1 SCOPE

(a) The general provisions and requirements contained in this Section shall apply to all hazardous materials including those materials otherwise covered in this Fire Code which exhibit or manifest the characteristics described in this Sub-section, except that when the general requirements conflict with those other requirements, the requirements which apply to the specific material shall prevail.

The classification system contained in Section 5240.9 of this Section shall apply to all hazardous materials including those materials otherwise covered in this Fire Code, which exhibit or manifest the characteristics described in this Sub-section.

This Section shall apply to materials not otherwise covered in this Fire Code which are flammable, or which may react to cause fires or explosions, or which by their presence create or augment a fire or explosion hazard, or which because of the toxicity, flammability or liability to explosion render fire fighting abnormally

dangerous or difficult; also to flammable or combustible liquids which are chemically unstable and which may spontaneously form explosive compounds or undergo spontaneous reactions of explosive violence or with sufficient evolution of heat to be a fire hazard. Hazardous materials shall include such materials as flammable solids, corrosive materials, poisonous gases or highly toxic, radioactive, oxidizing unstable, reactive, or thermally reactive, operatic or pyrophoric, combustible metal as defined. Also, any substance or mixture of substances which is an irritant, a strong sensitizer, or which generates pressure through exposure to heat, decomposition or other means. Except as other wise provided herein, the regulations contained in this Section supplement existing federal, state and local regulations relating to the storage, use and transportation of hazardous materials.

EXCEPTIONS:

(1) The off-site transportation of hazardous materials when in conformity with the Department of Transportation (DOT) regulations on file with and approved by the Department of Transportation.

(2) Hazardous materials in retail sales uses, provided the materials are packaged in individual containers not exceeding 10 liters (2.6 gallons) for liquids or 25 kilograms (55 pounds) for solids. There are no exceptions for highly toxic or poisonous gases, or for explosives and potentially explosive unstable materials.

(b) This Section shall also apply to chlorinated hydrocarbons and other materials which if not properly safeguarded may pose a threat to the public health and safety in a manner not directly related to the hazards associated with fire or explosion. It shall include but is not limited to any material listed by any federal or state public health and safety agency as a hazardous and/or extremely hazardous material, chemical or substance and any material which appears on the list of Environmental Protection Agency (EPA) priority pollutants.

(c) The specific requirements contained in Section 5240.21 shall apply to hazardous materials not otherwise covered in this Fire Code. When a material exhibits a hazardous characteristic in only one category of the classification system in Section 5240.9; and it is regulated elsewhere in this Fire Code, the requirements contained in Section 5240.21 shall not apply (for example a flammable liquid which is not unstable or highly toxic is regulated according to the requirements contained in Section 5239. When a material exhibits hazardous characteristics in more than one category of the classification system in Section 5240.9 and it is regulated elsewhere in this Fire Code, the requirements contained in Sections 5240.21, 5240.32, and 5240.39 shall apply in addition to the other requirements (for example a flammable liquid which is also unstable and highly toxic is regulated in accordance to the requirements contained in Section 5239 and those contained in Sections 5240.21, 5240.32, and 5240.39 for unstable and highly toxic materials.) When requirements conflict, the requirements related to the greater hazard shall take precedence. An attempt shall be made to satisfy the intent of all requirements.

5240.2 DEFINITIONS

For definitions, see Section 5208 of this Fire Code.

5240.3 PERMITS

(a) No person, firm or corporation shall store, handle or use any hazardous material specified in Section 5206 unless and until a valid permit has been issued pursuant to the Section.

(b) No person, firm or corporation shall construct, install, repair, abandon, remove, place temporarily out-of-service, close or substantially modify a storage facility for the handling of hazardous materials regulated by this section been issued. Permittee shall apply for approval to close any storage facility at least (30) thirty days prior to the termination of the storage of hazardous materials at the facility. Such application shall include any change or alteration of the facility closure plan filed pursuant to Sec. 5240.6. This (30) thirty day period may be waived if there are special circumstances requiring such waiver.

(c) HAZARDOUS MATERIALS MANAGEMENT PLAN. Each application for a permit pursuant to this section shall include a Hazardous Materials Management Plan (HMMP).

(d) HAZARDOUS MATERIALS INVENTORY STATEMENT. Each application for a permit pursuant to this section shall include a Hazardous Materials Inventory Statement.

(e) HAZARDOUS MATERIALS. For a permit to store, handle, transport on site or use ammonium nitrate, corrosive materials and solids, flammable solids, highly toxic liquids and solids, oxidizing liquids and solids, reactive materials, hypergolic materials, pyrophoric materials, unstable materials or organic peroxides, see Section 5206.

(f) RADIOACTIVE MATERIALS. For a permit to store, handle, transport on site or use radioactive materials see Section 5206.

NOTE: Where a material may be classified in more than one hazard category, the permit shall be obtained under the category in which the permit is required for the smallest amount.

(g) All hazardous materials permits shall be posted in a conspicuous location on the premises.

5240.4 GENERAL REQUIREMENTS

(a) The manufacture, storage, on-site transportation or use of hazardous materials shall be safeguarded with such protective facilities as public safety requires.

(b) Tanks, piping, valves, fittings and related components intended for use with hazardous fluids shall be designed and fabricated from suitable materials compatible with the hazardous fluid and having adequate strength and durability to withstand the pressures, structural stress and exposure to which they may be subjected.

Such tanks, valves and equipment shall conform to nationally recognized engineering standards, be listed by a recognized testing laboratory for the particular application. Abandonment of tanks in place shall be prohibited. Underground tanks used for the storage of hazardous liquids shall be located and protected in accordance with Section 5239 of this Fire Code. Secondary containment shall be provided for all underground tanks as required by state and local regulations pertaining to underground tanks.

Stationary above-ground tanks used for the storage of hazardous liquids shall be located and protected in accordance with Section 5239.16 of this Fire Code. Unstable, reactive, highly toxic poisonous liquids shall be treated as Class I-A flammable liquids. Other hazardous liquids shall be treated as Class II combustible liquids.

(c) In the absence of other requirements, portable tanks, containers and equipment intended for use with hazardous liquids shall conform to the requirements in Section 5239 of this Fire Code.

Materials shall be compatible with the liquids to be contained. Unstable, reactive, highly toxic, or poisonous liquids shall be treated as Class I-A flammable liquids. Other hazardous liquids shall be treated as Class II combustible liquids.

(d) Defective containers which permit leakage or spillage shall be disposed of or repaired in accordance with recognized safe practices; no spilled materials shall be allowed to accumulate on shelves or floors. Hazardous materials shall not be released into any sewer, storm, drain, ditch, drainage canal, lake, river or tidal waterway, or upon the ground, sidewalk, street or highway.

(e) Storage of hazardous materials on shelves shall be neat and orderly. Shelves shall be of substantial construction, adequately braced and shall have a lip or guard when used for storage of individual containers.

(f) Accurate records shall be kept of all leaks, spills or other unauthorized discharges of hazardous materials, and the Fire Department Chief shall be immediately notified when such discharges may create an imminent danger to life.

(g) Provisions shall be made for containing or neutralizing spills or leakage of hazardous materials which may occur.

(h) Accurate records shall be kept on peroxide forming chemicals and other substances which may dangerously deteriorate. Records shall include receiving, opening and disposal dates.

Periodic tests shall be made and recorded. Materials shall be properly disposed of on or before the required disposal date or when indicated by tests. All records shall be made, maintained, and available to the Fire Chief or his representative.

(i) Information regarding type, location, and amounts of hazardous materials including Material Safety Data Sheets or documents containing equivalent information for all hazardous materials on the premises shall be readily available.

No owner or person in charge shall refuse to supply such information immediately in an emergency, or within 15 days if no emergency exists.

(j) Visible hazard identification signs as specified in Identification of the Fire Hazards of Materials N.F.P.A. 704, or as otherwise specified, shall be placed at all entrances to and in locations where hazardous materials are stored, handled or used in quantities requiring a permit. This may waive this requirement in special cases when consistent with safety. Individual containers, cartons or packages shall be conspicuously marked or labeled.

(k) Secondary, containment shall be provided for portable tanks and containers used for storage or processes involving liquid hazardous materials. Such containment shall be in the form of barriers (dikes, curbs, berms) channels or drains to approved holding tanks, or by other suitable means so that leaks or spills will not endanger surrounding areas and in order to prevent the intermixing of materials which may react to cause fire, explosion, generation of flammable or toxic gas or large amounts of heat, or otherwise threaten life or property.

The containment shall be impervious to and compatible with the liquid to be contained. This requirement may be waived, when consistent with safety, and the aggregate quantity of the hazardous liquid is 60 gallons or less.

(l) The Fire Chief may require any or all of the following:

(1) Protection or removal of open flames, heated elements, mechanical equipment, electrical wiring and equipment, other potential ignition sources and initiating sources for other dangerous reactions.

(2) Fire or explosion detection, alarm and suppression systems.

(3) Overfill and leak detection and alarm systems, and excess flow limiters.

(4) Vapor or gas detection and alarm systems.

(5) Vapor or gas control and exhaust systems.

(6) Separation or isolation of materials where a fire, explosion or other dangerous reaction in one material may cause a fire, explosion, release of flammable or toxic gas or other dangerous reaction in the other material. Such separation may be by distance, fire-resistive construction, enclosure within a storage cabinet, or by other suitable means.

(7) Separation of occupancies, buildings, or areas within buildings, when handling, use or storage of hazardous materials creates a fire or life hazard to adjacent occupancies, buildings or areas within buildings. Such separation may be by distance, fire-resistive construction or other appropriate means.

(8) Breathing apparatus, protective clothing and equipment, testing devices or other emergency equipment.

(9) Tests and/or studies by recognized independent agencies as necessary to determine conformance

with standards for equipment or compliance with requirements contained within this Fire Code.

(10) Written operation, emergency, or evacuation plans as deemed necessary for fire or life safety, by owner.

(m) Where specific requirements are not otherwise established, manufacture, storage, on-site transportation or use of hazardous materials shall be in accordance with nationally recognized standards of good practices.

5240.5 CONSTRUCTION REQUIREMENTS

Buildings or portions thereof in which hazardous materials are stored, handled or used shall be constructed in accordance with this Code.

5240.6 FACILITY CLOSURE PLAN

The permit holder or applicant shall submit a plan to terminate the storage of hazardous materials storage facility in a manner that eliminates the need for further maintenance, eliminates the threat to public health and safety and the environment by residual hazardous materials in the facility and demonstrates that hazardous materials which were stored in the facility have been transported, disposed of or reused in an appropriate manner. Additional criteria appropriate for the quantity or types of material stored, may be required.

5240.7 OUT OF SERVICE STORAGE FACILITIES

Storage facilities may be placed out of service in accordance with the following:

(1) Temporarily out-of-service facilities: Storage facilities which are temporarily out-of-service and are intended to be placed back in service within 90 days, shall continue to be permitted, monitored and inspected.

(2) Permanent out-of-service facilities: Storage facilities for which a permit is not kept current or is not being monitored and inspected shall be deemed to be permanently out-of-service and shall be closed in accordance with Section 5240.6.

5240.8 SPECIAL INSPECTIONS

When expertise is not available within the Fire Department, the periodic employment of special inspectors may be required, to conduct an audit or assessment of permittee's facility to make a hazardous material safety with the purpose and provisions of this Section. The cost for such inspections shall be borne by the owners of the facility.

5240.9 SCOPE

(a) Scope. For the purposes of this Fire Code, hazardous materials shall be divided into "hazard categories." The categories shall include those materials regulated under this Section, and those materials regulated under other Sections of this Fire Code.

(b) Multiple Hazards. Materials may pose multiple hazards, that is, they may exhibit hazards in more than one hazard category. When this is the case, the hazards in each category shall be considered separately and collectively to determine requirements.

(c) Specific Requirements. The specific requirements for each hazard category are contained in Sections 5240.21, 5240.32 and 5240.39.

(d) General Requirements. General Requirements for all hazard categories are contained in Section 5240.

(e) Definitions. For definitions see Section 5208.

5240.10 EXPLOSIVES AND BLASTING AGENTS

Category I — Explosives and Blasting Agents. Explosives and blasting agents shall be divided into Sub-categories:

(1) High Explosives (Detonating)

(2) Low Explosives (Deflagrating)

(3) Blasting Agents

5240.11 COMPRESSED GASES

Category II — Compressed Gases. Compressed Gases shall be divided into Sub-categories.

(1) Flammable

(2) Oxidizing

(3) Corrosive

(4) Highly Toxic or Poisonous

(5) Reactive or Unstable

(6) Liquefied (except Cryogenic Fluids)

(7) Inert (Chemically unreactive)

5240.12 FLAMMABLE AND COMBUSTIBLE LIQUIDS

Category III — Flammable and Combustible Liquids. Flammable and combustible liquids shall be divided into Sub-categories which correspond with the classes described in Section 5208 of this Fire Code.

5240.13 FLAMMABLE SOLIDS

Category IV — Flammable Solids. Flammable solids may also exhibit explosive, reactive or unstable characteristics. Flammable solids shall be divided into the following Sub-categories:

(1) Organic Solids

(2) Inorganic Solids (except metals)

(3) Combustible Metals (except dusts and powders)

(4) Combustible Dusts and Powders (including metals)

5240.14 OXIDIZING MATERIALS

(a) Category V Oxidizing Materials. Oxidizing Materials shall be divided into Sub-categories.

(1) Oxygen, Ozone

(2) Other Gases

(3) Liquids

(4) Solids

(b) Classification of liquid and solid oxidizers according to hazard:

Class 1 — An oxidizing material whose primary hazard is that it may increase the burning rate of combustible material with which it comes in contact.

Class 2 — An oxidizing material that will moderately increase the burning rate or which may cause spontaneous ignition of combustible material with which it comes in contact.

Class 3 — An oxidizing material that will cause a severe increase in the burning rate of combustible material with which it comes in contact.

Class 4 — An oxidizing material that can undergo an explosive reaction when catalyzed or exposed to heat, shock, or friction.

5240.15 HIGHLY TOXIC MATERIALS

(a) Category VI Highly Toxic Materials. Highly Toxic Materials shall be divided into Sub-categories:

(1) Poisons, Class A

(2) Other Highly Toxic Materials (including pesticides, and fumigants and all Class B Poisons)

(3) Chemical Asphixiants

(4) Anesthetics

(5) Etiologic Agents

(6) Carcinogens, Mutagens and Teratogens

(b) Only those materials included within the definition of "Highly Toxic Materials", "Highly Toxic Pesticide" and "Poisonous Gas" are regulated by this Fire Code. See definition, Section 5208, Highly Toxic Materials.

5240.16 RADIOACTIVE MATERIALS

Category VII — Radioactive Materials. Radioactive Materials shall be divided into Sub-categories.

(1) Common Radiation Source Materials

(2) Fissionable Materials

5240.17 CORROSIVES

Category VIII — Corrosives. Corrosives shall be divided into Sub-categories:

(1) Acids

(2) Bases, Alkalis, Caustics

(3) Other corrosives

5240.18 CRYOGENIC FLUIDS

Category IX — Cryogenic Fluids. Cryogenic Fluids shall be divided into Sub-categories:

(1) Flammable

(2) Nonflammable

(3) Corrosive/Highly Toxic

(4) Oxidizer

5240.19 REACTIVE MATERIALS

(a) Category X — Reactive Materials. Reactive materials shall be divided into Sub-categories:

(1) Air-reactive Materials

(2) Water-reactive Materials

(aa) Alkali Metals

(bb) Metallic Carbides

(cc) Metallic Hydrides

(dd) Organo-metallic Compounds

(ee) Other Water Reactive Compounds

(3) Other Reactive Materials

(b) Those materials which are rated with a reactivity (instability), rating of 3 or 4 when rated in accordance with N.F.P.A. 704, are regulated as reactive materials. Combinations of materials listed in N.F.P.A. 491M-Hazardous Chemical Reactions, are regulated as reactive materials.

5240.20 UNSTABLE MATERIALS

(a) Category XI Unstable Materials. Unstable materials shall be divided into Sub-categories:

(1) Materials Which Vigorously Decompose (including organic peroxides)

(2) Materials Which Vigorously Polymerize

(3) Peroxide Forming Chemicals

(b) Only those materials which would be rated with a reactivity (instability) rating of 3 or 4 when rated in accordance N.F.P.A. 704 are regulated by this Section. See definition, Section 5208 Unstable Materials.

5240.21 STORAGE REQUIREMENT COMPRESSED GASES

(a) General. Storage of compressed gases shall comply with the provisions of Section 5235.

Storage of compressed gases which are radioactive shall comply with the provisions of Sec. 5240.25. Storage of compressed gases which are highly toxic or poisonous shall comply with the provisions of Sec. 5240.28.

(b) Indoor Storage. Indoor storage of flammable or oxidizing gases in quantities which exceed 3000 cubic feet shall be within a room or compartment separated from other hazardous materials storage by one-hour fire-resistive construction. Lesser quantities of flammable or oxidizing gases shall be separated from combustible and from other hazardous materials storage by noncombustible construction or a minimum distance of 10 feet.

Where the aggregate quantity of flammable or oxidizing gases exceeds 6,000 cubic feet, an automatic sprinkler system shall be installed, and the storage area shall be separated from all other occupancies by an occupancy separation of not less than one-hour fire rating, constructed in accordance with the South Florida Building Code. Explosion venting, in accordance with the N.F.P.A. 68 shall be provided for flammable gas storage which exceeds 6000 cubic feet.

(c) Exterior Storage. Exterior storage of flammable and oxidizing gases shall not be within 25 feet of any property line, street, public way, or exit to a public way. An unpierced, solid concrete or masonry wall, constructed in accordance with this Fire Code to meet a four-hour fire-resistive rating may be accepted in lieu of such distance. Buildings not connected with such storage, and all combustible materials, and other hazardous materials storage shall be separated from the storage of flammable and oxidizing gases by one-hour fire-resistive construction or a minimum distance of 15 feet. Exterior storage of compressed gases shall be provided with protection from the sun, well drained concrete pad and shall be secured against tampering.

5240.22 CRYOGENIC FLUIDS

(a) Cryogenic fluids shall be stored and used in accordance with the provisions of Section 5236.

(b) Storage and use of cryogenic fluids which are highly toxic shall also comply with the provisions of Sec. 5240.28.

5240.23 FLAMMABLE AND COMBUSTIBLE LIQUIDS

Storage and use of flammable and combustible liquids which exhibit other hazardous characteristics shall also comply with the applicable provisions of this Section.

5240.24 OXIDIZING MATERIALS

(a) General. Liquid and solid oxidizing materials shall be segregated from other chemicals and from combustible materials by distance or by fire-resistive construction. Oxidizing materials which are also flammable shall be stored out of doors or within a room equipped with an automatic sprinkler system. Where oxidizing liquids are stored, secondary containment or other means shall be provided to prevent the mixing of incompatible materials or the contamination of surrounding areas. Class 4 Oxidizers and any oxidizers which violently decompose or otherwise react explosively shall be stored in accordance with Section 5240.29. Oxidizers which are corrosive materials shall also meet the requirements contained in Section 5240.29. Oxidizers that are highly toxic liquids or solids shall also meet the requirements contained in Section 5240.27. In addition to the requirements of this Section, all oxidizing materials shall comply with the applicable

provisions of N.F.P.A. 43A, Storage of Liquid and Solid Oxidizing Materials.

(b) Indoor Storage. Indoor storage of liquid and solid oxidizing materials in quantities which exceed the following maximum quantities shall be within a room or compartment separated from combustible material and other hazardous materials storage by fire-resistive construction with a minimum rating of one-hour:

Oxidizer	Maximum Quantity
Class 1 and 2 liquids	500 gallons
Class 1 and 2 solids	1000 pounds
Class 3 liquids	40 gallons
Class 3 solids	500 pounds
Any combination of Class 2 and 3 solids	1000 pounds
Class 4 liquids and solids	any amount See Sec. 5240.26

Lesser amounts of liquid and solid oxidizing materials shall be separated from combustible materials and from all other hazardous materials storage by noncombustible construction or by a distance of not less than 10 feet. Storage within metal storage cabinets constructed in accordance with Section 5240.30(b)(1) shall satisfy this requirement.

Liquid oxidizing materials shall be stored within metal storage cabinets constructed in accordance with Section 5240.30(b)(1), or within a room or area provided with recessed floors, raised sills or open trench grating designed to contain the entire capacity of the largest single container.

When the total amount of such liquids stored in any one room or area exceeds 55 gallons, a drainage system which drains to a safe holding location shall be provided. When required the drainage system shall be designed and sized to carry off any anticipated spill, plus the minimum calculated fire flow in sprinklered rooms or areas.

Ventilation for highly toxic or corrosive oxidizing materials shall be provided in accordance with Sec. 5240.27(b) or Sec. 5240.29(b).

(c) Exterior Storage. Exterior storage of liquid or solid oxidizing materials shall not be within 15 feet of any property line, street, public way, or exit system to a public way. An unpierced, solid concrete or masonry wall, constructed in accordance with this Code to meet a four-hour fire-resistive rating may be accepted in lieu of such distance. Buildings not connected with such storage, and all combustible materials, and other hazardous materials storage shall be separated from the storage of liquid or solid oxidizing materials by one-hour fire-resistive construction or a minimum distance of 15 feet and shall be secured by a fence to prevent unauthorized intrusion.

Exterior storage areas for liquid oxidizing materials shall be provided with raised sills, open grate trenches or other means to contain leaks and spills. The volume to be contained shall not be less than 130% of the capacity of the largest individual tank or container.

5240.25 RADIOACTIVE MATERIALS

(a) General. When not in use, radioactive materials shall be kept in adequately shielded containers of such design that the gamma radiation will not exceed 200 milliroentgen per hour or equivalent at any point of readily accessible surface. Containers shall be fire-resistant or shall be stored within a storage cabinet which complies with Section 5240.30.

Canisters or tanks of radioactive gases shall be stored within a fire-resistive cabinet which is equipped with an automatic sprinkler, or within a room separated from all other storage or use by fire-resistive construction with a minimum rating of one hour and equipped with an automatic sprinkler system.

(b) Indoor storage of contaminated combustible materials shall be in closed noncombustible containers within a room separated from all other storage or use by fire resistive construction with a minimum rating of one hour.

(c) Exterior storage of radioactive materials and contaminated combustible materials shall require specific approval by the Fire Chief and shall be subject to such requirements as he might prescribe.

(d) Durable, clearly visible signs of warning of radiation dangers shall be placed at all entrances to areas or room's where radioactive materials are used or stored. In addition, each container in which radioactive materials are used, stored or transported shall hear a durable, clearly visible, appropriate warning sign. Such signs shall bear the three-bladed radiation symbol in magenta or purple on a yellow background in accordance with nationally recognized good practice.

(e) Signs are not required for storage of manufactured sections other than liquids, such as instruments or clock dials, electronic tubes or apparatus of which radioactive materials are a component part, and luminous compounds, when securely packed in strong containers, provided the gamma radiation at any surface of the package is less than 10 milliroentgen in 24 hours.

5240.26 REACTIVE AND UNSTABLE MATERIALS

(a) General. Reactive and unstable materials shall be stored away from open flames, heated elements and other reaction initiating sources, and shall be separated from combustible materials and other hazardous materials storage by fire-resistive construction with a minimum rating of one hour.

(b) Indoor Storage. Potentially explosive materials, including but not limited to Class 4 Oxidizers, unstabilized organic peroxides and materials with a reactivity (instability,) rating of 4 when rated in accordance with N.F.P.A. 704 and Identification of the Fire Hazards of Materials shall be stored in rooms or buildings which conform to requirements for Group E, Division I occupancies according to the South Florida Building Code. The room or area shall conform to the South Florida Building Code requirements for explosion venting. Except where water reactive materials are stored, an automatic sprinkler system shall be provided.

When the amount of organic peroxide or other unstable material stored is 50 pounds or more, such storage shall be in a detached, well ventilated storage building with walls having not less than a two-hour fire-resistive rating, constructed in accordance with this Code requirements for a Group E, Division I occupancy. An automatic sprinkler system shall be provided. The building shall be located the following minimum distances from any other hazardous material storage, combustible materials in the open and from any building, property line, street, or public way.

WEIGHT OF MATERIAL (Pounds Over)		**(Pounds Not Over)**	**DISTANCE (Feet)**
50	to	100	75
100	to	500	100
500	to	1000	125
1000	to	3000	200
3000	to	5000	300

The materials shall be store in their original (Department of Transportation approved) containers. Care shall be taken to avoid rough handling and contamination.

(c) Nitromethane. A suitable isolated outdoor storage area shall be provided for nitromethane. Hazardous processing shall not be permitted in the vicinity of this storage area. Nitromethane shall be stored

in the drums in which it is received or in an underground tank with suitable corrosion protection and a minimum of 2 feet of earth over the tank or in barricaded tanks aboveground.

If the drum storage is not adequately protected by a fast-acting deluge-type automatic sprinkler system, the storage of 2000 pounds or more shall be located the following minimum distances from inhabited buildings:

WEIGHTS (Pounds Over)		(Pounds Not Over)	APPROXIMATE NO. OF DRUMS	DISTANCE
2,000	to	10,000	20	200
10,001	to	20,000	40	300
20,001	to	40,000	80	400
40,001	to	80,000	160	500

Care shall be taken to avoid rough handling or contamination of this chemical. Legible warning signs and placards shall be prominently placed in the storage and processing areas.

(d) Ammonium Nitrate. In addition to the requirements of this Section, ammonium nitrate shall comply with the applicable provisions of N.F.P.A. 495, Manufacture, Transportation, Storage, and Use of Explosive Materials and to the following requirements.

(1) All flooring in storage and handling areas shall be of noncombustible material and shall be without drains, traps, pits or pockets into which any molten ammonium nitrate could flow and be confined in case of fire.

(2) Each storage pile of bags or other authorized packages and containers of such materials shall not exceed 12 feet in height, 12 feet in width and 30 feet in length. Such pile units shall be separated by a clear space of not less than 36 inches in width from the base to the top of the piles, serving as cross aisles. At least one service or main aisle in the storage area shall be not less than 4 feet in width. A clearance of not less than 30 inches shall be maintained from building walls and partitions and of not less than 36 inches from ceilings or roof structural members with a minimum of 18 inches from sprinklers.

(3) Ammonium nitrate storage areas shall be separated by a space of 30 feet or by a tight noncombustible partition from storage of organic chemicals, corrosive materials, compressed gases, flammable and combustible materials or other contamination substances such as sulphur, coal, flour and metallic powders such as zinc, copper and magnesium where storage of such materials is permitted with ammonium nitrate. Separation shall also be maintained from pesticides and other highly toxic materials.

