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Notice!

To receive Supplements of this Code Book you must notify the Dade County Building and Zoning Department of any change of address.

PART I
ADMINISTRATIVE

CHAPTER 1
TITLE AND SCOPE

101 TITLE
102 PURPOSE
103 SCOPE
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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 such 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 Section 4505.1(a) 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 com-

plete 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 MORE THAN 50 PERCENT: When additions, alterations and/or repairs within any 12-month period exceed 50 percent of the value of an existing building or structure, such building or structure shall be made to conform to all the requirements for a new building or structure or shall be entirely demolished.

104.3 FROM 25 PERCENT TO 50 PERCENT: Alterations and repairs exceeding 25 percent, but not exceeding 50 percent, of the value of an existing building or structure may be made within any 12-month period without making the entire existing building or structure comply, provided such alterations and repairs comply with the requirements of this Code and such addition conforms to the requirements of this Code for a new building of like area, height and occupancy. Such entire building or structure, including the new addition, shall not exceed the areas and heights specified in this Code.

104.4 STRUCTURAL WORK OF 25 PERCENT OR LESS: Structural alterations and repairs to any portion of an existing building within any 12-month period, the cost of which does not exceed 25 percent of the value of the existing building or structure, shall comply with all the requirements for new buildings or structures, except that minor structural additions, alterations and repairs, when approved by the Building Official, may be made with the same material of which the building or structure is constructed. Such building or structure, including new additions, shall not exceed the areas and heights specified in this Code.

104.5 NON-STRUCTURAL WORK OF 25 PERCENT OR LESS: Non-structural alterations or repairs, the cost of which does not exceed 25 percent of the value of an existing building or structure, and which does not affect egress or fire-resistive standards of safety, may be made with the same material of which the building or structure is constructed.

104.6 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.

104.7 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, alterations and repairs

shall be construed as the total cost of labor, materials and services, based on current prices for new materials.

104.8 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.

104.9 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, exits 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 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 of 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.

(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.

104.10 EXISTING BUILDINGS: (a) Any existing building other than a building of Group D, H or I Occupancy which complied with the Code in effect at the time of its construction or at the time of establishment of its present Group of Occupancy may be continued 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, exits, fire-resistance, openings in walls, electrical or plumbing equipment or fire-extinguishing apparatus be maintained during the period of use of the building in accordance with the minimum standards at the time of construction.

(b) Any existing building of Group D, H, or I Occupancy which complied with the Code in effect at the time of its construction or at the time of establishment of its present Group of Occupancy, may be continued to be used in its present Group of Occupancy. 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, exits, fire-resistance, openings in walls, electrical or plumbing equipment or fire-extinguishing apparatus. Minimum standards of safety shall be in accordance with this Code, regularly adopted and applicable fire codes or minimum housing codes, whichever provision shall be the most stringent.

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.

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, toolshed 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, toolsheds 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 POWERS AND DUTIES OF BUILDING OFFICIAL
202 UNSAFE BUILDINGS
203 BOARD OF RULES AND APPEALS
204 ALTERNATE MATERIALS AND TYPES OF CONSTRUCTION
205 VIOLATION AND PENALTIES

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201 POWERS AND DUTIES OF BUILDING OFFICIAL

The appointing authority shall appoint a Building Official and such person shall have not less than five years experience as either a registered professional engineer, a registered architect, a general contractor holding a certificate of competency and in effect at the time of his appointment, or a building official in responsible charge of enforcing a comprehensive building code; provided that the provisions of this section are not applicable to the persons acting as building officials in the incorporated areas on the effective date of this ordinance.

201.1 EMPLOYEES: The Building Official shall have the power to delegate powers and assignments to subordinate employees working under his authority. Such employees shall have the duties and powers as delegated by the Building Official.

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

201.3 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 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 the provisions of this Code and satisfactory to the Building Official, have been made, at which time he may authorize the work to proceed.

201.4 CONCEALED WORK: The Building Official 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 wilful or negligent concealment of a violation of this Code.

201.5 OCCUPANCY: Whenever any building or portion thereof is being used or occupied contrary to the provisions of this Code, the Building Official 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 portions 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 202.8 shall apply.

202 UNSAFE BUILDINGS

202.1 GENERAL: All buildings or structures that are, or hereafter shall become unsafe, unsanitary or deficient in adequate

exit facilities, or which shall constitute a fire or windstorm hazard, or are otherwise dangerous to human life or public welfare by reason of illegal or improper use, occupancy or maintenance, or which do not comply with the provisions of the applicable housing code, or which have been substantially damaged by the elements, acts of God, fire or explosion or otherwise, or which are incomplete buildings for which building permits have expired shall be deemed unsafe buildings or structures. All 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 or alteration is to be permitted on buildings or structures within the purview of the applicable minimum housing code, the provisions of such code shall also be complied with and controlling.

Reference herein to "buildings" shall include "structures" and reference to "structures" shall include "buildings." The words "building" and "structure" shall be deemed to include parts thereof.

202.2 CRITERIA: A building shall be deemed a fire hazard and unsafe when it is vacant and unguarded and open at door or window, or when there is an unwarranted accumulation of dust, debris or other combustible materials therein, or the building does not provide the exits or fire protection as provided herein for the particular occupancy, or if the electrical or mechanical installations or systems create a hazardous condition. The falling away, the hanging loose or loosening of any siding, block, brick, or other building material, structural member, appurtenances or parts thereof of a building; the deterioration of the structure or structural parts of a building; a partially destroyed building; any unusual sagging or leaning out of plumb of a building or any parts of a building when caused by deterioration or overstressing, all shall be deemed unsafe. The existence of unsanitary conditions by reason of inadequate or malfunctioning sanitary facilities or waste disposal systems shall be deemed unsafe. Buildings and structures which, by reason of illegal or improper use, occupancy or maintenance, do not conform to the provisions of the South Florida Building Code or of the applicable minimum housing code shall be deemed unsafe.

(a) 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

(b) 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.

(c) 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 paragraph 104.7 shall apply.

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 and posting 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 reasonable under the particular circumstances involved, 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, mortgagees, 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.

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.

202.9 NOTICE OF PUBLIC HEARING: (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 by 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: 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. 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. 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.

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. 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 matter shall proceed as provided by Chapter 24314, Laws of Florida 1947.

202.11 RECOVERY OF COST: The entire costs incurred pursuant to Sub-section 202.5 or Sub-section 202.10 shall be paid by the owner or occupant of the premises or by the person who caused or maintained the violation. 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. 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. 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.

202.12 JUDICIAL REVIEW: Any person or persons, jointly or severally, aggrieved by any final action taken or final decision rendered pursuant to the provisions of this section, may seek to have the same reviewed by the Circuit Court in this county by appeal in the manner and within the time prescribed by Chapter 24314, Laws of Florida 1947, after the matter has been acted upon by the appointing authority in accordance with said Chapter.

202.13 UNSAFE STRUCTURES AND HOUSING APPEALS BOARD: The Unsafe Structures and Housing Appeals Board is hereby created, consisting of nine members who shall be appointed by the Appointing Authority.

(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, however, 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 powers 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 Metropolitan Court or the County Judge's Court.

(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 in 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, subject to budget limitations and shall maintain a record of all proceedings in the office of the Building Official, including but not limited to a court reporter's transcript of the proceeding, 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 therefor; provided, the court reporter shall certify the copy of his transcript.

(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 hereof.

(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.

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 and Housing Appeals Board and to represent and advise the Board.

202.15 CONFLICT OF INTERESTS: 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 AND 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/or structures, there is hereby created a Board of Rules and Appeals, appointed by the Appointing Authority, consisting of seven members who are qualified by training and experience to pass on matters pertaining to building construction.

203.1 MEMBERSHIP: (a) Membership of the Board of Rules and Appeals shall be one architect, two general contractors, one structural engineer, one mechanical engineer, one master electrician and one master plumber, all being 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 10 years. Members shall be residents of, and have their principal business within, the area of any jurisdiction adopting this code.

In addition thereto, alternates shall be appointed for each of the above members representing the same respective profession and trade and with the same qualifications. When the member and respective alternate are both present at a meeting each shall have ½ vote and

when either is absent the member or respective alternate in attendance shall have a full vote.

(b) Board members and alternates shall be appointed for a term of three years except that to fill a vacancy or to provide continuity of the Board in general, or for members and alternates within the same specific category, such appointments may be for a term of less than three years.

(c) The Appointing Authority may remove any member of the Board for misconduct, incompetency or neglect of duty; however, any member so removed may, within ten days, request a public hearing and shall receive such hearing before such removal shall be final.

(d) A vacancy in the membership of the Board, occurring during a term, shall be filled by appointment of a member from the same field, and appointment shall be for the remainder of such term.

203.2 COMPENSATION: Members or alternates shall serve without compensation but shall be entitled to reimbursement for necessary expenses in the 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/or Building Official, and at such other times as the Board may determine.

(b) The Board shall select one of its members to serve as Chairman and one to serve as Vice Chairman, to act in the absence of the Chairman. The Building Official shall serve as Secretary to the Board. A detailed record of all proceedings shall be kept on file in the office of the Building Official. 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 irrelevant 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) Four members of the Board shall constitute a quorum. Decisions shall be at least four favorable votes. The Board shall reach decisions without unreasonable or unnecessary delay.

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

(g) The Building Official shall take immediate action in accordance with decisions of the Board.

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 direction of the Appointing Authority, or upon its own initiative, shall conduct investigation into the 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 qualification 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 may recommend to the elected officials any desired amendments or revisions to the Code.

(3) It shall also be the duty of the Board of Rules and Appeals to report annually to the elected officials on the operation of this Code, with respect to its enforcement, its effect on general building trends, the effect on buildings and other results.

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 recommend to the elected officials an amendment to 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.

(c) From the effective date of this Code, and unless and until an ordinance or other regulatory law to the contrary is adopted, the authority of the Board of Rules and Appeals is retained by the governing body of the jurisdiction.

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 decisions.

(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 equalled. 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) dollars nor more than five hundred ($500) dollars, or by imprisonment not exceeding sixty days, or by both such fine and imprisonment.

CHAPTER 3

PERMITS AND INSPECTIONS

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301 PERMITS REQUIRED

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, exit, 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 having first filed application and obtained a permit therefor from the Building Official; except that for general maintenance on repairs, which do not change the Occupancy, the value of which does not exceed twenty-five ($25.00) dollars labor and material, as determined by the Building Official, no permit shall be required in this or any of the following sections.

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.

(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 elevator or hoist, as provided in Chapter 32.

(g) 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.

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

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

(j) 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.

(k) The application, construction or repair of any roof covering, as provided in Chapter 34.

(l) The installation, alteration or repair of any air conditioning or refrigeration apparatus, as provided in Chapter 49.

(m) The installation, alteration or repair of any apparatus producing air contaminents.

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

(o) 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.

(p) The installation of exterior windows and exterior sliding 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.

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

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 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) The County and/or Fla. Dept. of Health and Rehabilitation Services, Division of Health for (but not limited to):

(1) The adequacy of waste treatment plants receiving waste from industrial, commercial, or multi-dwelling units where such waste discharges through a public or privately owned sewer system. Domestic waste from a single building or establishment not a part of a complex where the flow does not exceed 1200 gallons per day may be approved by the Building Official unless the Building Official has been previously notified that the treatment plant is overloaded and no additional waste may be discharged thereto;

(2) Waste treatment and disposal systems, including septic tanks where total flow at any building or establishment exceeds 1200 gallons per day;

(3) Places where food or drink is prepared or served to the public;

(4) Public water supply and supply or disposal wells;

(5) Public swimming pools;

(6) Air pollution;

(7) Chemical toilets as set forth in Sub-section 4603.21; and

(8) Trailer parks as set forth in Section 4619.

(e) 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.

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

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

(h) 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 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 school, design and construction to be in accordance with the rules and the regulations of these agencies.

(i) The Public Works Department for bulkheads, docks, similar construction or fill along waterfront property.

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

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 leasee.

(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.

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 separate ordinance providing for qualification and certification of construction tradesmen.

(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.

(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 of all work covered thereby. 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.

(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 conditions shall not be greater than those permitted in the original permit.

302.2 PLANS AND SPECIFICATIONS: (a) Application for permit shall be accompanied by two sets of plans as set forth herein and, when required by the Building Official, a third copy of the plan showing parking, landscaping and drainage.

(b) For buildings and/or structures, 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 seal of a Registered Professional Engineer, regardless of the cost of such work.

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

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 seal of a Registered Professional Engineer.

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

(e) Plans shall be mechanically reproduced prints on substantial paper or cloth showing completely all foundations, wall sections, floor plans, roof plans and elevations at a convenient scale, and the main details at a scale not less than ¾ inch equals one foot, together with the 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.

(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 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 Paragraph 302.1(e).

302.4 EXAMINATION OF PLANS: (a) The Building Official shall 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 as set forth in Section 302.3 are approved as set forth in Section 302.4 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 super-structure will be granted.

302.6 MOVING OF BUILDINGS AND STRUCTURES: (a) Before a building permit for moving a building or structure within or into the jurisdiction adopting this Code shall be approved or issued, such building or structure 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

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

303.2 BASIS OF PERMIT FEE: The Building Official may require an estimate of cost and/or other descriptive data as a basis for determining the permit fee.

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. 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 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.

(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 entire time that the work authorized by the permit is in progress.

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 of 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 correction 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 this Code is the responsibility of the owner.

304.3 TIME LIMITATION: **(a)** Permits shall expire and become null and void if the work authorized by such permit is not commenced within 90 days from the date of the permit or if the work after commencing is suspended or abandoned at any time for a period of 90 days. However, the Building Official may extend such permit for a period of ninety days from the date of expiration of the permit, if the work has not commenced, or for a period of ninety days from the date of the last recorded inspection, if written application for such extension is received and approved by the Building Official prior to the expiration date of the initial permit, and providing the proposed work complies with all requirements in effect at the time of such renewal. If the permit becomes null and void, and the work covered thereunder has not been completed, a new permit covering the proposed construction shall be obtained within 30 days from the date the initial permit became null and void or the Building Official may require that any work which has been completed under the initial permit shall be removed from the building site.

(b) Before work, for which the permit has for any reason become void and which work has been commenced, can be recommenced, a new permit may be issued, the fee for which shall be based on the amount of work to be done, provided the proposed work

complies with all requirements effective at the time of such reissuance.

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) The Building Official shall periodically, and as nearly as practicable once each year, inspect all buildings and structures, except buildings of Group I Occupancy having single family or duplex family uses and public-work structures, for compliance with this Code.

(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) 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 inspection and testing laboratories having a Registered Engineer in active responsible charge of the work of sampling and testing and which laboratories have complied with the standard for "Inspection and Testing Agencies for Concrete and Steel as Used in Construction," ASTM Designation E329-70T, which is hereby adopted to supplement, but not supersede, the requirements set forth herein. Testing laboratories located outside of this State and under the supervision of a Registered Engineer legally qualified to practice engineering in the state in which the laboratory is located and where such testing laboratory has complied with the above standard, may be permitted to submit test reports as required by this Code.

305.2 MANDATORY INSPECTIONS: (a) The Building Official, upon notification from the permit holder or his agent, shall make the following inspections and shall either approve that portion of the work completed or shall notify the permit holder or his agent wherein the same fails to comply:

FOUNDATION INSPECTION: To be made after necessary excavations have been made, forms erected and reinforcing steel placed.

PILE INSPECTION: To be made during the driving of the piles and after all piles are driven and forms and reinforcing steel are in place and tied, and before placing any concrete.

REINFORCING INSPECTION: To be made after any reinforcing steel is in place and before placing concrete.

FRAME INSPECTION: To be made at each floor level and after all framing, fire blocking, furring and bracing are in place, and plumbing and electrical work are roughed in.

ROOFING INSPECTION: To be made after anchor sheet or sheets have been tincapped and before cap sheet is mopped on. (See chapter 34)

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 SLIDING GLASS DOOR INSPECTION: To be made after windows and sliding glass doors are installed and before attachments and connections to the building frame are concealed except that for one and two story buildings this inspection shall not be required.

LATHING INSPECTION: To be made after lathing and before plastering, where plastering is a requirement for fire protection, or where suspended overhead.

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 up 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.

ELECTRICAL INSPECTION: To be made at each floor level; and no conduit boxes, panels or other electrical appurtenances shall be covered or concealed until approval shall have been received from the Building Official.

SPECIAL INSPECTIONS: To be made of all mechanical installations, signs and awnings immediately upon completion and at such intervals during the progress of the work as the Building Official or this Code may require.

OTHER INSPECTIONS: To be made as the owner or contractor or Building Official may reasonably request.

FINAL INSPECTION: To be made after the work is completed and the structure ready for use of occupancy.

(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 hereinabove for each successive inspection until such inspection has been made and the work approved and the inspector has so indicated on the approved plans or permit card at the job site.

(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 office of the Building Official and shall provide reasonable time for such inspection to be made. Rejection or refusal to approve the work for reasons of incompleteness, Code violation or inadequacy shall nullify that request for inspection. 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 Code requirements before request for inspection is made.

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

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

(2) Pile driving.

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

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

The special inspector shall be responsible for compliance with this code and shall submit progress reports and inspection reports to the Building Official.

(c) At the completion of the construction work or project, the special inspector shall submit a certificate of compliance to the Building Official, stating that the work was done in compliance with this Code and in accordance with the approved plan or plans; and his duties shall end with the submission of such certificate. Final inspection shall be made by the Building Official before a Certificate of Occupancy is issued.

305.4 INSPECTION REPORTS: The Building Official shall keep records of inspections, Certificates of Compliance, results of tests, plans, surveys and Certificates 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 alert, 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.

(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.

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: 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 shall have been issued by the Building Official,

certifying that the building and Occupancy are in accordance with the provisions of this 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. A Certficate of Occupancy for places of assembly shall indicate thereon and make record of the number of persons for which such certificate is issued.

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 of 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: A Temporary and/or Partial Certificate of Occupancy may be issued by the Building Official for the temporary use of a portion of a building, providing the portion of the building to be occupied is clearly designated and all code provisions such as sanitary facilities, exit requirements, fire-resistive separations, structural adequacy, the barricading of work areas, etc., relating to public safety have been approved by the Building Official. The Temporary and/or Partial Certificate shall be issued for a limited period not to exceed ninety days.

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.

PART II
DEFINITIONS

CHAPTER 4
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; or, visible, unobstructed and within physical reach.

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.

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.

APARTMENT HOUSE: 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 legally constituted body adopting this code such as, but not limited to, a county or city commission or council; or a person designated by such legally constituted body as having authority to appoint.

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 exit 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.

AREAWAY: 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.

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 opening protective will close if open, or such protective device will operate as intended. Not requiring manual operation.

AWNING: (See Chapters 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 EXIT: A landing or porch projecting from the wall of a building, and which serves as a required means of egress. The long side shall be at least 50 percent open, and the open area above the guardrail 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.)

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

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

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 prefabricated 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.

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.

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

ELEVATOR: A devise 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.

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 if 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 detectors shall conform to the requirements of NFPA Pamphlets No. 71-1969 and No. 90A-1969.

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 walls 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 2908 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 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 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 accessary 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 theatre 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.

GROUND FLOOR: 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, hip or roof.

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.

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 rating beyond the limits herein established, through the effect of age, moisture or other atmospheric condition.

JOISTS: Are secondary horizontal supporting members in floor, ceiling or roof construction.

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.

LIVE LOAD: 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.

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 projection 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.

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.

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.

MEZZANINE: Is an intermediate floor placed in any story or room. 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.

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

OCCUPANT LOAD: 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: Open-air parking garage is a structure having not less than 50 percent of the area of the exterior walls open at each story and used for the parking of motor vehicles.

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 which extends across at least two-thirds the width of each door leaf, which will open the door if subjected to pressure.

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 exit to a 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.

PORTE-COCHERE: 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 STAIRWAY: A stairway serving one tenant only and not for general public use.

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 exit arrangement of 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 in the Chapters on Occupancy, may be considered a street.

PUBLIC WAY: Any parcel of land unobstructed from the ground to the sky, more than 10 feet in width, 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, exits, and openings in walls, a permanent railroad right-of-way or easement may be considered as an unobstructed yard, public street or public space.

REMOTE: As applied to exits 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 purposes of its maintenance, but not including additional work that would affect structural, sanitary or fire resistive safety or exit facilities.

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.

SPECIFICATIONS: Wherever the specifications of governing authorities are mentioned in this Code, the reference shall be to the most recent editions of the specifications so mentioned in effect at the time of passage of this Code.

SPRINKLERED: 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 flights 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 a 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.)

STREET: Any public thoroughfare such as, but not limited to, street, avenue, lane, place, terrace, and roof, 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 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."

STRUCTURAL FRAME: All the members of a building or structure required to transmit loads to the ground.

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.

THEATRE: 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 is such building or portion thereof containing an auditorium having a platform, screen, and mechanical equipment adapted to the showing of motion pictures.

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 walls 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 wall 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 manner 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 exit arrangement, of buildings, waterways shall 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 destiny 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.

NOTES

PART III

REQUIREMENTS BASED ON OCCUPANCY

CHAPTER 5

CLASSIFICATION AND GENERAL REQUIREMENTS

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511 LOCATIONS ON THE PROPERTY
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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 and ventilation or for exit purposes or in any way to create violations of any of the provisions of this Code.

502 OCCUPANCY CLASSIFIED

502.1 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. Where 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. 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 in Sub-section 104.9.

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 104.10 herein.

504 OCCUPANT 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 Chapter 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.

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) Except as set forth in Table 31-C, all openings shall be protected by a fire assembly having a three-hour fire-resistive rating in four-hour fire-resistive walls and one and one-half hour fire-resistive rating in three-hour and 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 and three-hour fire division separation walls may terminate at the bottom of the roof deck provided 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 roof deck provided that the roof is of at least one-hour fire-resistive construction on each side of the fire division separation wall termination.

506.5 Where 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 4103.

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.

507.2 SEPARATION BETWEEN TENANTS: (a) Where in any building rooms or spaces are occupied by separate tenants unless visual separation is desirable there shall be not less than one-hour fire-resistive separation between such tenants. Walls or partitions shall be of the materials of construction and not less fire-resistivity than may be otherwise set forth herein based on Group of Occupancy, Type of Construction, or Occupancy Separation per Section 508.

(1) EXCEPTION: Where all tenants within a Fire Division are of Group G Division 2 Occupancy such spaces shall be exempt from the provisions in this Sub-section.

(b) Fire-resistive separation between tenants or between tenants and a mall area or path of egress will not be required where the space on both sides of such wall or partition are protected by an automatic sprinkler system or by a water curtain provided at the line of separation.

(c) Fire-resistive separation between tenants shall be from floor to the bottom of the fire-rated assembly above or where exposed combustible materials are used in the construction in an attic or ceiling space such separation shall continue to the deck above.

(d) Openings in fire-resistive separations between tenants shall be doors or windows complying with Section 3706 or air-movement openings provided with fire dampers.

508 OCCUPANCY SEPARATIONS

Occupancy separations shall be provided between the various Groups and Divisions of Occupancies as specified herein and in Table No. 5-A, but shall be not less fire-resistive than required by the Type of Construction.

TABLE No. 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	*	*	*	*	3	3	4	4	3	3	3	1	1	2	*	2
B-1		*	*	*	3	3	4	3	1	1	1	1	1	1	*	1
B-2			*	*	3	3	4	3	1	1	1	1	1	1	*	1
C				*	1	1	4	4	1	1	1	1	1	1	*	1
D-1					*	*	4	4	4	4	4	1	1	2	3	*
D-2						*	4	4	4	4	4	1	1	2	3	*
E							*	2	2	2	2	4	4	2	4	1
F-1								*	*	1	1	3	1	*	4	*
F-2									*	1	1	3	1	1	3	*
G-1										*	*	1	*	1	3	*
G-2											*	1	*	1	3	*
H												*	*	1	1	*
I													*	1	1	*
J-1														*	2	*
J-3															*	*
J-4																*

* No general requirement for fire-resistive separation by Group of Occupancy. See walls and partitions required for Type of Construction.