(4) Quantities of ammonium nitrate or ammonium nitrate fertilizer having no organic coating, in the form of crystals, flakes, grains or pills, including fertilizer grade, dynamite grade, nitrous oxide grade and technical grade ammonium nitrate and ammonium nitrate phosphate (containing 60 percent or more ammonium nitrate by weight) of more than 50 tons total weight shall be stored in a well ventilated building. Such building shall be of one-hour fire-restrictive or noncombustible construction as specified in this Code or shall be equipped with an approved automatic sprinkler system. No combustible materials or ammonium nitrate sensitizing contaminants shall be stored in this building.

(5) Storage of ammonium nitrate, coated or mixed with organic anti-caking materials, except compounded blasting agents, shall not be permitted in populated and congested areas.

(6) Distance to any other building, property line or street shall be as required, herein.

(e) Materials which may decompose, polymerize or otherwise react in a violent manner and/or release highly toxic or poisonous gases, vapors or fumes at normal ambient temperatures shall be stored in temperature controlled rooms or areas. Temperature control shall be designed for the specific hazard of the

material. The system of temperature control shall be supplemented by an emergency system supplied from a separate power source, and designed so that the emergency system will automatically operate when the temperature in the room or area reaches a predetermined level. The activation of the emergency system shall cause an alarm to be transmitted to an approved alarm service company or to a control station on the premises which is equipped with a public telephone and is manned 24 hours a day, every day. Temperature control is required in addition to all other requirements.

(f) Materials which are shock sensitive shall be padded, suspended, or otherwise protected. Special consideration shall be given to seismic protection.

(g) Materials which are pressure sensitive shall be stored in rooms designed to prevent the development of dangerous pressures.

(h) Materials which are light sensitive shall be stored in containers designed for such use.

(I) Water-reactive materials shall not be stored in any room or area with combustible or flammable materials. The storage area shall be dry, water-proof and well ventilated. Unless otherwise specified, automatic sprinklers and other piping carrying water shall be excluded from the room or area. See Section 5230 for specific requirements for the storage of calcium carbide.

(j) Secondary containment or other means shall be provided to prevent the intermixing of materials which are dangerously reactive in combination, or contamination of materials which react when contaminated. Materials which may have become contaminated shall be disposed of in a safe manner.

(k) Exterior Storage. Exterior storage of potentially explosive materials, including but not limited to Class 4 oxidizers, unstabilized organic peroxides and materials with a reactivity (instability) rating of 4 when rated in accordance with N.F.P.A. No. 704, Identification of the Fire Hazards of Materials, shall not be within 50 feet of any property line, street, public way or exit to a public way; nor within 25 feet of combustible materials, or other hazardous materials storage; nor within 25 feet of any building not connected with such storage. Storage of potentially explosive materials shall comply with the provision of Section 5237.

5240.27 HIGHLY TOXIC MATERIALS (LIQUIDS AND SOLIDS)

(a) General. Highly toxic liquids and solids shall be segregated from other chemicals and from combustible and flammable substances by distance or by fire-resistive construction. Highly toxic materials which are also flammable shall be stored out of doors or within a room equipped with an automatic sprinkler system. Where highly toxic liquids are stored secondary containment or other means shall be provided to prevent the mixing of incompatible materials or the contamination of surrounding areas.

Tanks used for the storage of highly toxic liquids under pressure shall be provided with monitoring and alarm devices to warn of pressure buildup beyond the maximum allowable working pressure. Means for transfer of the contents of the tank to a safe holding location, initiated manually and automatically upon signal from the monitoring devices may be required.

(b) Indoor storage of highly toxic liquids and solids shall be within a room or compartment separated from all other storage by one-hour minimum fire-resistive construction. Storage rooms or areas shall be separated from other occupancies within the building by an occupancy separation with a rating of one-hour. Storage within storage cabinets constructed in accordance with Sec. 5240.30(b) shall satisfy this requirement for limited amounts.

Highly toxic liquids shall be stored within storage cabinets constructed in accordance with Sec. 5240.30, or within a room or area provided with recessed floors, raised sills, or open trench grating designed to contain the entire capacity of the largest single container.

When the total amount of such liquids stored in any one room or area, exceeds 55 gallons, a drainage system which drains to a safe holding location shall be provided. The drainage system shall be designed and sized to carry off any anticipated spill, plus the minimum, calculated fire flow in sprinklered rooms or areas.

Mechanical ventilation which provides a minimum of 6 air changes per hour shall be provided in accordance with Section 5239 herein. Such ventilation shall not discharge to a point where vapors may endanger any person, domestic animal or wildlife.

A manual control, located outside the room or area protected shall be provided. Approved vapor detection devices shall be provided which will automatically activate the mechanical ventilation system. Exhaust scrubbers or processing as in Section 5240.28(b) may be required.

(c) Exterior storage of highly toxic liquids or solids shall not be within 15 feet of any property line, street, public way, or exit to a public way. An unpierced, solid concrete or masonry wall, constructed in accordance with the South Florida Building Code to meet a four-hour fire resistive rating may be accepted in lieu of such distance.

Highly toxic liquids that are flammable shall not be stored within 50 feet of any property line, street or public way unless protected by an automatic fire extinguishing system. Buildings not connected with such storage, and all combustible materials and other hazardous materials storage shall be separated from storage of highly toxic liquids and solids by not less than 15 feet, or by fire-resistive construction with a minimum rating of one-hour.

All exterior storage areas for highly toxic liquids shall be provided with raised sills, open grate trenches or other means to contain leaks and spills. The volume to be contained shall be not less than the capacity of the largest individual tank or container.

(d) Legible warning signs and placards shall be posted at all entrances to areas where highly toxic materials are stored or used.

5240.28 HIGHLY TOXIC AND POISONOUS GASES

(a) General. Storage of highly toxic or poisonous gases shall be within buildings or rooms that comply with the provisions of Section 5240.8(b) or in approved exterior locations in accordance with the provisions of Section 5240.28(c). All storage shall comply with the following:

(1) Container Support. Containers shall be individually secured at the top and bottom, so as to prevent falling during seismic activity or being knocked over. Containers not in use shall have valve protection devices in place or comparable protection provided at all times.

(2) Security. Areas where highly toxic or poisonous gases are stored or used shall be secured against unauthorized entry.

(3) Handling. Handling of highly toxic or poisonous gas shall be only by persons fully trained in the hazards involved and the safety precautions required.

(4) Breathing Apparatus. Two approved self-contained breathing apparatus units and suitable protective clothing shall be provided in the immediate area of storage.

(5) Excess Flow Control. Excess flow control valves or the equivalent shall be provided at the source.

(6) Automatic Fire Extinguishing System. An automatic fire extinguishing system which is compatible with the particular gas or gases stored shall be provided to protect all interior storage areas.

(7) No other storage of combustible or hazardous materials is permitted within rooms or areas used for storage of highly toxic or poisonous gases unless separated by not less than 25 feet or by fire-resistive construction with a minimum rating of one-hour.

(8) Individual cylinders or tanks and systems of cylinders or tanks in which the aggregate capacity exceeds a water capacity of 30 gallons and which are used for the storage of highly toxic or poisonous gases shall be provided with monitoring and alarm devices to warn of pressure buildups beyond maximum allowable working pressure. Means for transfer of the contents to another tank or container, initiated manually and automatically upon signal from the monitoring devices.

(9) All interior storage areas shall be equipped with a floor drain to prevent the accumulation of standing water.

(10) There shall be no storage (below ground level) for heavier than air toxic or poisonous gases.

(11) Cylinders shall be stored in upright position with empty cylinders segregated from full cylinders. All cylinders whether empty or full shall be stored with valve protection hoods in place.

(12) The Fire Chief may require the submission of an emergency response plan. (By owner/occupant.)

(b) Inside storage of highly toxic or poisonous gases shall be within a building or room which meets construction and location requirements specified in this Code. The building or room shall be of fire resistive construction, with a minimum rating of one hour and shall conform to all of the following:

(1) Monitoring. The atmosphere in storage rooms, areas or cabinets shall be monitored for the particular gas or gases present. An audible and visual alarm shall be activated when the maximum safe level for long-term exposure is reached.

(2) Controls. Emergency shut-off controls shall be provided inside and outside the area of use.

(3) Ventilation. South Florida Building Code Chapter 48, mechanical ventilation, installed in accordance with the mechanical code shall be provided. Such ventilation shall not discharge to a point where gases may endanger any person, domestic animal or wildlife. Approved gas detection devices shall be provided which activate the mechanical ventilation system.

(4) Discharge Treatment or Containments. Storage areas shall be provided with a system to control sudden or slow release of gas from containers or associated piping and/or equipment.

Such system shall be capable of diluting, filtering, absorbing or otherwise processing 100% of the capacity of the container presenting the highest potential hazard for each gas stored so that the maximum concentration at the point of discharge to the atmosphere shall not exceed the short term exposure limit of the material released.

The system shall be designed to handle anticipated pressure from a sudden release to the largest single container.

For the purpose of calculating system capacity, a release time of 5 minutes from maximum container capacity to empty is deemed to be a sudden release. More stringent design criteria where necessary to protect human life.

(5) Associated piping shall be installed in accordance with Section 5240.39.

EXCEPTION: The storage of small amounts of highly toxic or poisonous gases may be exempt from certain provisions of this subsection when supporting data is presented which shows that the danger to public safety is mitigated by engineering and/or operational controls.

Exterior Storage. Exterior storage of highly toxic or poisonous gases, shall not be located within 25 feet of any building not connected with such storage, nor within 25 feet of any property line, street, public way or exit to a public way. All combustible materials and other hazardous materials storage shall be separated from highly toxic or poisonous gas storage by not less than 25 feet, or by fire-resistive construction with a minimum rating of one-hour.

5240.29 CORROSIVE MATERIALS

(a) General. Corrosive materials shall be segregated from other chemicals, including other corrosives which are incompatible, and from combustible materials by distance or noncombustible construction. Secondary containment or other means shall be provided to prevent the mixing of incompatible materials or the contamination of surrounding areas. See Sec. 5240.24 and Sec. 5240.27.

(b) Indoor Storage. Indoor storage of corrosive material in quantities which exceed 110 gallons shall be within a room or compartment separated from all other storage by one-hour fire-resistive construction. Lesser quantities of corrosive materials shall be separated from combustibles and from other hazardous materials storage by noncombustible construction or a minimum distance of 10 feet.

Corrosive materials shall be stored with compatible corrosives within storage cabinets constructed in accordance with Sec. 5240.30, or within a room or area provided with recessed floors, raised sills, or open trench grating designed to contain the entire capacity of the largest single container.

When the total amount of such materials stored in any room or area exceeds 55 gallons, a drainage system which drains to a safe holding location shall be provided. The drainage system shall be designed and sized to carry off any anticipated spill, plus the minimum calculated fire flow in sprinklered rooms or areas. Secondary containment shall be of noncombustible material treated to prevent degradation from liquid contact.

When the total amount of corrosive materials in any room or area exceeds 110 gallons, mechanical ventilation which provides a minimum of 6 air changes per hour shall be provided in accordance with Chapter 48 and Section 5239 herein. Such ventilation shall not discharge to a point where vapors may endanger any person, domestic animal, or wildlife. A manual control, located outside the protected room or area, shall be provided.

(c) Exterior Storage. Exterior storage of corrosive materials shall not be within 10 feet of any property line, street, public way or exit to a public way. An unpierced, solid concrete or masonry wall, constructed in accordance with this Code to meet a four-hour fire-resistive rating may be accepted. (See Sec. 5240.44.)

All exterior storage areas for corrosive materials shall be provided with raised sills, open grate trenches or other means to contain leaks and spills. The volume to be contained shall be not less than 120% of the capacity of the largest individual tank or container.

(d) Legible warning signs and placards shall be posted at all entrances to areas where corrosive materials are stored or used.

5240.30 STORAGE CABINETS FOR HAZARDOUS MATERIALS

(a) General. When provisions of this Fire Code require that hazardous materials be stored in storage cabinets, such cabinets shall be in accordance with this Section. Cabinets shall be conspicuously labeled in red letters on contrasting background HAZARDOUS — KEEP FIRE AWAY.

(b) Construction. Cabinets may be constructed of wood or metal. Cabinets shall be listed or constructed in accordance with the following:

(1) Unlisted Metal Cabinets. Metal cabinets shall be of steel having a thickness of not less than 0.043 inch. Doors shall be well-fitted, self-closing and equipped with a latching device. Joints shall be riveted or welded and shall be tight fitting. The bottom of a cabinet designed for the containment of liquids shall be liquid tight to a height of at least 2 inches.

(2) Wooden cabinets, including the doors, shall be of not less than 1-inch exterior grade plywood, doors shall be of not less than 1-inch exterior grade plywood or equivalent, which is compatible with the material being stored. Doors shall be well fitted, self-closing and equipped with a latch, and piano type hinges. The bottom of a cabinet designed for containment of liquid shall be liquid tight to a height of at least 2 inches. Cabinets shall be painted with an intumescent-type paint.

Incompatible materials and materials which may cause a hazardous reaction shall not be stored within the same storage cabinet.

5240.31 ABOVE-GROUND TANKS AND PRESSURE VESSELS

(a) All aboveground storage tanks, pressure vessels and containers over 100 gallons (water capacity) permanently installed, mounted or affixed and used for the storage of flammable and combustible liquids, compressed gases, or hazardous chemicals regulated by this Section, shall be identified in accordance with N.F.P.A. 704, Identification of the Fire Hazards of Materials.

EXCEPTION: Portable tanks not permanently mounted, temporary tanks used on construction sites, drum storage and packaged materials in containers of 55-gallon or less capacity.

Labels shall conform with N.F.P.A. 704, Identification of the Fire Hazards of Materials, for size and color and shall be affixed to tank, vessel or container so as to be conspicuously visible at all times.

(b) When any tank covered in this Section is housed within a building, the building shall have the same hazard identification label in a conspicuous location on the exterior of the building.

5240.32 DISPENSING

(a) Dispensing of hazardous materials shall only be permitted in accordance with Sec. 3240.35 or in buildings, rooms or areas within buildings which comply with the provisions of Section 5240.21, for storage of the particular material.

EXCEPTION: Small amounts of hazardous materials, excluding potentially explosive, reactive or unstable materials and highly toxic or poisonous gases may be dispensed from approved containers not exceeding 5 gallons capacity in other locations, when approved.

(b) Liquid hazardous materials shall be dispensed only by approved pumps taking suction from the top container.

5240.33 USE

Use of hazardous materials shall only be permitted in accordance with Sec. 5240.35 or in buildings, room's, or areas within buildings which comply with the provisions of Sec. 5240.21 for storage of the particular material, and which meet South Florida Building Code requirements for Group E Occupancies when required.

EXCEPTIONS:

(1) Small amounts of hazardous materials may be used in other locations, when approved.

(2) Hazardous materials which are used within instruments, machinery or equipment that have been designed and instruments, machinery or equipment that have been designed and approved for that use, for example: Photocopy and blueprint machines, and devices which contain a controlled radioactive source.

(3) Hazardous materials which are used within enclosures that have been designed and approved for the particular hazard involved for example: Spray booths, and laboratory fume hoods.

(4) Hazardous materials which are used in areas provided with special engineering controls.

(aa) Control or removal of ignition sources such as smoking, open flames, static electricity, etc.

(bb) Control of flammable, toxic, corrosive and other hazardous vapors, fumes or gases by means of special exhaust systems, gas detection and alarm systems and automatic gas shutoff valves.

(cc) Dust removal systems.

(dd) Isolation of materials which could interact.

(ee) Storage of hazardous materials within approved storage cabinets.

(ff) Procedural controls on use of hazardous materials.

(gg) Fire extinguishing systems, alarm systems and other special systems.

(hh) Adequate exiting from the area.

5240.34 EQUIPMENT

(a) Equipment. All equipment and machinery used for dispensing, processing, or any other operation involving hazardous materials shall be of an approved type, and listed by a nationally recognized testing agency. Such equipment shall be maintained in an operative condition at all times and shall be replaced or repaired when defective.

(b) Electrical Devices. Electrical wiring and equipment in hazardous materials dispensing and use areas shall be installed in accordance with the National Electrical Code and classed for the hazardous atmosphere that may develop.

(c) Static Accumulation. When hazardous materials which are flammable liquids, dusts or powders are dispensed or used, adequate grounding or bonding shall be provided to prevent the accumulation of static electricity.

5240.35 EXTERIOR DISPENSING

Exterior dispensing and use of hazardous materials shall meet the requirements of Sections 5240.32(b), 5204.34, 5240.36, 5240.37, and 5240.38 and shall comply with the provisions of Section 5240.21 for exterior storage of the particular material.

5240.36 VENTILATION

(a) Ventilation shall be provided in all rooms or areas within buildings where hazardous materials are dispensed or used in accordance with requirements contained in Section 5240.21.

(b) Location of the intake shall be dictated by the vapor density of the material.

(c) Manual control shall be provided for all mechanical ventilation systems required for removal of flammable and other hazardous gases, vapors or dusts. A remote control switch shall be installed at an approved location outside of the area served by the system.

EXCEPTIONS: Ventilation may be omitted where inert or other special atmospheres are required.

5240.37 CONTAINMENT

Containment in the form of recessed floors, raised sill, or open trench grating shall be provided where hazardous liquids are dispensed or used. Such containment shall be in accordance with requirements contained in Section 5240.21.

5240.38 OPERATIONAL PROCEDURES

Written procedures shall be established for hazardous operations and processes. The procedures shall include a description of the hazards, proper operating procedures and an emergency action guide. A copy of the approved procedures shall be posted owner/operator at the site of the operation or process, and a copy shall be retained for Fire Department use.

Persons in charge of hazardous operation and processes shall be adequately trained concerning the nature of the hazards, proper operating procedures, and necessary emergency actions. Written documentation or other evidence of such training shall be required.

5240.39 ON-SITE

Hazardous materials, excluding reactive or unstable materials rated 3 or 4 in accordance with N.F.P.A. 704, Identification of the Fire Hazards of Materials, and highly toxic or poisonous gases, may be transported through, but shall not be left unattended, even momentarily, nor stored within any part of an exit.

5240.40 CARTS AND TRUCKS

(a) Carts and trucks used to transport hazardous materials shall be provided with means for restraining containers. Incompatible materials shall not be transported on the same cart or truck.

(b) Power carts and trucks shall be approved for Class 1, Division 1 or Class 1, Division 2 hazardous locations as classified in the National Electrical Code. Internal combustion engines shall not be used in areas where hazardous materials are stored or used.

5240.41 PIPING

(a)A building permit is required for installation of piping systems used to convey hazardous materials.

(b) Piping and tubing shall be installed in accordance with all approved standards. All hazardous materials piping shall bear visible identification.

(c) Piping which carries hazardous materials having a (N.F.P.A. 704) health hazard rating of 3 or 4 shall have welded connections throughout unless an exhausted enclosure is provided.

(d) Piping which carries hazardous materials shall not be run within any portion of an exit system which is required to be enclosed in fire-resistive construction.

(e) Excess flow control protection shall be provided on all piping which carries pressurized gaseous hazardous materials. A fail-safe system shall shut off flow due to rupture or other failure of piping, fittings or equipment. Where the piping originates outside the building, the valve shall be located outside the building as close to the bulk source as possible.

(f) Shutoff valves. Readily accessible manual and/or manually activated fail-safe emergency shutoff valves shall be provided as follows:

(1) at the tank, cylinder or bulk source

(2)at the branch piping connection into the area of use. The valves shall be identified and the location shall be clearly visible, or indicated by means of a sign.

5240.42 OFF-SITE

No person shall operate any vehicle transporting any hazardous materials unless at the time of such transportation there are affixed to both sides, the front and the rear of the vehicle placards and identification numbers in conformity with Title 49, Code of Federal Regulations.

5240.43 ALARM SYSTEM

Where highly toxic materials, poisonous gases, or corrosive liquids are stored or used in such quantity as to constitute a distinct hazard to the surrounding community, such storage or usage shall be provided with an approved automatic leak detection system connected to a local alarm and supervisory system.

5240.44 USE AND STORAGE OF MURIATIC ACID AND CHLORINE DERIVATIVES IN COMMERCIAL ZONING (COMMERCIAL ZONING is intended to be defined as areas where there is permitted sales to the public)

(a) GAS CHLORINE

(1) No container shall be larger than 150 lbs. and no more than 24 units may be stored at any one site and in accordance with 5240.28.

(2) No chlorine to be stored in a multiple tenant building.

(3) Chlorine transferring from container to container shall not be permitted.

(b) CALCIUM HYPOCHLORITE

(1) Quantities over 500 lbs. are to be stored in a separate four hour room conforming with this Code.

(2) Quantities under 500 lbs. are to be stored in pre-packaged containers (approved for that use) only.

(3) Material should be kept at least ten feet (10') (horizontal and vertical) from packaged muriatic acid oil, brake fluid or other reactive materials. (No above liquid storage.)

(4) Cardboard drums shall not be stacked on the floor. Drums shall be elevated at least one inch (1") and protected from contamination, dampness, wetness and provided with adequate ventilation as per 5240.27 and 5240.29 and pallets shall not be double stacked.

(5) No container shall be larger than 100 lbs.

(c) CHLORINATED TRIAZINETRIONE COMPOUNDS (DI-CHLOR, TRI-CHLOR, TRI-CHLOR TABLETS)

(1) Quantities over 1000 lbs. are to be stored in a separate four hour room conforming with this Code. (Exception: 2000 lbs. maximum on tablets ½" or larger.)

(2) Material should be kept at least ten feet (10') from packaged or bulk muriatic acid, oil, brake fluid or other reactive materials; no container larger than 300 lbs.

(3) Cardboard drums shall not be stacked on the floor. Drums shall be elevated at least one inch (1") and protected from contamination, dampness, wetness and provided with adequate ventilation as per 5240.27 and 5240.29.

(4) Cardboard drums shall not be stacked in excess of manufacturers recommendations.

(d) BULK STORAGE OF MURIATIC ACID

(1) All tanks shall be installed according to the licensing requirements of BCDNRP including secondary containment and requirements of this Code.

(2) No bulk storage shall be permitted of muriatic acid higher in strength than 37.5%.

(3) No filling of muriatic acid shall be permitted in any structure. Re: Outside filling. (Dispensing by gravity feed is permissible.)

(4) New installation of muriatic acid tanks are prohibited where sodium hypochlorite is bulk stored on same premises.

EXCEPTION: Existing tanks may be repaired or replaced as required by this Code.

(5) Solid foundations shall be provided where the tanks are resting (concrete pad and block is acceptable). Remodeled platforms over 48 inches in height shall be designed and sealed by professional engineers and/or architects. The structural integrity of all platforms must be protected form possible chemical erosion (as approved by the Building Department).

(6) Tanks shall be at least ten feet (10') from all operative doors, windows and vents of a neighboring facility.

(7) Tanks shall be labeled with muriatic acid label and a D.O.T. 1789 label with six-inch high lettering.

(8) Bulk storage of muriatic acid in any structure or outside of any structure shall be completely sealed and vented through a scrubber. In the absence of a commercial scrubber, the tank may be vented to a barrel filled with water and soda ash (or equivalent) and equipped with a vacuum break.

(9) Neutralization chemicals, soda ash or sodium bicarbonate shall be on hand to neutralize the site. (The following amounts shall be kept on site: at least 200 lbs. soda ash or 400 lbs. sodium bicarbonate stored in a waterproof container.)

(10) Water hose and outlet shall be accessible to tanks. An eyewash station or eyewash bottle within twenty feet of bulk storage area shall be provided.

(e) BULK STORAGE OF CHLORINE BLEACH

(1) All tanks shall be installed in accordance with 5240.44(d)(1) and (5). (New platforms over 48 inches in height shall be designed and sealed by professional engineers.) The structural integrity of all platforms must be protected from possible chemical erosion.

(2) Tanks shall be labeled with sodium hypochlorite label and a D.O.T. 1791 label with six inch high letters.

(3) No flammable or solid reactive material are to be stored within 10 feet of bulk storage area. Liquid reactive material must be stored in a separate secondary containment system in lieu of a distance requirement. All indoor liquid bulk storage shall be vented through the wall to outside atmosphere at least three feet above the roof of the structure. Adequate ventilation will be provided in all storage rooms as per 5240.27 and 5240.29 (Dispensing by gravity feed is permissible).

(4) Required safety equipment as per 5240.44(d)(10).

(f) ADDITIONAL REQUIREMENT FOR FACILITIES WITH BULK STORAGE OF BOTH MURIATIC ACID CHLORINE BLEACH

(1) Separate containment basins as per BCDNRP and this Code.

(2) No joint bulk storage within 50 feet of residential property.

(3) If both tank hoses are stored outdoors, an additional locking shut off valve for at lest one of the chemicals is required.

(4) All individual requirements for bleach tanks or acid tanks still apply as referenced by 5240.44 d, e, f, and this Code.

(g) Chemical supplier shall issue inspection certificate to facility twice a year, June 30th and December 31st. Facility will post copy of certificate with their BCDNRP license and facility operator will file one copy with the local fire department. All storage shall be approved by the Fire Department.

(h) THE ABOVE DOES NOT REFLECT ALL THE SAFEGUARDS, BUT DETAILS THE ITEMS ACCORDING TO THE APPLICABLE CODES PERTAINING TO THE CHEMICALS LISTED HEREIN, FOR STORAGE INSIDE AND OUTSIDE OF A STRUCTURE.

(i) DEFINITIONS(Note: Specific definitions for 5240.44 only)

(1) BULK STORAGE is containers larger than sixty gallons from which smaller containers are filled.

(2) CHLORINE BLEACH pertains to sodium hypochlorite solutions between 5% and 16%.

(3) MURIATIC ACID is a solution of HCL in water concentrations of 1% to 31.5%.

5241 HIGH PILE COMBUSTIBLE STOCK

5241.1 SCOPE

This Section shall apply to the storage of high-pile combustible stock. Factors such as method and height of stock piling, combustibility of materials, fuel load and rate of heat release, areas and size of piles, aisles, automatic fire extinguishing systems, smoke-removal systems, building construction and fire separations are considered in setting forth the provisions of this Section.

In all cases, the minimum requirements addressed in NFPA 231, General Storage; NFPA 231C, Rack Storage of Materials; NFPA 231D, Storage of Rubber Tires; NFPA 231E, Storage of Baled Cotton and NFPA 231F, Roll Paper Storage, shall apply.

5241.2 DEFINITIONS

For definitions of HIGH-PILED STORAGE and COMMODITY, see Section 5208.

CLASSIFICATION OF CONTENTS

Commodity classification shall be as defined and in accordance with the appropriate standards.

5241.3 AUTOMATIC FIRE-EXTINGUISHING SYSTEMS

(a) An approved automatic fire-extinguishing system shall be required throughout the building when the contiguous area (minimum separation between storage areas is 60 feet) used for high-piled combustible

storage exceeds 12,000 square feet, inclusive of aisles.

EXCEPTION: Automatic fire-extinguishing systems may be provided only in the storage area when it is separated from the remainder of the building by fire resistive separation in accordance with this Code.

(b) The design and installation of automatic fire extinguishing systems shall conform to requirements in this Code.

The fire-extinguishing systems shall be designed by a registered engineer or approved designer.

(d) The design of automatic fire-extinguishing systems for shall be approved by the Fire Chief and Chief Plumbing Inspector. The Fire Chief shall be guided by the standards and recommendations of the National Fire Protection Association, Factory Mutual Engineering and other nationally recognized fire protection authorities.

5241.4 ROOF VENTS, VENTING RATIOS AND DRAFT STOP

(a) Roof vents and draft stop shall be installed when the contiguous area (minimum separation between areas is 60 feet) used for high piled combustible stock exceeds 2,500 square feet.

EXCEPTION: Areas protected by an approved fire extinguishing system.

(b) The design and installation of roof vents and draft stop shall be as specified in this Code except as herein provided.

(c) Vents shall be installed in the roof, except that perimeter venting in the exterior walls by the use of automatic opening windows will be permitted to vent roof areas within 75 feet of an exterior wall. The top of such windows shall be located within one (1) foot of the roof or ceiling level and the windows shall be not less than 30 inches nor more than 60 inches in depth. Roof areas more than 75 feet from an exterior wall shall be provided with roof vents. Venting shall be provided in accordance with the following table:

Hazard Classification	Vent Area to Floor Area	Maximum Spacing Between Vent Centers
Classes I, II, III	1:100	120 feet
Class IV	1:50	100 feet
Special Hazard Commodities	1:30	75 feet

(d) The minimum dimension of any roof vent shall be not less than four (4) feet.

(e) Vents shall consist of automatic roof vents or automatic opening windows equipped with a fusible link designed to release at 165 degrees F.

(f) Draft stop shall be provided to aide the operation of roof vents. Draft curtains shall comply with the requirements of this Code except as herein provided.

(g) Draft stop shall be at least six (6) feet in depth and shall be of approved materials. For Classes I, II, and III commodities, draft stop shall divide the under roof area into sections not to exceed 10,000 square feet. For Class IV and Special Hazard Commodities, draft stop shall divide the under roof area into sections not to exceed 6000 square feet.

5241.5 AISLES

Aisles of not less than 44 inches in width shall be established to provide access to exits and fire department access doors.

5241.6 ACCESS TO BUILDING

Access door shall be provided at or near ground level for firefighting purposes in accordance with the

Fire Code, except as herein provided. There shall be at least one door not less than three (3) feet in width and not less than 6 feet 8 inches in height in 100 lineal feet or major fraction thereof of the exterior wall which faces the access roadways required by Section 5211.2(g). Metal roll-up doors are not acceptable for such purposes unless approved by the Fire Code Committee.

5241.7 WET STANDPIPE

(a) A Class II standpipe system shall be provided for all high piled stock areas that are not protected by automatic sprinklers. One and one-half inch hose connections complying with N.F.P.A. 14 shall be provided in high-piled storage areas which are protected by automatic sprinklers.

(b) Approved and listed hose reels or approved and listed semiautomatic hose racks shall be provided and shall be located so as to make the hose accessible at all times. The reels or racks shall be recessed or protected by suitable cabinets designed for such use.

5242 LIQUEFIED PETROLEUM GASES

5242.1 SCOPE

This Section shall apply to the storage, handling and transportation of liquefied petroleum gas and the installation of all equipment pertinent to systems for such uses. N.F.P.A. 58, Storage and Handling of Liquefied Petroleum Gases, is hereby adopted in its entirety as part of this Fire Code.

5242.2 DEFINITIONS

For definitions, see Section 5208 of this Fire Code.

5242.3 PERMITS AND REPORTS OF INSTALLATIONS

(a) For a permit to install or maintain an LP-gas container or operate LP-gas tank vehicles, see Section 5206.

(b) Installers shall maintain a record of all installation for which a permit is not required by Section 5206 (but not including installation of gas-burning appliances and replacing of portable cylinders) and have it available for inspection by the Fire Chief.

5242.4 INSTALLATION OF EQUIPMENT

All liquefied petroleum gas equipment, including such equipment installed at utility gas plants, shall be installed in accordance with the provisions of N.F.P.A. 58 and N.F.P.A. 59, except as otherwise provided in this Section or in other laws or regulations legally in effect.

5242.5 LOCATION OF CONTAINERS AND LIMITS

(a) All new liquefied petroleum gas storage installation and handling shall be in accordance with N.F.P.A. 58, the laws of the State of Florida, and all applicable rules, regulations, and ordinances of the jurisdictional areas.

(b) Within the limits established by law restricting the storage of liquefied petroleum gas for the protection of heavily populated or congested commercial areas, the aggregate capacity of any one installation shall not exceed 2,000 gallons water capacity, except that in particular installations this capacity limit may be altered at the discretion of the Fire Board after consideration of special features such as topographical conditions, nature of occupancy and proximity to buildings, capacity of proposed tanks, degree of private fire protection to be provided and facilities of the local fire department. The storage of liquefied petroleum gas shall conform to the provisions of the local zoning ordinance.

(c) Where a distributing point is allowed, there shall be in attendance a qualified person to make the transfer of liquefied petroleum gas. This person shall have been trained by a licensed gas company, and be in possession of documents certifying such training. The owner of the distributing point shall be licensed by the L.P. Division of the State of Florida.

(d) All plans for installations at distributing points shall be submitted to the authorities having jurisdiction for permits and approval. In addition, plans for locations at distributing points for fixed (stationary) installations of **(1)** 2,000 gallons individual water capacity, or **(2)** with the aggregate water capacity exceeding 4,000 gallons, or **(3)** any installation, regardless of size, which will be used for resale to the public, shall be submitted the State of Florida L.P. Division for approval and proper licensing, and be approved before the installation is started. Other safety precautions shall be adhered to as designated by the Fire Chief.

(e) An L.P. Gas storage tank shall not be installed on the same island used for gasoline or diesel fuel dispensing. A minimum distance of 25 feet shall be maintained between the L.P. gas storage tank and the flammable liquid dispensing devices.

(f)A distributing plant as defined in Section 5242.2 shall be prohibited unless approved by the Fire Chief.

(g) Multiple container installations with a total storage water capacity of more than 180,000 gallons (150,000 gallons LP-gas capacity) shall be subdivided into groups containing not more than 180,000 gallons in each group. Such groups shall be separated by a distance of not less than 50 feet, unless the tanks are **(1)** buried or mounted in an approved manner, or **(2)** protected with approved insulation on such areas that may be subject to impingement of ignited gas from pipelines or other leakage, or **(3)** protected by fire-walls of approved construction, or **(4)** protected by an approved system for application of water, or **(5)** protected by other approved means, where one of these forms of protection is provided, the separation shall not be less than 25 feet between such container groups.

(h) The storage and transportation of liquefied petroleum gas and the installation of all pertinent equipment shall be installed and maintained in accordance with N.F.P.A. 58, and subject to the approval of the Fire Chief. These orders shall apply to all persons and places within the jurisdiction except as herein provided.

5242.6 PARKING AND GARAGING

The parking and garaging of tank vehicles used for the transportation of liquefied petroleum gases shall be in accordance with Section 5242.1.

5242.7 PROHIBITED USE OF LIQUEFIED PETROLEUM GAS

(a) Liquefied petroleum gas shall not be used for the purpose of operating any device or equipment unless such equipment or device is approved for use with a liquefied petroleum gas.

(b) Liquefied petroleum gas shall not be released to the atmosphere except through an approved liquid level gauge or other approved device.

5242.8 DISPENSING AND OVERFILLING

(a) The dispensing of liquefied petroleum gases shall be performed by a qualified attendant.

(b) It shall be illegal for any person, firm, corporation, association, club or organization to operate a self-service liquefied petroleum gas dispensing operation which is open to the public.

(c) A person shall not fill or maintain a liquefied petroleum gas container with liquefied petroleum gas in excess of the fixed outage gauge installed by the manufacturer or the weight stamped on the tank.

5242.9 SAFETY DEVICES

A person shall not tamper with or make ineffective the safety devices of any liquefied petroleum gas container.

5242.10 SMOKING AND OPEN-FLAME DEVICES

(a) NO SMOKING SIGNS shall be posted. No person shall smoke within a minimum of ten (10) feet of any LP gas container of 1,200 gallon capacity or less, nor within a minimum of 25 feet of any such container over 1,200 gallon capacity.

(b) A person shall not install or maintain any open-flame device outside of buildings within 25 feet of any LP gas container having a capacity of 1,200 gallons or less, nor within 50 feet of any such container having a capacity over 1,200 gallons.

(c) A person shall not install or maintain any LP gas container with a capacity of 1,200 gallons or less within 25 feet of any open-flame device outside of buildings, nor shall any person install or maintain any such container with a capacity in excess of 1,200 gallons within 25 feet of any such open-flame device.

5242.11 CLEARANCE OF COMBUSTIBLES

Refer to N.F.P.A. 58.

5242.12 ABANDONMENT OF LIQUEFIED PETROLEUM GAS EQUIPMENT

Whenever the use of liquefied petroleum gas equipment has been discontinued, it shall be abandoned in an approved manner within a period of 30 days.

(a) The following procedures may be used when approved by the Fire Chief.

(1) Removal of all liquefied petroleum equipment.

(2) Burn-off content of container.

(3) Venting contents of container to atmosphere when discharge gas can be led to a safe point of discharge.

(b) All service openings shall be capped or plugged after contents have been removed from container.

(c) All LP tanks, abandoned or out of service in excess of ninety (90) days, shall be removed and properly disposed of.

5242.13 PROTECTING CONTAINERS FROM VEHICLES

LP gas containers located in or adjacent to areas such as alleys, driveways or parking lots where they may be damaged by vehicles, shall be protected from contact damage.

5242.14 COMPRESSED NATURAL GAS, SCOPE

This division shall apply to the design and installation of compressed natural gas (CNG) engine fuel systems on vehicles of all types and to their associated fueling (dispensing) systems.

5242.15 PERMITS

For permits to use equipment, structures or enclosures for the installation or storage of compressed natural gas (CNG) systems and/or components, see Section 5206.

5242.16 COMPLIANCE

Applications shall meet the applicable standards set forth in NFPA 52, Compressed Natural Gas (CNG) Vehicular Fuel.

5242.17 MAINTENANCE

In addition to the maintenance provisions set forth in the applicable standard, survey of premises and maintenance of equipment, shall be as set forth in Section 5211.2(i).

5243 MATCHES

5243.1 WHOLESALE STORAGE

(a) At wholesale establishments and wherever matches exceeding 60 matchman's gross (14,400 matches each gross) are stored, shipping containers containing matches shall be arranged in piles not exceeding 10 feet in height nor 1500 cubic feet in volume with aisles at least 4 feet wide.

(b) Where other materials or commodities are stored on the same floor with matches, a portion of the room shall be devoted to match storage exclusively and a clear space of not less than 4 feet maintained

between match storage and such other material or commodities.

5243.2 STORAGE NOT TO BE NEAR VERTICAL OPENINGS

Matches shall not be stored within 10 feet of any open elevator shaft opening, open stairway or other vertical opening.

5243.3 MATCH BINS REQUIRED

Where shipping containers containing matches are opened, the contents of such broken containers shall be removed and stored in metal or metal-lined bins equipped with self-closing metal or metal-lined covers.

5243.4 STORAGE BY RETAILERS

Where matches are sold at retail, original sealed packages may be stored on shelves. When such packages are broken, individual boxes shall be stored in metal or metal-lined bins as described in Section 5243.3.

5244 MOTION PICTURE PROJECTION

5244.1 SCOPE

The provisions of this Section shall apply where ribbon-type cellulose acetate or other safety film is used in conjunction with electric arc, xenon or other light-source projection equipment which develops hazardous gases, dust or radiation.

The provisions of this Section shall apply to the projection of ribbon-type cellulose nitrate film regardless of the light source used in projection.

5244.2 PROJECTION ROOM

(a) Every motion picture projection machine used for projecting film regulated under Section 5244.1 shall be operated within a motion picture projection room complying with the requirements of Section 5253 of this Fire Code.

(b) Projection rooms which are limited to the projection of safety film shall be posted on the outside of each projection room door and within the projection room itself with a conspicuous sign with 1-inch block letters stating **SAFETY FILM ONLY IS PERMITTED IN THIS ROOM.**

(c) There shall be installed and maintained ready for use in every projection room not less than two portable fire extinguishers with at least a 10-B:C rating.

5244.3 SMOKING

A person shall not smoke or maintain any other source of ignition within any projection room in which cellulose nitrate film is permitted, nor shall the operator or manager of the premises permit any person to smoke or to maintain any other source of ignition within said projection room. Conspicuous NO SMOKING signs shall be posted in such a room.

5244.4 PROJECTION EQUIPMENT

A person owning, controlling or managing any motion picture projection equipment shall not use or permit the use of projection equipment or film which is in a hazardous condition.

5244.5 FILM STORAGE AND USE

(a) Cellulose nitrate film may not be used or stored except within an enclosed film magazine, an approved storage cabinet or transportation container. Rewinding of cellulose nitrate film shall be done within an enclosed film rewind machine. Examination of film may be done on an open hand rewind machine with not more than one reel outside an approved container at any time.

(b) Safety film which is not mounted for projection shall be stored in approved transportation containers or an approved film cabinet.

5245 MOTION PICTURE FILM, CELLULOSE NITRATE

5245.1 APPLICABILITY OF DIVISION

This division applies to the storage and handling of cellulose nitrate motion picture film hereafter referred to as "nitrate film." Film having a cellulose acetate or other approved, low burning base, marked "safety film," is exempt from these provisions. Standards for Storage and Handling Cellulose Nitrate Motion Picture Film, NFPA 40 and the State Fire Marshal's Rules and Regulations 4A-5, are hereby adopted in their entirety as a minimum requirement of this Fire Code. See all Section 5253 of this Fire Code.

5246 CELLULOSE NITRATE PLASTIC (PYROXYLIN), STORAGE AND HANDLING

5246.1 DEFINITION

For definition of CELLULOSE NITRATE PLASTICS (PYROXYLIN), see Section 5208.

The Fire Code for Storage of Pyroxylin Plastic, N.F.P.A. 40E and the State Fire Marshal's Rules and Regulations 4A-6, are hereby adopted in their entirely as a minimum requirement of this Fire Code.

5246.2 PERMITS

For permits to store, handle, manufacture or assemble Sections of cellulose nitrate, see Section 5206.

5247 PESTICIDES

5247.1 SCOPE

This Section shall apply to both inside and outside storage of all forms of pesticides in portable containers other than fixed installation on transportation equipment.

The Fire Code for Storage of Pesticides in Portable Containers, NFPA 43D, is hereby adopted in its entirety as a minimum requirement of this Fire Code.

EXCEPTIONS:

(1) Highly toxic pesticides, see Section 5240.

(2) Storage in dwellings or private garages of pesticides registered by the Environmental Protection Agency for use around the home. Such pesticides are registered under the Federal Insecticide, Fungicide and Rodenticide Act of 1945 (FIFRA) as amended by the Federal Economic Poison Control Act of 1972.

5247.2 GENERAL REQUIREMENTS

(a) Containment of Hose Stream Runoff. Pesticides storage shall be located or constructed so that runoff from firefighting operations will not be located or constructed so that run off from firefighting operations will not contaminate streams, ponds, groundwater, croplands, pasture land or buildings.

(b) Flammable or Combustible. Pesticides that are flammable or combustible liquids shall be stored in accordance with the provisions of Section 5239.

(c) Oxidizers. Pesticides that are oxidizing agents shall be stored in accordance with Section 5240.

(d) Storage with Ammonium Nitrate. Pesticide shall not be stored in the same area with ammonium nitrate fertilizer.

(e) Storage Methods. Pesticides shall be stored in accordance with the recommendations of the manufacturer. Storage of pesticides shall be arranged according to compatibility.

(f) Location of Storage. Pesticide storage shall be restricted to a first-story room, or area which has direct access to the outside without passing through intervening rooms or corridors.

EXCEPTION: A facility used exclusively for pesticide storage. Pesticides shall not be stored in basements.

(g) Storage on Damp Floors. Pesticides in containers which could be damaged by moisture or water shall be stored off the floor.

(h) Damaged Containers. Leaking or damaged container of pesticides or materials contaminated by pesticides shall be immediately segregated and disposed of or decontaminated in accordance with regulatory requirements, manufacturer's instructions or recommended industry practice.

(i) Toxicity Data. Material safety data sheets for each toxic pesticide shall be available at each storage location.

5247.3 SIGNS

(a) Identification of Buildings, Rooms or Areas. Pesticide storage buildings, storage rooms or storage areas shall be identified by prominent and legible signs in accordance with NFPA 704.

(b) Container Labels. Each group of pesticide containers shall have labels visible to readily permit identification.

5247.4 FIRE PROTECTION

Storage facilities shall be protected in accordance with the provisions of Section 5211.

5247.5 EMERGENCY MANAGEMENT

Emergency preplanning and post-fire management shall be established and displayed to assist in proper action.

5247.6 DISPLAY

The quantity of pesticides in rooms or areas accessible to the public shall be limited to that needed for display. Drums and large packages shall be stacked in a safe manner.

5247.7 STORAGE AREAS

(a) Designating Areas. A separate building, room, portion of a building or outside area shall be designated as the pesticide storage area.

(b) Security. The storage area shall all be secured in such a manner as to prevent unauthorized entry.

5247.8 PESTICIDES STORED AS COMPRESSED GASES

(a) Sources of Heat. Compressed gas pesticides shall be stored away from heat (steam pipes, heaters, direct sun).

(b) Anchoring. All compressed gas cylinders in service or in storage shall be adequately secured to prevent their falling.

(c) Closing Containers and Safety Cap. Containers shall be tightly closed and provided with a safety cap when not in use, whether empty or full.

(d) Separation from Other Gases. Pesticide containers shall be separated from other compressed gases by pipe railings or other effective means.

5248 PREVENTION OF DUST EXPLOSION

For the definition of DUST as used in this Section, see Section 5208.

The Standard on Explosion Prevention Systems, NFPA 69, and the State Fire Marshal's Rules and Regulations A-10, Prevention of Dust Explosions, are hereby adopted in their entirety as a minimum requirement of this Fire Code.

5248.2 GENERAL REQUIREMENTS

(a) All dust-producing or dust-agitating machinery, such as grinding mills and separators, and all elevators, elevator legs, spouts, hoppers and other conveyors shall be provided with casting or enclosures maintained as nearly dust-tight as possible.

(b) Approved magnetic or pneumatic separators shall be installed ahead of all shellers, crackers, crushers, grinding machines, pulverizers and similar machines in which the entrance of foreign material may cause sparks to be generated.

(c) Suitable dust-collecting equipment shall be installed, and accumulation of dust shall be kept at a minimum in the interior of buildings. Exhaust and dust collecting systems shall be provided on any single piece of equipment or power tool producing or generating combustible fibers, chips, shavings, and dusts and exceeding 2 HP or any quantity of equipment or power tools exceeding 5 HP

(d) All machinery and metal parts of the crushing, drying, pulverizing and conveying system shall be electrically grounded in accordance with the National Electrical Code.

(e) Smoking and the carrying of matches, the use of heating devices employing an open flame or use of any spark producing equipment is prohibited in areas containing dust producing or dust-agitating operations. Artificial lighting in such areas shall be by electricity with all wiring and electrical equipment installed in accordance with the National Electrical Code.

(f) Properly designed and located vents which will relieve the pressure resulting from an explosion and prevent or reduce damage to buildings or equipment shall be required in all buildings where flammable or explosive dusts are manufactured, processed or generated. The design and amount of such equipment shall be in accordance with this Code.

(g) Static electricity shall be removed from all machinery and other component parts by permanent grounds or bonds or both. The design and installation of such grounds shall be in accordance with approved standards.

5249 VEHICLES AND VESSELS

5249.1 DEFINITIONS

For the purpose of this Section, vehicles and vessels are defined as any house trailer, railroad car, street car or bus, ship, barge or similar conveyance no longer mobile and permanently fixed to a foundation or mooring.

5249.2 COMPLIANCE

Any vehicle which is subject to human occupancy and is fixed or otherwise prevented from being mobile, shall comply with the appropriate provisions of the Fire Code applicable to buildings of similar occupancy or process.

5249.3 DEFINITIONS

For definition of VESSEL, see Section 5249.1.

5249.4 COMPLIANCE

Any ship, barge or other vessel which is subject to occupancy for any purpose other than navigation and is permanently moored, set aground or otherwise fixed, shall comply with this Fire Code applicable to buildings of similar occupancy or process.

5250 TENTS AND AIR-SUPPORTED STRUCTURES

5250.1 SCOPE

(a) Permits. For permits to use or operate a tent or air supported structure covering an area in excess of 200 square feet, see Section 5206.

(b) Compliance. The Standard for Assembly Seating, Tents and Membrane Structures, NFPA 102, is hereby adopted in its entirety as a minimum requirement of this Fire Code.

5250.2 PLACES OF ASSEMBLAGE

For the purpose of this Section, a place of assembly shall include any circus, sideshow, carnival, tent

show, theater, skating rink, dance hall or any other exhibition, production, engagement or offering, or other place of assembly in or under which 10 or more persons may gather for any purpose.

5250.3 PARKING OF VEHICLES

Automotive equipment that is necessary to the operation of the establishment shall not be parked within 20 feet of the tent or air-supported structure except by special permit. (See Section 5206.1) No other automotive equipment or internal combustion engines shall be located within 50 feet of the tent except upon a public street.

5250.4 LOCATION OF TENTS AND AIR-SUPPORTED STRUCTURES

(a) A tent or air-supported structure shall be located not less than 10 feet from any property line or permanent structure except where the property line is a street or alley.

(b) Tents or air supported structures having a floor area in excess of 1,500 square feet but less than 15,000 square feet shall be located not less than 30 feet from any other tent, air supported structure or structure.

(c) Tents or air-supported structures having an area of 15,000 square feet or more shall be located not less than 50 feet from any other tent or structure as measured from the side wall of the tent, unless joined together by a corridor.

EXCEPTION: Where conditions make it impossible to provide the required distance between tents or air-supported structures as specified in Sub-sections (b) and (c), the Chief may approve the locations of tents and air-supported structures closer than that specified if required passageways are provided and, in his opinion, adequate safety will be afforded.

(d) Tents and air-supported structures may be joined together by means of corridors, but such corridors shall be open to the sky. On each side of such corridor and approximately opposite each other, there shall be provided openings not less than 12 feet wide. These openings shall be equipped with sliding curtains as specified in Section 5250.11(e).

(e) See Section 5211 for required emergency access.

5250.5 FLAME-RETARDANT TREATMENT

The side wall, drops and top of all tents and air-supported structures shall be of flame-retardant material or shall be made fire retardant. All bunting and other flammable decorations or effects and sawdust when used on floors or passageways shall likewise be treated with a flame retardant solution.

An affidavit or affirmation shall be retained at the premises on which the tent or air-supported structure is located, attesting to the following information relative to the flame-retardant treatment of the fabrics:

(1) Date fabric was last treated with flame retardant solution.

(2) Trade name or kind of chemical used in treatment.

(3) The name of person or firm treating the material.

(4) The name and address of the owners of the tent.

5250.6 FIRE-RESISTIVE STANDARDS

Fire-resistive standards shall be in accordance with the applicable provisions of N.F.P.A. 701 Standards, Methods of Fire Tests for Flame-Resistant Textiles and Films, or of a recognized testing laboratory.

5250.7 SMOKING AND OPEN FLAME

(a) Smoking shall not be permitted in any tent or air-supported structure or in any adjacent areas where hay, straw, alfalfa, sawdust or other highly combustible materials are kept or stored.

Approved **NO SMOKING** signs shall be conspicuously posted.

(b) No fireworks, open flame or other device emitting flame or fire shall be used in or immediately adjacent to any tent or air-supported structure while open to the public, upon special permit as in Section 5206.

(c) Toy balloons or other similar devices that are inflated with poisonous, explosive or flammable gas shall not be permitted in or on the premises adjacent to any tent or air-supported structure.

(d) An approved receptacle for the disposal of lighted smoking materials shall be provided at all entrances to tents and air-supported structures.

5250.8 FIRE EXTINGUISHERS AND OTHER FIRE-PROTECTION EQUIPMENT

Fire extinguishers and other fire protection equipment shall be provided in every tent or air-supported structure as follows:

(1) One 2-A type extinguisher shall be provided in every tent or air supported structure having a floor area less than 1,000 square feet and also one in each additional 2,000 square feet or fraction thereof.

(2) At least one 40-B:C type fire extinguisher shall be provided for each kitchen, mess hall, power generator or transformer and at locations where flammable or combustible liquids are used, stored or dispensed.

(3) Fire hose line, water supplies and other auxiliary fire equipment shall be maintained at the site in such numbers and size as may be required.

5250.9 STANDBY FIREWATCH

Standby firewatch shall be provided in accordance with Section 5211.2(h)(1).

5250.10 ABATEMENT OF FIRE OR PANIC HAZARDS NOT SPECIFICALLY COVERED BY THIS ARTICLE

Any unforeseen condition that presents a fire hazard or would contribute to the rapid spread of fire, or would delay or interfere with the rapid exit of persons from the tent or air-supported structure or would interfere with or delay the extinguishment of a fire and which is not otherwise covered by this Section shall be immediately abated, eliminated or corrected.

5250.11 EXITS

(a) The aggregate width of exits from any tent or air supported structure shall be not less than one (1) foot for each 50 persons.

(b) An exit shall be not less than 36 inches wide.

(c) Exits shall be spaced at approximately equal intervals around the perimeter of the tent or air-supported structure and shall be so located that no point is more than 100 feet from an exit.

(d) Exits shall be provided in accordance with the following table:

CAPACITY OF TENT OR AIR-SUPPORTED STRUCTURE

Capacity	Minimum Number of Exits	Tent	Air Supported Structure
Up to 199	2	6	3
200 to 499	3	6	6
500 to 999	4	8	6
1000 to 1999	5	10	8
Over 2000	6	10	8

(e) Exit openings from any tent shall remain open, or may be covered by canvas curtain, provided:

(1) Said curtains shall be so arranged that when open no part of the curtains shall obstruct the exit.

(2) Said curtains shall be of a color, or colors, definitely contrasting with the color of the tent.

(f) Exit doors from air-supported structures shall swing in the direction of exit travel. To avoid hazardous air and pressure loss, all such doors shall be automatically closing against operating pressures. Opening force at the door edge shall not exceed 15 pounds.

(g) Smooth-surfaced, unobstructed aisles having minimum width of not less than 44 inches shall be provided from all seating areas and their width shall be progressively increased in width to provide at all points not less than one (1) foot of aisle width for each 50 persons served by such aisle at that point.

5250.12 MAINTENANCE OF EXIT WAYS

The required minimum clear width of exits, aisles and passageways shall be maintained at all times.