508.1 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.

508.2 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 have no openings therein and shall be of not less than four-hour fire-resistive construction.

(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 therein 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 sepa-

ration shall be protected by a fire assembly having a three-fourths-hour fire-resistive rating.

508.3 DESIGN AND MATERIAL OF OCCUPANCY SEPARATION: Walls which form separations between Occupancies or between fire divisions shall also conform with the provisions of PART VI as they pertain to design and material.

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(d) 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 EXIT FACILITIES FOR MIXED OCCUPANCIES

510.1 Where two or more Occupancies, having exit width based on different occupant contents, occur on the same floor and have common exits, the number of units required for each such occupancy shall be calculated separately, and the units of width combined and proportioned to two or more exits as required by travel distance limitations of the most restricted Occupancy.

510.2 Where two or more Occupancies, having exit width based on different occupant contents, occur on different floors of the same building, the combined width of exits 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 buildings 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.

(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. Such vestibules shall not be common to toilet rooms of both sexes.

(f) Toilet rooms connected to public rooms or passageways shall have a vestibule or shall otherwise be arranged or screened to insure 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.

512.3 SCREENING: Food-storage and preparation rooms shall have outside openings screened with 18-mesh-wire screening. Screen doors shall be equipped with self-closing devices.

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" height.

(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

The allowable areas as set forth in Chapter 6 through 15 herein may be increased or decreased by the percentages shown, each percentage to be applicable to the base figure and percentages may not be compounded.

515 FACILITIES FOR PHYSICALLY HANDICAPPED

515.1 STANDARD: The Standard Specification for Making Buildings and Facilities Accessible To, and Usable By, the Physically Handicapped, ANSI A117.1-1969, of the American National Standards Institute, is hereby adopted to supplement, but not supersede, the requirements set forth herein and is applicable only as set forth herein.

515.2 REQUIRED. (a) The following buildings or parts thereof shall be made accessible to and usable by the physically handicapped in accordance with, and to the extent of, the Standard set forth in Sub-section 515.1:

(1) Public buildings used primarily by the general public as a place of gathering or amusement, including theaters, restaurants, hotels and stadiums;

(2) Buildings of Group A or B Occupancy for 200 or more persons;

(3) Buildings of Group C or D Occupancy;

(4) Buildings of Group H Occupancy which provide for 50 or more living units, but only five percent of the units thereof shall be made accessible and such units shall comply with the Standards only in the single respect that room and toilet doors are a minimum of 32 inches in clear width;

(5) Buildings of Group G Division 2 Occupancy which exceed 20,000 square feet and which are for the use of the general public.

(b) Accessibility shall only be required to the common areas and within the living units.

(c) Accessibility by one of the required means of entrance or egress to each floor will be required except that, in multi-storied buildings, floors above the first floor or ground level are exempt from the requirements of this Section if a reasonable portion of all facilities and accommodations normally sought and used by the public in such buildings are accessible to, and usable by, the physically handicapped.

(d) In public buildings or buildings for the use of the general public only one toilet for each sex for each five floors will be required to satisfy the Standard.

(e) Adoption of the Standard shall not be construed to make public telephones or warning signals mandatory where such facilities are not otherwise required by this Code.

(f) Only the mandatory provisions of the Standard are hereby adopted and the recommended provisions shall not be construed to be mandatory.

516 GUARD RAILS

Guard rails shall be provided as a vertical barrier at abrupt differences in floor level such as, but not limited to, floor openings, wall openings, platforms, runways, mezzanines, roofs, ramps and bridges to prevent falls of persons where such differences in floor levels exceed 24 inches. Such guard rails shall be as set forth in Sub-section 3105.9 and as set forth in the 06 Sections of Chapters 6 thru 15 based on Occupancy.

NOTES

CHAPTER 6
REQUIREMENTS OF GROUP A OCCUPANCIES

601 GROUP A OCCUPANCY DEFINED
602 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
603 LOCATION ON PROPERTY
604 EXIT FACILITIES
605 LIGHT AND VENTILATION
606 ENCLOSURE OF VERTICAL OPENINGS
607 STAGES AND PLATFORMS
608 MOTION-PICTURE-MACHINE BOOTHS
609 SPECIAL HAZARDS
610 PLUMBING AND SANITATION
611 EXCEPTIONS AND DEVIATIONS
612 MIXED OCCUPANCY

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601 GROUP A OCCUPANCY DEFINED

Group A Occupancy shall include assembly uses such as theatres, 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 1,000 or more 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	Area Per Floor
I	Not Limited	Not Limited
II	60 feet (4 stories)	15,000

(b) Areas of buildings located in Fire Zone One shall be reduced 25 percent.

(c) Areas of buildings located with public streets on two sides may be increased 25 percent, and if on three or more sides, may be increased 50 percent.

(d) A side or rear yard providing access not less than 30 feet in width to a public street may be considered a public street for the purpose of determining the allowable area of a church where zoning or other regulations require that such yard be permanently unobstructed.

602.2 SPECIAL PROVISIONS: (a) A fire-resistive ceiling shall not be required in the assembly space of churches and gymnasiums in one-story buildings every part of the roof structure of which is 18 feet or more above any floor or above any balcony or gallery seating 50 or less persons.

(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

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.

The main floor shall be located at or near grade.

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 EXIT FACILITIES

Stairs, exits and smokeproof 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 rooms shall be provided with light and ventilation by means of windows or skylights with an area not less than one-eighth of the total floor area, one-half of which shall be openable, 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.

602.2 Vertical openings not required to be enclosed by Paragraph 606.1(a) and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

607 STAGES AND PLATFORMS

Stages, platforms and accessory features thereof shall be designed and constructed as set forth herein.

607.1 STAGES: (a) STAGE CONSTRUCTION: 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. 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.

Openings through stage floors shall be equipped with tight-fitting trap doors or 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 wall 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 fire-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 fire 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 material, so designed and constructed that for at least 30 minutes it will prevent all passage of flame and withstand with failure a temperature of 1700 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 opening 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 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 or 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 production continues for more than one year.

(h) **STAGE EXITS:** At least one exit two feet six inches wide shall be provided from each side of the stage opening, directly or by means of a 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.

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.

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 auditorium 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 MOTION-PICTURE-MACHINE BOOTHS

All booths constructed for the projection or showing of motion-picture films shall be as set forth herein.

608.1 Every motion-picture machine, using nitro cellulose or other inflammable films together with all electrical devices, rheostats and sewing machines used in connection therewith, and all such films, shall be enclosed in a booth large enough to permit the operator to walk freely on either side or back of the machine; and such room shall be not less than seven feet high and shall have a floor area of not less than 50 square feet for each motion-picture machine in such booth.

608.2 The floors, walls and ceiling of such booth shall be of incombustible materials of not less than two-hour fire-resistive construction as specified in Chapter 37.

608.3 The entrance to the booth shall be equipped with tight-fitting, self-closing doors of fire-resistive construction. Such door shall open outward and shall not be equipped with any latch. Booths exceeding 200 square feet in area shall have two means of exit

therefrom, and doors shall be remotely located. Any required exit door from a motion-picture booth shall be not less than two feet six inches in width.

608.4 Machine and observation ports in machine-booth walls shall be of three kinds: projection ports, observation ports and combined observation and spotlight ports. These ports shall be limited in size and number as follows: there shall be not more than one projection port for each machine head, including stereopticon machines, having an area of not more than 120 square inches. There shall be not more than one observation port for each projection port, having an area of not more than 150 square inches. There shall be not more than three combination observation and spotlight ports, and they shall not exceed 30 inches by 24 inches. There shall be not less than one foot of wall space between openings. Each port in the projection-booth wall shall be completely covered with a single pane of plate glass; and each such opening, together with all fresh-air inlets, shall be provided with automatic shutters of not less than ten-U. S. gage sheet metal large enough to overlap at least one inch on all sides and arranged to slide shut by gravity without binding. These shutters shall be held normally open by means of chains equipped with approved 160-degree-Fahrenheit fusible links, all so arranged that the shutters may be easily released by hand or automatically by the fusible links and close smoothly without noise. Every booth shall be equipped with a ventilating inlet not less than 30 square inches in area, placed near the floor and protected by two layers of copper gauze, one of 18 meshed per inch and the other of ten meshed per inch, in addition to the shutter as specified above. At the top of every booth there shall be at least a ten-inch-diameter vent for each motion-picture machine. Such vent shall be constructed of not less than 24-U. S. gage sheet metal and shall connect into a masonry flue or go directly through the roof and 12 inches above, and shall be provided with an exhaust fan which will produce a complete change of air in the booth every two minutes. No wood or other combustible materials shall be allowed to come closer than four inches to such vent, and there shall be not more than one elbow or change of direction of this metal vent in any attic space. No such vent shall pass through any occupied room unless encased in not less than four inches of solid masonry.

608.5 All shelves, furniture and fixtures within the booth shall be constructed of metal or other incombustible materials.

608.6 Every motion-picture machine shall be securely fastened to the floor to prevent overturning.

608.7 The rewinding machine shall be located in a fireproof compartment within the booth, and all films not in actual use shall be kept in individual metal boxes with tight-fitting covers and must be stored, each in its individual box, in a fireproof cabinet, which cabinet shall be divided into compartments having a capacity of not more than ten such film boxes in each compartment. Each compartment shall have a separate tight-fitting, self-closing cover of not less than ten-U.S. gage sheet metal, arranged to close automatically. No solder shall be used in the construction of such metal boxes, compartments or cabinets.

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 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.

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 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

Existing buildings not fully complying with the requirements of this chapter may be used for Group A Occupancies, if the requirements of Sections 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

Separation of Group A Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

CHAPTER 7

REQUIREMENTS OF GROUP B OCCUPANCIES

701 GROUP B OCCUPANCY DEFINED
702 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
703 LOCATION ON PROPERTY
704 EXIT FACILITIES
705 LIGHT AND VENTILATION
706 ENCLOSURE OF VERTICAL OPENINGS
707 STAGES AND PLATFORMS
708 MOTION-PICTURE-MACHINE BOOTHS
709 SPECIAL HAZARDS
710 PLUMBING AND SANITATION
711 MIXED OCCUPANCY

701 GROUP B OCCUPANCY DEFINED

701 GROUP B OCCUPANCY DEFINED: Group B Occupancy shall include assembly uses such as:

DIVISION 1: Assembly uses 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 occupant 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 classed 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 or occupancy shall be limited in height and area as follows:

Type	Allowable Height	Area Per Floor
I	Not Limited	Not Limited
II	60 feet (4 stories)	15,000
III Protected	30 feet (2 stories)	13,500
III Unprotected	20 feet (1 story)	9,000

(b) Areas of buildings located in Fire Zone 1 shall be reduced 25 percent.

(c) Areas of buildings located with public streets on two sides may be increased 25 percent, and if on three or more sides, may be increased 50 percent.

(d) A side or rear yard providing access not less than 30 feet in width to a public street may be considered a public street for the purpose of determining the allowable area of a church where zoning or other regulations require that such yard be permanently unobstructed.

702.2 SPECIAL PROVISIONS: (a) A fire-resistive ceiling shall not be required in the assembly space of churches and gymnasiums in one-story buildings, every part of the roof structure of which is 18 feet or more above any floor or above any balcony or gallery seating 50 or less persons.

(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 exits therefrom, shall be a minimum of Type II construction.

(e) Basements shall be of Type I construction.

703 LOCATION ON PROPERTY

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.

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 EXIT FACILITIES

704.1 GENERAL: Stairs, exits, 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: Stairs and exits for amusement structures shall be provided as set forth in Chapter 31, subject to the approval of the Building Official. Exit signs shall be installed as set forth in Section 3112 and where required by the Building Offical.

705 LIGHT AND VENTILATION

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 by Sub-section 706.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

707 STAGES AND PLATFORMS

Stages and platforms shall be as set forth in Section 607.

708 MOTION-PICTURE-MACHINE BOOTHS

Portable motion-picture machines using slow-burning (cellulose accetate or equivalent) type of film may be used without a motion-picture-machine booth. The slow-burning film shall have a permanent distinctive marker for its entire length, identifying the manufacturer and the slow-burning character of the film stock. Machines shall be marked with the name and/or trade mark of the maker and the voltage and current rating for which they are designed, and shall also be plainly marked: "FOR USE OF SLOW-BURNING FILMS ONLY."

In buildings where the showing of motion pictures is the principal use, motion-picture-machine booths, as set forth in Section 608, shall be provided.

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 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 OCCUPANCY

Separation of Group B Occupancies or divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

NOTES

CHAPTER 8

REQUIREMENTS OF GROUP C OCCUPANCIES

801 GROUP C OCCUPANCY DEFINED
802 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
803 LOCATION ON PROPERTY
804 EXIT FACILITIES
805 LIGHT AND VENTILATION
806 ENCLOSURE OF VERTICAL OPENINGS
807 STAGES AND PLATFORMS
808 MOTION-PICTURE-MACHINE BOOTHS
809 SPECIAL HAZARDS
810 PLUMBING AND SANITATION
811 EXCEPTIONS AND DEVIATIONS
812 MIXED OCCUPANCY

801 GROUP C OCCUPANCY DEFINED

Group C Occupancy shall include all schools having classes more than four hours each week and providing facilities for more than ten students or pre-school children.

Accessory uses to schools not exceeding the following maximums 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.

Such accessory uses exceeding the above maximums shall conform to the requirements of the Occupancy group which includes such use.

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	Area Per Floor
I	Not Limited	Not Limited
II	60 feet (4 stories)	18,000
III Protected	30 feet (2 stories)	15,000
III Unprotected & IV	30 feet (1 story)	13,500
V	30 feet (1 story)	8,500

(b) Area of buildings located in Fire Zone 1 shall be reduced 25 percent.

(c) Area of buildings located with public streets on two sides may be increased 25 percent, and if on three or more sides, may be increased 50 percent.

(d) A side or rear yard providing access not less than 30 feet in width to a public street may be considered a public street for the determination of allowable areas where zoning or other regulations require that such yard be permanently unobstructed.

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

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.

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 EXIT FACILITIES

Stairs, exits 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

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 by Sub-section 806.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

807 STAGES AND PLATFORMS

Stages and platforms shall be as set forth in Section 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.

808 MOTION-PICTURE-MACHINE BOOTHS

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 motion-picture-machine booth 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 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 fibres, chips, shavings, and dust. Exhaust and collecting systems shall comply with the standards set forth in Sub-section 4103.5.

809.9 Buildings shall comply, where required, with Section 515, Facilities for the Physically 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

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 OCCUPANCY

Separation of Group C Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

NOTES

CHAPTER 9

REQUIREMENTS OF GROUP D OCCUPANCIES

901 GROUP D OCCUPANCY DEFINED
902 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
903 LOCATION ON PROPERTY
904 EXIT FACILITIES
905 LIGHT AND VENTILATION
906 ENCLOSURE OF VERTICAL OPENINGS
907 MOTION-PICTURE-MACHINE BOOTHS
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: Occupancy where inmates are under physical limitations, such as hospitals, sanitoriums, homes for the aged and orphanages; and where accommodations are provided for more than six inmates.

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	Area Per Floor
1	I	100 feet (8 stories)	Not Limited
	II	30 feet (2 stories)	6,800
2	I	Not Limited	Not Limited
	II	60 feet (4 stories)	10,000
	III (Protected)	30 feet (2 stories)	7,500

(b) Area of buildings located in Fire Zone 1 shall be reduced 25 percent.

(c) Area of buildings located with public streets on two sides may be increased 25 percent, and if on three or more sides, may be increased 50 percent.

(d) A side or rear yard providing access not less than 30 feet in width to a public street may be considered a public street for the determination of allowable areas where zoning or other regulations require that such yard be permanently unobstructed.

902.2 SPECIAL PROVISIONS: (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.

903 LOCATION ON PROPERTY

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.

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 EXIT FACILITIES

Stairs, exits, 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

All portions of Group D Occupancies customarily used by human beings shall be provided with light and ventilation by means of windows or skylights with an area not less than one-eighth 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. Ducts for mechanical ventilation system shall serve no other Group of Occupancy. 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 by Sub-section 906.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

907 MOTION-PICTURE-MACHINE BOOTHS

Where motion pictures are to be shown regularly, the building shall be equipped with a motion-picture-machine booth 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 Handicapped.

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

Separation of Group D Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

CHAPTER 10
REQUIREMENTS OF GROUP E OCCUPANCIES

1001 GROUP E OCCUPANCY DEFINED
1002 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1003 LOCATION ON PROPERTY
1004 EXIT 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 explosives, highly flammable liquids, and highly combustible materials that are easily ignited and burn with extreme rapidity.

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, liquified petroleum gas charging or bulk storage plants, paint 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:

Type	Allowable Height	Area per Floor (in Sq. Ft.)
I	120 ft. (10 stories)	12,000
I	20 ft. (1 story)	Unlimited
II	40 ft. (2 stories)	6,000
II	20 ft. (1 story)	12,000

(b) Area of buildings located in Fire Zone 1 shall be reduced 25 percent.

(c) Area of buildings located with public streets on two sides may be increased 25 percent, and if on three or more sides, may be increased 50 percent.

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 EXIT FACILITIES

Stairs, exits, 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

All portions of Group E Occupancies customarily used by human beings shall have light and ventilation as set forth in Section 905. All portions of buildings where flammable liquids are used or stored shall be provided with mechanical ventilation as set forth in Chapter 48.

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 15 minutes. 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 by Subsection 1006.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

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 4107 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 fibres, chips, shavings, dusts, etc. Exhaust and collecting systems shall comply with the standards set forth in Subsection 4103.5.

1007.13 Buildings shall comply, where required, with Section 515, Facilities for the Physically Handicapped.

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

Separation of Group E Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

CHAPTER 11

REQUIREMENTS OF GROUP F OCCUPANCIES

1101 GROUP F OCCUPANCY DEFINED
1102 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1103 LOCATION ON PROPERTY
1104 EXIT 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, planing 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 because of use or occupancy, shall be limited in height and area as follows:

Type	Allowable Height	Area Per Floor
I	Not Limited	Not Limited
II	90 feet (6 stories)	18,000
III*	30 feet (2 stories)	18,000
IV	(1 story)	12,000
III** & V	20 feet (1 story)	10,000

* Protected.
**Unprotected.

(b) Area of buildings located in Fire Zone 1 shall be reduced 25 percent.

(c) Area of buildings located with public streets on two sides may be increased 25 percent, and if on three or more sides, may be increased 50 percent.

(d) A side or rear yard providing access not less than 20 feet in width to a public street may be considered a public street for the determination of allowable areas where zoning or other regulations require that such yard be permanently unobstructed.

(e) Areas of buildings may be increased 200 percent for one-story buildings and 100 percent for buildings not exceeding two stories in height if the building is provided with an approved automatic fire-extinguishing system throughout as set forth in Chapter 38, provided the sprinkler system is not otherwise required by this Code.

(f) Areas of one and two-story buildings of Type I, II, III, or IV Construction shall not be limited if provided with an approved automatic fire-extinguishing system throughout and are entirely surrounded by public streets or permanently unobstructed yards not less than 60 feet in width providing access to such streets.

(g) Where one-hour fire-resistive construction is required by this code, an approved automatic fire-extinguishing system may be substituted, provided such system is not otherwise required.

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 public streets not less than 60 feet in width.

(c) Parking garages used exclusively for parking and storing of passenger motor vehicles shall be of Type I construction, except that garages not exceeding four stories above grade may have structural framework and floors unprotected and exterior walls of not less than two-hour fire-resistive construction, except as otherwise provided in Section 1804, and garages exceeding four stories but not exceeding eight stories may have structural framework and floors protected by one-hour fire-resistive construction.

(d) Floors in motor service stations, garages and aircraft hangers shall be incombustible materials protected against saturation.

(e) Ramps used for the transfer of vehicles shall comply with Paragraph 3120.3(a) herein.

1103 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.

1104 EXIT FACILITIES

Stairs, exits, 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

All portions of Group F Occupancies customarily used by human beings shall have light and ventilation as set forth in Section 905. 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 Building Official 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 by Sub-section 1106.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

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 fibres, 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 Sub-section 4103.5.

1107.9 Buildings shall comply, where required, with Section 515, Facilities for the Physically Handicapped.

1108 PLUMBING AND SANITATION

1108.1 Plumbing shall be installed as set forth in Part VII.

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

Separation of Group F Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

NOTES

CHAPTER 12

REQUIREMENTS OF GROUP G OCCUPANCIES

1201 GROUP G OCCUPANCY DEFINED
1202 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1203 LOCATION ON PROPERTY
1204 EXIT 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 because of use or occupancy, shall be limited in height and area as follows:

Type	Allowable Height	Area Per Floor
I	Not Limited	Not Limited
II	90 feet (6 stories)	27,000
III*	30 feet (2 stories)	20,000
III** & IV	20 feet (1 story)	18,000
V	20 feet (1 story)	12,000

*Protected.
**Unprotected.

(b) Area of buildings located in Fire Zone 1 shall be reduced 25 percent.

(c) Area of buildings located with public streets on two sides may be increased 25 percent, and if on three or more sides, may be increased 50 percent.

(d) A side or rear yard providing access not less than 20 feet in width to a public street may be considered a public street for the determination of allowable areas where zoning or other regulations require that such yard be permanently unobstructed.

(e) Areas of buildings may be increased 200 percent for one-story buildings and 100 percent for buildings not exceeding two-stories in height if the building is provided with an approved automatic fire-extinguishing system throughout provided the sprinkler system is not otherwise required by this Code.

(f) Areas of one and two story buildings of Type I, II, III, or IV Construction shall not be limited if provided with an approved automatic fire-extinguishing system throughout and are entirely surrounded by public streets or permanently unobstructed yards not less than 60 feet in width providing access to such streets.

(g) Where one-hour fire-resistive construction is required by this code, an approved automatic fire-extinguishing system may be substituted, provided such system is not otherwise required.

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

Exterior walls shall have fire-resistive and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.

1204 EXIT FACILITIES

Stairs, exits 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

All portions of Group G Occupancies customarily used by human beings shall have light and ventilation as provided 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 by Subsection 1206.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

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 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

Separation of Group G Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

CHAPTER 13

REQUIREMENTS OF GROUP H OCCUPANCIES

1301 GROUP H OCCUPANCY
1302 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1303 LOCATION ON PROPERTY
1304 EXIT 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

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. EXCEPTION: A single-family residence containing no more than three bedrooms where no more than two bedrooms are rented, said rooms being 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 Buildings, or parts of buildings, classed in Group H because of use or occupancy, shall be limited in height and are as follows:

Type	Allowable Height	Area Per Floor
I	Not Limited	Not Limited
II	75 feet (5 stories)	13,500
III (Protected)	30 feet (2 stories)	13,500
III (Unprotected)	20 feet (1 story)	9,000

1302.2 EXCEPTION: Type III (Protected) buildings may be three stories in height if the floor level of the third floor is not more than 20 feet above the grade adjacent thereto.

1302.3 Area of buildings located in Fire Zone 1 shall be reduced 25 percent.

1302.4 Area of buildings located with public streets on two sides may be increased 25 percent, and if on three or more sides, may be increased 50 percent.

1302.5 Basements shall be of Type I construction.

1303 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.

1304 EXIT FACILITIES

Stairs, exits, 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) Rooms used for sleeping or living purposes shall be provided with light and ventilation by means of win-

dows in exterior walls with an area not less than one-eighth of the floor area of such rooms and not less than one-half of the required window area shall be openable. 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.