5250.13 MARKING OF EXITS

At every exit and wherever otherwise required to clearly indicate the direction of egress, an exit sign with letters at least 6 (six) inches in height shall be provided.

5250.14 EXIT ILLUMINATION

(a) Exits shall be illuminated at all times with light having an intensity of not less than one foot candle at floor level.

(b) Exit signs shall be lighted in tents and air-supported structures with occupant loads over 100 persons, by two separate power sources.

(c) Emergency exit illumination shall be provided by Type 1 emergency lighting, in accordance with Section 5213.

5250.15 OCCUPANT LOAD

(a) The occupant load shall be in accordance with the provisions of Section 5212.

(b) The owner or manager shall not permit a number of persons in excess of the capacity determined by the above method to enter the tent or air-supported structure.

5250.16 SEATING ARRANGEMENTS

The seating arrangements shall be in accordance with Section 5215.

5250.17 HEATING AND COOKING EQUIPMENT

(a) All heating or cooking equipment shall be installed as specified in the appropriate Section of this Code.

(b) Gas, liquid and solid fuel burning equipment designed to be vented shall be vented to the outside air as specified in the appropriate Section of this Code. Such vents shall be equipped with spark arresters when required.

(c) Heating and cooking apparatus shall not be located in exits, aisles, passageways or near combustibles.

5250.18 STORAGE OF FLAMMABLE OR COMBUSTIBLE LIQUIDS

(a) Flammable or combustible liquid shall not be stored in a tent or air-supported structure nor less than 50 feet from any tent or air-supported structure used for public assembly.

(b) The storage and dispensing of flammable or combustible liquids shall be in accordance with Section 5239.

(c) Liquefied petroleum gas shall not be stored or used in connection with any tent or air-supported structure unless the storage containers, equipment, fittings and appliances, and the placement, use, and operation of such equipment comply with Section 5242.

5250.19 HOUSEKEEPING

(a) All weeds and flammable vegetation shall be removed from the premises adjacent to or within 35 feet of any tent or air-supported structure.

(b) Hay, straw, trash and other flammable material shall not be stored less than 35 feet from any tent or air-supported structure, except by special permit in Section 5206.1 from the Fire Chief.

(c) The grounds both inside and outside of tents and air-supported structure shall be kept free and clear of combustible waste. Such waste shall be stored in approved containers or removed form the premises. The burning of rubbish on the premises shall not be permitted.

525I MOBILE HOMES AND RECREATIONAL VEHICLE PARKS

5251.1 SCOPE

This Section shall apply to all mobile home and recreational parks.

5251.2 COMPLIANCE

Mobile home parks and recreational vehicle parks shall meet the requirements of the uniform Standards of the State of Florida Fire Marshal Rules, Chapter a-42.

5252 GENERAL STORAGE

5252.1 COMPLIANCE

N.F.P.A. #101, 1985 Life Safety Code

N.F.P.A. #231, Standards for General Storage

N.F.P.A. #231C, Standards of Rack Storage of Materials

N.F.P.A. #231D, Standard of Storage of Rubber Tires, and

N.F.P.A. #231F, Standard of Rolled Paper Storage

are hereby adopted in their entirety as part of this Fire Code.

5253 FIRE-EXTINGUISHING APPARATUS AUTOMATIC-SPRINKLER SYSTEMS

See Chapter 38

Exception: Sec. 5253.1
Sec. 5253.2
Sec. 5253.3
Sec. 5253.4

5253.1 GENERAL

(a) In new buildings or in buildings altered to increase the area or height, and in existing buildings as set forth in Section 5201 and 5202 of this Chapter, approved automatic-sprinkler systems shall be installed and maintained as provided in this Section and in Section 5254 of this Chapter, except that the Fire Chief may require or may permit a carbon dioxide fire-extinguishing system, as set forth in Section 5253.3 or other approved automatic fire extinguishing system, to be used in lieu of such sprinkler system.

(1) Where Buildings exceed 50 feet in height, standpipe riser shall be designed to requirements of Chapter 2 of N.F.P.A. 14 as adopted by this Code.

(b) As used in this Section.

(1) Area shall be the allowable floor area set forth in this Code for the various types of construction.

(2) Height shall be the vertical distance from grade to the top of the main roof, exclusive of a mechanical penthouse.

(3) Grade shall be as set forth in Section 5254.1 of this Chapter.

(c) Combustible goods or merchandise shall include those made of wood, plastics, cloth or rubber; those containing flammable liquids; those packed with excelsior, paper or moss; those packaged or packed in paper; cardboard or wood containers and other goods or merchandise of equivalent, or greater, combustibility.

(d) Combustible, incombustible and noncombustible shall be as defined in the Standards Section of this Chapter.

(e) The installation of fire extinguisher or standpipes shall not reduce or nullify the requirements for automatic fire-extinguishing systems, as set forth in this Section and in Section 5254 of this Chapter.

(f) Where automatic fire-extinguishing protection is provided in other than High Hazard Occupancies, the fire-resistive requirements may be reduced by one hour in the area or portion of buildings so protected provided such buildings are not more than 50 feet in height, however, in no case shall it be less than one-hour fire-rated.

5253.2 BASEMENTS

Approved automatic-sprinkler systems shall be required:

(a) In basements or underground structures occupied as bowling lanes, restaurants, or for the manufacture, sale, or storage of combustible goods or merchandise (not including garages) and exceeding 2,500 square feet in area.

(b) In basements used as workshops or for storage of combustible goods in buildings used for assembly, educational or residential occupancies where the area used for such workshops or such storage of combustible goods exceeds 2,500 square feet.

(c) In basements of buildings used for assembly, educational, or residential occupancies where the area of such basements exceeds 5,000 square feet.

REQUIREMENTS BASED ON OCCUPANCY — See Chapter 38

5253.3 CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS — GENERAL

(a) The Fire Chief may require and may approve substitution for required sprinkler systems in places not commonly used by the public and, where so approved, carbon dioxide or other Underwriter Laboratories (UL) listed fire-extinguishing systems may be provided.

(b) Piping and materials shall comply with the Standards set forth in N.F.P.A. 13 & 13D, and this Code.

DESIGN AND CONSTRUCTION

Carbon dioxide fire extinguishing systems shall comply in all respects with the Standard for Carbon Dioxide Fire Extinguishing Systems, NFPA 12, as set forth in the Standards Section of this Chapter.

APPLICATION

Carbon dioxide fire-extinguishing systems may be used in rooms or enclosures containing flammable liquids in closed or open containers; ovens; dryers; electrical and other special machinery, apparatus and processes involving the use of flammable liquids, vapors, or dust; fur storage areas; lumber kilns; coal bins; loose textile stock areas; grain-handling machinery and in other enclosures containing stocks through which gas may permeate and where protection by water or other means may be ineffective or undesirable, and also in vaults; library stockrooms; organs and other places where fires may be extinguished by carbon dioxide gas with less loss than if water were used.

STANDPIPES AND HOSE STATIONS — See Chapter 38, Section 3803

WATER SUPPLY — See Chapter 38, Section 3804

FIRE DEPARTMENT CONNECTIONS — See Chapter 38, Section 3805

YARD HYDRANTS — See Chapter 38, Section 3806

PORTABLE FIRE EXTINGUISHERS — See Chapter 38, Section 3807

INSPECTIONS AND TEST — See Chapter 38, Section 3808

5253.4 FIRE PROTECTION

In all buildings in which standpipes are required, such standpipes shall be installed as the construction progresses, and installations shall be in such a manner that they are always ready for Fire Department use, to the topmost constructed floor. Such standpipes shall be provided with a Fire Department connection(s) on the outside of the building at the street level and with one outlet at each floor.

In every building operation wherever a tool house, storeroom or other shanty is placed, or a room or space is used for storage, dressing room or workshop, at least one approved portable chemical extinguisher shall be provided and maintained in an accessible location.

During building operations, free access from the street to fire hydrants and to outside connections for standpipes, sprinklers or other fire-extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times.

No material or construction equipment shall be placed within ten feet of such hydrant or connection, nor between it and the central line of the street.

5254 FIRE SUPPRESSION — LIFE SAFETY SYSTEM

See Chapter 51

FIRE SPRINKLER SYSTEM — See Chapter 51

5254.1 SMOKE CONTROL — GENERAL

(a) The standards in this Section shall be those of Chapter 5254 of this Code. EXCEPTION: Unless it is addressed in this Chapter.

(b) The Fire Chief shall review all smoke control systems.

(c) The Fire Chief shall approve the location of all alarm initiating devices, (controls & panels), and monitoring equipment.

EXCEPTION: Duct smoke detectors.

(d) H.R.S. regulations shall supersede all other references for Hospitals.

5254.2 PANELS OR WINDOWS

(a) Operable windows shall provide minimum areas for light and ventilation as set forth in Part III of this Code. Requirements based on occupancy, except as otherwise provided herein.

(b) Operable windows or removable panels in buildings exceeding 50 feet in height shall be at the rate of 20 square feet per 40 linear foot of exterior wall at every story and shall have a first opening a minimum of 10 feet from each corner or intersecting pair of walls and 40 feet on center thereafter and shall provide cross ventilation.

(c) Such windows or panels shall have minimum dimensions of 22 inches, and minimum openable area of five square feet. Refer also to Section 5211.2(q) herein.

(d) Such panels shall be clearly identified as required by the Fire Department.

(e) Removable panels shall be of tempered glass or any other material meeting the wind load requirements of this Code.

(f) Any other window or panel design which will produce equivalent results may be used subject to approval of authority having jurisdiction and based on performance test criteria herein.

(g) Breaking of the glass shall not constitute a removable panel.

(h) Smoke detectors shall be installed in corridors in accordance with NFPA-72E.

5254.3 TEST CRITERIA FOR MECHANICAL SMOKE CONTROL SYSTEMS

(a) Prior to testing of the smoke control system, engineer of record shall certify to the appropriate officials that the entire smoke control system has been tested, balanced and installed in accordance with his design plans and specifications and this Fire Code.

(b) The following shall be notified so that they may witness the system's performance test:

(1) Engineer of record or agent

(2) Building contractors

(3) Owner's representative

(4) Fire Department

(5) Building Department having jurisdiction

(c) The engineer or his representative shall supply a plan of the floor or zone layout including cubic area and smoke bomb size and locations accepted by testing authority. Bomb placement and size shall be sufficient to give even disbursement in area being tested.

(d) Sufficient smoke must be generated to produce at least double the volume of the smoke zone being tested.

(e) Timing of the test begins when the smoke bombs are ignited. Smoke control system shall activate within 30 seconds.

(f) Quantity of smoke shall obscure an exit sign from 3 feet within 3 minutes. Design quantity of smoke shall be obtained within 5 minutes.

(g) In cases where smoke is being exhausted so quickly that obscurity cannot be obtained and sufficient smoke has been generated to fill the test area, the system will be considered to be acceptable, if smoke can be observed moving toward the exhaust grills.

(h) Within ten minutes of the start of the test, the exit sign must be legible from 20 feet.

(i) If no exit sign is present, any object may be used for distance measurement (i.e. door, column).

(j) During the test no smoke may migrate to other zones.

(k) All testing shall be done under the supervision of mechanical inspector and/or fire inspector having jurisdiction and final acceptance of the smoke control system, and shall be his responsibility.

(l) All smoke generating devices shall be supplied by the owner or his designee and shall meet with the approval of the fire inspector having jurisdiction.

(m) Required tests:

(1) Test one shall be performed with system in automatic mode. Upon automatic activation of the test floor, four additional floors shall be activated manually.

(2) Test two shall be performed in full automatic mode.

(3) All Fire zones which are not typical to any other zone shall be tested independently.

(4) More than one typical zone may be required to be tested.

(n) The engineer of record must certify, in writing, that the system is designed and installed and will function as required by this Code and its adopted standards; and submit plans and specifications including design criteria incorporating volumetric flows, volumes and pressures as a record for testing procedures.

EMERGENCY SYSTEMS — See Chapter 51, Section 5109

EXITS — See Chapter 51, Section 5110

BUILDINGS MORE THAN 50 FEET TO 75 FEET IN HEIGHT — See Chapter 51, Section 5111.

5255 RACETRACKS AND STABLE FACILITIES

COMPLIANCE

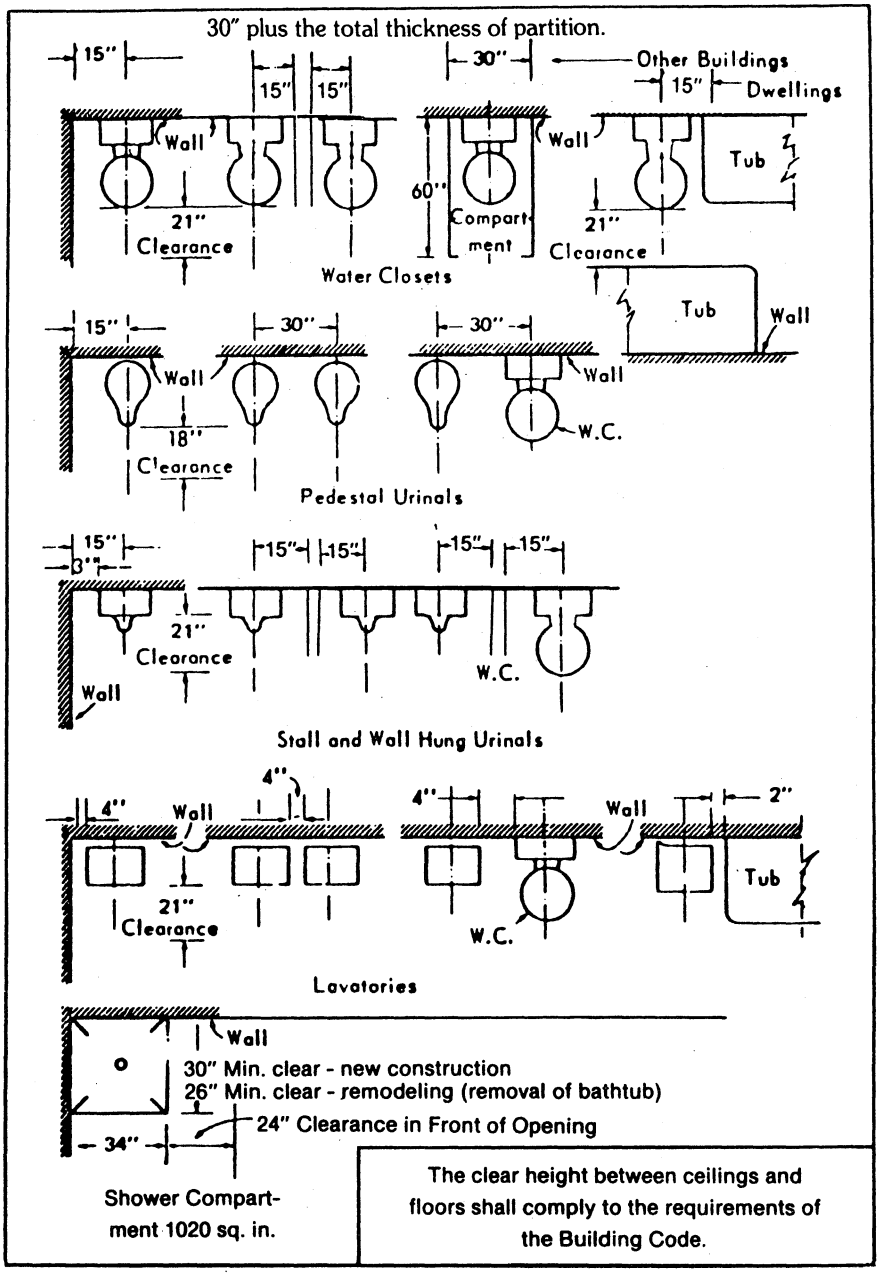
N.F.P.A. 150, Standard on Fire Safety on Racetrack Facilities is hereby adopted in its entirety.

APPENDIX A-1—SCHEDULE OF PIPING SYSTEM MATERIALS
See Sub-paragraph 4604.1 (b) (1)

REMARKS:
A. Gutter lines only.
B. Each job must be approved by Plumbing Official. Borosilicate glass pipe—High silicon cast iron.
C. NFPA 54.
D. Above ground only.
X. Approved for location or use shown.

LOCATION OR USE	Clay Pipe	Concrete Pipe	Polybutylene	Asbestos Cement Pipe	Cast Iron Soil Pipe XH Static Cast	Cast Iron Soil Pipe SV Centrifugal Spun	CI Hubless Soil Pipe	Cast Iron Water Pipe	Cast Iron Threaded Pipe	Wrought Iron Pipe	Galvanized Pipe (cold water only)	Red Brass or Copper Pipe	DWV Copper	Type L Copper Tubing	Type K Copper Tubing	Type M Copper Tubing	Stainless Steel Tubing	ABS Plastic Pipe	PVC Plastic Pipe	PE Plastic Pipe	Lead Pipe
Water Service			X					X	X	X	X	X		X	X	D	D	X	X	X	
Water Supply & Distribution System in Building			X						X	X	X	X		X	X	D	D				
Above-ground Drain, Waste & Vent in Building					X	X	X		X	X	X	X	X	X	X	X	X	X	X		X
Underground Drain, Waste & Vent in Building					X	X	X					X		X	X			X	X		X
Chemical & Acid Drain, Waste & Vent																		C	C	C	
Rainwater Leaders					X	X	X		X	X	X	X	X	X	X	X	X	X	X		X
Storm & Subsoil Drains	X	X		X	X	X	X			X	X	X		X	X			X	X	X	
Gas Piping									X	X	C										
Swimming Pool Piping					B	B	B			X	X	X		X	X			X	X		
Wells										X	X										
Lawn Sprinklers & Irrigation			X							X	X	X		X	X		X	X	X	X	
Septic Tank Tight Lines	X	X		X	X	X	X											X	X		
Underground Fire Standpipe								X		X	X								X		
Above Ground Fire Standpipe											X	X									
Building House Sewer	X				X	X	X											X	X		
A/C Condensate Drains			X		X	X	X			X	X	X	X	X	X	X	X	X	X		

NOTE: See Paragraph 4602.2 (c) for underground piping and deleterious fill.


30" plus the total thickness of partition.
15"
15"
15"
30"
Other Buildings
15"
Dwellings
Wall
21"
Clearance
60"
Compart-
ment
Wall
Tub
21"
Clearance
Water Closets
Tub
Wall
15"
30"
30"
Wall
Wall
18"
Clearance
W.C.
Pedestal Urinals
15"
3"
15"
15"
15"
15"
21"
Clearance
W.C.
Wall
Stall and Wall Hung Urinals
4"
4"
Wall
4"
Wall
2"
21"
Clearance
W.C.
Tub
Lavatories
Wall
30" Min. clear - new construction
26" Min. clear - remodeling (removal of bathtub)
24" Clearance in Front of Opening
34"
Shower Compart-
ment 1020 sq. in.
The clear height between ceilings and
floors shall comply to the requirements of
the Building Code.

APPENDIX A-3

Class A	—	Any motorboat less than 16 feet in length.
Class 1	—	Any motorboat 16 feet or over and less than 28 feet in length
Class 2	—	Any motorboat 28 feet or over and less than 40 feet in length.
Class 3	—	Any motorboat 40 feet or over and not more than 65 feet in length.

(a) The length shall be measured from end to end over the deck excluding sheer.

(b) The expression "length shall be measured from end to end over the deck excluding sheer" means a straight line measurement of the overall length from the foremost part of the vessel to the aftermost part of the vessel, measured parallel to the centerline. Bow sprit, bumpkins, rudders, outboard motor brackets, and similar fittings or attachments, are not to be included in the measurement. Length shall be stated in feet and inches.

ALPHABETICAL INDEX

(For Index by Parts, Chapters and Sections see Front of Book)

A

A - Occupancies, Group A - Assembly by 1,000 or more ..... Chapter 6
Definition of 601
ACCESS
Attic ..... 1805.3 (d)
Panels, For Fire Department ..... 1804.1 (e)
Roof 3105.13, 3109
Ground Level Floors 2005.1, 2204.3
Accessibility to Exits 3104.4
Accessibility for Handicapped 515
ACCESSORY BUILDINGS 502.3, 1701.6
ACCIDENTS
During Construction (First Aid) 3319
Persons in Elevators 3203.3
Precautions During Construction ..... Chapter 33
ACOUSTICAL CEILINGS 3510, 3511, 3705
ADDITIONS
In Fire Districts 1602, 1603, 1604
To Existing Buildings 104
ADHESIVES, Glued construction 2906.14, 2911.4
ADJOINING BUILDINGS (See Location on Property)
Foundation Protection 2401.1
ADJOINING OCCUPANCIES 505, 507.1, 508
ADMINISTRATIVE ..... Chapter 1
Additions to Existing Buildings 104.2
Alterations (and Repairs) 104.3
Change of Occupancy 104.7
Existing Buildings, Continued Use 104.8
Historical Buildings 104.9
Hurricane Precautions 105.3
Maintenance of Buildings and Property 105
Organization and Enforcement ..... Chapter 2
Purpose of Code 102
Roofing, Replacement 104.4
Scope of Code 103
Structural Determination, Defined 104.6
Title of Code 101
Value Determination, Defined 104.5
AGRICULTURAL BUILDINGS - Occupancy Group J - Division 7 1501
AGGREGATES
Masonry, Mortar 2702.10
Plaster 3503.2
Pneumatically Placed Concrete 2511
Precast Concrete Units 2509

AIR CONDITIONING ..... Chapter 48
General Administrative 4801
Definitions 4802
Mechanical Ventilation 4803
Air Conditioning and Refrigeration 4804
Equipment ..... 4805, 3409.1(a)
Ducts and Duct Systems 4806
Piping 4807
Weatherproofing and Insulation 4808
Maintenance 4809
AIR DUCTS ..... 3705.2 (a) (5), 4806
AIRCRAFT HANGARS - Occupancy Group F - Division 1 1101
Means of Egress ..... 3120.3 (b)
Special Provisions ..... 1102.2 (b)
Sprinkler Requirement ..... 3801.1 (e)
AIR INTAKES (see Ventilation in all Occupancies) 4803.2
Boilers ..... 4006.5 (c)
Projection Booth ..... 608.4 (b)
AIR SPACE
Under Wood Floors 2913.3
AISLES 3113
Auditorium 3115
Balcony 3115
Between Fixed Seals 3113
Institutional3118.5
ALARM SYSTEMS, Required 3126.1
Electrical 4512.4
Installation 3126.2
Valve ..... 3801.4 (b)
ALLEY
Projection Into 3603.6, 3603.7
Temporary Use 3602.4
ALLOWABLE AREA 514
ALTERATIONS 104.3, 301, 503
ALTERNATE MATERIALS AND CONSTRUCTION
Board of Rules and Appeals Approval 203
Building Official Approval 204, 3512.9, 3701
Electrical 4504
Plumbing 4601.4
ALUMINUM
Conduit 4507.2
Construction ..... Chapter 30
Roofing ..... 3401.7 (b)
Roofing Accessories 3407
Shingles 3404
Siding 3512.6
AMUSEMENT PARKS - Occupancy Groups A and B 601, 701
Devices for 3206.2
Electrical Requirements for ..... 4511.1 & 2

Special Requirements for ... 3115
ANNUAL INSPECTION ... 305.1 (d)
ANCHORS
Concrete Units ... 2508.9
Steel Joints ... 2808.6
Wood Components ... 2908
ANCHOR SHEET ... 3402.2
APARTMENT, Defined ... 401
APARTMENT HOUSE, Defined ... 401
Occupancy Group H ... 1301
APPEALS
Board of Rules and Appeals ... 203
For Alternate Materials and Construction ... 204.3
For Any Reason ... 204.4
Electrical ... 4504.7
Plumbing ... 4601.4
APPENDICES
Piping Material ... A-1
Plumbing Fixtures ... A-2
APPLIANCES
Chimneys for ... Chapter 39
Electrical ... 4003, 4504, 4508.1 & 2 & 3
Gas ... 4002, Chapter 47
Oil-Burning ... 4004
Solid-Fuel Burning (including Ranges and Space Heaters) ... 4005
APPLICATION
For Building Permit-How to Make ... 302.1, 302.2
For Examination of Construction Plans ... 302.3
Of Code for Roofing Replacement ... 104.4
Of Code to Change of Use or Occupancy ... 104.7
Of Code to Existing Buildings and Structures ... 104.1, 104.8
APPROVED (see Definitions) ... 401
ARCHITECT
Definition of ... 401
Impressed Seal Required on Plans ... 302.2 (c), 302.2 (b)
May Submit Plans for Examination ... 302.3
Statement of Soil Conditions Required by ... 2402.1
ARMORIES - Occupancy Groups A and B ... 601, 701
ASPHALT
Saturated Felt and Compounds ... 3402.1
Roof Flashings ... 3402.2 (i)
Shingles ... 3402.3
ASSEMBLY BUILDINGS
Occupancy Group A ... 601
Occupancy Group B ... 701
ASSUMPTIONS
Dead Load ... 2304.2 (a)
Live Load ... 2301.2, 2304, 2307
Live Load Reduction ... 2308

Reinforced Concrete Design 2505.1
Wind Load 2309
ASYLUMS - Occupancy Group D - Division 1 901
ATRIUM 401, 1807.7
ATTACHMENTS
Asbestos Cement Products 3506
Glass Veneer 3509.2
Gypsum Board 3510.6
Gypsum Lath . . . . . 3502.2 (b)
Metal and Wire Lath . . . . . 3502.3 (d)
Roof Insulation 3406
Suspended Ceiling Runners and Furring . . . . . 3502.5 (b) (c)
ATTIC
Access to and Division of 2006.5
Definition of 401
Ventilation . . . . . 2913.2 (b)
AUDITORIUMS - Occupancy Groups A and B 601, 701
AUTOMATIC FIRE-EXTINGUISHING SYSTEMS
Carbon Dioxide 3802
Sprinkler 3801, 5102
AWNINGS
Fabric 4301
Definition 4302, 4401.2
Rigid 4401
AUTOMOBILE GARAGES - Occupancy Group F - Division 1
Automatic-Sprinkler System Required . . . . . 3801.3 (e)
Minimum Ceiling Height . . . . . 513.1 (d)
Minimum Entrance Height . . . . . 513.1 (d)
Ramps, Stairs, Lifts and Means of Egress . . . . . 3120.3 (c)
Repair, Parking and Service Stations 1101
Special Provisions For . . . . . 1102.2, 3120.3 (c)

B

B - OCCUPANCIES, Group - Assembly of 1000 or less 701
BALCONY
Dead Ends 3104.5
Definitions 401
Exterior, Required Means of Egress 3104.1
For Smokeproof Enclosures 3109.4
Protection of Openings . . . . . 3104.7 (f) (g), 3105.12
BALLOON FRAMING . . . . . 2905.1 (h)
BARRICADES, Construction 3304, 3317, 3602
BARS, Reinforcing (see Reinforcing) 2504.9
Concrete, Protection for 2508.5
Placing 2508.3
Splicing and Welding 2508.4
BASEMENT
Construction Type 602, 702, 802, 902, 1002, 1102, 1202, 1302
Definition 401

Means of Egress, Required . . . . . 3102.1 (j)
Interior Finish, Flame Spread . . . . . 3708.3 (f)
Sprinklers, Required 3801.2
BATHROOMS (see Ventilation in Occupancy Group)
Ceiling Height - General 513.1
Residential - Minimum Dimensions 1305.2, 1405.2
Toilet Rooms and Facilities 512.2
BEAMS
Grade - Concrete or Steel 2405.3
Laminated Wood 2906.13, 2906.14
Live Load Reduction for 2308
Protection of Wood 2913
Tie - Concrete . . . . . 2704.2 (c)
Wood - Heavy Timber . . . . . 2003.3 (b) (4)
BEARING
Capacity of Soil 2402
Interior Foundation Walls Supporting Stud Walls . . . . . 2405.2 (a)
Interior Wall 2704.3
Partition, See Definition 401
Stairs Stringers, Wood 2906.16
Steel Joists 2808.6
Wall, See Definition under Walls 401
Wood Joists and Rafters . . . . . 2405.1 (b) (2), 2906.3
BEARING WALLS, INTERIOR
Definition (see Walls) 401
Fire Resistivity Ratings . . . . . Table 37-B
General Construction . . . . . 1804.3 through 2204.3
BEARING WALLS, EXTERIOR
Definition (see Walls) 401
Fire Resistive Ratings . . . . . Table 37-B
Special Provisions, Types I and II Group E . . . . . 1002 (d), 1804.1 (a)
Types I, II and III Construction 1804.1 (a)
Type IV Construction 2104.1
Type V Construction 2203.1
BLEACHERS - Occupancy Group J - Division 3 . . . . . 1502.3
Seats 3114.3
BLOCKS
Allowable Unit Stresses, Concrete 2703
Concrete 2702.5
Glass . . . . . 2704.2 (l)
Grill . . . . . 2704.2 (m)
U Type . . . . . 2704 (c) (2)
BOARD OF RULES AND APPEALS 203
BOILERS AND BOILER ROOMS 4006
BOLTS
High-Strength Steel 2802.2
Protection of 2807.1
Ribbed 2802.5

BOLTING
Bridging, Steel Joist . . . 2808.5 (c)
Open-Web Steel Joists Connections . . . 2808.3 (d)
Structural Members, Cold-Formed Steel . . . 2809.3 (c)
Structural Sheets, Cold-Formed Steel . . . 2809.4 (c)
2 x 4 Wood Plate to Masonry . . . 2906.3 (b)
Wall Panels, Cold-Formed Steel . . . 2809.4 (d)
Wood Studs Joining Masonry . . . 2905.1 (l)
BOND
Blocks, Concrete . . . 2704.1 (e)
Concrete . . . 2506.7
Construction Joints . . . 2507.4
Mortar . . . 2702.10 (c)
Panel Walls . . . 2704.2 (b) (6)
Pneumatically Placed Concrete . . . 2511.7
Reinforced Masonry Units . . . 2704.10
Reinforcing Bars . . . 2508.2, 2511.3
Tie Beam, Concrete . . . 2704.2 (c) (7)
BORING
Soil Investigation . . . 2402.2
Wood Members . . . 2906.5
BOWLING ALLEYS - Occupancy Groups A and B . . . 601, 701
BRACING
Concrete Forms . . . 2507.1
During Erection . . . 2301.1 (b)
Frame Construction . . . 2901.2, 2905.1 (m), 2909.3 (a)
Masonry Walls, Lateral . . . 2704.2 (b)
BRICK . . . 2702.2
Allowable Stresses . . . 2703
In Reinforced Unit Masonry . . . 2705
Walls . . . 2704.2 (h)
BRIDGING
Concrete Joists . . . 2509.10
Steel Joists . . . 2808.5
Wood Joists . . . 2901.2, 2906.9 (b)
BUILDING CODE
Application to Existing Buildings . . . 104, 1702
Enforced by . . . 201
Interpretation of . . . 201.1 (A) (2), 203.4 (b)
Purpose of . . . 102
Remedial . . . 202.8, 202.12
Scope of . . . 103
Title of . . . 101
Violation of . . . 201.1 (A) (4), 202.6
BUILDING OFFICIAL
Classifies Buildings . . . 502, 1701
Defined . . . 401
Powers and Duties of . . . 201.1, 305.3, 2314
Subordinates Powers and Duties . . . 201.1 (A) (2)

BUILDING PERMITS
Changes after Issuance of . . . 302.1 (e)
Fee for . . . 303
How to Apply for . . . 302
Operations for Which Required . . . 301, 301.1
Partial Approval (Temporary Permit) . . . 302.5
Revocation of . . . 304.4
Time Limitation of . . . 304.3
BUILDINGS
Accessory . . . 502.3
Classified by Type of Construction . . . 1701
Classified by Use or Occupancy . . . 502
Demolition of . . . 302.7
Existing . . . 104, 502
Fire Suppression in . . . Chapter 38 and 51
Maintenance of . . . 105
May be Occupied When . . . 307
Moving of . . . 302.6
Requirements Based on Fire Zones . . . 1601, 1602, 1603, 1604
Unsafe . . . 202
BUILT-UP ROOFING . . . 3402.2

C

C - OCCUPANCIES, Group C - Schools . . . Chapter 8
Definition of . . . 801
CABLES, ROPES AND CHAINS . . . 3308
CANOPIES
Fabric . . . 4301
Construction and Design . . . 4305, 4403
Definition . . . 4302, 4401.2
Over Public Property . . . 4304, 4404
Permit Required . . . 4303, 4402
Rigid . . . 4401
CARBON-DIOXIDE FIRE-EXTINGUISHING SYSTEMS . . . 3802
CARPORTS - Occupancy Group J - Division 1 . . . 1501, 3123
CAST-IN-PLACE CONCRETE PILES . . . 2404.6
CAST STONE . . . 2702.4
CAVITY WALL, Masonry . . . 2704.2 (g)
CEILING
Design Load . . . 2301.3, 2302
Fire-Resistive . . . 3705.4
Heights - Living Areas . . . 1305, 1405
Heights - Parking under Buildings . . . 513
In One-Story Church Buildings and Gymnasiums . . . 602.2, 702.2
Suspended and Furred . . . 3511
CEMENT, Portland . . . 2504.1, 2511.1
Plaster . . . 3702.5 (b)
Proportion of in Acceptable Concrete . . . 2505.1
Proportion of in Pneumatically Placed Concrete . . . 2511.4

CERTIFICATE
Of Approval, Plumbing . . . . . 4601.6 (p)
Of Competency . . . . . 201.6 (A), 4601.2
Of Compliance, Special Inspector . . . . . 305.3 (c)
Of Inspection, Boilers 4006.6
Of Inspection, Elevators . . . . . 3203.4 (e)
Of Occupancy 307
CHANGE IN OCCUPANCY 307.1
CHANGE IN USE 503
CHASES
Fire-Resistivity Requirements 1807
In Masonry Walls . . . . . 2704.2 (k)
CHICKEES
Definition 4401.2
Construction 4403.6
CHIMNEYS, FLUES, VENTS and FIREPLACES . . . . . Chapter 39
CHURCHES - Occupancy Groups A and B 601, 701, 3115, 3116
Ceilings in 602.2, 702.2
Emergency Lighting 3115.4, 3116.4
CHUTES
Enclosures for 1807.2
Laundry 1807.4
Sprinklers Required in 3801.4
Trash 1807.5
CLASSIFICATION
Of Buildings, by Fire Zone 1601
Of Buildings, by Occupancy 502
Of Buildings, by Types of Construction 1701
Of Materials and Assemblies for Fire Resistance 3701
CLAY TILE
Roof 3403
Structural 2702.6
CLEAN-OUT
In Metal Smokestacks . . . . . 3902.3 (e)
Plumbing . . . . . 4604.5, 4608.1 (h), 4608.2
CLEAN-UP
Of Building Area before Construction 2913.4
Of Site after Construction 306
CLEARANCE
Of Combustible Materials from Chimneys . . . . . 3902.2 (h)
Of Exterior Stacks from Walls . . . . . 3902.3 (f)
Of Fireplace Chimneys and Combustibles 3906.6
Of Interior Stacks and Roofs . . . . . 3902.3 (g)
Of Smoke-Pipes and Combustibles 3905.3
Of Wood Flooring and Masonry Walls . . . . . 2909.1 (h), 2003.3 (b) (5)
CLUBS - Occupancy Groups A and B 601, 701, 3115, 3116
CODE
Application to Existing Buildings 104
Purpose of 102

Scope of ... 103
Title of ... 101
COLUMNS
Concrete Filling, Effect on Strength ... 2806.3
Concrete, Starter ... 2704.2 (j)
Concrete, Tie ... 2704.2 (b)
Isolated Footings for ... 2403.3 (c)
Live Load Reduction of ... 2308
Pipe, Exterior Fire Protection not Required ... 3703.11
Pipe, Requirements when Concrete Filled ... 2806.2
Precast Concrete ... 2509
Prestressed Concrete ... 2510
Protection of Fire-Resistivity Covering Required ... 3703.5
Steel 2809
Steel, Fire Protection of 3703, ... Table 37-A
Tubular, Steel ... 2806
Wood ... 2906.12, 2003.3 (b)
COMBINED STRESSES ... 2309.3
COMBUSTIBLE
Definition ... 401
Interior Finish, Restrictions ... 3708
Liquids ... 4102.3
Materials Regulated ... 1812, 1912, 2012, 2110, 2210
COMBUSTION ENGINES ... 4009
COMMENCEMENT, of Work after Permit ... 304.3
COMPLIANCE, with Code ... 304.2
COMPOSITION ROOFING ... 3402.3 (d)
COMPUTATIONS, May Be Required ... 302.2 (e)
CONCENTRATED LOADS
On Floors ... 2303.3
On Walls ... 2703.4
CONCRETE, Blocks - Material and Dimensions of ... 2702.5
CONCRETE, Brick - Dimensions and Specifications of ... 2702.2
CONCRETE, Plain ... 2702.8
CONCRETE, Plain Gypsum ... 2702.9
CONCRETE, Reinforced ... Chapter 25
Aggregates for ... 2504.2, 2511.1
Allowable Stresses in ... 2505.2
Construction Joints in ... 2507.4
Cover for Reinforcement ... 2403.2 (c) (3), 2508.5
Fire-Resistive Classification ... 3702.2
Footings ... 2403.1, 2403.2
Forms for ... 2507
Foundation Walls ... 2405.1
Grade Beams ... 2405.3
Gypsum ... Chapter 26
Lintels ... 2704.2 (k) (2)
Mixing and Placing ... 2506

Over Wood 2912
Pile Caps . . . . . 2404.1 (f)
Piles, Cast-in-Place 2404.6
Piles, Precast 2404.4
Piles, Prestressed 2404.5
Pneumatically Placed 2511
Precast Units 2509, 2604.2
Prestressed 2510
Proportions for 2505, 2511.4
Protection from Fire 3703
Quality and Strength of 2505, 2509.4
Slabs on Fill 2403.4
Tests 2504.6, 2505.2, 2510.1 (c), 2603
CONDEMNATION, of Buildings 202
CONDITIONS OF PERMIT 304
CONNECTIONS
Dissimilar Materials 3004.2
Fire Protection of 3703.7
Fire Department 3805
For Precast Concrete Units 2509.11
For Structural Steel 2805.1
For Wood Components 2908
Gas Appliance . . . . . 4701.5, 4701.6 (a)
Nailed 2911
Permanent Electrical 4505.6
Plumbing . . . . . 4606.1 (c), 4607, 4613.2 (b)
Protection of 2911.2
Round, Metal Duct . . . . . 4806.3 (l)
Siamese 3603.5
Smoke Pipe 3905.2
Special Inspector Required for 2805.2
Temporary Electric Service . . . . . 4501.3 (c) (3) (5), 4506.1 (c), 4511
Welded . . . . . 2805.3, 2508.3 (d)
CONSTRUCTION HEIGHT and AREA (See Occupancies by Group)
CONSTRUCTION JOINTS, concrete 2507.4, 2511.7
CONSTRUCTION FENCES 3304.2
CONSTRUCTION MATERIALS
Fire-Resistive 3702
In Streets 3602
Safe Use of 2301.1
Weights of . . . . . 2304.2 (a)
CONTAMINANTS 4106
CONTINENTAL SEATING . . . . . 3114.1 (c)
CONVALESCENT HOMES - Occupancy Group D - Division 2 . . . . . 901, 3118
CONVENTS - Occupancy Group H 1301, 3122
CORBELING . . . . . 3902.2 (e)
CORRIDORS, Width and Special Provisions for
Definitions 401

General . . . 3102.2, 3104
Assembly Occupancies . . . 3115.1, 3116.1
Hazardous Occupancies . . . 3119.1
Institutional Occupancies . . . 3118.1, 3118.3 (a)
Mercantile and Business Occupancies . . . 3121.1
Residential Occupancies . . . 3122.1
School Occupancies . . . 3117.1
Storage and Industrial Occupancies . . . 3120.1
COST OF BUILDINGS (Value) . . . 104.5
COURTS
Construction Requirements . . . 3111, 3108.6
Definitions . . . 401
Final Discharge Stated . . . 3111.1
Restrictions . . . 3604
Slope, Maximum . . . 3111.3
Width of . . . 3111.2
COVERED MALLS, WALKWAYS and PASSAGEWAYS . . . 3124
COVERINGS
For Fire Protection, General . . . Chapter 37
For Roofs . . . Chapter 34
For Walls . . . Chapter 35
For Wood Doors . . . 3706.2
CURTAIN, Proscenium . . . 607.1 (e)
CURTAIN WALL
Definition . . . 401
Inspection of . . . 305.2 (a)
Permit Required for . . . 301.1 (p)
CUT-OFF, Untreated Wood Piles . . . 2404.3 (b)

D

D - OCCUPANCIES, Group D - Institutions . . . Chapter 9
Definition of . . . 901
DAMPERS
Fire . . . 1807.2 (d), 3705.2 (a)
Fireplace . . . 3906.7 (b)
DANCE HALLS, Occupancy Groups A and B . . . 601, 607, 3115, 3116
DEAD LOAD
Definition . . . 401
Weight of Materials for Calculation of . . . 2304.2 (a)
Dead Ends . . . 3104.5
DECORATIVE PROJECTIONS
Combustible Materials Regulated . . . 1812.5, 1912.5, 2012.5
Design Loads . . . 2305.4
May Occupy Public Area . . . 3603.4
DEFINITIONS
Of Flexible, Roof-like Structures . . . 4302
Of Mandatory Inspections . . . 305.2
Of Occupancies . . . "01" Sections - Chapters 6 through 15
Of Rigid, Roof-like Structures . . . 4401.2

Of Sign Types 4202
Of Types of Construction ..... "01" Sections - Chapters 18 through 22
Pertaining to Construction 401, 3124.2
Pertaining to Electrical 4502
Pertaining to Plumbing 4602
DEFLECTION
Allowable Span of Wood Joists Regulated by ..... 2904.1 (a) (1)
Exterior Glass Installation, Regulated by 3508
In Storm Shutter Design, where Provided 3513
Plywood, Allowable Load Based on 2909
Structural Aluminum 3002.3, 3003, 3004.2
Structural Members Subjected to Superimposed Loads 2303.3
DEMOLITION
Appeals 202.8
Application for Permit 302.7
Authorization 202.1
Criteria 202.2
Permit Required ..... 301.1 (c)
Precautions During 3302
DESIGN
Aluminum 3001.1, 3003, 3004.1
Cold-Formed Steel Construction 2809.3
Doors and Operative Windows 3508.3
Elevators and Escalators 3201
Footings and Foundations 2402, 2403
General 2301
Live Load 2304
Masonry 2701, 2703
Open Web Steel Joists 2808.3
Plastics 3505
Precast Concrete Units 2509
Prestressed Concrete 2510
Proscenium Curtain ..... 607.1 (e)
Reinforced Concrete 2501, 2505.1
Reinforced Gypsum Concrete ..... 2603, 2604.1 (c)
Signs 4205
Stages ..... 607.1 (a)
Structural Steel 2801.2
Swimming Pools 5002
Wood Trusses 2906.17
Wood 2901.1

DIAPHRAGMS, RIGID
Wood-Based Structural-Use Panels ..... 2902.1 (a) (3), 2902.2
Reinforced Concrete Floor or Roof as ..... 2704.2 (c) (4)
Structural Sheets, Steel 2809.4
DISTANCE SEPARATION 1804
Definition 401

DOORS
Additional Doors 3103.10
Assembly Use (Groups A and B) 3115
Corridor . . . . . 3104.7 (a)
Elevator 1807
As Required for Egress 3103
Exterior Stairway 3105.12
Fire, as Part of a Fire-Assembly 3706.12
Fire, Definition of 401
Glass Lights in . . . . . 3104.7 (d), 3706.5
In Exit Enclosures . . . . . 3108.3 (b)
Institutional (Group D) 3118
Interior Stairway . . . . . 3108.3 (b)
Maximum Width 3103.5
Minimum Width and Height 3103.4
Power Activated . . . . . 3103.6 (d)
Projection Room 608
Requiring Panic Hardware . . . . . 3103.3 (a) (4), 3109.5
Smokeproof Enclosure 3109
Special Doors, Limited Use 3103.6
Swinging into Landings . . . . . 3105.6 (c)
Tests 3706.1, 3106.2
To Public Property 3603.4
Used by Physically Handicapped . . . . . 515.3 (c)
DOWNSPOUTS
Building 4604.4
Definition of (also see Leader) 4602
Draining Projections 3603.6
From Marquees 3603.3, 3603.5
DRAFT STOPS (see also Fire Stops)
In Wood-Frame Construction 2907
Floor Systems 1805.3, 1905.3, 2005.3
Spaces above Ceilings 1805.3, 1806.5, 1906.5, 2006.5
DRAINAGE
Roof 1806.4, 1906.4, 2006.4, 2106.3, 2205.3
Storm 4611
Swimming Pool 5004.3
Systems and Disposal 4605
Transformer Enclosures . . . . . 4514.1 (b)
Transformer Vaults 4101.4
DRAWINGS, Required for
Awnings, Canopies, etc. . . . . 4303.1 (b), 4402.1 (b)
Building Permits 302.2
Electrical Permits 4505.2
Gas Installation Permits 4703.3
Mechanical Permits 4801.3
Plumbing Permits . . . . . 4601.5 (e)
Signs . . . . . 4203.2 (c)
Swimming Pools 5002.3

DRESSING ROOMS . . . . . 607.1 (c)
DRINKING WATER
Required for
Construction Personnel 20
Fountains (Minimum Required) . . . . . 4613.19 - Table 46-P
Premises for Human Habitation 4614.1, 4616.1
Trailer Parks 4619.7
DRY CLEANING PLANTS - Occupancy Group F - Division 2 1101
DRY VENTS 4610.2
DRY WALL 3510
DUCTS 4806
DUMB-WAITER 3205
DUPLEX - Occupancy Group 1 . . . . . Chapter 14
DURABLE SPECIES, WOOD . . . . . 2913.2 (a) (6)
DUTIES, of
Board of Rules and Appeals 203.4
Building Official 201.1
Electrical Inspector 4501.2
Plumbing Official 4601.2
Unsafe Structures Board . . . . . 202.13 (d)
DWELLING
Group 1 Occupancy Defined 1401
Definition of 401
Requirements of (Group 1 Occupancy) . . . . . Chapter 14

E

E - OCCUPANCIES, Group E - Hazardous . . . . . Chapter 10
Definition of 1001
EARTH PRESSURE
Below grade Structures, Action On 2305.2
Foundations, Action on 2402, 2403
Precautions Due to 3303
EAVES
And Gable Drip 3407.3
Over Public Property . . . . . 3604.2 (b)
ECCENTRIC LOAD on
Continuous Footing . . . . . 2403.2 (e)
Isolated Footing . . . . . 2403.3 (b)
EGRESS
Definitions (see Means of Egress) 401
Facilities for, by the Physically Handicapped 515
Facilities for, General . . . . . Chapter 31
Facilities for, Mixed Occupancy 510
Illumination of 3112
ELECTRIC
Appliances - Heat Producing 4003
Lighting - Emergency and Signs 3112
Lines and Equipment, Before Demolition 3302

Lines, Precautions During Building Operations . . . 3301
Service Equipment, Projecting Over Public Property . . . 3603.5
Service, For Elevators . . . 3204.2
Service Poles, Temporary . . . 3318, 4506.1 (c)
Signs . . . 3112.6 (b), 4210, 4514
System Energizing . . . 307.5, 4505.6
Temporary Connection . . . 3318, 4501.3 (c) (3) (5), 4506.1 (c), 4511
Unsafe . . . 4501.3 (c) (4) (5)
Welding . . . 3321
Wiring (see Electrical Wiring)
ELECTRICAL . . . Chapter 45
Administration (see also Chief Electrical Inspector)4501
Code, for South Florida . . . 4501
Definitions . . . 4502
Materials and Types of Construction . . . 4504
National Code, Adoption . . . 4503.8
Permits and Inspections . . . 4505
Plans . . . 4505.2
Sign Installations . . . 4507
Special Requirements (see also Electrical Wiring) . . . 4513
Standards . . . 4503
ELECTRICAL CONDUIT
Aluminum . . . 4507.2
Electrical Metallic Tubing . . . 4507.3
Embedded in Concrete . . . 2507.3
Feeders . . . 4509.3
Flexible Raceways Required . . . 4507.9
Isolated from Other Piping . . . 4513.5
Raceways, Low Voltage . . . 4512
Raceways, Stores and Warehouse Spaces . . . 4506.1(d), 4509.3
Rigid Nonmetallic Conduit (PVC) . . . 4507.8
ELECTRICAL INSPECTOR, CHIEF
Appeal, from Decisions of . . . 4504.7
Approves Alternate Materials, etc. . . . 4504.5
Approves Temporary Service . . . 4501.3 (c) (3) (5), 4506.1 (c), 4511
Authorizes System Energization . . . 4505.6
Inspects all Installations . . . 4505.5
Powers and Duties of . . . 201.3, 4501.3
Qualifications for . . . 201.3
Subordinates of . . . 4501.3 (a)
ELECTRICAL SERVICE . . . 4506.1
(Defined as "the conductors and equipment between the supply system and the wiring system of the premises served")
Feeders . . . 4509
Grounding (also see Grounding) . . . 4506.1 (e)
Masts . . . 4506.1 (b)
Meter Rooms, not Required . . . 4506.2 (a)
Meter Rooms, 6 or more Meters . . . 4506.2 (a)
Over Public Property . . . 3603.5 (a) (2)

Prohibited . . . . . 4506.1 (a) (1) (2)
Separately Metered . . . . . 4506.3 (f)
Service Entrance Cable 4509.2
Temporary, for Construction . . . . . 3318, 4506.1 (c)
Temporary, for Test . . . . . 4501.3 (c) (3)
Working Hazards, Overhead Facilities 3301
ELECTRICAL WIRING - Branch Circuits 4508
Boxes, Panels etc., Prohibited Fasteners 4507.4
Circus (etc.) Temporary Installations 4511
Color Coding 4510
Construction, Demolition, Repair 3302, 4511.3
Elevators 4513.7
Freezers, Separate Circuit For . . . . . 4508.2 (a)
Fans, Ceiling - Protection 4513.1
Indirect Lighting 4513.3
Laundry 4508.8
Low Voltage Systems 4502, 4512
Non-Metallic-Sheathed Cable 4507
Outlets per Circuit, Maximum . . . . . Table 4508.4
Ranges 4508.1
Refrigerators, Separate Circuit for . . . . . 4508.2 (a)
Transformers . . . . . 4507.7, 4514.1 (b), 4514.3, 4, 5
Water Heaters 4508.3
Window Display Lighting 4508.9
ELECTRICAL WIRING - Special Requirements 4507
Aluminum Building Wire 4510.3
Coves (for Indirect Lighting) 4513.3
Cut Nails 4507.4
Fire Alarms 4512.4
High Voltage 4514.2
Metal Buildings, Ground Required 4513.6
Neon or Cold Cathode Lighting (Interior) 4514.5
Neon Transformers 4514.3
Signs, Exterior 4514.1
Signs, Window and Window-Border (Interior) 4514.4
Smoke Detectors 4507.5, 3127, 3122.9
Through Structural Members 4513.4
ELECTRICIAN, Definition of 4502.2
ELEVATORS AND ESCALATORS . . . . . Chapter 32
Enclosures 1807.2
Openings 1807.3
Shafts . . . . . 1807.1 (a)
EMERGENCY LIGHTING 3112
Exits 3112.1
Exit Signs 3112.6
ENCLOSURE OF VERTICAL OPENINGS
Fire-Resistivity Requirements 3704
Requirement as to Occupancy . . . . . "06" Section, Chapter 6 through 15
Requirement as to Type 1807, 1907, 2007

Special Requirements . . . . . 3115 through 3123
ENGINEER
Definition (see Professional) 401
Investigates Soil Bearing Capacity 2402.2
May Submit Plans for Examination . . . . . 302.3 (b)
Must Make Major Corrections on Tracings . . . . . 302.4 (e)
Prepares, Approves and Seals Plans for:
Awnings, canopies and tents . . . . . 4303.1 (b), 4402.1 (b)
Construction costing more than $5,000 . . . . . 302.2 (b)
Mechanical and electrical design . . . . . 302.2 (c)
New electrical construction over 600 amps 4505.2
New mechanical construction over $20,000 . . . . . 4801.3 (c)
New plumbing systems of over 125 fixture units . . . . . 4601.5 (e)
Pre-cast concrete units . . . . . 2509.1 (b)
Prestressed structural items . . . . . 2510.1 (b)
Reinforced unit masonry construction 2705
Screen enclosures . . . . . 4403.4 (d)
Sea walls and bulkheads 2408
Signs exceeding 12 square feet in area . . . . . 4203.2 (d)
Structures using aluminum members 3003
Swimming pools 5002.3
Work involving extensive structural computation . . . . . 302.2 (c)
Work preponderantly structural design . . . . . 302.2 (d)
Submits Plans Required to be Sealed . . . . . 302.3 (a)
Supervises Pile Driving . . . . . 2404.1 (q)
ENGINEERING (see also Design)
Aluminum - Allowable Unit Stresses 3002
Concrete Blocks - Equivalent Thickness Formula . . . . . Table 37-B
Glass - Maximum Area of Fixed Exterior 3508.2
Hydrostatic Uplift 5002.4
Live and Dead Loads . . . . . Chapter 23
Masonry - Allowable Unit Stresses 2703
Pile Driving Formula Load 2404.2
Plumbing - Temperature Relief Valve Sizing . . . . . Table 46-S
Reinforced Unit Masonry - General Design 2705
Safe Capacity of Group Piling . . . . . 2404.1 (l)
Wood - Unit Stresses 2904
Wood Joists and Rafters - Allowable Span . . . . . 2904.1 (a) (1)
ENTRY, right of
Building Official and Representatives . . . . . 201.1 (A) (3)
Chief Electrical Inspector and Subordinates . . . . . 4501.3 (a) (3)
Chief Plumbing Inspector and Subordinates . . . . . 4601.2 (a) (1)
EQUIPMENT OF SWIMMING POOLS 5005
EXCAVATIONS 2401, 3303
EXHAUST
Combustion Engine 4009.5
Systems 809.8, 1007.12, 1107.8, 4806.15
Ventilation (see Ventilation)