(b) Rooms used for sleeping and living purposes, where located as the first-occupied space below a roof, shall be protected from extreme temperatures. The overall coefficient of heat transmission or "U" factor for such roof construction shall not be greater than 0.23.

(c) The floor area for an apartment shall be not less than required by applicable zoning regulations.

1305.2 ROOMS: (a) SLEEPING ROOMS: 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 90 square feet. Rooms, the floor of which is more than three feet below grade and which depend on natural ventilation, shall not be used for sleeping purposes. The minimum average height of each sleeping room shall be eight feet, and the least height shall be seven feet.

(b) LIVING AND DINING ROOMS: Living and dining rooms shall have a minimum average height of eight feet and a least height of seven feet.

(c) KITCHENS AND CORRIDORS: Kitchens and corridors shall have a minimum height of seven feet.

(d) TOILET ROOMS: Toilet rooms shall have a minimum height of seven feet, a minimum width of three feet, and a minimum area of 15 square feet.

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 by Subsection 1306.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

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 Handicapped.

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 rooms serving a one-family-unit shall have outside openings, screened with 18-mesh-wire screening.

(b) For occupancies with an occupant content of ten or more persons, separate facilities shall be provided for employees.

(c) 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.

(d) Lavatories may be located in rooms, provided there is no conflict with minimum requirements otherwise set forth herein.

1309 MIXED OCCUPANCY

Separation of Group H Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

CHAPTER 14

REQUIREMENTS OF GROUP I OCCUPANCIES

1401 GROUP I OCCUPANCY DEFINED
1402 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1403 LOCATION ON PROPERTY
1404 EXIT 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

Group I Occupancy shall include: All single-family uses and duplexes; dormitories, fraternity houses and monastery uses when such buildings are used to domicile no more than six persons; buildings classified as Group C Occupancy and Group D-2 Occupancy when such buildings are used to house no more than six students or inmates and the appropriate supervisory personnel; and rooming houses, when such rooming houses are operated in a single-family residence containing no more than three bedrooms, where no more than two bedrooms are rented, said rooms being used to house not more than two persons per bedroom.

1402 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

Buildings, or parts of buildings, classed in Group I because of use or occupancy shall be limited in height and area as follows:

Type	Stories	Area per Floor
I	Not Limited	Not Limited
II	4	15,000
III (Protected)	2	10,000
III (Unprotected), IV & V	1	7,500

EXCEPTION: Type III (Unprotected) and Type V may be two stories in height and the second floor occupants shall be protected by one-hour fire-resistive or heavy-timber construction.

1403 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.

1404 EXIT FACILITIES

Stairs and exits shall be provided 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 SLEEPING ROOMS: 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. 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. The minimum average height of

each sleeping room shall be eight feet, and the least height shall be seven feet.

1405.3 LIVING AND DINING ROOMS: Living and dining rooms shall have a minimum average height of eight feet and a least height of seven feet.

1405.4 KITCHEN AND HALLWAYS: Kitchens and hallways shall have a minimum height of seven feet.

1405.5 TOILET ROOMS: Toilet rooms shall have a minimum height of seven feet, a minimum width of three feet, and a minimum area of 15 square feet and shall be ventilated as set forth in Subsection 1305.1.

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 by Subsection 1406.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

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.

1408 PLUMBING AND SANITATION

1408.1 Plumbing shall be installed as set forth in Part XII.

1408.2 (a) Sanitation fixtures 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

Separation of Group I Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

CHAPTER 15

REQUIREMENTS OF GROUP J OCCUPANCIES

1501 GROUP J OCCUPANCY DEFINED
1502 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE
1503 LOCATION ON PROPERTY
1504 EXIT 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 include:

DIVISION 1: Garages for four or less motor vehicles, porte-cocheres, and car-portes.

DIVISION 2: Tanks, towers and similar structures and fences.

DIVISION 3: Stadiums, reviewing stands, grandstands and similar structures.

DIVISION 4: Cabanas and bath houses and similar structures.

DIVISION 5: Public and private swimming pools and buildings accessory thereto.

DIVISION 6: Solariums, sundecks and similar roofless structures.

DIVISION 7: 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

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, except that Type V buildings shall be limited to 500 square feet in area.

1502.2 DIVISION 2: Tanks and towers shall be designed and constructed as set forth in Part VI.

Fences shall be of rot and termite-resistive materials. Fences shall be substantially constructed and secure. 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. Unless otherwise limited by zoning regulations, property-line fences on property zoned for residential use shall be limited to five feet in height, and masonry fences on property zoned for commercial use shall be designed and constructed as set forth in Part VI.

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) Stadiums, reviewing stands, grandstands and similar structures shall conform to the Standard "Places of Outdoor Assembly" NFPA No. 102-1967 of the National Fire Protection Association which is hereby adopted, excepting that portion in reference to tents, to supplement, but not supersede, the specific requirements set forth herein.

(b) Permanent structures shall be constructed of Type I or Type IV construction. Permanent construction of exposed combustible materials shall not be permitted under public seating. Any enclosed space under public seating not a part of or not actively used in connection with every public assembly in the grandstand shall be separated therefrom as set forth in Section 508.

(c) Temporary structures may be constructed of unprotected steel or wood and shall be not more than one story or 30 feet in height, and not more than 50 feet in width, front to rear.

1502.4 DIVISION 4: Buildings classed in Division 4 of Group J shall conform to the requirements based on location in the Fire Zone and to the following specific restrictions:

Type	Allowable Height	Area Per Floor
I	Unlimited	Unlimited
II	60 feet (4 stories)	10,000
III (Protected)	30 feet (2 stories)	5,000
III (Unprotected) & IV	20 feet (1 story)	3,000
V	10 feet (1 story)	1,000

1502.5 DIVISION 5: (a) Above-grade structures, accessory to pools, shall be limited in height and area 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 walls 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 or more 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) A greenhouse structure not exceeding 50 square feet in area, accessory to a single family residence and complying with Part V of this Code shall not be limited as set herein.

(d) 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 1/180 of the span.

(2) Sheet-metal roofing and siding shall have a minimum thickness of 29 U.S. Standard gage.

(3) Aluminium roofing and siding shall be of not less thickness than 0.019 inches.

(4) Non-metallic 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: 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.

EXCEPTION: The requirements of this Sub-section shall not supercede applicable zoning regulations.

1503 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.

1504 EXIT FACILITIES

Stairs and exits shall be provided as set forth in Chapter 31. (See Section 3123 for specific requirements of 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 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: All portions, customarily used for human occupancy, shall have light and ventilation as provided in the Occupancy most suitably applicable. Exit and emergency lighting may be omitted when such occupancies are used only during daylight hours.

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 by Subsection 1506.1 and abrupt differences in floor level shall be protected by guard rails as set forth in Sub-section 3105.9.

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.

1507.2 REQUIREMENT 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 car-portes 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 car-portes of Group I Occupancy. When a porte-cochere or car-porte 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 protected on the garage side with not less than 26-gage sheet metal or one-fourth inch rigid asbestos board, or shall be one and three-eighths inch solid-core doors, 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 car-porte is located under another Occupancy, there shall be not less than one-hour fire-resistive construction, separating such Group J-1 Occupancy from Group I Occupancy and not less than two-hour fire-resistive construction separation from all other occupancies.

(b) **DIVISION 3:** (1) The space under temporary structures of Division 3 of Group J Occupancy shall not be used for any purpose whatsoever.

(2) Buildings shall comply, where required, with Section 515, Facilities for the Physically Handicapped.

(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 requirement 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

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

Separation of Group J Occupancies or Divisions thereof from all other Occupancies or Divisions of Occupancies shall be as set forth in Chapter 5.

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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 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.

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.

(e) Damage from fire or windstorm may be repaired, using the same materials of which the building or structure was constructed, provided that the cost of such repair shall not exceed 20 percent of the replacement cost of the building or structure.

1602.2 Fences and signs in Fire Zone 1 shall be constructed of incombustible materials.

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 complies 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 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 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.

(e) Damage from fire or windstorm may be repaired using the same materials of which the building or structure was constructed, provided the cost of such repairs shall not exceed 20 percent of the replacement cost of the building or structure.

1603.2 Fences and signs in Fire Zone 2 shall be constructed of incombustible materials.

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 other-

wise 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 complies with that set forth for the Type of Construction of the main building to which the open shed is attached.

1604 FIRE ZONE 3

Any building complying with the requirements of this Code may be erected, constructed or moved into Fire Zone 3.

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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 equalled.

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 in 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.

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

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.

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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

The structural frame of Type I buildings or structures shall be of steel or reinforced concrete; and walls, permanent partitions, roofs and floors 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.

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 Unless specifically designed as a structural frame, the walls shall be considered as load-bearing and shall be constructed of masonry or reinforced concrete except that masonry bearing walls shall be limited to 35 feet in height. Bearing walls shall be of fire-resistive construction as set forth in Section 1804 but not less than as set forth for the structural frame in Paragraph 1803.1 (b).

1804 WALLS AND PARTITIONS

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. 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 and parallel to the common lot line.

1804.1 (a) Main exterior walls shall be of incombustible four-hour fire-resistive construction except as follows:

(1) Main exterior bearing walls of buildings for Occupancies

other than Group E, having a distance separation of more than ten feet may be of three-hour fire-resistive construction and where having a distance separation of more than 20 feet may be of one-hour fire-resistive construction.

(2) Main exterior nonbearing walls of buildings for occupancies other than Group E, having a distance separation of more than five feet may be of three-hour fire-resistive construction and where having a distance separation of more than ten feet may be of two-hour fire-resistive construction and where having a distance separation of more than 20 feet may be of one-hour fire-resistive construction.

(3) Main exterior walls of buildings for other than Group E Occupancy having a distance separation of 30 feet may be of unprotected incombustible construction with no limit on the area of openings, or such walls may be omitted.

(4) Main exterior walls of buildings used for parking garages shall be of not less than two-hour fire-resistive construction except that walls having a distance separation of 15 feet or more shall be of incombustible materials or may be omitted as provided in Subparagraph 1804.1 (b) (4).

(5) Combustible materials may be used outside of the main exterior wall provided such materials comply with Section 1812.

(b) Openings in main exterior walls shall be as follows:

(1) 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 have no openings.

(2) Openings in walls of buildings other than Group E Occupancy having a distance separation of from five to ten feet shall be protected by a fire assembly 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 openings more than 10 percent of such wall area. Openings in walls of buildings other than Group E Occupancy having distance separation of more than 10 feet but less than 30 feet shall be protected by ordinary doors or windows and the total area of openings in any story shall be limited to 50 percent of such wall area.

(3) Openings in 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 in any story shall be limited to 20 percent.

(4) Openings in walls of buildings used for 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 in any story shall be limited to 50 percent of such wall area.

Openings in walls of buildings used for parking garages having a distance separation of more than 15 feet shall be protected by ordinary doors and windows provided that where, in the opinion of the Building Official, a fire hazard or noise or light nuisance is not thereby created, the Building Offical may waive or vary the enclosure or opening protection requirements for walls having a distance separation of more than 15 feet.

(c) Buildings having exterior walls without openings shall be provided with access panels along street fronts or walls otherwise accessible for fire-fighting entrance to the building as follows:

(1) Access panels shall be in every story up to and including the sixth.

(2) Not less than one opening shall be located in each accessible wall and additional openings shall be provided so there shall be not more than 250 feet horizontally between such openings.

(3) Access panels or openings shall be identified and easily openable. The sill height above the floor level served shall be not

more than 34 inches and the openings shall be not less than 36 inches wide by 72 inches high.

1804.2 Fire Division walls shall comply with Section 506 herein.

1804.3 Interior bearing walls shall be three-hour fire-resistive construction.

1804.4 (a) Partitions shall be of one-hour, fire-resistive construction except as follows:

(1) Partitions of Group D Occupancies shall also be of incombustible materials.

(2) Partitions of required exit corridors in Group D Occupancies shall have not less than two-hour fire-resistivity.

(3) Corridor partitions shall also comply with Section 3104 when serving as the required exit as defined in Chapter 4.

(4) Partitions subdividing offices, stores, apartments and similar uses within the area occupied by a single tenant may be constructed without a fire-resistive rating provided the materials of construction are:

(aa) Incombustible or;

(bb) fire-retardant treated wood or;

(cc) of wood provided a space of not less than 18 inches, as measured down from the ceiling, shall be open or of transparent incombustible material.

1805 FLOORS

1805.1 MATERIALS: (a) Floor systems shall be of incombustible materials. Poured-in-place concrete slabs shall be not less than 2½ 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.

(b) Where wood floors are laid over the concrete slabs, the space between the floor slab and the underside of the finish floor shall be filled with incombustible materials.

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.

1806 ROOFS

1806.1 MATERIALS: Roof systems shall be incombustible materials. Poured-in-place, concrete slabs shall be not less than 2½ 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 contruction, 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 be fire-re-

tardant except as otherwise set forth in Sub-section 3401.3, and shall comply with Chapter 34.

1806.4 ROOF DRAINAGE: 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. Where roofs are not designed in accordance with the above, overflow scuppers shall be placed not more than four inches above the low point of the roof. If scuppers are installed to provide the overflow drainage, they shall be not less in aggregate area than three times the area required for the contributory downspouts or leaders, but of not less dimension than two inches and shall be so placed that they will prevent the accumulation of water in any area in excess of the design consideration of the flashings and structure.

1806.5 FURRED SPACES ABOVE A CEILING: Access scuttles, not less than 16 inches by 30 inches, shall be provided to all spaces above a furred ceiling having a minimum vertical distance of 36 inches. Such access scuttles shall be from common spaces such as corridors and no part of such furred space shall be more than 100 feet from an access scuttle.

1807 VERTICAL OPENINGS

1807.1 GENERAL: (a) Every light shaft, vent shaft, chute, pipe chase or other opening between floors shall be enclosed or protected to prevent the spread of fire and smoke.

(b) Stairways and ramps shall be enclosed as and where required and with the fire-resistive requirement characteristics set forth in Chapter 31 and shall otherwise comply with this Section.

(c) Elevators, escalators and transporting assemblies shall be enclosed as set forth in this Section and in Chaper 32.

(d) A court, any part of which is used as a means of egress from from a building shall comply with Sub-section 3108.6.

(e) Guard rails shall be provided as a vertical barrier at abrupt differences in floor level such as, but not limited to, floor openings, wall openings, platforms, runways, mezzanines, roofs, ramps and bridges to prevent falls of persons where such differences in floor levels exceed 24 inches. Guard rails will not be required at the loading docks, truck wells and similar locations where it is apparent that the edge of such raised level is to be used for loading. Guard rails will not be required on docks or seawalls, where the lower level is the water surface. Such guard rails shall be as set forth in Subsection 3105.9.

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 in Paragraph 1807.2(c).

(b) Shafts, ducts, chutes and other verticle 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.

(c) Pipes of steel, iron or cast iron passing through floors need not be in enclosed shafts provided the space around the pipe is effectively sealed at each floor to prevent the passage of fire and smoke with material having a fire-resistive rating equivalent to the rating of the floor.

(d) Heating and ventilating shafts need not be enclosed where such ducts extend through less than four stories of a building, 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 a minimum of two feet above the roof and shall 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(c).

(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 and such fire assembly shall be of a type to effectively close the opening against passage of smoke as well as fire.

1807.4 LAUNDRY CHUTES: (a) Laundry chutes shall not have openings into an enclosed stair, corridor or other enclosed exit facility but shall open into a separate room or closet separated from the exit or exit-corridor by a self-closing fire-assembly.

EXCEPTION: (1) This requirement shall not apply to Group I 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 an enclosed stair, corridor or other enclosed exit facility.

(b) Trash chutes having openings to an enclosed space shall open into a room separated from other enclosed rooms or enclosed spaces by a self-closing fire assembly.

(c) Trash chutes and rooms shall be protected by automatic sprinklers as set forth in Sub-section 3801.1.

(d) 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 or galvanized or aluminum coated steel with no screws, rivets or other projections on the interior surface of the chute. Laps or joints shall be of design so that liquid will drain to the interior of the chute. The steel shall be not lighter than as indicated below:

(1) Chutes handling Type 2 or 3 wastes, or a combination of both, shall be not lighter than 16 gauge except the upper 6 stories may be of 18 gauge.

(2) Chutes handling wastes other than Type 2 or Type 3, shall be made of steel not lighter than No. 14 gauge.

(f) Metal chutes may be lined with firebrick (ASTM Type G, low duty or the equivalent) not less than 2½ 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.

1807.6 FLUE-FED OR DIRECT-FED INCINERATOR: Flue-fed or direct-fed incinerators and incinerator chutes within buildings are prohibited.

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 Architectural 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 requried 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 water runoff, a curb not less than eight inches in height shall be provided.

1811.8 Where the public has access to roof areas, a guard rail not less than 36 inches above the roof shall be provided around all open wells or shafts and at all exterior walls.

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, wainscotting, 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 or windows or frames may be used except 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 3710.

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, as set forth in Sub-paragraph 1812.5 (a) (1), shall be limited to 40 feet above grade.

(b) (1) 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.

(2) Combustible materials, as set forth in Sub-paragraph 1812.5 (b) (1), shall be limited to 40 feet above grade.

(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.

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 The structural frame of Type II buildings or structures shall be of steel or reinforced concrete and the exterior walls and interior bearing walls shall be of incombustible fire-resistive construction.

1901.2 Permanent partitions, floors and roofs shall be of fire-resistive construction.

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.

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 Unless specifically designed as a structural frame the walls shall be considered as load-bearing and shall be constructed of masonry or reinforced concrete, except that masonry bearing walls shall be limited to 35 feet in height.

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.

1906 ROOFS

1906.1 MATERIALS: Roofs shall be of 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 materials or fire-retardant treated wood.

(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 be fire-retardant except as otherwise set forth in Sub-section 3401.3, and shall comply with Chapter 34 herein.

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 FURRED SPACES ABOVE A CEILING: Access scuttles, not less than 16 inches by 30 inches shall be provided to all spaces above a furred ceiling having a minimum vertical distance of 36 inches. Such access scuttles shall be from common spaces such as corridors and no part of such furred space shall be more than 100 feet from an access scuttle.

1907 VERTICAL OPENINGS

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 on incombustible materials or fire retardant wood complying with Section 2908 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 2908 but need not have fire-resistive protection.

1910.2 Architectural 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 water runoff, a curb not less than eight inches in height shall be provided.

1911.8 Where the public has access to roof areas, a guard rail not less than 36 inches above the roof shall be provided around all open wells or shafts and at all exterior walls.

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 insulating materials, other than a vapor barrier not exceeding .064 inches in thickness, shall not be permitted in concealed spaces.

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 3710.

1912.5 Decorative non-structural combustible materials may be applied to the exterior of the exterior walls, fascia and soffits as set forth in Sub-section 1812.5.

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 loadbearing walls of incombustible, fire-resistive construction.

(b) Type III buildings or structures shall have an interior structural frame of steel, reinforced concrete, wood, or interior loadbearing 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, partitions, ceilings and floors of not less than one-hour fire-resistant construction, except that the fire protection of floors may be omitted as specified in Sub-section 2005.2.

(b) Type III (unprotected) buildings 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 MATERIALS: (a) Unless specifically designed as a structural frame with panel walls, the exterior walls shall be considered as load-bearing and shall be constructed of masonry or reinforced concrete. Where designed as a structural frame, the materials shall be as set forth in Paragraph 2001.1(a).

(b) The interior structural support shall be of steel, reinforced concrete, wood, or interior bearing walls of incombustible materials or wood studs.

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: Wood columns may be sawn or glued laminated and shall be not less than 8-inch nominal in depth when supporting roof loads only.

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 ½ 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 ½ 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.

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 or fire-retardant treated wood 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 bearing walls and partitions shall be of incombustible materials or of wood studs, and for Type III (protected) buildings, or for Type III (unprotected) buildings where supporting upper floors or where adjacent to common paths of egress, shall be of one-hour fire-resistive 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 Sub-section 2907.3. Access openings shall be provided to all space under the building.

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, such fire protection may be omitted.

2006 ROOFS

2006.1 MATERIALS: Roofs shall be of 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 of 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 Subsection 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.

2006.3 ROOF COVERINGS: Roof coverings shall be fire-retardant except as otherwise set forth in Sub-section 3401.3 and shall comply with Chapter 34 herein.

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: Attic spaces shall not be required, but where attic spaces are provided such spaces shall have a minimum vertical dimension of 18 inches clear distance and, where unprotected combustible material is exposed, shall be divided by fire stops into areas not exceeding 2,500 square feet. Access scuttles shall be from common spaces such as corridors, and no part of an attic space shall be more than 100 feet from an access scuttle. Minimum vertical dimension shall not be required for hip or gable roof construction.

2007 VERTICAL OPENINGS

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 2908 and fire-resistive as specified in this Chapter, with the following exceptions:

(a) Combustible materials shall be permitted as specified in Subsection 2012.5.

(b) The projection of wood roof 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 (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 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.

(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.

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 insulating materials, other than a vapor barrier not exceeding .064 inches in thickness, shall not be permitted in concealed places.

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 3710.

2012.5 Decorative structural and non-structural combustible materials may be applied to the exterior of the exterior walls, fascia and soffits as set forth in Sub-section 1812.5.

NOTES

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

All structural and other elements of Type IV buildings shall be of incombustible materials.

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

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

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. 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 and parallel to the common lot line.

2104.1 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.

2104.2 Fire Division walls shall be of incombustible materials and shall also comply with Section 506 herein.

2104.3 Interior bearing walls and partitions shall be of incombustible materials. Corridor partitions shall also comply with Paragraph 3104.4(a).

2105 FLOORS

Floors shall be of incombustible materials, and a wood-wearing surface shall be permitted.

2106 ROOFS

Roofs shall be of any incombustible material, and fireproofing shall not be required.

2106.1 Roof coverings shall be as set forth in Chapter 34.

2106.2 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.

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

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, a guard rail not less than 36 inches above the roof shall be provided around all open wells or shafts and at all exterior walls.

2110 COMBUSTIBLE MATERIALS REGULATED

A loading platform may be constructed of heavy timber construction with wood floors not less than one and five-eighths inches thick. A Type IV building or structure erected over such platform shall be supported by incombustible materials to the foundation.

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

All structural and other elements of Type V buildings shall be of incombustible materials or wood.

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

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. 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.

2203.1 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 that 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.

2203.2 Fire Division walls shall be of incombustible materials and shall also comply with Section 506 herein.

2203.3 Interior bearing walls and partitions shall be of incombustible materials or wood. Corridor partitions shall also comply with Section 3104.

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 of ventilation as set forth in Paragraph 2907.3 (b).

2204.3 Access openings shall be provided to all space under the building.

2205 ROOFS

2205.1 Roofs shall be of incombustible materials or wood.

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 shall not be required, but where attic spaces are provided, such spaces shall have a minimum vertical dimension of 18 inches clear distance and, where unprotected combustible material is exposed, shall be divided by fire stops into areas not exceeding 2,500 square feet. Access scuttles shall be from common spaces such as corridors, and no part of an attic space shall be more than 100 feet from an access scuttle. Minimum vertical dimension shall not be required for hip or gable roof construction.

2206 FIREPROOFING

Bearing walls supporting floors shall not be less than one-hour fire-resistive protection except that where a ground floor has clearance of less than three feet, such fire protection may be omitted.

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

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 No combustible insulation other than a vapor barrier not exceeding .064 inches in thickness. shall be permitted in concealed spaces.

PART VI
ENGINEERING AND CONSTRUCTION REGULATIONS

CHAPTER 23
LIVE AND DEAD LOADS

2301 GENERAL
2302 UNIT LIVE LOAD
2303 SPECIAL LOAD CONSIDERATIONS
2304 ROOF LIVE LOADS
2305 LIVE LOAD REDUCTIONS
2306 WIND REQUIREMENTS
2307 LIVE LOADS POSTED
2308 OCCUPANCY PERMITS
2309 UNIT DEAD LOADS
2310 FOUNDATION DESIGN
2311 LOAD TESTS

2301 GENERAL

2301.1 DESIGN: (a) Any system or method of design or construction shall admit of a rational analysis in accordance with well-established principles of mechanics and sound engineering practices.

(b) Buildings and other structures and all parts thereof shall be designed and constructed to be of sufficient strength to support the estimated or actual imposed dead, live, wind, and any other loads, both during construction and after completion of the structure, without exceeding the stresses for the various materials as specified in this Code.

(c) The 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 the 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 the attachments shall be capable of resisting applied loads normal to the surface, in and out.

2301.2 LOADS: (a) No building or part thereof shall be designed for live loads less than those specified in this Chapter.

(b) The live loads set forth herein shall be assumed to include ordinary impact but where loading involves unusual impact, provision shall be made by increasing the assumed live load.

(c) Provision shall be made in designing office floors for a load of 2000 pounds placed upon any space two and one-half feet square wherever this load upon an otherwise unloaded floor would produce stresses greater than those caused by a uniformly distributed load of 50 pounds per square foot.

(d) In designing floors, not less than the actual live load to be imposed shall be used in the design. Special provision shall be made for machine or apparatus loads.

(e) Where partition locations are subject to change, floors shall be designed to support, in addition to all other loads, a uniformly distributed load equal to 20 pounds per square foot.

(f) Public garages and commercial or industrial buildings in which passenger cars or loaded trucks are placed, used or stored shall have the floor systems designed to support the maximum concentrated wheel load placed in any possible position.

2301.3 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/360

(b) Roof members or components not supporting plaster under span/240

(c) Floor members or components span/360

(d) Vertical and wall members or components with masonry or plaster backing span/360

(e) Vertical and wall members or components without plaster backing span/180

2302 UNIT LIVE LOADS

Unit Live Loads shall be not less than set forth in the following Table:

TABLE 23-A

USE	UNIT LIVE LOADS IN POUNDS PER SQUARE FOOT
Apartments	40
Auditoriums—Fixed Seats	75
Movable Seats	100
Balconies and Galleries	100
Cabanas and Bath Houses	50
Dance Halls	100
Dwellings	40
Garages	100
Garages—For passenger cars with seven and one-half feet fixed maximum head room to upper floors	50
Gymnasiums	100
Hospitals—Wards and Rooms	40
Hotels—Guest Rooms and Private Corridors	40
Libraries—Reading Rooms	60
Stack Rooms	150
Manufacturing—Light	75
Heavy	125
Marquees	60
Offices	50
Paths of Egress—Serving occupancies 80 psf or less	80
Serving occupancies over 80 psf (Nor less than the designed floor load)	100
Platform, Assembly	100
Printing Plants—Press Rooms	150
Composing and Linotype Rooms	100
Rest Rooms	40
Restaurants	80
Reviewing Stands and Bleachers	100
Roof Loads	(See Section 2304)
Schools—Classrooms	40
Skating Rinks	100
Stages	125
Storage—Light	75
Medium	125
Heavy (Load to be determined by proposed use or occupancy)	250
Stores—Light Merchandise	75
Heavy Merchandise	100

2303 SPECIAL LOAD CONSIDERATIONS

2303.1 FLOORS: In the design of floors, consideration shall be given to the effect of known or probable concentration of load,

partial load, impact and machine loads, and design shall be based on the load or combination of loads which produce the higher stresses.

2303.2 BELOW GRADE STRUCTURES: In the design of basements, tanks, swimming pools and similar below grade structures, provision shall be made for the forces due to hydrostatic pressure and lateral pressure of adjacent soil.

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, and the angle of repose of filled soil and muck shall be 15 degrees, with a horizontal line.

For the hydrostatic pressure on any floor below a ground water level, calculations shall be based on full liquid pressure, and such floors shall be designed for live load without hydrostatic uplift and hydrostatic uplift without live load except that private swimming pools may be designed with approved pressure releases for hydrostatic uplifts.

2303.3 OTHER: Balcony and stairway guard rails and grip rails shall be designed to resist a horizontal thrust, in any direction, or not less than 20 pounds per lineal foot applied to the grip rail or top of the guard rail.

Ornamental cantilevered projections on the exterior of buildings shall be designed for not less than 60 pounds per square foot load or 200 pounds per foot applied at the outer edge.

2304 ROOF LIVE LOADS

2304.1 Roofs shall be designed for a live load of not less than 30 pounds per square foot except;

(a) Roofs occupied as roof gardens or for concentrated loads shall be designed for the corresponding occupancies.

(b) Glass areas of greenhouse roofs shall be designed for a live load of not less than 15 pounds per square foot.

(c) Roofs with a slope of 1½ to 12, or greater, without parapet, supported by wood trusses may be designed for an allowable stress increase for truss members and joints of 33 and 1/3 percent for both dead and live load.

(d) Roofs of screen enclosures as set forth in Sub-section 4403.1.

2304.2 Roof decking shall be designed to support the live load set forth in Sub-section 2304.1 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.

2305 LIVE LOAD REDUCTION

The following reductions in assumed live loads shall be permitted in designing columns, walls, beams, girders, and foundations:

2305.1 No reduction of the assumed live load shall be allowed in the design of any slabs, joists or other secondary members except as set forth herein.

2305.2 A reduction of the total live load used in the design of girders based on a certain tributary floor or roof area shall be permitted as noted in the following schedule. This reduction shall not be in addition to the permitted column reduction nor shall such reduction be used in design of buildings to be used or occupied as warehouses or for storage purposes:

Reduction Allowed	Tributary Floor or Roof Area
5%	100 square feet
10%	200 square feet
15%	300 square feet or more

2305.3 The total live loads carried by a column or footing may be reduced by an amount not exceeding the following percent

ages except that the reduction at any floor or roof shall not be required to be less than the average percent of reduction allowed for tributary members at that floor or roof. The percentage herein set forth shall be applicable to all the live load tributary to the member considered based on the location of the member in the building as follows:

Allowable Reductions for Warehouses and Storage Buildings:

	Percent
Roof	0
Roof and one floor	0
Roof and two floors	5
Roof and three floors	10
Roof and four floors	15
Roof and five or more floors	20

Live Load Reductions for Manufacturing Buildings, Stores, and Garages:

	Percent
Roof	0
Roof and one floor	0
Roof and two floors	10
Roof and three floors	20
Roof and four or more floors	30

Allowable Live Load Reductions for All Other Buildings:

	Percent
Roof	0
Roof and one floor	0
Roof and two floors	10
Roof and three floors	20
Roof and four floors	30
Roof and five floors	40
Roof and six or more floors	50

2306 WIND REQUIREMENTS

2306.1 GENERAL (a) Building and structures and every portion thereof shall be designed and constructed to resist the forces due to wind pressure. The wind velocity shall be taken as not less than 120 MPH at a height of 30 feet above the ground, except as may be otherwise set forth herein.

(b) Such forces shall be applied in any direction, with all possible combinations based on height and shape factors, but in no case shall any roof be designed for less than 30 pounds per square foot live load. The said live load shall not be considered to act simultaneously with the wind load.

(c) Systems shall be designed and constructed to transfer wind forces to the ground.

(d) No allowance shall be made for the shielding effect of builings or other structures.

(e) The minimum unit wind pressures to be used in design shall be obtained by multiplying the velocity pressures set forth in Table 23-B of Sub-section 2306.2 by the Shape Factors as described in Sub-section 2306.3.

(f) The Building Official may accept a design based on other nationally recognized and accepted data, the validity of which is shown by wind tunnel and/or satisfactory test data, and may require evidence to support the values for wind pressure used in the design of structures not specifically included in this Section.

(g) Structural members, providing stability for the building or structure, shall be designed to resist the forces set forth in Table 23-B multiplied by the shape factors set forth in Paragraph 2306.3(a).

(h) Building components such as, but not limited to, purlins, girts, wall panels and sheathing, transferring wind loads to the structural frame, shall be designed to resist the forces set forth in Table 23-B multiplied by the shape factors set forth in Paragraph 2306.3(b).

2306.2 **VELOCITY PRESSURES:** (a) Velocity pressures, in pounds per square foot, based on height above ground, in feet, shall be taken as not less than those in Table 23-B.

TABLE 23-B

HEIGHT ABOVE GROUND (In Feet)	MINIMUM VELOCITY PRESSURE In pounds per square foot.
0 to 5	22
5 to 15	27
15 to 25	33
25 to 35	37
35 to 55	41
55 to 75	46
75 to 100	50
100 to 150	55
150 to 250	63
250 to 350	71
350 to 550	80
550 to 750	89
750 to 1000	97
over 1000	100

(b) Velocity pressures are based on the formula

$$P = 0.00256 \times V^2 \times \left(\frac{H}{30}\right)^{2/7}$$ where:

V = 120 MPH; and

H = the height above grade (in feet) of the pressure being computed.

(c) Velocity pressure for heights above 1000 feet may be taken as that for 1000 feet.

2306.3 **SHAPE FACTORS:** (a) Shape factors for the stability of a building or structure shall be taken as: ("Plus" signifies pressures inward or downward and "minus" signifies pressures outward or upward.)

(1) For Vertical Surfaces:

(aa)	Rectangular Prismatic Structures (sum of + 0.8 windward and − 0.5 leeward)	1.3
(bb)	Cylinders	0.7
(cc)	Flat surfaces with no appreciable depth such as signs and fences	1.4

(dd) Partially Open Surfaces:

Per cent Solid	Shape Factor (times gross area)
10	0.35
20	0.55
40	0.80
60	1.00
80	1.20
100	1.30

(2) For Horizontal Surfaces (Including Surfaces with less than 10° inclination to the horizontal.)

		Windward* 1/3 of surface	Leeward** 2/3 of surface
(aa)	Enclosed Buildings:	−1.0	−0.75
(bb)	Buildings with one or more sides open	−1.5	−1.25
(cc)	Overhangs and eaves	−1.5	(all cases)

*The direction from which the wind is coming.

**The direction towards which the wind is going.

(3) FOR INCLINED SURFACES:

Angles from the Horizontal	Normal to Windward Surface	Normal to Leeward Surface
(aa) Above 70° to 90°	+0.80	−0.50
Above 60° to 70°	+0.70	−0.50
Above 50° to 60°	+0.50	−0.50
Above 40° to 50°	+0.20	−0.50
Above 30° to 40°	−0.20	−0.50
Above 20° to 30°	−0.40	−0.50
10° to 20°	−0.70	−0.50

(bb) Overhangs and Eaves .....−1.50 (all cases)

(cc) For buildings with one or more sides open, add −1.0 to the negative factors for inclined surfaces.

(dd) For gable roofs a factor of −0.6 shall be used when the wind is assumed to blow parallel with the roof ridge.

(ee) The wind pressure on a curved roof due to wind blowing at right angles to the axis of the roof shall be computed on the basis that the curved portion is divided into not less than five equal segments. The pressure on each segment, whether positive or negative, shall be determined by the use of shape factors in Sub-paragraph (aa) above, appropriate to the slope of the chords of the segments.

(ff) In multi-span or saw-tooth roofs where the span heights and slopes are approximately the same and where there is a sheltering effect from the windward span, the external pressures and forces on the intermediate spans may be appropriately reduced.

(b) Shape factors for building components transferring wind loads to the structural frame shall be taken as:

(1) VERTICAL SURFACE SHAPE FACTORS

	Pressure Inward	Pressure Outward
(aa) Exterior walls of enclosed buildings, including fixed lites of glass, glazing and all supporting members	+1.1	−1.1
(bb) Operative doors and windows, including all constituent parts.	+1.1	−0.55
(cc) Exterior walls of buildings with one or more sides open	+1.1	−1.5

(2) Horizontal Surface Shape Factors as set forth in Paragraph 2306.3(a)(2).

(3) Inclined Surface Shape Factors as set forth in Paragraph 2306.3(a)(3).

2306.4 OVERTURNING MOMENT AND UPLIFT: (a) Computations for overturning and uplift shall be based on the building as a whole using the shape factors set forth in Paragraph 2306.3(a).

(b) Overturning stability of any building or structure taken as a whole shall be provided and shall be not less than 150 percent of wind load overturning moment.

(c), Uplift stability of any building structure or part thereof or isolated component thereof shall be provided and shall be not less than 150 percent of the wind load uplift thereon.

(d) 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.

2306.5 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 except as follows:

(1) Such increased stresses shall not apply to foundations except as provided in Section 2310.

(2) Such increased 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 increased stresses shall not apply to glazing materials other than glass.

(b) In no case shall the cross-section properties be less than required for dead load plus live load without wind load.

2306.6 SCREEN ENCLOSURES: The wind loads on screen surfaces shall not be less than set forth in Paragraph 4403.4(c). 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.

2307 LIVE LOADS POSTED

The live loads for which each floor or part thereof of a commercial or industrial building is or has been designed, other than a concrete floor slab at grade, shall be conspicuously posted by the owner in that part of each story in which they apply, using durable signs and in letters not less than three inches in height. It shall be unlawful to remove or deface such notices and the occupant of the building shall be responsible for keeping the actual load below the allowable limits.

2308 OCCUPANCY PERMITS

Plans for proposed buildings of commercial or industrial occupancy, and storage areas in buildings of any occupancy, shall show the design live load for each portion of the floor area and Certificates of Occupancy as set forth in Section 307 shall not be issued until such signs are posted as required.

No change in the occupancy of a building shall be made until a Certificate of Occupancy has been issued by the Building Official, certifying that the floors are suitable for the loads characteristic of the proposed occupancy.

2309 UNIT DEAD LOADS

Unless otherwise substantiated by specific information, the weight of the materials and assemblies of construction used in the calculation of loads shall be not less than as follows:

Concrete	144	pounds per cubic foot
Earth, dry	100	pounds per cubic foot
Stone masonry	160	pounds per cubic foot
Timber	50	pounds per cubic foot
Wood studs—plastered two sides	18	pounds per square foot
Solid plaster—one-inch thick	10	pounds per square foot
Four-inch hollow blocks—gypsum	13	pounds per square foot
Four-inch hollow blocks—concrete	25	pounds per square foot
Eight-inch hollow blocks—clay	40	pounds per square foot
Eight-inch hollow blocks—concrete	50	pounds per square foot
One-inch wood sheathing	4	pounds per square foot
Two 30-pound felts, tar & gravel	6	pounds per square foot
Clay or concrete roof tile	18	pounds per square foot

2310 FOUNDATION DESIGN

2310.1 The load for which foundations shall be designed shall preferably be determined in the following manner. The area of the footing or number of piles shall be determined under the column having the greatest percentage of live load, by dividing the total load by the allowable soil pressure or load per pile. From the results obtained, the dead load soil pressure or load per pile shall be determined by dividing the total dead load by the area of the footing, or the number of piles as determined from the total load, and such figures shall be used to determine all other foundations from total dead loads. The total reduced live load in the column immediately above the footing shall be the live load used in the above computations.

2310.2 Where the pressure on the foundation due to wind is less than 25 percent of that due to dead and other live loads, wind pressure may be neglected in the footing design. Where this ratio 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.

2311 LOAD TESTS

2311.1 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 tests as proof of compliance to be made at the expense of the owner or his agent by an approved agency. Test methods shall be as specified by this Code for the material in question.

2311.2 Where there is no recognized standard test procedure for the material or assembly in question, the Building Official shall require that the material or assembly under dead plus live load shall deflect not more than as set forth in Sub-section 2301.3 herein, and that the material or assembly shall sustain dead plus twice the live load for a period of 24 hours, with a recovery of at least 80 percent.

2311.3 Where elements, assemblies or details of structural members are such that calculation of their load carrying capacity, deformation underload 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.

2311.4 Load tests on roofing and attachments shall be as set forth in Sub-paragraph 3402.1 (d) (7).

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 EXCAVATIONS

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, where necessary, to prevent the adjoining earth from caving in; such protection to be by the person causing the excavation to be made. 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 under-pinned 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 excavations 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 or 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 SOIL INVESTIGATION: Plans for new buildings or additions shall bear a statement as to the nature and character of the soil under the structure. Where the bearing capacity of the soil is not known or is in question, or the load imposed on the soil is unusual, the Building Official may require examination of subsoil conditions such as by borings and other tests. Evaluation of results of investigation by a Registered Professional Engineer, known to the Building Official to be qualified to evaluate safe bearing capacity may be required. Plate load tests shall be used only to supplement other subsoil investigations.

2402.2 PRESUMPTIVE CAPACITIES: The allowable bearing capacities on supporting soils shall not exceed those set forth in the following table unless the design bearing capacity is substantiated by recognized tests, analysis and procedure. These values are considered safe in respect to actual failure of the supporting ground but do not necessarily ensure the prevention of excessive foundation movements where unusual soil or moisture conditions are encountered.

Nature of Soil	Maximum Soil Pressure (Pounds per square foot)
Other than as stated below	0
Rock or sand fill over soil of higher bearing capacity	600
Undisturbed sand, or sand and rock	2500
Solid rock or with pot holes cleaned and filled with concrete (Minimum depth of strata 5 feet)	6000

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 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
600	1	12″ x 30″
	2	12″ x 36″
2500 or More	1	10″ x 16″
	2	10″ x 20″

Based on soil investigation as set forth in Sub-section 2402.1, the footing sizes may be reduced considering allowable bearing values and loads, but the minimum width of a footing under the main walls of a building shall not be less than 16 inches nor less than eight inches more than the width of the foundation wall.

(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:

	Height			
	9″ to 2′	2′1″ to 4′	4′1″ x 6′	6′1″ to 10′
Other than rock	4″ x 8″	8″ x 16″	10″ x 16″	12″ x 20″
For rock	None	8″ x 12″	8″ x 16″	10″ x 20″

(c) The minimum continuous footings specified in this section shall be reinforced as follows:

Reinforcing	Width Foundation
2—#4 Bars	12″ wide
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 not be less than 24 bar diameters and all corners shall be properly tied. 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) Reinforcing shall be uniformly spaced and shall provide a minimum of three inches of concrete cover.

(4) Excavations for continuous footings 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 vertical tie of the same cross section and design as the footings, or the smaller of the footings, so joined.

(e) Continuous footings on which the center of gravity of the loads fall outside of the middle one-third shall be considered eccentric and provisions shall be made to limit the soil pressure at the edges to 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.

2403.3 ISOLATED FOOTINGS: (a) Dimensions for an isolated footing shall not be less than 10 inches deep and 20 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 on which the center of gravity of the load falls outside the middle 1/3 of any line passing through the center of gravity of the footings shall be considered eccentric, and provisions shall be made to limit the soil pressure at the edges by means of footings straps or other approved methods.

(c) Where isolated footings support reinforced concrete columns, dowels equivalent in number and area to the column reinforcing and having a length not less than 20 diameters above and below the joint shall be provided in the footing. Where footing depth does not allow straight dowels standard 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.

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 inchs 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 the Tentative Methods of Test for Moisture Density Relations of Soils, ASTM Designation D1557-70, modified to use 25 blows on 5 layers with a 10 pound hammer dropping 18 inches.

(d) 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 2½ feet out from such support with a minimum of twice the area of reinforcing set forth in Paragraph 2403.4 (c).

(e) The discontinuous edges of all slabs surrounding swimming pools and slabs for screen patios shall be at least 8 inches deep for a width of 8 inches and contain 1 #5 continuous bar.

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 the Engineer. Immediately after completion of jetting, pile shall be driven below the depth jetted to the required resistance but not less than one foot. 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 3/4 times the diagonal dimension of rectangular piles but in no case less than 30 inches, considering also provisions of Section 2404.1 (l). 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 Subsection 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:

$$E = 1 - \phi \left(\frac{(N-1)M + (M-1)N}{90MN} \right)$$

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
ϕ..... arc $\tan\left(\frac{D}{S}\right)$ 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 1/4

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 by the special inspector or Engineer. The piles shall reach their final penetration by driving.

(s) The maximum load permitted on any pile shall not exceed 50 tons unless substantiated by load test performed at the site as set forth in sub-section 2404.9. The Building Official may require tests on any pile where its 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 heaved piles 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: $$P = \frac{2\ Wh}{S + 1}$$

Single Acting Hammers: $$P = \frac{2\ Wh}{S + 0.1}$$

Double Acting Hammers Or Differential: $$P = \frac{2\ (W + Ap)h}{S + 0.1}$$

In which:

A=area of piston in square inches

p=pressure in pounds per square inch at the hammer

P=equals allowable total load in pounds

W=equals weight of striking part of hammer in pounds

h=equals height of fall of striking part of hammer in feet or stroke in feet

S=equals average penetration, in inches, per blow of not less than the five final blows

E=equals actual energy delivered by hammer per blow in foot pounds

2404.3 WOOD PILES: (a): Wood piles shall be in one piece of approved timber containing no evidence of decay, free from short

kinks or reverse bends and having uniform taper from butt to tip. A straight line drawn from the center of the butt to the center of the tip shall lie wholly within the body of the pile. The diameter of wood piles shall be not less than 6 inches at the tip and not less than 10 inches three feet from the butt for piles which are 25 feet or less in length; or 8 inches at the tip and 12 inches three feet from the butt for piles which exceed 25 feet in length. No piles which have a spiral grain exceeding one complete turn in 40 feet shall be used.

(b) Untreated wood piles in all cases shall be cut off not higher than mean low water and shall be capped with concrete.

(c) Pressure preservative treatment for piles as set forth herein shall be in conformance with the requirements of the American Wood Preservers Association "Manual of Standard Practice" C1-69, C3-69, and C12-69 for the treatment of wood piles currently in effect. Preservative treatment required herein may be omitted for piles having rot and borer resistive characteristics satisfactory evidence of which is approved by the Building Official.

(d) Wood piles supporting structures over the ground may be cut off at any elevation below the ground surface provided that such piles shall have been treated with the equivalent of Grade 1 creosote oil under pressure in such a manner as to retain not less than 12 pounds of creosote oil per cubic foot. In such cases, the pile butt shall be thoroughly coated with two applications of hot creosote oil.

(e) 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 loading and other similar light structures shall have been treated with the equivalent of Grade I creosote oil or 7 - 30 creosote-coal tar solution under pressure in such a manner as to retain not less than 20 pounds of creosote oil or creosote-coal tar solution per cubic foot or refusal.

(f) 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.

(g) 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.

(h) In the absence of load tests, the total load on any wood pile shall not exceed the values set forth in Table 24-A.

TABLE 24-A

Tip Diameter	Butt Diameter	Maximum Load In Tons
6″	10″	15
8″	12″	20
10″	14″	25

2404.4 PRECAST CONCRETE PILES: (a) Precast concrete piles shall be cast of concrete having a compressive strength of not less than 3,000# 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 such 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 and end closures 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# 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) 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. Shells having a wall thickness of 0.119 inch or more may be considered as carrying part of the load. Adequate allowance for corrosion shall be considered in the design but not less than the outer 1/16 inch of the shell thickness shall be deducted before computing the area of the shell considered as carrying load. The metal for the shells shall conform to ASTM Designation A252-69, Grade 2. Welded and Seamless Steel Pipe Piles, or ASTM Designation A245-64, Grade A, Flat-Rolled Carbon Steel Sheets of Structural Quality. 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 0.25 f'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: Rolled structural steel piles shall conform to the Specification for Structural Steel for Bridges and Buildings of the American Society for Testing Materials, ASTM Designation A29-67 and A306-64 except that copper may be added to increase the corrosion resistant properties of the material. Sections of such piles of H form shall have flange projection not exceeding 14 times the thickness of web or flange and with total flange width not less than 85 percent of the depth of the section. No section shall have a nominal thickness of metal less than 3/8 inch. 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. In the absence of adequate corrosion protection, 1/16 inch shall be deducted from each face in determining the area of the pile section. 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 1½ 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.