EXISTING BUILDINGS
Application of Code to ... 104
Classification by Type of Construction ... 1702
EXIT COURTS ... 3111
EXIT ILLUMINATION (Lights) ... 3112
EXITS - see Means of Egress
EXPIRATION OF BUILDING PERMIT ... 304.3
EXPLOSIVES (see also Occupancy Group E) ... 4104
EXTERIOR TRIM ... 1812.5, 1912.5, 2012.5
EXTERIOR WALL OPENINGS ... 1804.1 (d), 2004.1, 2104.2, 2203.2
Protection of ... 3104.6 (b), 3105.12
EXTERIOR STAIRWAY ... 3105.11
Protection of ... 3105.12
EXTERIOR WALLS
Construction of ... 1803.2, 1903.2, 2003.1, 2103, 2201
Definition (see Walls) ... 401
Masonry ... 2704.2
Protection ... 1804.1 (a), 2004.1, 2104.2, 2203.2

F

F - OCCUPANCIES, Group F - Storage and Industrial ... Chapter 11
FACILITIES FOR THE PHYSICALLY DISABLED AND/OR HANDICAPPED ... 515
FABRICATOR
Applies for Certification ... 305.1 (b) (3)
Approval by Building Official Required ... 305.1 (b) (5)
Certificate of Competency Required ... 305.1 (b) (2)
May Appeal Disapproval ... 305.1 (b) (8)
FACTORIES - Occupancy Group F - Division 2 ... 1101
FAMILY, Definition of ... 401
FARM BUILDINGS - Occupancy Group J - Division 7 ... 1501
FALLOUT SHELTER ... 302.2 (g)
FASTENINGS (see Adhesives, Anchors, Attachments, Connections)
Aluminum, Decking and Siding ... 3004
Awning, Canvas ... 4305.3
Glass Block ... 2704.10
Glass Veneer ... 3509.2, 3509.3
Ladders ... 3315.4
Plastics ... 3505.1
Pre-Cast Gypsum Roof Units ... 2604.2 (e)
Roofing ... 3402
Roofing Accessories, Metal ... 3407
Roof Tile ... 3403
Seats ... 3114.4
Shingles ... 3402.3, 3403, 3404, 3405
FENCES - Occupancy Group J - Division 2 ... 1501
Agricultural (Exempt) ... 1502.2
Construction of ... 1502.2
Foundation for ... 2403.2 (b)

Masonry 2704.8
School Ground 3117.9
FIBERBOARD, Identification . . . . . 2902.1 (a) (5)
FILL, Concrete Slabs on 2403.4
FILM
Projection Rooms 608.1
Sprinklers Required . . . . . 801.3 (b)
Storage and Handling 4103
FINAL INSPECTION (Mandatory) 305.2
FINES FOR VIOLATIONS 205, 303.3
FINISHES, Interior (see also Interior Finishes) 3708
FIRE ALARMS, Manual 3126
Installations . . . . . 3126.2 (b), 4512.4
Required 3117.11, 3118.10, 3120.6, 3121.4, 3122.8
Tests . . . . . 3126.2 (e)
FIRE ASSEMBLY
Automatic Closing, Required When 3706.4
Definition 401
Dual Purpose **FIRE-EXIT** Doors . . . . . 3706.4 (c)
Fire Divisions 506
Fire Doors 3706.2
Fire-Rating Determined by National Standards . . . . . 3706.3 (a)
Fire Windows 3706.6
For Protection of Openings . . . . . 3706.1 (a)
Glazed Opening in 3706.5
Hardware and Frames 3706.4
Signs for 3706.10
Testing Agency Label Required . . . . . 3706.1 (b)
Tin-Clad Doors 3706.8
FIRE BRICK, uses . . . . . 3906.2, 4007.3 (c)
FIRE CLAY
For Fireplaces Smoke-chambers 3906.4
For Flue Lining . . . . . 3902.2 (b)
FIRE DAMPERS . . . . . 506.6, 1807.2 (d), 3703.6, 3706.2 (a)
FIRE DEPARTMENT, Approval Required . . . . . 301.2 (a)
Connections 3805
Elevators for Emergency Use by 3204.2
FIRE DIVISIONS 506
Definition 401
Ducts Through 506.6
Openings in . . . . . 506.2 (b), 506.2 (c)
FIRE DOORS 3706.2
FIRE EXTINGUISHING SYSTEMS
Automatic Sprinklers, Required Where 3801
Carbon Dioxide, Permitted Where 3802
Hydrants, Required Where 3806
Inspections and Tests Required 3808
Standpipes, Required Where 3803

FIRE EXTINGUISHERS, portable 3807
FIRE MARSHALL, STATE - Rules have Jurisdiction . . . . . 301.2 (k)
FIREPLACES, Construction of 3906
FIRE PROTECTION (see Types of Construction)
Fire Resistive Standards, Materials and Methods . . . . . Chapter 37
FIRE-PROTECTED PASSAGEWAYS . . . . . 3111.1 (b)
Definition - see Means of Egress 401
For Exit Courts 3108.6
For Smokeproof Enclosures . . . . . 3109.6 (b)
Slope 3111.3
Width 3111.2
FIRE PROTECTION DURING CONSTRUCTION 3323
FIRE PUMPS 3804.4
FIRE RESISTIVE RATINGS, Application to
Assemblies, General 3706.1
Balconies . . . . . 3104.6 (b)
Buildings - see Type of Construction 1701
Ceilings 3703.6, 3705.4, 3705.5
Combustible Members 3704.2
Corridors . . . . . 3104.6 (a)
Courts 3108.6
Definition 401
Doors . . . . . 3104.7 (a), 3108.3 (b), 3109.5, 3706.2, 3706.8
Dual Purpose Doors . . . . . 3706.4 (c)
Floor and Roof Systems . . . . . Table 37-C, 3705.2
Horizontal Exit 3108.2
Interior Finishes 3708
Lathing, Where Rating is Required 305.2, 3501.1
Materials, Some 3702
Passageways . . . . . 3111.1 (b)
Protection of Structural Components . . . . . 3703, Table 37-A
Roof Covering 3707
Smokeproof Enclosures 3109
Stairways, Exterior 3105.11
Vertical Openings 3108.2
Walls and Partitions . . . . . 3704, Table 37-B
Windows 3706.6
FIRE RESISTIVE STANDARDS 402, 3701.2
FIRE RETARDANT WOOD 2914
FIRE SEPARATION
Classification of 508.3
Design and Materials of 508.4
Form of 508.2
Required between Occupancies . . . . . 508, Table 5-A
FIRESTOPS (see also Smoke-stop) 2907, 3704.3
FIRE SUPPRESSION - Life Safety System . . . . . Chapter 51
FIRE-WALLS 2704.4
FIRE WINDOWS 3706

FIRE ZONES . . . . . Chapter 16
FIRST AID, During Construction 3319
FLAME, OPEN - Prohibited . . . . . 3322, 4102.4 (i), 4102.4 (j)
FLAME-SPREAD, Interior Finishes 3708
Basis of Classification . . . . . 3708.2 (a)
Classification by Class . . . . . 3708.2 (b)
Exempt Construction . . . . . 3708.1 (d), 3708.3 (b)
Existing Buildings, Application to . . . . . 3708.3 (e)
Interior Finish Defined . . . . . 3708.1 (a), 3708.1 (b)
Limited Areas, Requirement . . . . . 3708.3 (d)
New Building Basements, Requirement . . . . . 3708.3 (f)
Not Applicable to . . . . . 3708.1 (c)
Requirements Based on Use or Occupancy . . . . . 3708.3 (a)
Where Automatic-Sprinklers Exist . . . . . 3708.3 (c)
FLAMMABLE LIQUIDS 4102
Classified 4102.3
Combustible Liquid, Defined . . . . . 4102.3 (b)
Detail Regulations 4102.4
FLASHING
Felt . . . . . 3402.2 (i)
Metal Base 3407.7
Metal Counter 3407.8
Vent Pipe 3407.9
FLOOR AREA, Limitation . . . . . "02" Section - Chapter 6 through 15
Covered Malls 3124.3
Definition of (Net and Gross) 401
General 514
Toilet Rooms . . . . . 1305.2 (b), 1405.2 (b)
FLOOR CONSTRUCTION (see also Types of Construction)
Aircraft Hangar, Garages and Service Stations . . . . . 1102.2 (d)
As a Form of Separation 508.1
Below Grade 2305.2
Concrete, Pneumatically Placed 2510, 2510.11
Concrete, Precast Units 2509
Concrete, Prestressed Units 2510
Concrete, Slab on Ground 2403.4
Fill under Wood over Concrete . . . . . 1805.1 (b)
Fire-Resistivity, How to Obtain . . . . . 3705.2, Table 37-C
Heavy Timber . . . . . 2906.12, 2003.3 (b) (2)
Loading Consideration 2301.2, 2303
Openings, Protection of . . . . . 508.3 (c) (4)
Permanent Elements under (Forms, tile, etc.) 1805.1
Projection Room 608
Sheathing . . . . . 2909.1 (e), 2912.2
Stages and Platforms 607.1, 607.2
Steel, Cold-Formed Structural Members 2809.3
Steel Decks, Cold-Formed Sheets 2809.4
Steel Joists, Open-Web 2808
Temporary 3311

Toilet Room ..... 512.2 (d), 2906.8 (c)
Wood, Floor Joists 2806.8, 2912.2
Wood, Horizontal Framing 2906
Wood, Laminated Beams 2906.14
Wood Sheathing and Flooring 2909
Wood, Sleepers ..... 2913.2 (a) (3)
FLOOR LOADS
Assumed Live 2301.2
Dead and Live, Defined 401
Reductions allowed 2308
Required Signs before Occupancy 2311
Tests, May be Required for Capacity 2314
Unit Dead ..... 2304.2 (a)
Unit Live (Table 23-A) 2304
FLOOR OPENINGS, Fire-Resistive Requirements
Protection, during Construction 3312
Protection, during Demolition 3302
FLOORS UNDER CONSTRUCTION 3312
FLUES
Chimney Liners, Appliance ..... 3902.2 (b), 3902.2 (f)
Chimney Liners, Fireplace 3906.5
Classified 3901.3
Connections 3905.2
False Fireplace 3906.10
Sizing (area), Appliance ..... 3901.2, 3902.2 (c)
Sizing (area), Fireplace 3906.7
Type A, Defined 3902.1
Type B, BW, Standards 3903, 3904
FLUE-FED INCINERATOR ..... 4007.1 (b)
FLY GALLERIES ..... 607.1 (b)
FOOT BLOCK ..... 4604.4 (d)
FOOTINGS
Continuous 2403.2
Elapsed Time Before Use ..... 2403.2 (g)
General, Reinforced Concrete 2403.1
Inspection (Mandatory) 305.2
Isolated 2403.3
Protection of 2401.1, 4603.15
Reinforcing for ..... 2403.2 (c)
Slab supported by, Requirements 2403.4
FORMS
Application, for Permit 302.1
Excavation Used for ..... 2403.2 (h)
For Concrete 2507.1
For Pneumatically Placed Concrete 2511
Removal of, Concrete Construction 2507.2
Wood, Removal Before Occupancy ..... 2913.4 (b)
FORCED VENTILATION ..... Chapter 48
FOUNDATION

Concrete, Design of . . . 2505.1
Excavation for . . . 2401
Extending into Public Property . . . 3603.7
Footing for . . . 2403
Grade Beams . . . 2405.3
Inspection (Mandatory) . . . 305.2
Liability of Excavator . . . 2401
Load Test, on Piles . . . 2404.9
Openings in Wall for Ventilation . . . 2913.3
Piling for . . . 2404
Retaining Walls . . . 2407
Walls, Exterior . . . 2405.1
Walls, Interior . . . 2405.2
FOUNDATION WALLS . . . 2405
FRAME BUILDINGS (see Type V Buildings) . . . Chapter 22
FRAME INSPECTION (Mandatory) . . . 305.2
FRAMING Horizontal, Wood . . . 2906
Vertical, Wood . . . 2905
FURRING
Ceilings . . . 2906.5 (b), 3502.5, 3511
Cross . . . 3502.5 (c)
Masonry Walls . . . 2910
FUSIBLE LINKS
Attic Fan Opening . . . 4806.10 (c) (3)
Openings in Proscenium Walls . . . 607.1 (d) (3)
Projection Rooms . . . 680.4 (a) (2)
Stage Ventilators . . . 607.1 (f)

G

G - OCCUPANCIES, Group G - Mercantile and Business . . . Chapter 12
GALLERIES, Fly . . . 607.1 (b)
GALVANIZING
Definition of Galvanized . . . 2809.2 (b)
Protection of Sheet Steel . . . 2809.6 (b)
Steel Roofing and Siding . . . 2809.5
GARAGE, PARKING - Occupancy Group F - Division 1 . . . 1101
Building Considered Enclosed When . . . 3120.3 (c) (4) (bb)
Continuous Belts or Lifts . . . 3120.3 (c) (5)
Floors . . . 1102.2 (d)
Means of Egress . . . 3120.3 (c) (6), 3120.3 (c) (7)
Ramps . . . 3120.3 (c) (1), 3120.3 (c) (3)
Special Construction . . . 1102.2 (c)
Stairs, to be Enclosed When . . . 3120.3 (c) (4) (aa)
Travel Distance . . . 3120.3 (c) (3) (dd), 3120.3 (c) (6) (bb)
Ventilation . . . 1105
Wall Area, Defined . . . 3120.3 (c) (4) (cc)
GARAGE, PRIVATE - Occupancy Group J - Division 1 . . . 1501
Attached to Residence, Requirements . . . 1507.2 (a) (3)
Definition (see also Carports) . . . 401

Fire Extinguisher Required When . . . 1507.2 (a) (1)
Floors . . . 1507.2 (2)
Located Under Another Occupancy . . . 1507.2 (a) (4)
Ventilation . . . 1505.1
GARAGE, REPAIR - Occupancy Group F - Division 1 . . . 1101
Definition (see Service Station) . . . 401
Special Provisions . . . 1102.2
Ventilation . . . 1105
GAS . . . Chapter 47
Inspection Required to Connect . . . 4704
Permit Required to Work With . . . 4703
Piping, Multifamily and Commercial . . . 4701.6
Portable Appliances . . . 4701.5
Shut-Off Valves Required . . . 509.3, 4701.7
Standards . . . 4702
GLASS BLOCK MASONRY . . . 2704.10
GLASS FIBER REINFORCING . . . 3505.1 (g)
GLASS VENEER . . . 3509
GLAZING, Installations . . . 3508
Area Limits, Exterior . . . Table 35-E
Details of . . . 3508.2 (b)
Difference in Level 4 feet or less . . . 3508.2 (c) (2)
Difference in Level more than 4 feet . . . 3508.2 (c) (1)
Divided Wind Load . . . 3508.1 (e)
Doors - Sliding and Swinging, Exterior . . . 3508.3 (a)
Doors - Without Frames, Exterior . . . 3508.3 (a) (4)
Fire Windows . . . 3706.6 (b), 3706.7
Interior (including Shower Doors) . . . 3508.4
Interior Corridors (F and G Occupancy) . . . 3104.7
Openings, Fire Doors and Windows . . . 3706.5
Plastic . . . 3508.5 (c)
Protection, by Arrangement . . . 3508.2 (c) (2)
Protection, by Size and Safety-Glazing . . . 3508.2 (c) (3)
Replacement Requirements . . . 3508.1 (f)
Safety Glazing . . . 3508.5
Sloped . . . 3508.6
Window Protection, Exterior . . . 3508.3 (c)
GLUE . . . 2911.4
GLUE LAMINATED MEMBERS . . . 2902.1 (a) (3), 2902.2, 2906.14
GRADE (elevation), Definition . . . 401
GRADE IDENTIFICATION, Lumber . . . 2902
GRADE, of Lumber . . . 401, 2902.4, 2904
GRADES UNDER BUILDINGS . . . 2406
GRANDSTANDS - Occupancy Group J - Division 3 . . . 1501
Permanent . . . 1502.3 (b)
Special Provisions . . . 3123.1
Standards for . . . 402, 1502.3 (a)

GREENHOUSES - Occupancy Group J - Division 7 1501
General Specifications 1502.7
GRIDIRONS . . . . . 607.1 (b)
GROUND FLOOR, Definition 401
GROUNDING, Electrical
Apparatus Boxes, Metal . . . . . 4514.1 (f)
Electrodes . . . . . 4506.1 (e)
High Voltage Wiring Systems . . . . . 4514.2 (a) (1)
Metal Buildings 4513.6
Metal Raceways . . . . . 4514.1 (d)
GROUNDS, for Plastering . . . . . 3503.1 (e)
GROUPS, BUILDING, Classified 502
A - Assemblies of 1000 persons or more . . . . . Chapter 6
B - Assemblies of less than 1000 persons . . . . . Chapter 7
C - Schools . . . . . Chapter 8
D - Institutions . . . . . Chapter 9
E - Hazardous storage and handling . . . . . Chapter 10
F - Storage and industrial . . . . . Chapter 11
G - Mercantile and business . . . . . Chapter 12
H - Residential, multiple . . . . . Chapter 13
I - Residential, single-family and duplex . . . . . Chapter 14
J - Miscellaneous . . . . . Chapter 15
GUEST, definition 401
GUEST ROOM, Definition 401
GUNITE (see Concrete, Pneumatically Placed) 2511
GUTTERS AND DOWNSPOUTS 3407.11, 4611
Definition 4602
Discharge over Public Property . . . . . 3603.5, 3603.6 (e), 4611.4 (c)
Discharge under Public Property . . . . . 4611.4 (f)
Foot Block Required . . . . . 4604.4 (d)
GYMNASIUMS - Occupancy Groups A and B 601, 701
Special Provisions 602.2, 3115, 3116
GYPSUM
Concrete, Plain 2702.9
Lathing 3502.2
Plaster . . . . . 3503.1 (b), 3503.3
Tile 2702.7
Wall Board 3510, 3510.3
GYPSUM, REINFORCED . . . . . Chapter 26
Limitations of use 2603.2
Poured in Place 2604.1
Precast Units 2604.2

H

H - OCCUPANCIES, Group H - Multiple Residential . . . . . Chapter 13
HABITABLE ROOM
Bedroom, Minimum Size . . . . . 1305.2 (a), 1405.2
Bedroom, Temperature Protection 1305.1, 1405.1

Carport, Converted to . . . . . 1507.2 (a) (2)
Ceiling Height . . . . . 1305.2 (c), 1405.2 (c)
Definition 401
Fire-Fighting Requirements 3122.2
Light and Ventilation . . . . . "05" Sections - Chapters 6 through 15
Means of Egress, Width 3122.1
Restrictions for Use as . . . . . 3122.1 (f) (2)
Windows, Minimum area of 605.1, 905, 1305.1
HANDRAILS 3105.8
HANGARS, AIRCRAFT (see Aircraft Hangars)
HARDBOARD
Identification . . . . . 2902.1 (a) (6)
Floor Underlayment . . . . . 2909.1 (j)
Exterior Wall Cladding . . . . . 2909.4 (b) (3)
HARDWARE 3103.3
HAZARDOUS BUILDINGS 202
HAZARDOUS OCCUPANCIES (see Group E) . . . . . Chapter 10
HANGERS, Metal - Wood Headers . . . . . 2906.6 (c)
HEADERS
Ceiling Joists, Wood . . . . . 2906.3 (d)
Floor Joist, Wood . . . . . 2906.3 (c)
Non-Bearing Wood Partition Opening . . . . . 2905.3 (d)
Openings in Horizontal Wood Framing 2906.6
Openings in Vertical Wood Framing . . . . . 2905.1 (k)
Roof Joist, Wood 2906.10
HEARTH, Fireplace 3906.9
HEAT-PRODUCING APPARATUS . . . . . Chapter 40
HEAVY TIMBER CONSTRUCTION 2003.3
HEIGHT, Definitions 401
Architectural Projections . . . . . 3603.6 (b)
Awnings, Above Grade . . . . . 4304.1 (a), 4404.1
Buildings . . . . . "02" Sections, Chapters 6 through 15, 5101.1 (a)
Ceiling, General 513
Ceiling, Residential Units 1305.2, 1405.2
Chimneys, Fireplace . . . . . 3906.5 (e)
Curb, Rainwater Control . . . . . 2011.7 (c)
Doors, Minimum . . . . . 3103.4 (a)
For Windload 2309
Interior Bearing Wall 2704.3
Marquees . . . . . 3603.3 (c)
Metal Smokestacks . . . . . 3902.3 (d)
Parapets . . . . . 2011.7 (b)
Parking under Buildings . . . . . 513.1 (d)
Railings, Horizontal 516.2
Signs 4206, 4207, 4208, 4209, 4210
Stair-Railings 3105.9
Stairways 3105.14
Tie Columns . . . . . 2704.2 (b)

HOISTING MACHINERY 3306
HOIST TOWERS 3310
HOLLOW-UNIT MASONRY, REINFORCED 2704.10
Maximum Working Stresses in 2703
HOMES, for the aged - Occupancy Group D - Division 2 901
HOODS
Domestic 4806.14
Restaurant Equipment 4806.13
HORIZONTAL EXITS
Accessibility to Exit . . . . . 3104.4, 3115 through 3123
Corridors and Exterior Balconies 3104
Courts as Means of Egress 3108.6, 3111
Dead Ends 3104.5
Definition 401
Discharge Area Requirements 3107.3
Emergency Lighting of 3112.2
Enclosure Wall Protection 3104.6, 3108.2
Facilities for Physically Handicapped 515
Illumination of 3112.2
Opening Protection, Enclosure Walls 3108.3
Opening Protection, Separation Walls 3107.2
Passageways 3111, 3124
Ramps . . . . . 3106, 3120.3 (c)
Safeguards for 516
Signs, Required 3112.6
Travel Distance 3102.4
Used as a Required Means of Egress 510, 3107.1
Width of 3115.1, 3117.1, 3118.1, 3119.1, 3120.1, 3121.1, 3122.1
Yard Areas as Means of Egress 3116.6
HORIZONTAL AREA SEPARATION
Adjoining Occupancy 505
Between Mixed Occupancy, Required . . . . . Table 5-A
Between Tenants 507.2
Classification of 508.2
Fire Divisions 506
Forms of General Definition 508.2
Party Walls 507
HOSE, Fire
Cabinets, Recessed-Wall Protection Required . . . . . 3803.7 (e)
Connections . . . . . 3803.7, 3805.2 (a)
Nozzles . . . . . 3803.7 (c)
Reels . . . . . 3803.7 (e)
Size of . . . . . 3803.7 (a)
Station Location 3803.7
HOSPITALS - Occupancy Group D, Divisions 2 and 3 901
Special Provisions, Divisions 1 and 2 . . . . . 902.2
Special Provisions, Divisions 3 . . . . . 902.3
HOTELS - Occupancy Group H 1301
Special Provisions 3122

HOT WATER
Distribution 4614.16
Safety Devices 4614.17
Tanks 4614.18
HOUSE, Apartment, Rooming, Fraternity - Group H 1301
HURRICANE PRECAUTIONS 105.3, 305.5, 3324
HYDRANTS, YARD
Connections and Hose Requirements . . . . . 3806.3 (c)
Hose Houses and Equipment . . . . . 3806.3 (d)
Location . . . . . 3806.3 (b)
Pipe Size 3806.3
Plumbing 4617.1
Signs Required . . . . . 3806.3 (e)
Where Required . . . . . 3806.3 (b)
HYDROSTATIC
Pressure to be Considered 2305.2
Relief Valves, Limited Use of . . . . . 5002.4 (a) (3)
Stress Increase Allowed . . . . . 5002.4 (a) (4)
Uplift and Lateral Forces to be Considered 5002.4

I

I - OCCUPANCIES, Group I - Single and Duplex Dwellings . . . . . Chapter 14
ILLUMINATION
During Construction 3318
Means of Egress 3112
Sign . . . . . 3112.6 (b), 3120.5 (b)
Special Considerations . . . . . 3120.5 (b)
INCINERATORS 4007
INCOMBUSTIBLE
Construction (Type IV Buildings) . . . . . Chapter 21
Definition 401
INCREASE IN AREA, Allowable 514
INDUSTRIAL - Occupancy Group F - Division 2 1101
INFLAMMABLE LIQUIDS (see Flammable Liquids)
INSPECTION
Awning and Canopy 4303.2, 4402.2
Buildings (see Mandatory) 305.2
Electrical (see Mandatory) 305.2
Fabricating Plant . . . . . 305.1 (b) (2)
Gas 4704
Glass Installation (see Mandatory) 305.2
Hurricane 305.5
Mandatory 305.2
Mechanical 4801.2
Plumbing 4601.6
Product . . . . . 305.1 (b) (1)
Requests for . . . . . 305.2 (d)
Screen enclosure 4402.2
Sign 4204

Special 305.3
INSULATING MATERIALS 3709
INSULATION
Clearance Reduced by (Smoke-Pipes) 3905.3
Combustible Prohibited in 1912.2, 2012.2, 2210.2
Exhaust Ducts . . . . . 4806.13 (e) (7)
Fireplace and Chimney . . . . . 3906.1 (b)
Incombustible Used for Fire Protection . . . . . Table 37-A
Required when . . . . . 1305.1 (b), 1405.1
Roof (Thermal) 3406
INTERIOR FINISHES 3708
Classified by Flame-Spread Rating and Radiant Flux 3708.2
Defined 3708.1
Requirements, by Occupancies and Use 3708.3
INTERIOR FOUNDATION WALLS 2405.2
INTERIOR PARTITION (a non-bearing separation)
Definition 401
In Type I Construction 1804.4
In Type II Construction 1904.4
In Types III, IV and V Construction 2004.3, 2014.4, 2203.4
Masonry 2704.7, 2705
INTERIOR STAIRWAYS (see also Vertical Openings) 3105.10
Enclosure Construction 3108.2, 3108.4
Enclosure Required 1807, 1907, 2007, 3108, 3109
Safeguards Required 3105.8, 3105.9
Protection of Opening when Enclosed 3108.3, 3109.6
Use of Space Under 3108.5
(See also "06" Sections, Chapter 6 through 15)
INTERIOR TRIM 1812.2
Finish Requirements not Applicable to . . . . . 3708.1 (c)
INTERPRETATION OF CODE
By Board of Rules and Appeals . . . . . 203.4 (b)
By Building Official . . . . . 201.1 (A) (2)