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 building, 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) For wood frame buildings not exceeding one story in height, isolated piers may be substituted for interior foundation walls where such piers do not exceed 24 inches in height, are a minimum of 12 inches by 12 inches in cross-sectional dimension, and are located at corners and points of concentration, but not more than six feet apart.

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

The grade of the ground under buildings of joist or suspended slab construction, having no basements, shall be not lower than the lowest surrounding finished lot area grades in order to prevent the accumulation and standing of ground, storm or tide water under such building unless provided with other approved means of drainage. Plans for future raising of lots shall be taken into account in planning the grade of the ground under such buildings; or the Building Official may establish grades under such buildings based on present or future street or sidewalk grades abutting the property.

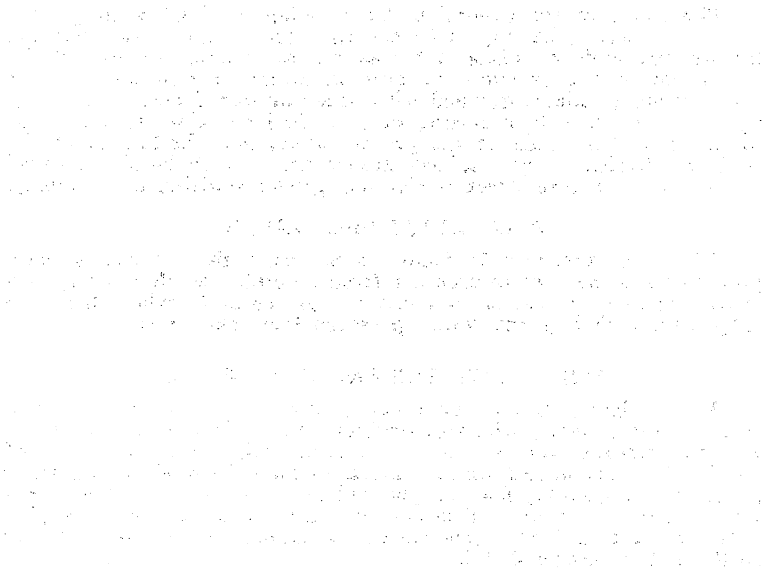
2407 RETAINING WALLS

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 pressures to which they are subjected, including any water pressure that may exist.

2408 SEAWALLS AND BULKHEADS

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 other deposition or removal of material in all of the water areas of this County, shall be planned and designed by a Registered Professional Engineer, and in accordance with this and other applicable standards and requirements of the administrative authority set forth in Sub-section 301.2.

NOTES



CHAPTER 25

REINFORCED CONCRETE

2501 GENERAL
2502 STANDARDS
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2505 QUALITY OF CONCRETE
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2501 GENERAL

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.

2502 STANDARDS

The following standards are hereby adopted as a part of this Code and supplement, but do not supersede, the specific requirements as set forth herein:

2502.1 "Building Code Requirements for Reinforced Concrete," ACI 318-63, as adopted by the American Concrete Institute.

2502.2 "Minimum Standard Requirements for Precast Concrete Floor Units," ACI 512-67, as adopted by the American Concrete Institute.

2502.3 "Manual of Standard Practice for Detailing Reinforced Concrete Structures," ACI 315-65.

2502.4 "Minimum Requirements for Thin-Section Precast Concrete Construction," ACI 525-63, as adopted by the American Concrete Institute.

2502.5 "Deformed Billet Steel Bars for Concrete Reinforcement" ASTM A615-70 of the American Society for Testing Materials.

2502.6 "Standard Specifications for Vermiculite Concrete Roofs and Slabs-On-Grade," ANSI A122.1-1965 of the American National Standards Institute.

2503 DEFINITIONS

The following words and terms shall, for the purpose of this Code, have the meanings set forth in this Section:

(a) Commissioners of Buildings shall mean the Building Official.

(b) Board of Special Construction shall mean the Board of Appeals.

2504 MATERIALS AND TESTS

2504.1 PORTLAND CEMENT: Portland cement shall conform to the "Standard Specifications for Portland Cement" (ASTM Designation: C150-70).

2504.2 CONCRETE AGGREGATES: Aggregates used in concrete for buildings or structures shall conform to the "Standard Specifications for Concrete Aggregates" (ASTM Designation: C33-

67 or to the "Standard Specifications for Lightweight Aggregates for Structural Concrete" (ASTM Designation: C330-69) except as follows:

(a) The gradation of locally produced sand and crushed rock aggregate shall be as follows:

COARSE AGGREGATE		FINE AGGREGATE	
Percent Passing		Percent Passing	
1½" Sieve	100-	⅜" 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

(b) Aggregates failing to meet these specifications but which have been shown by approved laboratory test to produce concrete of the required quality may be used where authorized by the Building Official.

(c) Aggregates shall be quarried or washed in fresh water and shall contain not more than one-twentieth of one percent salt by weight.

2504.3 REINFORCING: Reinforcing steel complying with the standard set forth in Sub-section 2504.5 shall not be of structural grade.

2504.4 TESTS: (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 the requirements of the American Society for Testing Materials as noted elsewhere in this Chapter. Tests shall be made by an approved testing laboratory and the results of such tests submitted to the Building Official by the laboratory. The complete records of such tests shall be available for inspection during the progress of the work and for a reasonable period thereafter, and shall be preserved by the engineer or architect for that purpose.

2505 QUALITY OF CONCRETE

2505.1 CONCRETE QUALITY: (a) For the design of reinforced concrete structures, the value of f'_c used for determining the allowable stresses as stipulated in Section 2505.3 shall be based on the 28-day compressive strength of the concrete or the specified minimum compressive strength at the earlier age at which the concrete may be expected to receive its full load. All plans, submitted for approval or used on the job, shall clearly show the assumed strength of concrete at a specified age for which all parts of the structure were designed.

(b) The minimum quality and strength of concrete used structurally shall be not less than as follows:

(1) Concrete of heavy aggregates such as common rock and sand shall be of not less strength than 2,000 psi in 28 days.

(2) Concrete of lightweight aggregates such as expanded shale or cinders used for structural columns, beams, suspended slabs and similar structural members shall be of not less strength than 2,000 psi in 28 days nor contain less cement than 5 bags per yard.

(3) Concrete of lightweight aggregates such as expanded shale and other expanded minerals used in combination with tees spaced not more than 32⅝ inches apart placed on formboard and reinforced with wire mesh shall be of not less strength than 350 psi in 28 days.

(c) Concrete of lightweight aggregate such as expanded shale and other expanded minerals used for insulation over structural decks and where not assigned structural value shall be of not less strength than 125 psi in 28 days or a net density of 12 pounds per cubic yard.

(d) Gypsum concrete shall comply with Chapter 26 herein.

(e) The Building Official may accept concrete mixed in the proportion of one cubic foot or one sack of Portland cement, two and one-half cubic feet of sand and four cubic feet of coarse aggregate when machine mixed with sufficient water to make a plastic mix with no free water, provided the use of concrete so proportioned and mixed is limited to minor building components.

(f) When the design is based on f'_c in excess of 2500 psi, proportioning and mixing shall be approved by, and placing shall be under the supervision of a Registered Professional Engineer as set forth in Sub-section 305.3.

2505.2 TESTS ON CONCRETE: (a) (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, nor less than one test for each 50 cubic yards of concrete used at any job site.

(3) Specimens shall be made and cured in accordance with the Standard Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Field, (ASTM Designation: C31-69).

(4) Specimens shall be tested in accordance with the Standard Method of Test for Compressive Strength of Molded Concrete Cylinders, (ASTM Designation: C39-66) and the three specimens constituting a standard test shall be tested at 28 days.

(5) Test cylinders taken on truck-mixed concrete shall be taken at the approximate one-quarter point and three-quarter point of the load.

(b) 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 relation between the seven and 28-day strengths of the concrete is established by tests for the materials and proportions used.

(c) To conform to the requirements of these specifications, the average strength of the laboratory cured cylinders representing each class of concrete as well as the average of any five consecutive strength tests representing each class of concrete shall be equal to, or greater than the specified strength and not more than one strength test in ten shall have an average value of less than 90 percent of the specified strength.

(d) In addition, where there is question as to the quality of the concrete in the structure, the Building Official may require core tests in accordance with the "standard" Methods of Securing, Preparing and Testing Specimens from Hardened Concrete for Compressive and Flexural Strengths," (ASTM Designation: C42-70) or order load tests for that portion of the structure where the questionable concrete has been placed. When concrete in structures has failed to meet the minimum standards, the Building Official shall order analysis and report by a Registered Engineer to determine the adequacy of the structure.

(e) The maximum allowable slump of concrete shall be six inches. On jobs controlled and supervised by a Professional Engineer, this maximum may be exceeded, but no concrete shall exceed the slump as indicated on the approved plans for the proposed work.

No water shall be added at the job site to concrete delivered by truck as ready for use except by the control of a supervising Professional Engineer or other concrete control authority acceptable to the Building Official, and then only when slump tests are made and the concrete so delivered is known to be of less than the slump specified or job conditions require a greater slump.

2505.3 ALLOWABLE UNIT STRESS IN CONCRETE: The allowable unit stresses in concrete shall not exceed those set forth in the standard in Sub-section 2502.1.

2506 MIXING AND PLACING

2506.1 FORMS AND EQUIPMENT: (a) Before placing concrete, all equipment for mixing and transporting the concrete shall be cleaned, all debris removed from the spaces to be occupied by the concrete, forms shall be thoroughly wetted or oiled, masonry filler units that will be in contact with concrete shall be well drenched, and the reinforcement shall be thoroughly cleaned.

(b) Water shall be removed from place of deposit before concrete is placed unless otherwise permitted by the Building Official.

2506.2 MIXING OF CONCRETE: (a) Unless otherwise authorized by the Building Official, the mixing of concrete shall be done in a batch mixer of approved type.

(b) All concrete shall be mixed until there is a uniform distribution of the materials and shall be discharged completely before the mixer is recharged.

(c) For job mixed concrete, the mixer shall be rotated at a speed recommended by the manufacturer and mixing shall be continued for at least one and one-half minutes after all materials are in the drum. For batches larger than one cubic yard, mixing time shall be increased 15 seconds for each additional cubic yard or fraction thereof.

(d) Ready-mixed concrete shall be mixed and delivered in accordance with the requirements set forth in the "Standard Specifications for Ready-Mixed Concrete" (ASTM Designation: C94-69).

(e) No concrete shall be retempered after it has taken an initial set nor shall any batch or portion thereof be deposited in forms more than one and one-half hours after the mixing of that particular batch has been commenced.

2506.3 CONVEYING: (a) Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent separation or loss of the materials.

(b) Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery end without separation of the materials.

2506.4 DEPOSITING: (a) Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between the bars. No concrete that has been contaminated by foreign materials shall be deposited on the work.

(b) When concreting is once started, it shall be carried on as a continuous operation until the placing of the panel or section is completed. The top surface shall be generally level. When construction joints are necessary, they shall be made as set forth in Sub-section 2507.8.

(c) All concrete shall be thoroughly compacted by suitable means during the operation of placing, and shall be thoroughly worked around the reinforcement and embedded fixtures and into the corners of the forms. Where concrete is placed in columns or walls, the placing shall be so conducted that the concrete will not pass reinforcements for more than six feet. Separate lifts shall be thoroughly compacted. Vibrators may be used to aid in the placement of the concrete, provided they are used under experienced supervision, the forms are designed to withstand their action, and their action is not directed to bars, any part of which is in contact with concrete which started to take its initial set.

(d) Where conditions make compacting difficult, or where the reinforcement is congested, batches of mortar containing the same proportions of cement to sand as used in the concrete, shall first be deposited in the forms to a depth of at least one inch.

2506.5 CURING: In all concrete structures, concrete made with normal Portland cement shall be maintained in a moist condition for at least the first seven days after placing and high-early-strength concrete shall be so maintained for at least the first three days.

2506.6 BONDING: Before new concrete is deposited on or against concrete which has set, the forms shall be retightened, the surface of the set concrete shall be cleaned of all foreign matter and laitance, and wetted. The cleaned and wetted surfaces of the hardened concrete shall first be slushed with a coating of neat cement against which the new concrete shall be placed before the mortar has attained its initial set.

2507 FORMS AND DETAILS OF CONSTRUCTION

2507.1 DESIGN OF FORMS: Forms shall conform to the shape, lines and dimensions of the members as called for on the plans, and shall be substantial and sufficiently tight to prevent leakage of mortar. Forms shall be properly braced or tied together so as to maintain position and shape. Temporary openings at the bottom of columns shall be provided to facilitate cleaning and inspection before depositing concrete. When the concrete has attained sufficient strength, forms shall be removed from at least two faces of all reinforced members, other than where placed in contact with the soil or for slabs or joists, to facilitate inspection of placing operations, except that "U" type beam block may be used with the limitations as set forth in Sub-paragraph 2704.2 (c) (2).

2507.2 REMOVAL OF FORMS: The removal of forms shall be carried out in such a manner as to insure the complete safety of the structure. Vertical forms may be removed in 24 hours, provided that the concrete has hardened sufficiently that it is not injured. Bottom forms and shoring for slabs, beams and girders shall not be removed in less than 14 days; except that where tests indicate that the concrete has attained sufficient strength to safely support itself and any imposed loads in less time, adjustments in the above waiting periods may be made by the Building Official in conformance with the results obtained.

2507.3 PIPES AND CONDUITS EMBEDDED IN CONCRETE: Pipes which will contain liquid gas or vapor at other than room temperature shall not be embedded in concrete necessary for structural stability or fire protection. Drain pipes and pipes whose contents will be under pressure greater than atmospheric pressure by more than one pound per square inch shall not be embedded in structural concrete except in passing through from one side to the other of a floor, wall or beam. Electric conduits and other pipes whose embedment is allowed shall not, with their fittings, displace that concrete of a column on which stress is calculated or which is re-

quired for fire protection, to greater extent than four percent of the area of the cross section. Sleeves or other pipes passing through floors, walls or beams shall not be of such size or in such location as unduly to impair the strength of the construction; such sleeves or pipes may be considered as replacing structurally the displaced concrete, provided they are not exposed to rusting or other deterioration, are of uncoated iron or steel not thinner than standard wrought-iron pipe, have a nominal inside diameter not over two inches, and are spaced not less than three diameters on centers. Embedded pipes or conduits other than those merely passing through, shall not be larger in outside diameter than one-third the thickness of the slab, wall or beam in which they are embedded; shall not be spaced closer than three diameters on centers, nor so located as unduly to impair the strength of the construction. Circular uncoated or galvanized electrical conduit of iron or steel (EMT included) may be considered as replacing the displaced concrete. Non-metallic and non-ferrous metallic conduit which does not reduce the structural strength below that required by the design may be embedded in concrete where such use and embedment complies with the National Electrical Code as set forth in Paragraph 4505.1 (a) herein.

2507.4 CLEANING AND BENDING REINFORCEMENT: Metal reinforcement, at the time concrete is placed, shall be free from rust, scale or other coatings that will destroy or reduce the bond.

2507.5 PLACING REINFORCEMENT: Metal 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 one inch nor less than the diameter of the bars, and the bars in the upper layers shall be placed directly above those in the bottom layer.

2507.6 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 24 bar diameters, but not less than 12 inches for bars. The clear distance between bars shall also apply to the clear distance from a contact splice and adjacent splices or bars.

(b) Welded splices in reinforcing bars shall be made by certified welders and shall comply with the American Welding Society standard AWS D 12.1-61 which is hereby adopted to supplement, but not supersede, the requirements set forth herein.

2507.7 CONCRETE PROTECTION FOR REINFORCEMENT: (a) The reinforcement of footings 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 #5 and one and one-half inches for #5 bars or smaller.

(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 walls; 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 inch.

(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 in Paragraph 2507.7(b).

(d) Exposed reinforcement bars intended for bonding with future extensions shall be protected from corrosion by concrete or other adequate covering.

(e) The above protective coverings are minimums but protection shall not be less than elsewhere set forth for required fire-resistive ratings.

2507.8 CONSTRUCTION JOINTS: (a) Joints not indicated on the plans shall be so made and located as to least impair the strength of the structure. Where a joint is to be made, the surface of the concrete shall be thoroughly cleaned and all laitance removed. Vertical joints shall be thoroughly wetted, and slushed with a coat of neat cement grout immediately before placing of new concrete.

(b) At least two hours must elapse after depositing concrete in the columns or walls before depositing in beams, girders, or slabs supported thereon. Beams, girders, brackets, column capitals, and haunches shall be considered as part of the floor system and shall be placed monolithically therewith.

(c) Construction joints in floors shall be located near the middle of the spans of slabs, beams, or girders except where such slabs, beams or girders carry concentrated loads, in which case the location of construction joints shall be determined by engineering analysis.

2508 PRECAST CONCRETE UNITS

2508.1 GENERAL: (a) Precast concrete units shall comply with the minimum requirements set forth in this Chapter, and the Standards set forth in Sub-sections 2502.2 and 2502.4.

(b) All precast structural items shall be designed by a Registered 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.

2508.2 CONCRETE PROTECTION FOR REINFORCEMENT: Concrete coverage of reinforcement in precast units shall be as set forth in the appropriate standard except that precast cement mortar units may have less cover than otherwise set forth, but not less than ⅛ inch providing:

(a) The units are manufactured under the control, certification and supervision of a Registered Professional Engineer.

(b) Reinforcing shall be galvanized, stainless steel or approved equal.

(c) To insure exact final location of the steel, positive and rigid devices for that purpose are employed in the manufacturing process.

(d) Cement mortar density shall be not less than 155 pounds per cubic foot, including reinforcing, and the minimum strength shall not be less than 5000 psi in 28-days.

(e) Cement mortar shall not contain less than 1 part cement, by volume, for each two parts of fine aggregate.

(f) Fine aggregate shall have a maximum size of 4.76mm (#4 sieve).

(g) No coarse aggregate shall be used.

(h) Units shall be cast on vibrating forms.

(i) Member shall not be in contact with the ground or standing water.

(j) Where required for fire-resistivity concrete cover shall be as set forth in Chapter 37.

2508.3 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 reinforcing 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 the narrowest dimension between sides of the forms.

2508.4 STRENGTH OF CONCRETE: (a) Concrete for precast structural units made of crushed stone or other heavy aggregate shall have a compressive strength of not less than 2500 p.s.i. at 28 days.

(b) Concrete for precast units made of light weight aggregate concrete shall follow the general provisions of Sub-section 2503.3 with consideration of the nature and limitations of the aggregate and the strength of the product.

2508.5 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 regular cement, or at least seven days old, if made with Type III cement, or until its strength, as established by definite tests, is at least 60 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 reinforceing except at ends or, with a compressive section dimension more than one-eighth inch less than specified dimension shall not be permitted.

2508.6 CURING: (a) No precast structural unit shall be removed from the form until the concrete has attained a compressive strength of 30 percent of the 28-day design strength but not less than 1000 p.s.i., 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.

2508.7 IDENTIFICATION AND MARKING: All joists, beams, girders, 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.

2508.8 CUTTING OF HOLES: No openings or channels not provided for in the structural design shall be made on the job without the specific approval of the engineer and in accordance with his written, detailed instructions covering such work.

2508.9 ANCHORAGE: Anchorage of all precast concrete units shall be designed, based on rational analysis to transmit loads and other forces to the structural frame.

2508.10 BRIDGING: 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.

2508.11 CONNECTIONS: All joints 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, storage, and transportation of members.

2509 PRESTRESSED CONCRETE

2509.1 GENERAL: (a) The term "prestressed concrete" refers to pretensioned concrete in which the reinforcing is tensioned before hardening of the concrete; or to post-tensioned concrete in which the reinforcing is tensioned after hardening of the concrete; or combinations of both pre-tensioning and post-tensioning.

(b) All prestressed structural items shall be designed by a Registered 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 design 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 these Standards 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.

2509.2 DESIGN AND CONSTRUCTION: (a) Deflection under live load shall not exceed L/240 and where plaster ceilings are to be applied shall not exceed L/360.

(b) Calcium chloride shall not be used in concrete for prestressed members.

2510 PNEUMATICALLY PLACED CONCRETE

2510.1 (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 be proportioned and applied as set forth herein.

2510.2 MATERIALS: (a) Portland cement shall comply with the Standard Specifications for Portland cement (ASTM) Designations: C150-70.

(b) Aggregate shall comply with the standard recommended practice for Shotcreting ACI 506-66 of the American Concrete Institute. Aggregate for concrete to be used in connection with steel reinforcing shall be quarried or washed in fresh water and shall contain not more than one-twentieth of one percent salt by weight.

(c) Water shall be of potable quality.

(d) All reinforcement shall be clean and free of loose rust or other coatings harmful to bond. Only round bars or wire mesh shall be used.

2510.3 PROPORTIONS: (a) Unless otherwise specified, all pneumatically placed concrete shall be mixed in the proportions of one part of cement to four and one-half parts of sand based on loose, dry volume.

(b) The Building Official may require that core tests shall be made to determine the strength of the material placed. Not less than two test cylinders shall be made of each day's operation. Test cylinders shall be furnished by the person or firms doing or causing the work to be done, and shall be six inches in diameter and 12 inches in height. Forms for cylinders shall be of one-quarter inch hardware cloth, shall be shot with the same air pressure, nozzle tip and hydration as the mortar in the structure and the hardware cloth form shall be removed in 24 hours. Cylinders shall be cured and tested in accordance with the Standard Method of Test for Compressive Strength of Molded Concrete Cylinders (ASTM Designation: C39-66). One cylinder shall be tested at seven days and shall develop a compressive strength of not less than 2400 p.s.i. and one cylinder shall be tested at 28 days and shall develop the specified strength but not less than 3000 p.s.i. based on 1:4½ mix.

2510.4 REBOUND: Rebound recovered clean and free of foreign matter may be reused as sand in quantity not to exceed 20 percent of the sand requirements.

2510.5 CONSTRUCTION JOINTS: Construction joints shall be sloped to a thin edge. No square joints will be allowed.

2510.6 CURING: A light spray of water shall be applied as soon as possible without damage to the surface and the surface shall be kept moist for a period of not less than five days.

2510.7 WORKMANSHIP: Only well trained or experienced foremen, gunmen, nozzlemen, and rodmen shall be employed and the Building Official may require written evidence of experience as a requisite of approval of the work.

2510.8 FORMS: Forms shall be true to line and level, shall be substantially braced to avoid excessive vibration and shall be adequately supported to avoid deflection. Forms for columns shall, where practicable, be on two sides only. Forms for beams shall be a soffit and one side or may be a soffit only with vertical backing of fine wire mesh near the center. Forms shall be clean and thoroughly wetted before application of mortar.

2510.9 PREPARATION OF SURFACES: (a) Old concrete or masonry surfaces shall be thoroughly cleaned by sand blasting. Sand blasting shall be done by experienced workmen and using approved equipment and sand shall be clean, sharp, hard and uniform.

(b) All concrete and masonry surfaces shall be cleaned of dust and loose particles by compressed air and water and shall be thoroughly wetted and surface damp before application of mortar.

(c) Steel surfaces shall be cleaned free of substances that will prevent bond and shall be sand blasted where necessary.

(d) Earth surfaces shall be thoroughly compacted, neatly trimmed to line and grade, and shall be wetted and without free surface water before application of mortar.

2510.10 PLACING OF MORTAR: (a) A uniform water pressure, not less than 15 pounds per square inch above the air pressure, shall be maintained at the nozzle.

(b) For lengths of hose up to 100 feet, pneumatic pressure at the gun shall be 45 pounds per square inch or more. Where length exceeds 100 feet, pressure shall be increased five pounds per square inch for each additional 50 feet of hose required. Steady pressure shall be maintained.

(c) The nozzle shall be held at right angles to the surface and at a distance of two and one-half to three and one-half feet.

(d) When enclosing reinforcing steel, the nozzle shall be held to direct the material behind the bars. Each side of individual bars shall be shot separately.

(e) When enclosing reinforcing steel, an air blow-out jet shall precede the nozzlemen to blow out all rebound or sand which may have lodged behind the bars.

(f) Mortar shall emerge from the nozzle in a steady uninterrupted flow and when the flow becomes intermittent, the nozzle shall be diverted from the work. Hydration shall be thorough and uniform.

(g) In shooting walls and columns, application shall begin at the bottom and the first coat shall completely embed the reinforcement to the form.

(h) In shooting beams, application shall begin at the bottom and a surface at right angles to the nozzle shall be maintained.

(i) 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. The limit of material in one layer shall be the appearance of excess moisture on the surface.

(j) Before placing succeeding layers, all loose material rebound, laitance, rebound pockets, sags or other imperfections harmful to bond or strength shall be removed or carefully cut out and the surface shall be damp. Sufficient time shall be allowed between layers for the material to set.

(k) Finishing of surfaces may be by any method not harmful to the strength of the material. A finish coat may be applied starting from the top and working down.

NOTES

CHAPTER 26

REINFORCED GYPSUM CONCRETE

2601 DESIGN
2602 STANDARDS
2603 TESTS
2604 CONSTRUCTION DETAILS

2601 DESIGN

2601.1 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 so far as they are applicable.

2601.2 LIMITATIONS OF USE: (a) Reinforced gypsum concrete used for roofs of occupancies producing unusually high humidities shall be constructed with the use of non-absorbitive 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-absorbitive formboard.

2602 STANDARDS

The "Standard Specifications for Reinforced Gypsum Concrete" (ANSI-A59.1-1968) of the American National Standards Institute is hereby adopted to supplement, but not supersede, the specific requirements set forth herein.

2603 TESTS

The Building Official may require reasonable tests of gypsum-concrete units or the materials of gypsum-concrete construction to determine their quality.

2604 CONSTRUCTION DETAILS

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) Reinforcing fabric shall conform to ASTM Designation A185-70, shall be galvanized with a zinc coating conforming to ASTM Designation B6-70 and contain a minimum weight of coating of 0.30 ounces per square foot of uncoated wire surface determined in accordance with ASTM Designation A90-69; shall have an effective cross-sectional area of not less than 0.026 square inches per foot of width or No. 12 gage wire spaced four inches on centers as principal reinforcing nor less than 0.0075 square inches per foot of width or No. 14 gage wire spaced eight inches on center as temperature reinforcing, and shall be lapped not less than 16 inches at the ends. 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 not less than ⅜ 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 Section 2604.2 (c), precast gypsum-concrete units shall have not less than the following thicknesses:

(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-grooved 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 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 will not be permitted.

CHAPTER 27

MASONRY

2701 DESIGN

2702 QUALITY, TESTS AND APPROVALS

2703 ALLOWABLE UNIT STRESSES IN MASONRY

2704 CONSTRUCTION DETAILS

2701 DESIGN

2701.1 Masonry shall be designed by a method admitting of rational analysis based on established principles of mechanics.

2701.2 Buildings not exceeding three stories, or 40 feet, in height shall be designed as either wall-bearing or skeleton frame or a combination thereof and all buildings more than three stories, or 40 feet, in height shall be designed as a skeleton frame.

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: 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.

Test of materials shall be made in accordance with the Standard Specifications of the American Society for Testing Materials as such standard specifications are noted in this Chapter (ASTM).

(d) APPROVALS: (1) Only such masonry units as bear the approval of the Building Official and are manufactured or fabricated by plants having a Certificate of Approval as set forth in Paragraph 305.1 (b) shall be considered acceptable for the construction of buildings or other structures.

(2) Approval of masonry units and manufacturing or fabricating plants shall be for periods not to exceed one year and may be obtained upon application and the submission of certificates of tests in accordance with the provisions of this Chapter.

(3) The provisions for tests for approval of masonry units shall not be construed as in lieu of any tests otherwise required under this Chapter.

(4) 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 Designation: C67-66.

(c) QUALITY: (1) Burned clay or shale brick shall conform to the Standard Specification for Building Brick, ASTM Designation: C62-69.

(2) Sand-lime brick shall conform to the Standard Specification for Building Brick, ASTM Designation: C73-67.

(3) Concrete brick shall conform to the Standard Specification for Building Brick, ASTM Designation: C55-70.

2702.3 STONE: Stone for masonry shall be hard and durable.

2702.4 CAST STONE: Cast stone 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 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 7⅝" x 7⅝" x 15⅝" 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 Designation: C90-70, 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 Sampling and Testing Structural Clay Tile, ASTM Designation: C112-70.

(c) QUALITY: (1) Structural clay load-bearing wall tile shall conform to the Standard Specification for Structural Clay Load-Bearing Wall Tile, ASTM Designation: C34-62.

(2) Structural clay floor tile shall conform to the Standard Specification for Structural Clay Floor Tile, ASTM Designation: C57-57.

(3) Structural clay non-load-bearing tile conform to the Standard Specification for Structural Clay Non-Load-Bearing Tile, ASTM Designation: C56-62.

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 of gypsum tile shall conform to the Standard Method of Testing Gypsum and Gypsum Products, ASTM Designation: C471-66, C472-70 and C473-68.

(c) QUALITY: Gypsum partition tile or block shall conform to the Standard Specification for Gypsum Tile or Block, ASTM Designation: C52-70.

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: (a) 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 "Tentative Specifications for Mortar of Masonry Units, ASTM Designation: C270-68."

(b) AGGREGATES: (1) The gradation of aggregate for masonry mortar shall be such that the fineness modulus is between 1.20 and 2.35 when determined in accordance with the "Tentative Specification for Aggregate for Masonry Mortar. ASTM designation: C144-70."

(2) Aggregates shall be quarried or washed in fresh water and shall contain not more than one-twentieth of one percent salt by weight.

(c) MORTAR: (1) Mortar used to bond unit masonry shall be of 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:

Unit	Type N or O 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 percentages 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 unity masonry shall not exceed one-tenth the allowable compressive stress.

2703.3 TENSION: Unreinforced unit masonry shall be assumed to have no value in resisting tension.

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.

(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) Reinforced unit masonry shall comply with Sub-section 2704.10 herein.

(e) 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.

(f) Bond shall be provided by lapping units in successive vertical courses or by providing vertical or horizontal reinforcing to resist applicable loads.

2704.2 EXTERIOR WALLS: (a) **GENERAL:** 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).

No roof or other members shall be placed to develop direct horizontal thrust on walls unless such walls are specifically designed.

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 256 square feet, except as set forth in Sub-paragraph 2704.2 (b) (1).

(b) **TIE COLUMNS:** (1) Concrete tie columns shall be required in exterior walls of unit masonry except in one-story buildings of Group H and I Occupancy. Concrete tie columns shall be required at all corners, at intervals not to exceed 20 feet center-to-center of columns, adjacent to any corner opening exceeding four

feet in width, adjacent to any wall opening exceeding nine feet in width, and at the ends of free-standing walls exceeding two feet in length. Structurally designed columns may substitute for the tie columns herein required.

In one-story buildings of Group H and I Occupancy the tie beam shall be anchored at intervals not to exceed 20 feet center-to-center to the foundation or floor slab in any wall if required to resist uplift forces as set forth in Section 2306. Such anchorage shall provide the equivalent strength of a vertical #5 reinforcing bar bent into the foundation or floor slab and into the tie beam, encased in concrete or mortar, and lapped a minimum of 18 inches or otherwise spliced in a manner which will develop the full strength of the bar. A slot for cleanout and inspection shall be provided at all splices and connections. Alternate methods of providing anchorage of equivalent strength to that described above may be used where design computations which admit of rational analysis according to accepted engineering principles are furnished and approved by the Building Official or where load tests of the anchorage devices show an ultimate resistive strength equivalent to that set forth in Section 2306.

(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 column may 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 tie 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, lugs not less than one inch deep by three inches wide shall be provided in the concrete which forms the perimeter of such panels. Where structural steel members are fire-proofed with masonry units, the panel walls shall be bonded into the fire proofing.

(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 14½ 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 18 inches. Continuity shall be provided at corners by bending two bars from each direction around the corner 18 inches or by adding two #5 bent bars which extend 18 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 diaphram of reinforced concrete with a minimum thickness of four inches.

(5) Changes in level of tie beams shall be made at columns.

(6) A tie beam may follow the rake of a gable or shed end if the slope does not exceed 3 in 12.

(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.

(d) **GABLE END AND SHED END WALLS:** Gable and shed end walls of masonry with a maximum rise of more than three feet shall be provided with a concrete coping not less than 64 square inches in area reinforced with two #4 bars and tie columns.

(e) **PARAPET WALLS:** 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.

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) 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. 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.

American National Standards Institute Publication A41.1-1953 shall be the standard for solid-unit masonry construction.

(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 tie 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 column of minimum 8" x 8" dimension reinforced with 2 #5 bars.

(k) **CHASES, RECESSSES 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 tie 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 to 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 8 inches on the masonry, at each end. 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.

(l) **GLASS BLOCK:** (1) 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 and one-half inches at the mortar joint and the mortared surfaces of the blocks are satisfactorily treated for mortar bonding.

(2) Glass block panels for exterior walls shall not exceed 144 square feet of unsupported wall surface nor 25 feet in length nor 20 feet in height between supports. For interior walls, glass block panels shall not exceed 250 square feet of unsupported area nor 25 feet in one direction between supports.

(3) Exterior glass blocks panels shall be set in recesses at the jambs and, for panels exceeding ten feet in horizontal dimension between supports, at the head as well, to provide a bearing surface at least one inch wide along the panel edges; except that when approved by the Building Official for panels exceeding neither 100 square feet in area nor ten feet in either horizontal or vertical dimension, and situated four stories or less, and less than 52 feet above grade level, anchorage may be provided by means of noncorrodible perforated metal strips.

(4) Glass block panels shall have reinforcement in the mortar joints spaced not more than two feet apart vertically and below and above any openings within a panel. The reinforcement shall consist of two parallel longitudinal galvanized steel wires, No. 9 gauge or larger, spaced two inches apart, and having welded thereto No. 14 or heavier cross wires at intervals not exceeding eight inches, or the equivalent approved by the Building Official.

(5) Glass block shall be laid in only Type M or S mortar or equivalent approved material. Both vertical and horizontal mortar joints shall be at least one-quarter and not more than three-eighths inch thick and shall be completely filled.

(6) 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 material.

(m) **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 walls shall be laid in Type M or S mortar.

2704.3 INTERIOR BEARING WALLS: Interior-bearing walls shall be constructed as specified in 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 wall 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: Fire-walls shall be constructed as set forth in Section 2704.2 for exterior walls and as set forth in Chapter 37.

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 individaul units not exceeding 20 inches in any dimension and having not more than 200 square inches of surface area with corrugations or scorings 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 by 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 a 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 as required for exterior walls and a coping as provided herein.

2704.9 OTHER MASONRY WALLS: Walls of masonry materials or arrangements 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 REINFORCED UNIT MASONRY: (a) GENERAL DESIGN: (1) Where design and construction of walls is of reinforced unit masonry as set forth in this Sub-section, tie columns and tie beams as set forth in Sub-section 2704.2 will not be required except where necessary to satisfy the requirements in Sub-paragraph 2704.10 (a) (15) herein.

(2) Reinforced unit masonry shall be reinforced solid-unit masonry or reinforced hollow-unit masonry as set forth herein.

(3) The design of buildings or structures using reinforced unit masonry shall be by a Professional Engineer or Registered Architect.

(4) The construction of structures of reinforced unit masonry may be required to be under the supervision of an inspector as set forth in Sub-section 305.3 herein.

(5) The design and construction of reinforced unit masonry shall be based on the assumptions, requirements, and methods of stress determination set forth in Chapter 25 except as otherwise set forth in this Section.

(6) Reinforced unit masonry shall be so designed and constructed that the unit stresses do not exceed those set forth in TABLE 27-A.

(7) The compressive strength of reinforced masonry assumed for design may be determined by test using as maximum working stresses those set forth under Special Condition in TABLE 27-A. Such working stresses shall be substantiated by test samples of the work as directed by the Building Official.

(8) The axial stress in reinforced masonry bearing walls shall not exceed the value determined by the formula:

$$f_m = 0.20\ f'_m \left[1 - \left(\frac{h}{30t} \right)^3 \right]$$

Where:

f_m equals compressive unit axial stress in masonry wall.

f'_m equals approved ultimate compressive masonry stress as set forth in Sub-paragraph 2704.10 (a) (4).

h equals height of wall.

t equals total thickness of wall.

(9) The unit stresses in reinforcement shall not exceed those set forth for reinforcement in concrete.

(10) All walls using stress permitted for reinforced masonry shall be reinforced with both vertical and horizontal bars.

(11) The minimum area of total reinforcement shall be not less than 0.002 times the gross cross-sectional area of the wall, not more than two-thirds of which may be used in either direction. Principal wall steel shall be limited to the maximum spacing of 4 feet on center.

The minimum diameter shall be ⅝ inch except that approved wire reinforcement used as temperature steel or to replace running bond may be considered as part of the required reinforcement.

(12) Only horizontal reinforcement which is continuous in the wall shall be considered in computing the minimum area of reinforcement.

(13) If the wall is constructed of more than 2 units in thickness, the reinforcement shall be equally divided into 2 layers, except where designed as retaining walls.

(14) In bearing and exterior walls of every type of reinforced masonry there shall be not less than one ½-inch bar or two ⅝-inch bars on all sides of, and adjacent to, every opening which exceeds 24 inches in either direction; and such bars shall extend not less than 40 diameters, but in no case less than 24 inches, beyond the corners of the opening. The bars required by this paragraph shall be in addition to the reinforcement otherwise required.

(15) The minimum nominal thickness of reinforced masonry bearing walls and exterior walls shall be 8 inches and the ratio of unsupported height and unsupported length to thickness (one or the other but not both) shall not exceed 25.

(16) Non-bearing interior partitions may be constructed of any masonry specified in this Sub-section and shall be not less than 2 inches in thickness.

(17) Non-bearing interior partitions may be constructed with wire-mesh reinforcement to resist tensile stresses where such wire-mesh reinforcement is embedded in the plaster applied to the surface.

(b) REINFORCED SOLID-UNIT MASONRY: (1) Reinforced solid-unit masonry is that form of construction made with brick or solid concrete brick units in which interior joints of masonry are filled by pouring grout therein as the work progresses and in which reinforcing is embedded. Only Type M mortar shall be used.

(2) At the time of laying, all masonry units shall be free of excessive dust and dirt.

(3) All units in the two outer tiers shall be laid with full shaved head and bed mortar joints.

(4) All longitudinal vertical joints shall be grouted and shall be not less than ¾ inch in thickness. In members of 3 or more tiers in thickness, interior bricks shall be embedded in the grout so that at least ¾ inch of grout surrounds the sides and ends of each unit.

(5) One exterior tier may be carried up 12 inches before grouting, but the other exterior tier shall be grouted in lifts not to exceed 4 inches or one unit, whichever is greater.

(6) If the work is stopped for one hour or longer, the horizontal construction joints shall be formed by stopping all tiers at the same elevation and with the grout one inch below the top.

(7) The thickness of grout or mortar between brick and steel shall be not less than ¼-inch except that ¼-inch bars may be laid in ½-inch horizontal mortar joints.

(c) REINFORCED HOLLOW-UNIT MASONRY: (1) Reinforced hollow-unit masonry is that type of construction made with hollow masonry units in which certain cells are continuously filled with concrete or grout, and in which reinforcement is embedded. Only Type M mortar shall be used.

(2) All reinforced hollow-unit masonry shall be built to preserve the unobstructed vertical continuity of the cells to be filled.

(3) Walls and cross webs forming such cells to be filled shall be full bedded in mortar to prevent leakage of grout.

(4) All head (or end) joints shall be solidly filled with mortar

for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells.

(5) Bond shall be provided by lapping units in successive vertical courses or by equivalent mechanical anchorage.

(6) Vertical cells to be filled shall have vertical alignment sufficient to maintain a clear, unobstructed continuous vertical cell measuring 2 inches by 3 inches.

(7) Cleanout openings shall be provided at the bottoms of all cells to be filled at each lift or pour of grout where such lift or pour of grout is in excess of 4 feet in height. Any overhanging mortar or obstruction or debris shall be removed from the sides of such cell walls. The cleanouts shall be grouted, after inspection.

(8) Vertical reinforcement shall be held in position at the top and bottom and at intervals not exceeding 192 diameters of reinforcement.

(9) All cells containing reinforcement shall be filled solidly with grout. Vertical cells containing reinforcement shall be filled solidly with grout in lifts not exceeding 8 feet in height.

(10) If the work is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout 1½ inches below the top of the uppermost unit.

TABLE 27-A

MAXIMUM WORKING STRESSES (p.s.i.)—REINFORCED SOLID AND HOLLOW UNIT MASONRY

TYPE OF STRESS	FACTOR	Solid Masonry Units			Hollow Masonry Units		
		Special Inspection		Without Special Inspection	Special Inspection		Without Special Inspection
		Special[1] Condition	2500 psi Min.	1500 psi Min.	Special[1] Condition	Grade A Units*	Grade A Units*
		f'_m by test Max.=2000	f'_m=1500	f'_m=750	f'_m by test Max.=1600	f'_m=1200	f'_m=600
Compression — Axial	$0.20f'_m$	400	300	150	320	240	120
Compression — Flexural	$0.33f'_m$	670	500	250	533	400	200
Shear[2] (No Shear Reinforcement)	$0.02f'_m$	40	30	15	32	24	12
Shear[2] (Shear Reinforcement Taking 2/3 Shear)	$0.04f'_m$	80	60	30	64	48	24
Bearing[2]	$0.25f'_m$	500	375	187	400	300	150
Modulus of Elasticity	$1000f'_m$	2,000,000	1,500,000	750,000	1,600,000	1,200,000	600,000
Modulus of Rigidity	$400f'_m$	800,000	600,000	300,000	640,000	480,000	240,000
Bond-Plain Bars		60	60	30	60	60	30
Bond-Deformed Bars		130	130	90	130	130	90

* Units complying with Paragraph 2702.5(a)(2)

1 See Sub-paragraph 2704.10

2 Using net sections, including cells that are filled with grout or concrete.

Amended 17 November 1969

NOTES

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

2801 GENERAL

2801.1 DESIGN: Steel and iron members shall be designed by methods admitting of rational analysis according to established principles of mechanics.

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 herein, apply to structural steel for buildings and other structures. Section 2809 applies to cold formed members of sheet or strip steel and light gage steel construction.

2801.3 STANDARDS: The following standards are hereby adopted as a part of this Code and supplement, but do not supersede, the specific requirements set forth herein:

(a) "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings," adopted February 12, 1969, and supplement No. 1 effective November 1, 1970, including the seventh edition of the "Manual of Steel Construction" of the American Institute of Steel Construction.

(b) "Code for Welding in Building Construction," (AWS D1.0-68), of the American Welding Society.

(c) Specifications for Structural Joints Using ASTM A325-70 or ASTM A490-70 Bolts, as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

(d) "Standard Specifications for Open Web Steel Joists J- and H- Series" December 1970, "Standard Specifications for Long Span Steel Joists LJ- and LH- Series" July 1970 and "Standard Specifications for Deep Long Span Steel Joists DLJ- and DLH- Series" February 1970, all as adopted by SJI.

(e) "Specification for the Design of Cold-formed Steel Structural Members," 1968 Edition of the American Iron and Steel Institute.

(f) "Design of Light Gage Cold-Formed Stainless Steel Specification," 1968 Edition of the American Iron and Steel Institute.

(g) "Tentative Specification for General Requirements for Delivery of Zinc-Coated (Galvanized) Iron and Steel Sheets, Coils and Cut Lengths Coated by the Hot-Dip Method," ASTM A525-67 of the American Society for Testing and Materials.

(h) "Standard Qualification Procedure (Tentative)" B3.0-41T of the American Welding Society 1941 reprinted April 1969.

(i) "Qualification of Welding Procedures and Welders for Piping and Tubing," AWS D10.9-69 of the American Welding Society.

2802 MATERIAL

2802.1 STEEL: Steel shall conform to the physical requirements set forth in the applicable Standard in Paragraphs 2801.3 (a), (b), (c), (d), (e), (f) or (g).

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 section.

2804 MINIMUM THICKNESS OF MATERIAL

The minimum thickness of material shall be not less than as set forth in the applicable Standards listed in Paragraphs 2801.3 (a), 2801.3 (d), 2801.3 (e) or 2801.3 (f) 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 shall inspect the welding and high-strength bolting on buildings exceeding 10,000 sq. ft. in area or 3 stories in height or as required by the Building Official because of special conditions.

2805.3 Welding in the shop or field shall be done only by persons who have been tested and certified by an approved testing laboratory for the welds to be performed.

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, shall have one shop coat of paint and, if

exposed to the atmosphere or elements in the completed 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 oz. 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 Paragraph 2801.3(d).

2808.2 DESIGN: (a) Open web steel joist systems shall be designed to accommodate the loads and forces set forth in Chapter 23.

(b) Where the net uplift force is equal to or greater than the gravity load of construction, all web and bottom chord members shall have a minimum slenderness ratio of 200 and be proportioned to accommodate the maximum compression and tension stresses.

(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. However, in no case may the l/r ratio of the top chord about the vertical axis, based on the distance between lines of bridging, exceed 200 for the LJ Series nor 170 for all other Series joists. 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 farther apart than 36 inches.

(d) Fastenings shall be bolting, welding or other approved fastening device that provides a resistance to lateral movement equal to 200 pounds per lineal foot.

2808.3 CONNECTIONS: The joints and connections of members of steel joists shall be made by welding or riveting.

2808.4 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 of material having a thickness not less than:

(1) ⅛ inch for hot-rolled sections
(2) 16 gage for cold-formed sections
(3) ½ inch diameter for round members

(c) Bridging shall be connected to the chords of the joists by bolting or welding capable of transmitting the forces required of the bridging members.

2808.5 END SUPPORTS AND ANCHORAGE: (a) Joists shall not bear directly on unit masonry.

(b) The ends of every joist shall be bolted, welded or embedded at each bearing to provide not less resistance in any direction than 50 percent of the rated end reaction.

(c) The ends of joists shall have a minimum bearing, on reinforced concrete, of 4 inches for H and J Series Joists and 6 inches for LJ and LH Series joists, and on steel, of 2½ inches for H and J Series joists and 4 inches for LJ and LH Series joists, except that shorter end bearing may be used where proper design is made.

2808.6 FABRICATION: The fabrication of joists shall specifically comply with Paragraph 305.1(b) herein.

2808.7 SHOP STANDARDS: The applicant for building permit will not be required to submit shop drawings for steel joists except as set forth in Paragraphs (a) and (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 designs 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 non-structural roofing, siding and other construction elements formed from sheet or strip steel and as set forth in Paragraphs 2801.3 (e) and (f).

2809.2 STANDARDS: (a) Cold-formed steel used in structural applications shall conform to the Standard set forth in Paragraphs 2801.3 (e) and 2801.3 (f).

(b) Galvanizing as referred to herein is to be zinc coating conforming to the Standard set forth in Paragraph 2801.3 (g).

(c) Gage as referred to herein is "Manufacturers Standard Gage" (AISI) for uncoated sheet and strip, and "Galvanized Sheet Gage" (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.

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 the other limitation of this code, except that metal without fill of less thickness than 22 gage shall not be considered to have diaphragm value.

(b) Poured fill 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.

(c) Positive attachment of sheets shall be provided as required to resist uplift and diaphragm forces, as set forth in Paragraph 2809.3 (b) and not less frequently than the following maximum spacings:

(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.