J

J - OCCUPANCIES, Group J - Miscellaneous 1501
Division 1 - Garages for four or fewer motor vehicles, porte-cocheres and car-motor vehicles, porte-cocheres and carports.
Division 2 - Tanks towers, fences and similar structures.
Division 3 - Stadiums, reviewing stands, grandstands, enclosed grandstands, arenas and enclosed domed structures.
Division 4 - Cabanas, bath houses and similar structures.
Division 5 - Public and private swimming pools and buildings accessory thereto.
Division 6 - Solariums, sun-decks, and similar roofless structures.
Division 7 - Greenhouses, agricultural buildings and farm service buildings not for human habitation.
Division 8 - Open storage yards, lumber yards and similar structures.
JAILS - Occupancy Group D - Division 1 901
Special Provisions 902.2, 3118.8
JALOUSIE DOORS . . . . . 3508.5 (d)

JOINTS
Construction, in concrete 2507.4
Construction, in Reinforced Masonry 2705
Design Considerations, Concrete 2509.11
End, Lumber . . . . . 2902.1 (a)
Expansion, Glass Block Panels . . . . . 2704.10 (h)
Expansion, Glass Veneer 3509.6
Glass Block . . . . . 2704.2 (l)
Masonry, Mortar . . . . . 2702.10 (b) (3)
Masonry, Reinforced 2705
Welded 2805.3, 2808.4
JOISTS
Anchorage (see Anchors)
Bridging, Concrete 2509.9
Bridging, Steel 2808.5
Bridging, Wood, Nailing 2911.1
Ceiling, Wood 2906.9
Concrete, Precast 2509
Concrete, Prestressed 2510
Floor, Wood 2906.8
Roof, Wood 2906.10
Steel, Open Web 2808
Wood, Allowable Span . . . . . 2904.1 (a) (1)
Wood, Allowable Stresses 2904

K

KEENE'S CEMENT, Specifications for . . . . . 3503.2 (d)
Application . . . . . 3503.4 (b) (3)
Finish for Masonry Cement Plaster . . . . . 3503.3 (b) (3)
Sand-Float Finish for Gypsum Plaster . . . . . 3503.3 (b) (2)
KINDERGARTENS - Occupancy Group C 801
Rooms used for 802.2, 811
KITCHEN
Dishwashers 4613.13
Fixture Units, Plumbing 4605.6
Food Disposals, Domestic . . . . . 4613.10 (b)
Grease Interceptors, Required 4612.2
Hoods, Domestic 4806.14
Hoods, Commercial 4806.13
Minimum Height . . . . . 1305.2 (c), 1405.2 (c)
Pass-Through Windows . . . . . 3508.3 (b) (6)
Plumbing, Minimum Facilities . . . . . 4613.19 (j)
Prohibited (see Guest House) 401
Ranges . . . . . 4508.1 (a) (b) (c)
Receptacle and Light Outlets 4508.4
Refrigerators and Freezers . . . . . 4508.2 (a)
Supply Pipe, Sizes 4614.13
Ventilation . . . . . 1305.1 (a), 1405.1

L

LABELS
- Fire Assembly, Required . . . 3706.1 (b)
- Fire Door . . . 3706.2 (b)
- Fire Window . . . 3706.6
- Issued by . . . 3706.1 (c)
- Tin-Clad Doors . . . 3706.8

LACQUER FACTORIES - Occupancy Group E - Division 2 . . . 1001
- Special Provisions . . . 3119
- Ventilation Requirements . . . 1005

LADDERS
- Prohibited to Rooms for Living or Sleeping . . . 3122.1 (f) (2)
- Shall be provided where . . . 3315, 3105.13 (c)
- Steel Specifications . . . 3105.13 (d)
- Swimming Pool . . . 5005.6

LAMINATED
- Glass . . . 3508.2 (a) (2)
- Members . . . 2906.14
- Timber . . . 2902.1
- Wood-based Structural-use panels . . . 2902.1(a) (3)

LANDINGS OF STAIRS . . . 3105.6
- Vertical Distance Between . . . 3105.6 (d)

LATERAL BRACING
- Masonry Walls . . . 2704.2 (b) (2)
- May be Omitted . . . 2909.3 (b)
- Stud Walls . . . 2909.3

LATH
- Attachment to Metal Supports . . . 3502.2 (b) (2), 3502.3 (f)
- Attachment to Wood Supports . . . 3502.2 (b) (1), 3502.3 (e)
- Corner Bead and Inside Angle . . . 3502.2 (e)
- Gypsum . . . 3502.2(a)
- Metal, Wire and Accessories . . . 3502.3 (a)
- When Not to be Applied . . . 3502.2 (f)

LAVATORIES, Minimum Requirement . . . 4613.19

LEADERS (see Gutters and Downspouts)

LIBRARIES - Occupancy Group G - Division 2 . . . 1201

LIGHT (see Illumination) Also see "05 Sections, Chapter 6-14 incl."

LIME . . . 3503.2 (c)

LIME PLASTER . . . 3503.3

LINING
- Chimney . . . 3902.2 (b)
- Fireplace . . . 3906.2, 3906.5
- Separation of . . . 3902.2 (f)

LINTEL
- Definition . . . 401
- Fireplace . . . 3906.8
- Masonry Opening . . . 2704.2 (k) (2)
- Wood . . . 2905.1 (k)

LIQUIFIED PETROLEUM GAS (LP-G) . . . . . Chapter 47
Inspection Required 4704
Permit Required to Work 4703
Scope 4701.1
Shut-Off Valves, Required 4701.7
Work, Defined 4703.1
LIQUIDS (See Flammable Liquids)
LIVE LOAD
Concentration of 2303
Definition 401
On Screen Enclosures 2306.6, 4403.1, 4403.4
Posting Required 2311
Reduction Allowed 2308
Roof 2307
Stress Increase Allowed 2309.3
Wind 2309
LOAD, OCCUPANT, Determination of 3101.4
Definition 401
LOADS (see Dead, Floor, and Live Loads)
Allowable on Soil 2402
Bearing, Pile 2404
Interior Wall and Partition Design 2305.5
Masonry Wall, Concentrations 2703.4
Ornamental Projection Design 2305.4
Retaining Wall Design 2407
Roof 2304, 2307, 2309
Safeguards 2305.3
Special Consideration 2305
Wind 2309
LOCATION ON PROPERTY (see Walls and Partitions)
Chapter 18 through 22 511
LOCKS . . . . . 3103.3, 315.3, 3116.1 (b), 3117.8, 3118.8
LOT, Definition 401
LOT LINES, Definition 401
LOT SURVEY, May Be Required . . . . . 302.2 (f)
LUMBER
Allowable Unit Stresses . . . . . 2904.1 (a)
Grade and Species 2902.4
Identification 2902.1
Moisture Content 2902.3
Sizes 2903.1
Sub-Flooring . . . . . 2909.1 (d)
To be Preservatively Treated . . . . . 2902.1 (a), (8), 2913.2

M

MAINTENANCE Buildings and Property 105
MALLS, covered 3124
Area Allowable 3124.4

Construction 4124.3
Definition 4124.2
Exits . . . . . Chapter 31; 3124.5
Ventilator 4124.6
MANSARDS (see Roof)
MANUFACTURING PLANTS - Occupancy Group F - Division 2 1101
Appeal of Disapproval . . . . . 305.1 (b) (8)
Approval of Products of . . . . . 305.1 (b) (5)
Certificate of Competency, Application . . . . . 305.1 (b) (3)
Fire Alarms 3120.6
Illumination of Means of Egress and Exit Signs 3120.5
Name Required on Products . . . . . 305.1 (b) (7)
Single Means of Egress May Be Permitted 3120.4
MARKETS - Occupancy Group G - Division 1 1201
Special Provisions 3121
MARQUEES 3603.3
MASONRY . . . . . Chapter 27
Additions to Existing Walls . . . . . 2704.2 (j)
Aggregates, Concrete Blocks . . . . . 2702.5 (a) (1), 2504.2
Aggregates, Mortar . . . . . 2702.10 (b)
Area of Panels, 8 Inches Thick . . . . . 2704.2 (a)
Backing . . . . . 2704.6 (a)
Bearing Walls, Exterior 2704.2
Bearing Walls, Interior 2704.3
Bond, Unit . . . . . 2704.1 (e)
Brick and Stone . . . . . 2702.2, 2702.3, 2702.4, 2704.2 (h)
Buildings, Height Allowable 2701.2
Cavity Wall . . . . . 2704.2 (g)
Chases, Recessed and Opening in . . . . . 2704.2 (k)
Copings Required on . . . . . 2704.2 (d), 2704.2 (e), 2704.8
Fences 2704.8
Glass Block 2704.10
Mortar . . . . . 2702.10 (b)
Parapet Walls . . . . . 2704.2 (e)
Partitions (Non-Bearing Separations) 2704.7
Plain Concrete 2702.8
Plain Gypsum Concrete 2702.9
Reinforced Construction Unit Masonry 2705
Stresses, Allowable in 2703
Stresses, Maximum Working, for Reinforced 2705
Supporting Wood Components . . . . . Chapter 29
Tests . . . . . 2702.1 (c)
Tie Beams in . . . . . 2704.2 (c), 2704.3
Tie Beam, Not Required When . . . . . 2704.2 (c) (4)
Tie Columns in . . . . . 2704.2 (b)
Tie Columns, Not Required When . . . . . 2704.2 (b) (1)
Tile 2702.6, 2702.7
"U" Block in Lieu of Tie-Beam . . . . . 2704.2 (c) (2)
Units, For Fire-Resistive Walls . . . . . 2702.5 (a) (2)

Units, General . . . . . 2702.5 (a) (1)
Units, Modular-Dimensions . . . . . 2702.5 (a) (3), 2702.5 (a) (4)
Unsupported Height (Partitions) . . . . . 2704.7 (c)
Unsupported Height (Walls) . . . . . 2704.2 (c) (1)
Unsupported Width (Partitions) . . . . . 2704.7 (b)
Used as Fire-Resistive Material 3702.3, 3703.2
Used Units . . . . . 2704.1 (e)
Veneer . . . . . 2704.6 (b) (2)
Walls, Other than Specified 2704.9
Wood Supporting 2912
MASTIC 3509.3
MATERIALS
Alternate 204
Combustible, Regulated . . . . . 607.2 (e), 1812, 1912, 2012, 2110, 2210
Dissimilar 3004.4
Drainage 4604
Fire Resistive 3702
For Concrete 2504
For Pneumatically Placed Concrete 2511
For Wall Cladding and Glazing . . . . . 3512, Chapter 35
Incombustible, Definition 401
Other than Approved . . . . . 2702.1 (b), 3512.9
Storage of 3305
Weight of . . . . . 2304.2 (A)
MEANS OF EGRESS
Aisles 3113
Corridors and Exterior Balconies 3104
Courts 3108.6
Definitions 401
Doors 3103
Emergency Lighting for 3112.2, 3112.3, 3112.4, 3112.5
Enclosures, Exit 3108
Escalators 3205
Fire Doors 3706.2
Horizontal Exit 3107
Illumination of 3112.1
Malls, Covered . . . . . 3124, 3124.3 (a)
Exit Discharge 3110
Passageways . . . . . 3111, 3115.2 (b), 3124.3 (c)
Power Activated Doors . . . . . 3103.6 (d)
Ramps 3106, 3118.7
Signs for 3112.6
Smokeproof Enclosures 3109
Special Requirements by Occupancy . . . . . 3115 through 3123
Stage . . . . . 607.1 (h)
Stairways 3105
Walkways, Covered . . . . . 3124.3 (b)
Width of . . . . . 3102.2, 3115.1 through 3122.1
Yard Areas 3111.6

MECHANICAL VENTILATION . . . . . Chapter 48
MERCANTILE, Occupancy Group G - Division 1 1201
METAL
Aluminum . . . . . Chapter 30
Clad Doors 3706.2
Columns 2806
Doors, Steel 3706.2
Joists, Bar 2808
Lath 3502.3
Reinforcing 2504.4, 3504.2
Roofing Accessories 3407
Roofing and Siding 2809.5, 3004.2, 3004.3, 3512.6
Runners and Furring (Suspended Ceiling) 3502.5
Shingles 3404, 3512.4
Steel and Iron . . . . . Chapter 28
Studs 3510.5, 3703.9
Ties 3509.4
Wire Lath . . . . . 3502.3 (e)
MEZZANINE
Definition (also see Floor Area, Gross) 401
Exits . . . . . 3102.1 (c)
MILL CONSTRUCTION (Heavy Timber) 2003.3
MINIMUM DIMENSIONS 1305.2, 1405.2
MIXED OCCUPANCIES (see Sections in Groups) 510, 3101.7
MONASTARIES, Occupancy Group H 1301
MORTAR, Masonry 2702.10
MOTEL, Occupancy Group H 1301
MOTION PICTURE THEATRE, Occupancy Groups A and B 601, 701
MOVING OF BUILDINGS 302.6
MOVING STAIRWAYS 3205
MULTIPLE-RESIDENTIAL, Occupancy Group H 1301
MUSEUMS, Occupancy Group G - Division 2 1201

N

NAILS
Galvanized, Where Used 2911.2
Number Required to Connect Wood Members 2911
Penetration Required 2911.3
NEW MATERIALS AND TYPES OF CONSTRUCTION 204
NON-BEARING WALLS, INTERIOR
Definition (see Walls) 401
Fire-Resistivity Ratings . . . . . Table 37-B
Type I Construction (Fire-Resistant) 1804.4
Type II Construction (Semi-Fire-Resistant) 1904.4
Type III Construction (Ordinary Masonry) 2004.3
Type IV Construction (Incombustible) 2104.4
Type V Construction (Wood Frame) 2203.4
Unit Masonry (Other than Fire-Walls) 2704.7

NON-BEARING WALLS, EXTERIOR
Definition (see Walls) . . . 401
Fire-Resistivity Ratings . . . Table 37-B
Special Provisions for Types I and II, Group E . . . 1002.2 (d), 1804.1 (a)
Types I and II Construction (Except Group E) . . . 1804.1 (c) (2)
Type III Construction (Not Allowed for E Occupancy) . . . 2004.1
Types IV and V Construction . . . 2104.2, 2203.2
NON-CONFORMING BUILDINGS . . . 104
NON-COMBUSTIBLE (see Incombustible)
NOMINAL DIMENSIONS
For Masonry Units (Modular) . . . 2702.5 (a) (4)
For Wood . . . 2903.1
NOTICES
For Inspections . . . 305.2
Of Unsafe Buildings . . . 202.4
Of Violation . . . 305.2
Stop Work . . . 304.4
NURSERIES, Occupancy Group C . . . 801
Special Provisions . . . 802.2
NURSING HOMES, Occupancy Group D - Division 2 . . . 901

O

OBSTRUCTION PROHIBITED
Access from the Street to Fire-Equipment During Construction . . . 3323
By Signs, Fire Door . . . 3706.10
Court Areas . . . 3604.2
Drainage Systems . . . 4603.9
Means of Egress . . . 3101.9
Courts and Passageways . . . 3111.2 (b)
Stairs and Stairways During Construction . . . 3314
Streets, During Demolition or Construction . . . 3602.2 (b)
OCCUPANCY
Adjoining . . . 505
Certificate of . . . 307
Change in Use . . . 503
Classified . . . 502
Definition . . . 401
Mixed . . . (see Chapters 6 through 15)
Permanent, of Public Property . . . 3603
Separations . . . 508
Temporary, of Public Property . . . 3602
When Not Specifically Mentioned in Code . . . 502.2
OCCUPANT LOAD, Determination of . . . 3101.4
Definition . . . 401
OFFICE BUILDINGS, Occupancy Group G - Division 2 . . . 1201
Special Requirements . . . 1202.2, 3121
OIL BURNING APPLIANCES . . . 4004
OPENINGS TO BE PROTECTED (see Types of Construction) . . . (also see Chapter 31)

OPEN PARKING GARAGE, Occupancy Group F - Division 1 . . . . . 1102.2
Definition 401
Determination of "open" . . . . . 3120.3 (c) (4) (bb)
OPEN STRUCTURES 1502.3
OPEN WEB STEEL JOISTS 2808
ORDINARY MASONRY CONSTRUCTION - Type III . . . . . Chapter 20
ORPHANAGES, Occupancy Group D - Division 2 901
Special Provisions 902.2, 3118
OVERCROWDING PROHIBITED 3101.5
OVERTURNING MOMENT AND UPLIFT 2309.2

P

PAINT
Aluminum in Contact with Other Metals 3004.4
Classified 4102.3
Not Permitted, Ladders . . . . . 3115 (k)
Protection of Metal (Steel) 2807, 2809.6
Storage Prohibitions 4102.4
PAINT SPRAY BOOTHS 4106.2
PAINT STORAGE AND HANDLING, Occupancy 1001
Group E - Division 2
PANEL WALL
Bonding . . . . . 2704.2 (b) (6)
Definition (see Walls) 401
Glass Block 2704.10
Openings . . . . . 2704.2 (k) (2)
Reinforced Concrete, Thickness . . . . . 2704.5 (b)
Unit Masonry, Thickness . . . . . 2704.5 (a)
PANIC HARDWARE
Definition 401
Special Uses 3115.3, 3117.8
Uses . . . . . 3103.3 (a), 3109.5 (c)
PARAPET WALL
Construction . . . . . 2704.2 (e)
Definition 401
Required (see also Types of Construction) 2011.7
Roofing . . . . . 3402.2 (k)
PARKING GARAGE (see Garage, Parking)
PARTICLEBOARD
Identification . . . . . 2902.1 (a) (7)
Floor Underlayment . . . . . 2909.1 (k)
Siding . . . . . 2909.4 (b) (3)
PARTITION (see Definition) 401
PARTY WALLS
Definition 401
Requirements 507
PASSAGEWAYS
Definition (see Means of Egress) 401

Requirements 3111, 3115, 3124
PEDESTRIAN PROTECTION 3304.1, 3304.2
PENALTIES AND VIOLATIONS, Provided by Code 205
PENTHOUSE, Definition 401
PERLITE
Fire Protection for Floor and Roof Systems . . . . . Table 37-C
Mixed with Portland Cement for All Protection . . . . . Table 37-B
Plaster Protection for Primary Steel Members . . . . . Table 37-A
Proportions in Plaster Base Coats . . . . . 3503.3 (a)
Proportions in Plaster Finish Coats . . . . . 3503.3 (b) (5)
PERMIT
Air Conditioning 4801.3
Alteration (of Structures) . . . . . 301.1 (a)
Application for 302
Awning 4303.1, 4402.1
Change of Occupancy 301, 307
Conditions of 304
Curtain Walls (see Definition in 401) . . . . . 301.1 (p)
Demolition 302.7
Does Not Permit Violation of Code 304.2
Electrical 4505.1
Elevator 3203.1
Expiration of 304.3
Explosives 4104
Exterior Windows and Exterior Glass Doors . . . . . 301.1 (o)
Fees 303
Fees Doubled When 303.3
Gas Appliances 4703
Heat Producing Apparatus 4001.2
Moving (of Structure) 302.6
Not Valid When 307.3
Plans Required For 302.2
Plumbing 4601.5
Premise 301.3
Revocation of 304.4
Roofing . . . . . 301.1 (j), 3401.1 (f)
Sign 4203.1
Swimming Pool 5002.1
Temporary 302.5
To Store Construction Materials in Street . . . . . 301.2 (a)
Use and Occupancy 307
When Required 301
Work Without 301
PHYSICALLY DISABLED AND/OR HANDICAPPED 515
PIERS, MASONRY . . . . . 2704.2 (f)
PILES 2404
Cast-in-Place Concrete 2404.6
Driving Formula Load 2404.2
Precast Concrete 2404.4

Prestressed Concrete 2404.5
Protection of Wood 2913.1
Special 2404.8
Structural Steel 2404.7
Tests 2404.9
Wood 2404.3
PIPE COLUMNS
Attached Metal Members 3703.7
Compression Members, Minimum Dimensions 2806.1
Concrete Filled, Pressure Relief Requirements 2806.2
Concrete Filling in Lieu of One-Hour Protection 3703.11
Effect of Concrete Fill on Loading 2806.3
Jacketing 3703.5
Protection Required for Various Fire-Ratings . . . . . Table 37-A
Protection Required Other than Fire-Resistivity 2807
Reinforcement of Cast-in-Place Protection 3703.3
Welding 2805.3
PLAIN CONCRETE 2702.8
PLAIN GYPSUM CONCRETE 2702.9
PLANS REQUIRED
Air-Conditioning 4801.3
Awning . . . . . 4303.1 (b), 4402.1 (b)
Building 302.2
Curtain Walls . . . . . 302.2 (e)
Drainage . . . . . 4605.13 (c)
Electrical 4505.2
Exterior Window and Exterior Glass Doors . . . . . 302.2 (e)
Gas Work 4703.3
Plumbing . . . . . 4601.5 (e)
Screen Enclosures . . . . . 4403.4 (d)
Sign . . . . . 4203.2 (c), 4203.2 (d)
Survey . . . . . 302.2 (f)
Swimming Pools 5002.3
PLANTS, MANUFACTURING, Occupancy Group F - Division 2 1101
PLASTER AND PLASTERING 3503
PLASTERBOARD, GYPSUM (used with or without plaster) 3510
PLASTICS . . . . . 3505, 3508.5 (c)
PLATE GLASS
Maximum Area of Fixed Panels, Exterior Walls 3508.2
PLATFORMS AND STAGES 607
PLATFORM HOISTS 3309
PLATFORM, Loading 1812.3, 1912.3, 2012.3, 2110
PLENUMS, Ceiling 1805.3, 1806.5, 1905.3, 2005.3
PLOT PLAN . . . . . 302.3 (c)
PLUMBING . . . . . Chapter 46
PLUMBING, ADMINISTRATIVE
Alternate Materials and Construction 4601.4
Application of Code to Existing Installations . . . . . 4601.1 (d)

Certificate of Approval . . . . . 4601.6 (p)
Concealed Work . . . . . 4601.2 (a) (3), 4601.6 (h)
Correction Notice of Violation . . . . . 4601.6 (j)
Fees . . . . . 4601.5 (b)
Final Inspection . . . . . 4601.6 (b)
Inspection . . . . . 4601.6 (a)
Maintenance of Installations . . . . . 4601.1 (e)
Permits - Required 4601.5
Plans - Required (see Plans) . . . . . 4601.5 (e), 4605.13 (c)
Plumbing Chief 4601.2
Private Sewer Tapping . . . . . 4601.5 (c)
Purpose of Plumbing Code . . . . . 4601.1 (b)
Stop Work Orders . . . . . 4601.2 (a) (2)
Tests . . . . . 4601.6 (b) (c) (d)
Title of Plumbing Code . . . . . 4601.1 (a)
Unsafe Buildings and Premises 4601.3
Workmanship . . . . . 4601.6 (o)

PLUMBING, BUILDING CODE REFERENCES

Automatic Sprinkler Systems 3801
Building Official Requires Compliance 301.2
Carbon Dioxide Fire-Extinguishing Systems 3802
Chases, Masonry . . . . . 2704.2 (k)
Cutting Holes, Concrete 2509.8
Drainage Projections Over Public Property . . . . . 3603.8 (c)
Embedded Pipes, Concrete 2507.3, 3703.4
Facilities for Physically Handicapped 515
Fire Department Connections 3805
Fire-Resistive Floors, Pipes in 3705.2
Hydrants 3806
Mandatory Inspections 305.2
Notching of Wood Members . . . . . 2905.1 (i), 2906.5
Pipes in Walls, Wood Framing . . . . . 2905.1 (j)
Pipes Over Public Property . . . . . 3603.5, 3805.2 (b)
Pressure Tests 3808.2
Representation on Board of Rules and Appeals 203.1
Requirements by Groups of Occupancy . . . . . Chapters 6-15 incl.
Sanitation During Construction 3320
Solar Tanks and Systems 4008.1
Standpipe, Permits . . . . . 3803.1 (b)
Swimming Pool Inspection 5006.3
Swimming Pool Piping, Inspection 5006.2
Swimming Pool Piping, Materials 5005.3
Swimming Pool Piping, Permit 5004.1
Toilet Rooms (Based on Occupancy) 512.2, 515
Vent Pipe Flashing, Roof 3407.9
Water Supply 3804

PLUMBING, DEFINITIONS 4602

PLUMBING CHIEF (see also Plumbing, Administrative)

Appointment of 4601.2

Concealed Work, May be Exposed by . . . . . 4601.2 (a) (3)
Occupancy, Violations Reported to Building Official . . . . . 4601.2 (a) (4)
Powers and Duties of . . . . . 4601.2 (a)
Qualifications for . . . . . 201.4 (A) (3)
Right of Entry by . . . . . 4601.2 (a) (1)
Stop Work Orders, Issued by . . . . . 4601.2 (a) (2)
Subordinates to . . . . . 4601.2 (a)

PLUMBING, REQUIREMENTS AND MATERIALS

Back Water Valve 4613.12
Caulking Ferrules 4604.7
Circuit or Loop Vent 4610.5
Cleanout and Traps 4608
Cleanout Materials 4604.5
Disposal and Discharge Wells 4616.5
Drainage System and Disposal 4605
Drainfields 4615
Ejectors 4605.9
Filters, Swimming Pool 4618, 5005.1
Fire Extinguishing Apparatus 3801, 4617
Fixtures, Plumbing 4613
Fixtures, Minimum Requirements 4613.19
Grease Interceptors 4612
Hangars and Supports 4609
Indirect Waste Piping 4606
Industrial Wastes 4603.10
Interceptors 4612
Joints and Connections 4607
Loop Vents 4610.5
Material Standards (see Standards) 4604
Mosquitoes, Protection from 4611.5
Private Sewer Systems 4605.13
Prohibited Fittings 4603.3
Rain water 4611
Retention and Time Discharge 4605.4
Safety Relief Devices 4614.17
Separator 4612
Service Pipe Sizing 4614.13
Sewer Required 4603.17
Sinks, Materials . . . . . 4604.7 (c)
Soakage Pit Lids 4611.6
Special Wastes 4606.6
Standpipes 3803, 4617
Storage Tanks, Water 4614.6
Storm Drainage Systems 4611
Structural Safety (see Building Code Ref.) 4603.6
Sump Vents 4605.11
Supply Wells 4616
Supports and Hangers 4609
Swimming Pools . . . . . 4618, Chapter 50

Tests (see Administrative) 4601.6
Toilet Facilities for Workmen 4603.21
Trailer Coaches and Parks 4619
Traps and Cleanouts 4608
Used Equipment and Materials 4603.13
Venting Materials 4604.6
Vents and Venting Systems 4610
Vent Stacks 4610.9
Water Supply 4614
Yard Hydrants 4617
PLUMBING STANDARDS . . . . . 4604.1 (b), 402
PNEUMATICALLY PLACED CONCRETE 2511
PORTLAND CEMENT
For Concrete Mixes 2504
For Plaster Mixes . . . . . 3503.2 (e)
POSTS
Fence . . . . . 1502.2 (b)
Wood, Not Permitted 2204.2
Wood, Requirements 2905.3, 2913.2
POSTING
Live Loads 2311
Unsafe Buildings, by Building Official 202.4
Unsafe Buildings, by Plumbing Official . . . . . 4601.3 (d) (2)
POWER ACTIVATED DOORS . . . . . 3103.6 (d)
PRECAST CONCRETE UNITS 2509
Aggregates for 2509.3
Anchorage of 2509.9
Bridging Joist 2509.10
Connections of 2509.11
Cutting Holes in 2509.8
Professional Design Required . . . . . 2509.1 (b)
Protection of Reinforcement 2509.3
Strength of 2509.4
PREPARATION, SITE 302.5
PRESTRESSED CONCRETE 2510
Calcium Chloride Prohibited . . . . . 2510.3 (b)
Deflection, Limited . . . . . 2510.3 (a)
Professional Design Required . . . . . 2510.1 (b)
PRESSURE TANKS . . . . . 3804.3 (b)
PRIVATE GARAGES (see Garage, Private)
PROJECTION FROM BUILDINGS (see also Types of Construction)
Architectural (see also Combustible) 3603.6
Awnings 3603.2, 4304, 4404
Doors and Windows 3603.4
Exception 3603.8
Foundations 3603.7
Marquees 3603.3
Over Public Property, Temporary 3602
Pipes and Service Equipment 3603.5

Restricted Areas (Yards, Courts) . . . 3604
Signs . . . 3603.1, 4208
PROJECTION ROOMS . . . 608, 708
PROSCENIUM CURTAINS AND WALLS . . . 607
PROTECTION OF WOOD . . . 2913
PUBLIC GARAGE (see Garage, Repair)
PUBLIC PROPERTY
Restricted Areas . . . 3604
Use of Permanent . . . 3603
Use of Temporary . . . 3602
PUMPS, FIRE . . . 3804.4
PURPOSE OF CODE . . . 102

Q

QUALITY AND DESIGN, Materials of Construction
Aluminum . . . 3003
Glass . . . 3508.1
Masonry . . . 2701, 2702
Reinforced Concrete . . . 2505
Reinforced Unit Masonry . . . 2705
Steel . . . 2801.1, 2802
Wood . . . 2902, 2903, 2904

R

RADIATION PROTECTION . . . 4105
RAFTERS, WOOD
Anchorage . . . 2908.4
Bearing . . . 2906.3
Glue Laminated . . . 2906.14
Heavy Timber . . . 2906.12, 2003.3
Nailing . . . 2911
Notching and Boring . . . 2906.5
Roof . . . 2906.10
Size, Minimum . . . 2906.1
Spacing, For Plaster Ceilings . . . 2906.2, 3502.2
Spacing, For Plywood Sheathing . . . 2909.2 (c)
Splicing . . . 2906.4
Supporting Roof Tile . . . 2912.2 (d)
Trussed . . . 2906.17
Vertically Laminated . . . 2906.13
RAILROAD RIGHTS-OF-WAY, Definition . . . 401
RAMPS . . . 3106
Classification . . . 3106.2, 3120.1
May be Means of Egress if . . . 3106.1
Parking Garage . . . 3120.3 (c)
Protective Enclosure . . . 3106.3
Slope . . . 1102.2 (e), 3120.3 (c) (1)
READY-MIXED CONCRETE, Tests . . . 2505.2 (a) (5)

RECERTIFICATION . . . . . 201.6 (B)
RECESS, in Masonry . . . . . 2704.2 (k)
REDUCTIONS IN LIVE LOAD 2305
REINFORCED CONCRETE (see Concrete, Reinforced)
REINFORCED UNIT MASONRY
General Design 2705
Hollow-Unit 2705
Maximum Working Stresses 2703
Solid-Unit 2705
REINFORCEMENT
Cleaning and Bending 2508
Footing, Concrete . . . . . 2403.2 (c)
For Cast-in-Place Protection 3703.3
For Concrete, Not to be Structural Grade 2504.4
For Unit Masonry Construction 2705
Pile Caps . . . . . 2404.1 (f)
Piles, Concrete (see Piles)
Placing in Concrete 2508.3
Protection for (Concrete Cover) 2508.5, 3703.8
Slabs, Concrete . . . . . 2403.4 (c)
Splices 2508.4
Substitutions . . . . . 2704.2 (i)
Swimming Pool . . . . . 5003.1 (b), 5003.1 (c)
REPAIR, of Existing Buildings 105
RETAINING WALLS 2407
REVOCATION OF PERMIT 304.4
REVOLVING DOORS . . . . . 3103.6 (a), 3103, 10 (b)
RIBBON, in Frame Construction . . . . . 2905.1 (h) (2), 2906.3 (a) (2)
ROOF COVERINGS . . . . . Chapter 34
Anchoring Built-Up to Concrete Decks . . . . . 3402.2 (e)
Anchoring Built-Up to Wood Decks . . . . . 3402.2 (c)
Attachment of Anchor Sheet of Gypsum Decks . . . . . 3402.2 (d)
Attachment of Anchor Sheet to Insulation 3406
Built-Up 3402.2
Concrete Tile 3403
Fire-Retardant, Requirements 3401.4
Gravel and Slag Surface, Restricted Use . . . . . 3402.2 (m)
Insulation 3406
Membrane Flashings . . . . . 3402.2 (i)
Metal Accessories to 3407
Metal Decking . . . . . 3401.7, 3402.2 (f)
Metal Shingles 3404
Mineral Surfaced . . . . . 3402.2 (m) (2)
Replacement 3401.8
Slate and Composition . . . . . 3402.3 (c), 3403.3 (d)
Wood Shingles and Shakes 3405
ROOF DRAINAGE . . . . . 1806.4, 3401.1 (d), 3401.8 (f)

ROOF FIREPROOFING 1806.2, 1906.2, 2006.2
(Exceptions due to height above floor included)
ROOF MOUNTED EQUIPMENT 3409
ROOM CONTENT (see Occupant Load)
ROOM, PROJECTION 608, 708
RUBBLE MASONRY ..... 2704.2 (h) (2)

S

SAFEGUARDS
During Construction ..... Chapter 33
In and Around Buildings 516
Glazed Openings ..... 3508.2(c), 3508.3(c)
Maintenance of 105
SAND
Masonry 2504.2
Mortar 2702.10
Plaster 3503.3
SANITATION DURING CONSTRUCTION 3320
SANITARIUMS, Occupancy Group D - Division 2 901
SCAFFOLDS 3316
SCHOOLS, Occupancy Group C 801
SCOPE, of Code 103
SCREEN ENCLOSURES 2309.4, 4403.4
SCREEN VENTS
Attic Spaces ..... 2913.2 (b)
Under First Floor, Wood-Frame 2913.3
SCUTTLES ..... 1805.3 (d), 1806.5, 1906.5, 2006.5 (a), 2205.4
Access to Roof ..... 3105.13 (b)
SEATING CAPACITY ..... 3101.4 (b)
SEATS
Bleacher 3114.3
Continental Spacing ..... 3114.1 (c)
Fastening of 3114.4
Standard Spacing ..... 3114.1 (a)
Width, Minimum 3114.2
SEAWALLS AND BULKHEADS 2408
SELF-CLOSING DOORS
Definition 401
Requirements ..... Table 31-C, 3103.3 (b)
SEPARATION
Between Tenants 507.2
Distance 1804.1, 2004.1, 2104.1, 2203.2
Fire Divisions 506
Occupancy ..... Table 5-A, 508
Party Walls 507
SHEATHING
Exterior Wall 2909.4
Floor 2909.1

Roof 2909.2
Storm 2909.3
SHINGLES AND SHAKES, WOOD 3405
Application to Buildings 1812.5
Exposure to Weather, Maximum . . . . . Table 34-B
Shakes, Wood 3405
Wood, Shingles 3405
SHOW CASES (and Other Movable Appurtenances) 1812.1
SHOW WINDOW (Store-Front)
Backing 1812.2
Bulkheads 1812.1
Display Lighting Outlets 4508.9
Glazing 3508.1, 3508.2
Replacement . . . . . 3508.1 (f)
SHUTTERS, STORM 105.3, 3513
SIAMESE CONNECTIONS 3805.1
Over Public Property . . . . . 3603.5 (a)
SIDEWALK (Public Property)
Drainage Under . . . . . 3603.6 (e)
Permanent Occupancy of 3606
Protection Required 3602.5
Sheds and Fences, Construction 3304
Temporary Occupancy of 3602.3
Vertical Clearance Over, Explained 3603.8
SIGNS . . . . . Chapter 42
Definitions 4202
Design 4205
Exit 3112.6
Illuminated 4213, 4514
Limitations . . . . . 4206 through 4210
Permit Required 4203
Professional Design Required . . . . . 4203.2 (d)
Unsafe 4204
SKATING RINKS, Occupancy Group A and B 601, 701
Special Requirements
SKYLIGHTS 1811.6, 1911.6, 2011.6, 2109.2
SLABS, CONCRETE 2403.4
SLATE SHINGLES . . . . . 3402.3 (c)
SMOKE CONTROL 5107
SMOKE DETECTORS 3127
Definitions 401
C Occupancy 3117.12
D Occupancy 3118.11
H Occupancy 3122.9
I Occupancy 3122.9
Electrical Wiring Method 4507.5
SMOKE PIPES 3905
SMOKE STACKS 3902.3

SMOKEPROOF ENCLOSURES (Stair Towers) 3109
Construction 3109.3
Doors in 3109.5
Exit Discharge 3109.6
Openings in 3109.4
Required 3109.2
SOIL
Bearing Allowable 2402.2, 2403.2
Investigation Required 2402.1
Plans to Include Statement of Condition 2402.1
Retaining Walls for 2407
Treatment 2913.5
SOLAR HEATERS 4008
SPACE UNDER FLOORS 2913.3
SPARK ARRESTOR, Flue 4007.3
SPECIAL INSPECTOR 305.3
SPECIFICATIONS, PLANS AND (see Plans) 302.2
SPLICES
Reinforcing Bars 2508.4
Wood Members . . . . . 2905.1 (g), 2906.4
SPRAY PAINTING 4106
Hazardous Occupation, see Group E - Division 2 1001
Sprinklers Required . . . . . 3801.4 (d)
SPRINKLERS, AUTOMATIC 3801
Floor Area Increase Due to . . . . . 514.2 (c)
Reduction in Interior Finish Requirements due to . . . . . 3708.3 (c)
Required . . . . . 3801.1, Chapter 51
Where Provided, Shall Operate Alarm System . . . . . 3117.11 (b)
STAGES AND PLATFORMS 607, 707, 807
Accessory Rooms . . . . . 607.1 (c), 607.2 (c)
Combustible Regulated . . . . . 607.1 (g), 607.2 (e)
Construction . . . . . 607.1, 607.2 (a) (b)
Means of Egress Stage . . . . . 607.1 (h)
Gridirons, Fly Galleries, Pin Rails . . . . . 607.1 (b)
Projection Rooms 608, 708, 808
Proscenium Curtains . . . . . 607.1 (e)
Proscenium Walls . . . . . 607.1 (d)
Special Requirements . . . . . 607.1 (i)
Ventilators . . . . . 607.1 (f)
STAIRWAYS (Vertical Openings)
Access and Arrangement . . . . . "04" Sections - Chapter 6-15 incl.
Access to Roof 3105.13
Basement 3105.7
Circular 3105.5
Enclosures for 1807.1, 3108.1
Exterior 3105.11
Handrails 3105.8
Headroom, Clearance 3105.14
Interior 1808, 1908, 2008, 3105.10

Landings . . . 3105.6
Ramps, Substitute for . . . 3106
Rise and Run . . . 3105.3
Signs Required . . . 3112.6
Smokeproof . . . 3109
Space Under . . . 3108.5
Spiral . . . 3105.4 (b)
Stair-Railing . . . 3105.9
Temporary . . . 3314
Width . . . 3105.2
Winders, Definition . . . 401
Winding . . . 3105.4 (a)
STANDARDS . . . 204.1, 402
STANDPIPES AND HOSE STATIONS . . . 3803
STEEL, STRUCTURAL . . . Chapter 28
STOP-WORK ORDERS . . . 201.1 (A) (4)
STORE FRONT (see also Show Window)
Definition . . . 401
Doors, Glass Sliding and Swinging . . . 3103.6, 3508.3
Doors, Glass Without Frames . . . 3508.3
Fixed Glass Portions . . . 3508.2
May be a Curtain Wall (see Curtain Wall) . . . 401
Permit Required When . . . 301.1 (o), 301.1 (p)
Use of Public Property not Permitted . . . 3603.4
STORM RESTORATION PROGRAM . . . 305.5 (f)
STORM SHUTTERS . . . 105.3, 3513
STORY, Definition . . . 401
STUCCO . . . 3504
STUDS, WOOD . . . 2905
SUSPENDED CEILINGS . . . 3511
Fire-Resistive . . . Table 37-C, 3703.6, 3705.5 (b)
Lath and Plaster . . . 3502.5
Other than Lath and Plaster . . . 3705.5 (a)
SURVEY, Required . . . 302.2 (f)
SUSPENSION OF PERMIT . . . 304.4
SWIMMING POOLS . . . Chapter 50

T

TANKS
Dilution . . . 4605.4 (c)
Dip . . . 4106.3
Flushing . . . 4614.4 (b)
Hot Water Storage . . . 4614.18
Intercepting . . . 4605.3 (c)
Pressure . . . 4614.7 (i)
Retention . . . 4605.4 (a)
Roof . . . 1509
Septic . . . 4615

Surge . . . . . 4614.7 (b)
Temporarily Located, Construction Sites 3321
Underground . . . . . 4102.4 (l) (m) (n) (o) (p)
Water-Supply . . . . . 4614.6 (b), 4614.7 (a)
TEMPORARY OCCUPANCY 1601.4
Fire Protection During 3323
Portions of Building 307.4
Removal After Use 105.2, 306
Sheds and Fences, During Construction 3304
TENTS 4306
TERMITE PROTECTION 2913.5
TESTS
Boilers . . . . . 4006.6 (f)
Concrete 2504.6, 2505.2
Fire-Resistive Materials 3701.1
General 2314
Gypsum 2603
Masonry 2702
May be Required 305.1
New Materials and Methods 204.2
Piles 2404.9
Roofing . . . . . 3401.1 (g)
Roof Tile . . . . . 3401.1 (b), 3403.1 (e)
Soil Bearing 2402.1
Steel 2802.4
Tie Beam and Column Anchorage . . . . . 2704.2 (b)
Tile Roof . . . . . 3403.2 (f)
Wind-borne Debris 2315
THEATRE, Occupancy Groups A and B 601, 701
Definition 401
TILE, FLOOR, WALL 3507
TILE, ROOF 3403
TIMBER
Glue Laminated . . . . . 2902.1 (a) (2), 2903.1
Heavy Construction 2003.3
TITLE OF CODE 101
TOILET ROOMS 512.2, 515, 1305.2, 1308.2, 1405.2, 1408.2
TOWERS, RADIO, Occupancy Group J - Division 2 1509
TRAILER COACHES AND PARKS 4619
TRANSFORMER VAULTS 4101
Protection of Openings 4101.3
Special Requirements 4101.6
Ventilation 4101.2, 4101.5
Wall and Floor Thickness 4101.3
TRANSPORTING ASSEMBLIES, Definition 3202
TRASH CHUTES 1807.5
Chimney Section . . . . . 1807.5 (g)
Enclosures for . . . . . 1807.2 (f), 1807.5 (h)

Fire-Resistive Rating Required . . . 1807.2 (a) (b)
Gate-Valve Required . . . 4617.3
Metal, Lined and Unlined . . . 1807.5 (e) (f)
Openings in . . . 1807.5 (a) (b) (j)
Protection of Openings Required . . . 1807.5 (j)
Sprinklers Required . . . 3801.4 (d)
Wastes, Classified . . . 1807.5 (d)
TRAVEL DISTANCE . . . 3102.4
TREADS, STAIR . . . 3105.3
TRIM . . . 1812, 1912, 2012, 2110, 2210, 3708
TRUSSES, WOOD . . . 2906.17
TYPES OF CONSTRUCTION
Classification . . . 1701
Existing Buildings . . . 1702
Type I - Fire-Resistive . . . Chapter 18
Definition . . . 1801
Type II - Semi-Resistive . . . Chapter 19
Definition . . . 1901
Type III - Ordinary Masonry . . . Chapter 20
Definition, General . . . 2001.1
Definition, Protected . . . 2001.2 (a)
Definition, Unprotected . . . 2001.2 (b)
Type IV - Incombustible . . . Chapter 21
Definition . . . 2101
Type V - Wood Frame . . . Chapter 22
Definition . . . 2201
TYPES OF FLUES
Type A, Definition . . . 3902.1
Type B, Standard for . . . 4702.1, 4702.2
Type C, Standard for . . . 4702.1, 4702.2

U

UNDERGROUND TANKS . . . 4102.4 (l) (m) (n) (o)
UNDERWRITERS' LABORATORIES, INC. (UL) . . . 402
UNSAFE BUILDINGS . . . 202, 4601.3
Appeal and Review . . . 202.8
Appeals Broad . . . 202.13
Conflict of Interest . . . 202.15
Criteria . . . 202.2
Duties of Legal Counsel . . . 202.14
Duties and Powers of Board . . . 202.13 (d)
Emergency Action . . . 202.5
General . . . 202.1
Inspection . . . 202.3
Judicial Review . . . 202.12
Notice of Public Hearing . . . 202.9
Notice of Violation . . . 202.6
Organization of Board . . . 202.13 (c)
Posting . . . 202.4

Public Hearing 202.10
Qualifications of Board Members . . . . . 202.13 (a)
Recording of Notice 202.7
Recovery of Costs (Incurred) 202.11
Term of Office of Board Members . . . . . 202.13 (b)
UNSAFE ELECTRICAL CONDUCTORS AND EQUIPMENT . . . . . 4501.2 (b) (4)
UNSAFE PLUMBING SYSTEMS . . . . . 4601.2 (a) (2), 4601.3 (d)
USE OF BUILDINGS 104.7, 307
UTILITIES, HAZARDOUS 509

V

VALUE, of Building and Structures
Definition 401
Purpose of Code 104.5
VALVES, for Hazard Utilities 509
VENEER
Glass 3509
Masonry Backing for 2704.6
Plastic, Exterior 3505.3
VENTILATION
Air Conditioning . . . . . Chapter 48
Attic Spaces . . . . . 2913.2 (b)
Electrical Meter Rooms, Equipment Enclosures and Rooms . . . . . 4506.3 (a)
Mechanical (forced) 4803
Private Garage 1505.1
Requirements Based on Occupancy . . . . . "05" Section, Chapter 6-16 incl.
Under First Floor, Wood-Frame 2913.3
VENTS
Connections 3905.2
Heating 3901.1, 4005.2
Interconnections 3905
Plumbing 4610
Type A 3902
Type B 3903
Type BW 3904
VENT SHAFTS (see Vertical Openings)
VERTICAL FRAMING, WOOD 2905
VERTICAL OPENINGS
By Occupancy Group . . . . . "06" Sections, Chapter 6-15 incl.
Requirements for 1807
VESTIBULES, rest room . . . . . 512.2 (e), 512.2 (f)
VIOLATIONS AND PENALTIES 205

W

WALKWAYS
Covered, Construction . . . . . 3124.3 (b)
Covered, Definition 3124.2
Covered, Openings in 1804.1
During Construction 3304

In Restricted Areas 3604
On Public Property 3603.8
WALLBOARD
Fiberboard, Identification . . . . . 2902.1 (a) (5)
Gypsum 3510
Hardboard, Identification . . . . . 2902.1 (a) (6)
Particleboard, Identification . . . . . 2902.1 (a) (7)
WALLS (see also Partitions)
Anchoring of Wood 2905, 2908
Brick and Stone . . . . . 2704.2 (h)
Cavity . . . . . 2704.2 (g)
Chases, Recesses and Openings in, Masonry . . . . . 2704.2 (k)
Concrete, Plain 2702.8, 2704
Decorative Block . . . . . 2704.2 (m)
Curtain (see Curtain Wall)
Definition of 401
Design of 2309
Enclosure, Construction 3108.2
Enclosure, Openings in 3108.3
Fire 2704.4
Fire-Resistive 3704
Foundation 2403.2
Glass Block 2704.l0
Glass Veneered 3509
Institutional Shower . . . . . 4613.8 (d)
Interior Bearing, Masonry 2704.3
Lath and Plaster 3502, 3503
Masonry (see Masonry)
Masonry, Concentrated Loads on 2693.4, 2808.6
Masonry Faced 2704.6
Masonry, Not Listed (Bulkheads, etc.) . . . . . 2704.2 (j)
Panel 2704.5
Parapet (see Parapet Walls)
Party 507
Piers, in Masonry . . . . . 2704.2 (f) (1)
Projection Booth 608.2
Reinforced Construction (see Reinforced Unit Masonry)
Smokeproof Enclosure, Construction 3109.1
Smokeproof Enclosure, Openings in 3109.4, 3109.5, 3109.6
Stud, Steel . . . . . 3502.2 (c) (2), 3510.5
Stud, Wood 2905
Stuccoed 3504
Thickness, Masonry . . . . . 2702.5 (a) (4), 2704.2 (a)
Toilet (Tiled) . . . . . 512.2 (d)
Water Curtain Protected . . . . . 3124.3 9 (a) (2)
Wood . . . . . Chapter 29
Wood, Sheathed 2909.3
Wood, Supporting Masonry 2912
WAREHOUSE, Occupancy Group F - Division 1 1101

WATER
Added to Concrete . . . . . 2505.2 (e)
Closets . . . . . 512.2 (c), 4613.5
Curtain . . . . . 3124.3 (a) (2)
Drinking During Construction 3320
Fountains (Drinking) 4613.11, 4613.19
Heater 4701.6
Supply . . . . . 301.2 (e), 3804, 4614
Swimming Pool 5004.2
Tanks (see Tanks) 5004.2
WATER SUPPLY . . . . . 301.2 (e), 3804, 4614
WELDING AND CUTTING 3321
WELDING STANDARDS 2801.3, 2805.3, 2809.7
Bar Joist Connections 2808.4
Special Inspector Required 2805.2
Steel Bridging . . . . . 2808.5 (c)
Steel Joist Anchorage . . . . . 2808.6 (b)
WET STANDPIPES 3803.1
WIDTH
Aisles 3113.2
Continuous Footing 2403.2
Corridor 3104.2
Courts, Passageways and Areas 3111.2
Cross Aisles 3113.5
Door, Maximum and Minimum 3103.4, 3103.5
Means of Egress 3102
Ramps, Pedestrian 3106.2
Room and Toilet Doors for Handicapped . . . . . 515.3 (e)
Seats 3114.2
Stair Treads 3105.3
Stairway Landings 3105.6
Temporary Sidewalks 3602.3
Tie Beams, Masonry . . . . . 2704.2 (c) (2)
Tie Columns, Masonry . . . . . 2704.2 (b) (2)
Toilet rooms, Residential . . . . . 1305.2 (b), 1405.2 (b)
Unit of Exit Width . . . . . 3102.2 (b) (1)
Vomitories 3113.6
Windows for Rescue . . . . . 3122.2 (a), 3117
Yard, May Increase Allowable Area . . . . . "02" Sections, Chapters 6-15 incl.
WIND LOAD REQUIREMENTS 2309
WINDOWS 1809, 1909, 2009, 2107, 2208
Area Required . . . . . "05" Sections, Chapters 6-15 incl.
Fire-Resistive Assembly 3706.5, 2706.6, 3706.7
Installation Details 3508.1, 3508.3
Over Public Property 3603.4
Permit for Installation, Required When . . . . . 301.1 (o)
Rescue . . . . . 3117, 3122.2 (a)
WIRE
Supporting Suspended Ceiling Components 3502.5

WIRE GLASS
Glazing in Fire Windows 3706.7
WIRE LATH 3502.3
WOOD . . . . . Chapter 29
Anchorage 2908
Bearing 2906.3
Calculated Fire Resistance 3710
Ceiling Joists 2906.9
Columns and Posts 2905.3
Connectors (Nailing) 2911
Connectors, Protection 2911.2
Connectors, Safe Loads 2911.5
Debris, Before and After Construction 2913.4
Design 2901.1
Durable Species . . . . . 2913.2 (a) (6)
Exterior Wall Cladding 2909.4
Fabrication 2901.3
Fire-Retardant Treated 2914
Fire-stops 2907
Floor Joists 2906.8
Floor Sheathing 2909.1
Furring 2910
Glue 2911.4
Glue Laminated Beams 2906.14
Grade and Species 2902.4
Heavy Timber Construction 2003.3, 2906.12
Horizontal Framing 2906
Identification 2902.1
Joists Entering Masonry 2906.7
Moisture Content 2902.3
Nail Penetration 2911.3
Notching and Boring 2906.5
Openings 2906.6
Partitions 2905.2
Piles, Protection of 2913.1
Preservative, Treatment of . . . . . 2913.2 (a)
Roof Joists 2906.10
Roof Rafters 2906.11
Roof Sheathing 2909.2
Sizes 2903
Spacing 2906.2
Span Tables . . . . . Table 29-A
Splicing 2906.4
Stair Stringers 2906.16
Standards 402, 2901.4
Storm Sheathing 2909.3
Termite Protection 2913.5
Trusses 2906.17
Unit Stresses 2904

Ventilation, Attic Spaces ..... 2913.2 (b)
Ventilation, Under Floor 2913.3
Vertical Framing 2905
Vertically Laminated Beams 2906.13
Wood Supporting Masonry 2912
Workmanship 2901.2
WOOD-BASED STRUCTURAL-USE PANELS
Decking 2912.2
Exterior Wall Cladding 2909.4
Floor Sheathing 2909.1
Identification ..... 2902.1 (a) (3)
Preservatively Treated ..... 2913.2 (a) (5)
Quality 2902.2
Roof Sheathing 2909.2
Storm Sheathing 2909.3
WOODWORKING SHOPS, Occupancy Group F - Division 2 1101

X

X-RAY FILM
Not Classed Like Cellulose-Nitrate Film 4103

Y

YARDS
Areas May be Fenced 3111.6
Definition 401
Building Location in ..... "03" Sections - Chapters 6-15 incl.
Providing Access May Permit Floor Area Increase
(see "02" Sections - Chapters 6-15 incl.) 514
Restricted Areas 3604

Z

ZONES, FIRE ..... Chapter 16

Broward County Board of Rules and Appeals
955 S. Federal Highway
Ft. Lauderdale, Florida 33316