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 2902.1.

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 gage is used, the sheets shall be protected by being galvanized in accordance with the Standards of Paragraph 2801.3 (g) and have a minimum of 1.25 oz. 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-sections 2805.2, 2801.3, and 2805.3 herein.

(b) The fusion welding of structural members and structural sheets less than 22 gage in thickness shall be through weld washers not less than 14 gage in thickness and one inch in diameter, contoured if necessary to provide continuous contact, or an equivalent device.

NOTES

CHAPTER 29
WOOD

2901 DESIGN
2902 STANDARDS
2903 QUALITY AND SIZE
2904 ALLOWABLE UNIT STRESSES
2905 CONSTRUCTION DETAILS
2906 WORKMANSHIP
2907 PROTECTION OF WOOD
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2901 DESIGN

Wood members used for structural purposes shall be designed by methods admitting of rational analysis according to established principles of mechanics.

2902 STANDARDS

The following standards are hereby adopted as being a part of this Code and supplement, but do not supersede, the specific requirements set forth herein:

2902.1 National Design Specification for Stress-Grade Lumber and Its Fastenings 1968 with 1970 supplement of the National Forest Products Association.

2902.2 (a) Softwood Plywood, Construction and Industrial Product Standards PS 1-66, US Department of Commerce, National Bureau of Standards.

(b) Plywood Design Specification, April 1, 1969, published by American Plywood Association.

2902.3 American Lumber Standards for Softwood Lumber—Simplified Practice Recommendations PS 20-70 of the U. S. Department of Commerce, National Bureau of Standards.

2902.4 The Timber Construction Standards AITC 100-69 of the American Institute of Timber Construction.

2902.5 Structural Glued Laminated Timber—Commercial Standard CS 253-63, U.S. Department of Commerce, National Bureau of Standards.

2903 QUALITY AND SIZES

2903.1 GRADE: (a) All lumber used structurally, including interior partition studs and plates, shall be identified by the grademark of an approved Lumber Grading or Inspection Bureau or Agency.

(b) All lumber used for joists, rafters, stringers and/or beams shall be of a stress-grade not less than 1200 p.s.i. extreme fiber stress in bending and tension parallel to the grain.

(c) All lumber used for studs in bearing walls shall be grademarked and be of not less strength than: Stud Grade by Southern Pine Inspection Bureau rules; Standard Grade or West Coast Stud Grade by West Coast Lumber Inspection Bureau rules; or Standard Grade or No. One Stud Grade Douglas Fir, Hemlock or Larch by Western Wood Products Association rules.

(d) All lumber used for studs in interior non-bearing walls and partitions shall be grade-marked and be of not less strength than: No. 3 by Southern Pine Inspection Bureau rules; Utility Grade by West Coast Lumber Inspection Bureau rules; or Utility Grade or No. 2 Stud Grade Douglas Fir, Hemlock or Larch by Western Wood Products Association rules.

(e) All lumber used for roof sheathing shall be grade-marked and be of not less strength than No. 2 Southern Pine or Standard Douglas Fir, Hemlock or Larch.

(f) All lumber used for floor sheathing shall be as set forth in Paragraph (e) above for roof sheathing, except that where a finish floor having a strength equal to or greater than one-half inch T & G wood strip flooring is to be applied, the sub-flooring (floor sheathing) may be lumber having the strength and physical characteristics one grade less than set forth in Paragraph (e) above.

(g) All lumber permanently incorporated into a building or structure shall be air-dried or kiln-dried and shall contain not more than 19 percent moisture at the time of its use and/or at the time of treatment with a wood preservative.

(h) The Building Official shall require the species and grade of all wood used for load-bearing purposes, the design of which is based on stresses in excess of 1200 p.s.i. stress-grade lumber, to be shown on the plans submitted with applications for building permits.

(i) All plywood used structurally, including floor and roof sheathing and exterior wall cladding, shall be of a type made with exterior-type glue.

2903.2 SIZES: (a) All wood structural members shall be of sufficient size to carry the dead and required live loads without exceeding the allowable deflections or working stresses specified. Adequate bracing and bridging to resist wind and other forces shall be provided.

(b) Sizes of wood members referred to by this Code are nominal sizes. The minimum acceptable net sizes conforming to nominal sizes shall be within 2% of the minimum net sizes contained in the standard specified in Sub-section 2902.3 at 19% moisture content. Computations to determine the required sizes of members shall be based on the net sizes contained in the standard.

2904 ALLOWABLE UNIT STRESSES

2904.1 GENERAL: (a) Wood joists and rafters may be of the sizes set forth in Table 29-B without additional professional design or shall be designed based on the allowable unit stresses set forth in the Standards in Section 2902.

Where the design is based on allowable working stresses higher than the lowest stress-grade for the species, the design shall be supported by computations submitted by a registered architect or registered professional engineer and the Building Official may require that fabrication and/or construction be under the supervision of a special inspector as set forth in Sub-section 305.2.

(b) The deflection of wood members shall not exceed that set forth in Sub-section 2301.3 herein.

(c) The span of roof rafters shall be measured horizontally from bearing to bearing, and the horizontal distance from plate to ridge or other support shall be the span.

TABLE 29-B

(Based on 1200 psi fibre stress and 1/360 deflection)

Nominal Size	Spacing (Inches)	Maximum Allowable Span for Uniform Loading				
		67 psf	57 psf	47 psf	37 psf	22 psf
2 x 6	12	10'-2	11'-0	11'-3	12'-4	17'-7
	16	8'-10	9'-6	10'-2	11'-3	15'-2
	24	7'-2	7'-9	8'-8	9'-8	12'-5
2 x 8	12	13'-6	14'-7	15'-0	16'-6	23'-6
	16	11'-8	12'-8	13'-8	15'-0	20'-6
	24	9'-6	10'-4	11'-5	12'-10	16'-8
2 x 10	12	17'-1	18'-5	19'-0	21'-1	28'-10
	16	14'-10	16'-1	17'-4	19'-0	25'-4
	24	12'-1	13'-1	14'-5	16'-3	21'-0
2 x 12	12	20'-8	22'-4	23'-0	25'-4	—
	16	18'-0	19'-6	20'-10	23'-0	31'-3
	24	14'-7	15'-10	17'-6	19'-8	25'-6
3 x 6	12	12'-3	13'-2	13'-2	14'-6	20'-11
	16	11'-1	12'-0	12'-0	13'-2	19'-0
	24	9'-1	9'-10	10'-10	11'-6	16'-0
3 x 8	12	16'-4	17'-7	17'-7	19'-5	28'-0
	16	14'-8	15'-11	15'-11	17'-7	25'-3
	24	12'-1	13'-1	14'-0	15'-5	21'-3
3 x 10	12	20'-9	22'-3	22'-3	24'-6	—
	16	18'-9	20'-3	20'-3	22'-3	—
	24	15'-4	16'-8	17'-8	19'-6	26'-10
4 x 6	12	13'-8	14'-8	14'-8	16'-2	23'-4
	16	12'-4	13'-4	13'-4	14'-8	21'-2
	24	10'-8	11'-7	11'-8	12'-10	18'-7
4 x 8	12	18'-3	19'-7	19'-7	21'-8	—
	16	16'-7	17'-10	17'-10	19'-7	28'-2
	24	14'-3	15'-6	15'-7	17'-7	24'-7
4 x 10	12	23'-5	24'-9	24'-9	27'-3	—
	16	21'-3	22'-11	22'-11	24'-8	—
	24	17'-11	19'-6	20'-0	22'-0	—

67#—Floor joists with plaster under, 50#LL 17#DL

57#—Floor joists with plaster under, 40#LL 17#DL
Roof rafters having a slope of 2½ to 12 or more, 30#LL 27#DL

47#—Floor joists without plaster under, 40#LL 7#DL
Roof joists with plaster under, 30#LL 17#DL

37#—Ceiling joists over living rooms and under usable attic space, 25#LL 12#DL
Roof joists without plaster under, 30#LL 7#DL

22#—Ceiling joists without usable attic space, 10#LL 12#DL

Where there is an accessible space having a clear vertical height of 30 inches or more, ceiling joists shall be designed as having usable attic space.

2904.2 PLYWOOD: (a) The allowable plywood unit stresses for respective grades of Softwood Plywood shall not exceed the stresses set forth in the Standard in Paragraph 2902.2 (b).

(b) Working stresses of plywood other than those in the Standards in Sub-section 2902.2 shall be determined according to the species.

(c) All plywood permanently exposed in outdoor locations shall be of exterior type, and where used for roof or exterior wall sheathing shall meet the performance standards for exterior type plywood in Sub-section 2902.2, unless otherwise approved by the Building Official.

(d) Walls or roofs sheathed with plywood may be considered as diaphragms to distribute horizontal forces subject to the approval of the Building Official, based on structural analysis and/or tests; and where so used plywood shall be bonded with an exterior adhesive meeting performance standards for exterior type except as set forth in Paragraph 2904.2(c) above.

(e) All plywood used structurally, including applications such as siding, roof sheathing, wall sheathing, sub-flooring, diaphrams, and built-up members shall conform to the performance requirements of the standard set forth in Sub-section 2902.2.

(f) Each panel of plywood shall be identified for grade and glue type by the trademark of an approved testing and grading agency.

2904.3 GLUED-LAMINATED: (a) Glued-laminated members shall comply with the Standard, set forth in Sub-section 2902.5.

(b) The Building Official may require tests to determine the strength, permanence, effect of moistures and insect resistance of adhesives; and only approved adhesives may be used.

(c) The Building Official may limit or otherwise regulate the use of glued-laminated members after consideration of the exigencies of manufacture, location and service.

2904.4 TRUSSED RAFTERS: Trussed rafters shall be designed by methods admitting of rational analysis based on the standards set forth in Section 2902.

Where metal is used for connecting wood members such metal shall be not less than 20 gage and shall be galvanized with a zinc coating conforming to the Tentative Specification of ASTM Designation A361-67.

2905 CONSTRUCTION DETAILS

2905.1 COLUMNS OR POSTS: (a) All wood columns and posts shall be framed to true-end bearings and shall be securely anchored against lateral or vertical forces.

(b) All wood columns and posts shall have the bottom protected from deterioration.

(c) Splicing of columns shall be done only in regions where lateral support is adequately provided about both axes.

(d) No notching or cutting shall reduce the design dimensions of the column.

2905.2 STUDS: (a) SIZE: Studs shall be not less than 2″ x 4″ and, where supporting more than one floor and a roof, shall be not less than 2″ x 6″ or 3″ x 4″.

(b) HEIGHT: Maximum allowable height of 2″ x 4″ and 3″ x 4″ stud framing shall be 14 feet, and of 2″ x 6″ stud framing shall be 20 feet, unless the wall is otherwise laterally supported.

Solid wood bridging shall be placed at intervals of not over eight feet.

(c) SPACING: No studding shall be spaced more than 16 inches on centers, except that in lieu of this requirement the studs and plates shall be designed as a system of columns and beams.

(d) PLACING: Studs in exterior and bearing walls shall be placed with the longest dimension perpendicular to the wall. Stud-bearing walls shall, so far as practicable, be carried directly to the foundation or sills or beams at grade.

(e) PLATES: The top plate of stud-bearing walls shall be doubled and lapped at each intersection with walls and partitions. Joints in the upper and lower members of the top plate shall be lapped not less than four feet.

(f) BASE PLATES: Stud walls resting on masonry shall have base plates or sills of wood treated with an approved preservative.

Sills of interior bearing walls, resting on masonry foundation walls where wood floor joists are to be used, and sills of exterior stud walls shall be of not less than the 4″ x 6″ dimension, bolted to the masonry at the corners and at intervals of not more than four feet with one-half-inch bolts embedded seven inches into the masonry or, in lieu thereof, a 2″ x 4″ base plate, and each such stud anchored past the base plate to the masonry with a ⅛″ x 1″ steel strap or equivalent.

Base plates of interior stud bearing walls resting on concrete slab floors shall be effectively fastened thereto, and such plates shall not be embedded in the concrete.

(g) CORNERS: Corners of stud walls or partitions shall be framed solid by doubling the studs.

(h) WIND BRACING: Exterior stud walls shall be effectively wind-braced with diagonal sheathing or plywood as set forth in Paragraph 2905.9(c).

(i) SPLICING: Bearing studs shall be spliced only at points where lateral support is provided.

(j) BALLOON FRAMING: Where practicable, exterior stud walls of two-story buildings shall be balloon-framed with studs continuous from foundation to second-floor ceiling and having second-floor joists set on a let-in 1″ x 4″ ribbon.

(k) NOTCHING: No notching or cutting whatsoever shall be permitted in studs which carry loads in excess of 75 percent of their capacity.

Studs which carry 75 percent or less of their capacity or studs of non-bearing partitions may be notched to a depth of ⅓ the depth of the stud without limit of the number of consecutive studs.

(l) PIPES IN WALLS: Stud partitions containing plumbing, heating or other pipes shall be so framed and the joists spaced to give proper clearance for the piping. Where a partition containing such piping runs parallel to the floor joists, the joists shall be doubled and spaced to permit the passage of such pipes and shall be bridged. Where plumbing heating or other pipes are placed in or partly in a partition, necessitating the cutting of the plates, a metal tie not less than one-eighth-inch thick and one and one-half inches wide shall be fastened to each side of the plate across the opening with four 16d nails at each end of each strap.

(m) HEADERS: All openings in bearing walls 4 feet or less in width shall be provided with headers equivalent to double headers of not less than 2-inch nominal thickness, placed on edge, securely fastened together, and all openings more than four feet wide shall be trussed or provided with headers or lintels. Such headers or trusses shall have not less than 2-inch nominal solid bearing at each end to the floor or bottom plate, unless other approved framing methods or joint devices are used.

(n) STUDS JOINING MASONRY: Where stud walls or partitions join masonry walls, such studs shall be secured against lateral movement by nailing or bolting to the masonry.

(o) INTERIOR NON-BEARING PARTITIONS: (1) Studs in interior 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.

(2) Studs in interior partitions without openings shall be of not less size than 2" x 3" spaced not more than 24 inches on centers.

(3) Stud partitions may have a single top plate.

(4) Openings not exceeding four feet in width, in partitions shall be provided with headers two-inch nominal thickness placed flat and end nailed through the studs with no solid bearing required.

(5) In any Occupancy interior partitions, without openings, not exceeding nine feet in height may be of studs placed flat in the wall.

(6) Studs in walls subject to frequent wetting shall be protected with 15-pound asphalt-saturated felt.

(7) Wardrobe units serving as partitions; prefabricated or partially prefabricated, and which do not support ceiling, floor or roof loads, may be of 2" x 2" studs spaced not farther apart than 16 inches and with a plywood skin glued and nailed to the studs.

2905.3 FIRESTOPS: Firestopping shall be provided to cut off all concealed draft spaces both vertical and horizontal. Firestops shall form effective fire barriers between stories and between a story and roof space. Firestops shall be provided in specific locations, as follows:

(a) In exterior or interior stud walls, at ceilings and floor levels.

(b) In all stud walls and partitions, so placed that the maximum dimension of any concealed space is not over eight feet.

(c) Between stair stringers at intervals not exceeding seven feet of vertical height and at top and bottom.

(d) Around sliding door pockets.

(e) Other locations not specifically mentioned where concealed spaces permit a spread of fire.

(f) Firestops, when of wood, shall be of two-inch nominal thickness in direction of protection.

(g) Horizontal firestops of attic and ceiling plenums shall be provided as specified in Sub-sections 2006.5 and 2205.4.

2905.4 JOISTS AND RAFTERS: (a) SIZE: The minimum size of joists and rafters shall be as specified in Section 2904 and shall be not less than 2" x 6" nominal size; except that for ceiling joists of spans not exceeding four feet, the Building Official may approve 2" x 4" nominal size.

(b) SPACING: Maximum spacing of joists and rafters, where a plaster ceiling is directly supported on the bottom of such members, shall be 16 inches on centers.

(c) BEARING: (1) Joists and rafters shall have: (aa) not less than four inches of bearing except that; (bb) joists may bear on a 1" x 4" let-in ribbon and be nailed to the studs at the second-floor level of balloon framing and except that; (cc) ceiling joists may butt into the web of a steel beam and be neatly fitted to bear not less than three inches on the bottom flange of such beam.

(2) Joists and rafters on masonry may bear: (aa) on and be anchored to a wood plate provided that such plate shall be not less than 2" x 6" and attached to the masonry with one-half-inch diameter bolts, ten inches long, spaced not more than two feet apart; (bb) on a 2" x 4" wood plate attached to the masonry with bolts not more than four feet apart provided that each joist or rafter is fastened to the masonry by a one-inch by one-eighth-inch anchor embedded

in the masonry; (cc) on a channel-shaped metal saddle and fastened to the masonry by a one-inch by one-eighth-inch anchor embedded in the masonry; (dd) on masonry if each joist or rafter is pressure-treated in accordance with Sub-section 2907.2.

(3) Floor joists may butt into a header beam if effectively toe-nailed and if an approved saddle providing not less than three inches of bearing transmits the vertical load to the top of the header.

(4) 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.

(d) ANCHORAGE: (1) Joists fire-cut into a masonry wall shall be anchored to the concrete beam on which they bear. 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.

(2) All 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.

(3) 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.

(4) Anchors securing wood to concrete shall be of not less than ⅛" x 1" strap iron embedded in the concrete and nailed to the stud or joist or rafter with not less than three 16d galvanized nails or shall be a commercial anchor approved by the Building Official, anchoring each member to a plate provided such plate is not less than 2" x 6" and anchored to the concrete by bolts spaced not more than 24 inches apart.

(5) Anchors securing wood to wood shall be of ⅛" x 1" strap, nailed to each member with three 16d galvanized nails, or shall be a commercial anchor approved by the Building Official, anchoring each member.

(6) Any anchoring systems shall be continuous from the foundation to the roof and shall satisfy the uplift requirements of Section 2306.

(e) SPLICING: No horizontal members shall be spliced between points of support; except that the Building Official may, in special cases, approve properly designed and bolted splices.

(f) NOTCHING AND BORING: Unless the local unit stress is calculated on the basis of a reduced size and found to be not in excess of the allowable stresses, wood members in bending shall not be cut, notched or bored to clear pipes or conduits or for other purposes except as follows:

(1) Notches may be cut in the top or bottom not deeper than one-fifth of the depth of the joist and not farther from the support than one-fifth of the span.

(2) Holes may be bored in the middle one-third of the depth and length, not larger than one-sixth of the depth, and there shall be not less than the depth of the joist between any two holes in the same joist.

(3) Where necessary to run service pipes in the space between the ceiling and floor larger than can be accommodated by the above provisions, such ceilings shall be furred down, or provisions shall be made by the use of headers or beams and/or changing the direction of the joists where the design permits.

(g) OPENINGS: 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 unit stress requirements. Headers shall be the same size as the joists and where supporting more than one joist shall be not less than doubled members. Headers shall be supported by approved metal hangers or ledgers or other approved means.

(h) ENTERING MASONRY OR CONCRETE: Ends of wood members entering or bearing on masonry shall be treated with an

approved preservative as set forth in Sub-section 2907.2. Where masonry extends above such wood members, such members shall be fire-cut so that the top edge does not enter the masonry or concrete more than one inch.

(i) **FLOOR JOISTS:** Floor joists under all walls parallel to any joists shall be doubled. Such doubled joists may be separated not more than 6 inches by solid blocking spaced at 4-foot intervals. Floor joists supporting concrete for bathroom floors shall have a maximum spacing of 12 inches.

(j) **CEILING JOISTS:** (1) In buildings without parapet walls, the ceiling joists, where practicable, shall be nailed to the rafters to act as a collar tie.

(2) Ceiling joists, spanning more than 14 feet, shall be laterally supported by a 2″ x 6″ member set on edge on top of the joists at mid-span and secured to the joists with 2″ x 4″ blocks or other approved methods; or a member the same size as the ceiling joists laid flat on the joists and nailed to each joist with not less than one 16d annular ringed nail for each 2 inches of joist width.

(3) Ceiling joists shall not be used to support rafter loads.

(k) **ROOF JOISTS:** Roof joists may cantilever over exterior walls as limited by the allowable stress, but the length of such cantilever shall not exceed the length of that portion of such joist inside the building; and when the cantilever of tail joists exceeds three feet, the roof joist acting as a header shall be doubled.

(l) **ROOF RAFTERS:** (1) Hip rafters, valley rafters and ridges shall be required and shall be not less in size than the largest rafter framing thereto nor less than required to support the loads.

(2) Collar ties shall be provided at each third pair of rafters, unless other means of resisting the thrust of the rafters is required and provided and/or the ridge is designed as a supporting beam. Such collar ties shall be placed horizontally at or below the upper-third point of the rafters, and shall be not less than 1″ x 6″ size. Effectively nailed ceiling joists may serve as collar ties.

(3) All ridge, hip and valley rafters shall be effectively anchored.

(m) **BRIDGING:** Bridging of floor and roof joists shall be provided as set forth in the standard in Sub-section 2902.1 except that for buildings of other than Group I Occupancy all joists shall be bridged at intervals not exceeding 8 feet.

2905.5 SUSPENDED OR FURRED CEILINGS: (a) Joists or furring supporting a plaster ceiling shall be spaced not more than 16 inches on center.

(b) Joists of a suspended ceiling shall be not less than 2″ x 4″ members, and wood hangers shall provide proper nailing and be not less than the equivalent of 1″ x 4″ members.

(c) Furring of a ceiling in contact with supporting joists shall be not less than 1″ x 3″ for spans to 24 inches, 2″ x 2″ for spans to 36 inches, and for longer spans shall be designed as joists.

2905.6 MILL CONSTRUCTION: Mill-constructed floors or roofs shall comply with Sub-section 2003.3.

2905.7 VERTICALLY LAMINATED BEAMS: Vertically laminated built-up beams shall be made up of members continuous from bearing to bearing.

2905.8 STAIR STRINGERS: Stair stringers shall, where practicable, be so framed that there is not less than four inches of bearing at the ends. Where it is not practicable to provide such bearing, the stringers may be hung in steel hangers of approved type.

No notching or cutting whatsoever shall be permitted in the effective area of stair stringers.

2905.9 SHEATHING: (a) FLOOR SHEATHING: (1) Floor

sheathing, where a part of a required fire-resistive assembly, shall comply with Section 3704.

(2) 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 Sub-paragraphs (3), (4), and (5).

(3) 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 or plywood sub-floor shall be required.

(4) Lumber sub-flooring shall be laid diagonally, shall be not less than nominal one-inch wood, 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.

(5) Plywood 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:

PLYWOOD SUB-FLOOR (1)

PANEL IDENTIFICATION INDEX (2)	MAXIMUM PLYWOOD SPAN (3)
32/16, 36/16	16" (4)
42/20	20" (4)
48/24	24"

Footnote (1) These values apply for Structural I and II, Standard Sheathing and C-C grades only. Spans shall be limited to values shown based on possible effect of concentrated loads.

Footnote (2) Identification index appears on all panels in the construction grades listed in footnote (1).

Footnote (3) Plywood edges shall have approved tongue and groove joints or shall be supported with blocking, unless ¼ inch minimum thickness underlay is installed or unless finish floor is one inch nominal wood strip. Allowable uniform load based on deflection of 1/360 of span is 100 psf.

Footnote (4) May be 24 inches if nominal one inch wood strip floor is laid at right angles to joists.

Plywood panels shall be nailed to supports with 6d common nails when ½ inch thick and 8d common nails when ⅝ inch or ¾ inch thick. Nail spacing shall be 6 inches on center at panel edges and 10 inches on center at intermediate supports.

(6) Flooring shall be nailed with 8d common nails not less than two in each board at each support.

(7) Floors for mill-type buildings shall be sheathed as specified for mill floors, Sub-section 2905.6.

(8) Flooring shall not extend closer than one-half inch from masonry walls.

(9) If resilient flooring is to be applied directly to a plywood sub-floor without separate underlayment, the plywood shall have a top ply of C-plugged grade or better, and the ply immediately under the face shall be at least C grade unless the face ply is 1/6 inch or more in nominal thickness. Plywood shall be continuous over two or more spans with face grain perpendicular to supports. Maximum thickness and maximum joist spacing shall comply with the following table:

ALLOWABLE SPAN FOR PLYWOOD COMBINATION SUB-FLOOR UNDERLAYMENT (1)

SPECIES GROUPS	MAXIMUM PLYWOOD SPAN (inches) (2) (3) 16" (4)	20" (4)	24"
1	½"	⅝"	¾"
2, 3	⅝"	¾"	⅞"
4	¾"	⅞"	1"

Footnote (1) Applicable underlayment grade, C-C (Plugged) and all grades of sanded Exterior type plywood.

Footnote (2) Spans shall be limited to values shown based on possible effect of concentrated loads.

Footnote (3) Allowable uniform load based on deflection of 1/360 of span is 100 psf. Plywood edges shall have approved tongue and groove joints or shall be supported with blocking, unless ¼ inch minimum thickness underlayment is installed or unless finish floor is one inch nominal wood strip.

Footnote (4) If wood strips are perpendicular to the joists or supports, thickness shown for 16 inch and 20 inch spans may be used for 24 inch span.

(b) ROOF SHEATHING: (1) Wood roof sheathing shall be tongue-and-grooved or shall be plywood except as may be otherwise approved by the Building Official.

(2) Tongue-and-grooved roof sheathing shall have thickness of not less than three-fourths inch without tolerance and sheathing of such thickness shall span not more than twenty-eight inches between rafters or joists, 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.

(3) Plywood roof sheathing shall be ½ inch minimum thickness and shall be continuous over two or more spans with face grain perpendicular to supports. The allowable spans shall not exceed the following:

ALLOWABLE SPANS FOR PLYWOOD ROOF SHEATHING (1)

PANEL IDENTIFICATION INDEX (2)	MAXIMUM SPAN IF BLOCK OR OTHER EDGE SUPPORTS	MAXIMUM SPAN WITHOUT EDGE SUPPORT
24/0 (½" only)	24"	20"
30/12	30"	26"
32/16	30"	28"
36/16	32"	30"
42/20	36"	32"
48/24	42"	36"

Footnote (1) Values apply to Structural I and II, Standard and CC-Exterior grades.

Footnote (2) Identification Index appears on all panels listed in footnote (1).

(aa) Plywood panels shall be nailed to supports with 6d common nails, for thicknesses of ½ inch and with 8d common nails for ⅝ inch, ¾ inch and ⅞ inch thicknesses.

(bb) Nail spacing shall be six inches on center at panel edges and 12 inches on center at intermediate supports.

(4) Roof sheathing for mill-type construction shall comply with Sub-section 2905.6.

(c) STORM SHEATHING: Exterior stud walls shall be sheathed to resist the racking load of wind as set forth in Section 2306 and shall be either,

(1) Tightly fitted, diagonally-placed, tongue-and-groove sheathing, not less than ¾ inch thickness, nailed with three 8d common nails to each support; or

(2) Plywood panels of maximum practicable size, applied vertically or horizontally, and not less than 5/16 inch for 16 inch stud spacing, fastened with 6d common nails for panel thicknesses up to and including ½ inch, and 8d common nails for ⅝ inch or more thicknesses, spaced 6 inches on center at panel edges and 12 inches on center at intermediate supports.

(3) An effective water barrier shall be provided under all wood exterior cladding between the cladding and the supporting studs except under plywood siding.

(4) All openings shall be flashed.

(d) EXTERIOR WALL SHEATHING: Plywood may serve for both storm sheathing and exterior cladding provided,

(1) The panel thickness shall be not less than 3/8 inch except for 303 specialty siding panels and T1-11.

(2) The supporting studs shall be spaced not more than 16 inches apart,

(3) All joints shall be backed solidly with nailing pieces or studs not less than two inches in width or joints shall be lapped horizontally or otherwise made watertight,

(4) Where face plys are vertical, horizontal cats spaced not farther apart than three feet eight inches vertically shall be provided for support of plywood less than 7/16 inch panel thickness in second floor exterior walls and horizontal cats shall be provided for T 1-11 panels spaced not farther apart vertically than three feet eight inches for first story installation and not farther apart than two feet four inches for second story installations.

(5) Nailing shall be as set forth for storm sheathing except that nails shall be non-corrosive galvanized or aluminum siding or casing nails.

2905.10 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.

2905.11 CONNECTORS: (a) The allowable loads on all types of connectors shall be as set forth in the Standards referred to in Sub-section 2902.1 and in Table 29-C.

TABLE 29-C

NUMBER OF NAILS FOR CONNECTING WOOD MEMBERS

Connection	Box or Common	
Joist to Sill or Girder, Toe Nail	2 16d	
Bridging to Joist, Toe Nail	2 8d	
1" x 6" Sub-floor to Joist, Face Nail	2 8d	
Two-inch Sub-floor Joist or Girder	2 16d	
Plate to Joist or Blocking	16d	16" c/c
Stud to Plate, End Nail	2 16d	
Stud to Plate, Toe Nail	2 16d	or 3 8d
Top Plates: Spike Together	16d	24" c/c
Laps and Intersections	2 16d	
Ceiling Joists: To Plate, Toe Nail	2 16d	
Laps over Partitions	3 16d	
To Parallel Rafters	3 16d	
Rafter to Plate	3 16d	
Continuous One-Inch Brace to Stud	2 8d	
1" x 6" Sheathing to Bearing	2 8d	
1" x 8" Sheathing to Bearing	3 8d	
Corner Studs and Angles	16d	30" c/c
Plywood	8d	(6" c/c edges) (12" c/c interior)
Anchors to Rafters or Roof Joists	3 16d	

(b) Nails, bolts and other metal connectors which are used in locations exposed to the weather shall be galvanized or otherwise corrosion resistant.

(c) 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.

(d) Except for plywood 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.

(e) Safe loads and design practice for types of connectors not mentioned or fully covered herein shall be determined by the Building Official before approval.

2905.12 WOOD SUPPORTING MASONRY: No wood shall support masonry or concrete except as follows:

(a) Wood foundation piles may be used to support concrete or masonry.

(b) Plywood 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 lightweight concrete topping as follows:

(1) There shall be an approved moisture vapor barrier between the concrete or other cementitious materials and the wood.

(2) Wood members supporting concrete shall be preservative treated in compliance with the Standards set forth in Sub-paragraph 2907.2(a)(4).

(3) Plywood decking shall be of exterior grade with exterior glue.

(c) Wood rafters may support concrete roof tile.

2906 WORKMANSHIP

Workmanship, in the fabrication, preparation, installation and the joining of wood members and the connectors and mechanical devices for the fastening thereof, shall conform throughout to the best practices.

2907 PROTECTION OF WOOD

2907.1 WOOD PILES: Wood piles shall be treated with preservatives as specified in Section 2404.3 (b).

2907.2 (a) PRESERVATIVE TREATED OR DURABLE SPECIES WOOD: (1) All wood in areas where deterioration would affect 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, or less than 18 inches from, the ground shall be treated in an approved method with an approved preservative or shall be of an approved durable species.

(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 except that the ends of joists not less than 8 feet above the grade when in contact with concrete or masonry, may be treated by dipping the ends in an approved preservative for a period of not less than 5 minutes.

(4) The method and material of treatment with a preservative shall be in accordance with the American Wood Preservers Association (AWPA) standards C1-69, C4-69 and M6-69 and with the American Wood Preservers Institute (AWPI) standards LP-2-69, LP-3-69, LP-4-69, LP-5-69, LP-7-69, LP-22-69, LP-33-69, LP-44-69, LP-55-69 and LP-77-69, all of which are hereby adopted to supplement, but not supercede the requirements set forth herein.

(5) All lumber and plywood required to be preservatively treated shall bear an American Wood Preservers Institute (AWPI) quality mark or that of an independent inspection agency that maintains continuing control, testing and inspection over the quality of the product as set forth in the Standards adopted herein.

(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.

2907.3 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. Where practicable, ventilating openings shall be arranged on three sides. 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.

(b) Where wood-floor joists are used, there shall be not less than 18 inches distance between the bottom of such floor joists and the grade beneath, as set forth in Section 2406.

2907.4 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.

2907.5 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.

2908 FIRE-RETARDANT TREATED WOOD

2908.1 Fire-retardant treated wood shall have been treated with fire-retardant chemicals in accordance with the American Wood Preservers Association (AWPA) Standard C1-69 and shall have a flame-spread rating of not higher than 25 with no evidence of significant progressive combustion when tested for 30 minutes duration in accordance with the Standard of the American Society of Testing and Materials (ASTM) Designation E84-68.

2908.2 Fire-retardant treated wood shall bear identification showing fire performance rating issued by an approved testing agency having a reexamination service.

2908.3 Fire-retardant treated wood shall have no greater fuel contributed than 30 nor smoke developed greater than 65 as tested in accordance with ASTM E84-68.

2908.4 Fire-retardant treated wood where hereinafter accepted shall be used only in those assemblages or locations where there is positive permanent protection (such as in an enclosed structure or assemblage envelopment) against exposure or contact with moisture that would leach out or otherwise progressively reduce the fire-retardant treatment.

NOTES

CHAPTER 30

ALUMINUM

3001 GENERAL
3002 ALLOWABLE UNIT STRESSES
3003 DESIGN
3004 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 Aluminum Construction Manual, Specifications for Aluminum Structures, November 1967, of the Aluminum Association is hereby adopted to supplement, but not supersede, the specific requirement set forth herein.

3002 ALLOWABLE UNIT STRESSES

3002.1 The design, fabrication and assembly of aluminum members for buildings and other structures shall conform to the Standard set forth in Sub-section 3001.2 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 2301.3 herein.

3003 DESIGN

The Building Official may require that any structure using aluminum primary or secondary members be designed by a Registered Professional Engineer.

Increases in allowable unit stresses as set forth for wind loads in Sub-section 2306.6 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.

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.

3004 CONSTRUCTION DETAILS

3004.1 CONNECTIONS: Aluminum members shall be designed as set forth in the Standards in Paragraph 3001.2 (a).

3004.2 STRUCTURAL 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 2301.3.

(b) Aluminum sheet used for roof decking or siding shall be not less than 0.019 inches in thickness.

(c) Aluminum sheets shall be secured to the supports to adequately resist positive and negative loads and at intervals not exceeding eight and one-half inches and shall be secured to each other at side laps at intervals not exceeding 12 inches.

(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 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 0.019 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-interlock, overlap or seam to prevent water intrusion.

3004.4 DISSIMILAR MATERIALS: (a) Where aluminum surfaces come in contact with metals other than stainless steel, zinc, white bronze of small area or other metals compatible with aluminum, aluminum surfaces shall be kept from direct contact with such parts by:

(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) A good quality caulking material placed between the aluminum and the dissimilar metal;

(4) A non-absorptive tape or gasket;

(5) Steel members hot-dip galvanized or zinc plated after fabrication.

(b) Dissimilar metals shall be painted if used in locations where drainage from them passes over aluminum.

(c) 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.

(d) Aluminum in contact with wood or other absorptive 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 absorptive material shall be painted with two coats of aluminum house paint and seal joints with a good quality caulking compound.

(e) 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 (d).

3004.5 EXPANSION, 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
EXIT FACILITIES

3101 GENERAL
3102 EXITS REQUIRED, NUMBER, WIDTH, ARRANGEMENTS AND TRAVEL DISTANCE
3103 DOORS
3104 CORRIDORS AND EXTERIOR EXIT BALCONIES
3105 STAIRWAYS
3106 RAMPS
3107 HORIZONTAL EXIT
3108 EXIT ENCLOSURES
3109 SMOKEPROOF ENCLOSURES
3110 EXIT OUTLETS
3111 EXIT COURTS, EXIT PASSAGEWAYS, AND YARD AREAS
3112 EXIT ILLUMINATION, 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

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) Every building, structure, or portion thereof shall be provided with exits as required by this Chapter. Where there is a conflict between a general requirement and a specific requirement for an individual occupancy, the specific requirement shall be applicable.

(b) Descriptive information of the National Fire Protection Association standard Life Safety Code, NFPA 101-1970, is recognized as a standard of good practice but is not hereby adopted as part of this Code and shall not supersede the specific requirements as set forth herein.

3101.3 DEFINITIONS: For the purpose of this Chapter, terms shall be defined as set forth in Chapter 4 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.

(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 shall be determined by the number of fixed seats installed. Aisles serving the fixed seats and not used for any other purpose shall not be assumed as adding to the occupant load.

(c) The occupant load permitted in a building or portion thereof may be increased above that specified in this Section if the necessary exits are provided. 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 areas of an occupancy shall be provided with exits as though the accessory use areas were 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 thereof 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 exit requirements 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 EXIT OBSTRUCTION: No obstructions shall be placed in the required width of an exit except projections permitted by this Chapter.

3101.10 POSTING OF ROOM CAPACITY: (a) Any room having an occupant load of more than 50 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 exit 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 Occupancies, changes in elevation of less than 12 inches along any exit serving a tributory occupant load of 10 or more, shall be by means of ramps.

3102 EXITS REQUIRED

3102.1 NUMBER OF EXITS: (a) Every building or useable portion thereof shall have at least one exit, and shall have not less

than two exits where required by Table 31-A.

(b) In all Occupancies, floors above the first story shall have not less than two exits where required by Table 31-A, or where having an occupant load of more than 10, whichever is more restrictive.

(c) Each mezzanine used for other than storage purposes shall have the number of exits as required for upper floors.

(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 exits, see Section 607.

(f) Every story or portion thereof, having an occupant load of 500 to 1000 shall have not less than three exits.

TABLE 31-A—SQUARE FEET PER OCCUPANT BASED ON FLOOR AREA

Use-1	Minimum of Two Exits Required Where Number of Occupants is Over	Square Ft. Per Occupant
Aircraft Hangars (No repair)	10	500 Gross
Auction Rooms	30	7 Net
Assembly Areas, Concentrated Use (without fixed seats)	50	7 Net
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		
Children's Homes and Homes for the Aged	5	80 Gross
Classrooms	50	20 Net
Dormitories	10	50 Gross
Dwellings	5	300 Gross
Garage, Parking	30	200 Gross
Hospitals and Sanitariums, Nursing Homes	5	80 Gross
Hotels and Apartments	10	200 Gross
Kitchen-Commercial	30	200 Gross
Library Reading Room	50	50 Gross
Locker Rooms	30	50 Gross
Mechanical Equipment Room	30	300 Gross
Nurseries for Children (Day-Care)	5	50 Gross
Offices	30	100 Gross
School Shops and Vocational Rooms	50	50 Net
Stores, Retail Sales Rooms		
Basement	-2-	20 Gross
Ground Floor	50	30 Gross
Upper Floors	10	50 Gross
Warehouses	30	300 Gross
All Others	50	100 Gross

-1- Refer to Sections 3118, 3119, 3120 for other specific requirements.

-2- See Paragraph 3102.1(j) for basement exit requirements

(g) Every story or portion thereof, having an occupant load of more than 1000 shall have not less than four exits.

(h) The number of exits required from any story of a building shall be determined by using the occupant load of that story. Where exits serve more than one story, only the occupant load of each story considered individually need be used in computing the number of exits required. Where exits from floors above and/or below converge at an intermediate story, the number of required exits shall be increased by the percentage of the occupant load which exits through the story under consideration as follows:

(1) Fifty percent of the occupant load in the first adjacent story above (and the first adjacent story below, when a story below exits through the level under consideration).

(2) Twenty-five percent of the occupant load in the next story immediately beyond the first adjacent story.

(i) The maximum number of exits 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 exits as required for stories.

(2) Basements and cellars used for other than service of the building shall have not less than two exits.

3102.2 WIDTH: (a) The total width of exits shall be not less than as follows:

(1) For corridors, exterior exit balconies, ramps, exit courts, passageways and exits at grade or within 21 inches of grade, a full 11 inches for each 50 persons or fraction thereof, except a full 11 inches for each 15 persons or fraction thereof for Group D Division 2 Occupancies, and a full 11 inches for each 25 persons or fraction thereof for dormitories of Group H Occupancies.

(2) For stairways, interior or exterior, or smokeproof enclosures, a full 11 inches for each: 38 persons or fraction thereof for Group A or B Occupancy; 30 persons or fraction thereof for Group C, F, or G Occupancy; 23 persons or fraction thereof for Group E, H, I, J, or D Division I Occupancy; 15 persons or fraction thereof for Group H (Dormitory) Occupancy; 11 persons or fraction thereof for Group D Division 2 Occupancy.

(3) For doors and horizontal exits, a full 11 inches of width for: 50 persons or fraction thereof for all occupancies except; 25 persons or fraction thereof for Group H (Dormitory) Occupancies; 15 persons or fraction thereof for Group D Division 2 Occupancies.

(4) But not less than the minimum otherwise set forth in this Chapter.

(5) The total width required in Sub-paragraphs (1), (2), and (3) above shall be divided approximately equally among the separate exits.

(b) The total exit width required from any story of a building shall be determined by using the occupant load of that story. Where exits serve more than one story, only the occupant load of each story considered individually need be used in computing the width of exits required. Where exits from floors above and/or below converge at an intermediate story the width of required exits shall be increased by the percentage of the occupant load which exits through the story under consideration as follows:

(1) Fifty percent of the occupant load in the first adjacent story above (and the first adjacent story below, when a story below exits through the level under consideration).

(2) Twenty-five percent of the occupant load in the next story immediately beyond the first adjacent story.

(c) The maximum exit width required from any story of a

building shall be maintained until egress is provided from the structure.

3102.3 ARRANGEMENTS OF EXITS (a) Where two exits are required such exits shall be located a 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 exits 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).

TABLE 31-B

Group of Occupancy	Distance to An Exit:			
	From any Point		From any Required Door of Single Room or Apartment	
	Unsprinklered	Sprinklered	Unsprinklered	Sprinklered
A & B	150	200	N. R.	N. R.
C	150	200	N. R.	N. R.
D1	N. R.	N. R.	N. R.	N. R.
D2	150	200	100	150
E	75	75	N. R.	N.R.
F1	200	300	N.R.	N. R.
F2	100	150	N. R.	N. R.
G1	150	200	100	150
G2	200	300	N. R.	N. R.
H	150	200	100	150
I	N. R.	N. R.	N. R.	N. R.
J *	N. R.	N. R.	N. R.	N. R.
Open Plan, Any Occupancy Except E	100	100		

N. R.—No Requirement
*—For Group J, Division 3, see Paragraph 1502.3(a).

(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) In any building requiring undivided floor areas so large that 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 distance to exits may be satisfied by providing stairs leading to exit tunnels or to overhead passageways in accordance with Section 3111. In cases when such arrangements are not practicable the authority having jurisdiction may, by special ruling, permit other exit arrangements for one-story buildings where distances in excess of the maximum distances set forth if complete automatic sprinkler protection is provided and if the height of the

ceilings, ceiling curtain boards, and roof ventilation is such as to minimize the possibility that occupants will 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 distance of travel to reach the nearest exit exceed 400 feet.

3103 DOORS

3103.1 GENERAL: This section shall apply to every exit door serving an area having an occupant load of more than 10, or serving hazardous rooms or areas. Sub-sections 3103.8 and 3103.9 shall apply to all doors, regardless of occupant load.

3103.2 SWING: (a) Exit doors shall swing in the direction of exit 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 exit travel.

(b) Exit 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.

3103.3 TYPE OF LOCK OR LATCH: (a) 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 or area served is occupied.

(b) Flush bolts or surface bolts shall not be used.

(c) 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.

(d) Exit discharge doors from smokeproof enclosures shall be provided with panic hardware.

3103.4 WIDTH AND HEIGHT: (a) Every required exit doorway shall be of a size as to permit the installation of a door not less than 32 inches in width and not less than six feet eight inches in height.

(b) When installed in exit doorways, exit doors shall be capable of opening at least 90 degrees and shall be so mounted that the clear width of the opening is not less than 28 inches.

(c) In computing the exit width required by Sub-section 3102.2, the actual width of the door leaf or leaves shall be used.

3103.5 DOOR LEAF WIDTH: (a) No leaf of an exit door shall exceed four feet in width.

3103.6 SPECIAL DOORS: (a) Revolving, sliding, and overhead doors shall not be used as required exits, except that sliding and overhead doors may be used for not more than one half the required exits where such sliding and overhead doors will normally be open at all times when the building is occupied.

(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.

3103.7 EGRESS FROM DOOR: Every exit 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 an exit door.

(b) The floor or landing shall be level with, or not more than two inches lower than the threshold of the doorway.

(c) EXCEPTION: 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 on an exterior landing providing the door does not swing over the top step or 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 exit 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 exit situations provided:

(1) Such doors have a minimum width of six feet six inches.

(2) Such doors are not used in occupancies where exits are required to be equipped with panic hardware.

(3) At least one conforming exit door is located adjacent to each revolving door installed in a building.

(4) The revolving door shall not be considered to provide an exit width.

3104 CORRIDORS AND EXTERIOR EXIT BALCONIES

3104.1 GENERAL: (a) This Section shall apply to every corridor and exterior exit balcony serving as a required exit as defined in Chapter 4 herein for an occupant load of more than 10 persons.

(b) Sub-section 3104.5 shall apply regardless of occupant load.

3104.2 WIDTH: Every corridor or exterior exit balcony shall be not less in width than 44 inches. For special requirements for Group C and D Occupancies, see Sections 3117 and 3118.

3104.3 PROJECTIONS: (a) The required width of corridors and exterior exit balconies shall be unobstructed. Widths shall be taken as the clear, unobstructed width between guardrails or between a guardrail and a wall.

(b) EXCEPTION: (1) Trim, griprails, and doors when fully opened shall not reduce the required width by more than seven inches.

(2) Doors in any position in their swing shall not reduce the required width by more than one-half.

3104.4 ACCESS TO EXITS: (a) When more than one exit is required, they shall be so arranged that it is possible to go in either direction from any point in a corridor or exterior exit balcony to a separate exit, except from dead ends permitted by this Section.

(b) For access to exits within individual apartments, rooms and spaces see special requirements, Sections 3115 through 3123.

3104.5 DEAD ENDS: Exits and exit access shall be so arranged that there are no dead-end pockets or hallways whose 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

GROUP OF OCCUPANCY Continued	MAXIMUM DEAD ENDS (in feet) Continued
E	0
F and G	50
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) Walls and ceilings of exit corridors shall be not less than one-hour fire-resistive 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 building.

(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 occupant load of 30 or less, nor to corridors formed by partitions regulated by Sub-section 1804.4, 2004.3, 2104.3, and 2203.3.

(d) **EXCEPTION:** Where exterior corridors or exterior exit balconies are enclosed on both long sides and above, and the length of enclosure along the long axis exceeds twice the width, 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 exit balconies shall not project into an area where protected openings are required.

3104.7 OPENINGS: (a) Where corridor walls are required to be one-hour fire-resistive construction every interior door opening shall be protected as set forth in Table 31-C.

(b) 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 other than doors, in any portion of an interior corridor wall shall not exceed 25 percent of the area of the corridor wall common to the room which is separated from the corridor.

(d) Individual glass lights in doors shall not exceed 1200 square inches and any single window shall not exceed the limits set forth in Sub-section 3706.5.

(e) **EXCEPTION:** In corridors of Group F and G Occupancies, interior openings may have fixed, plain glass, as set forth in Section 3508, of an area not exceeding 50 percent of the area of the corridor walls provided the corridors are at least ten feet in width and do not serve as means of egress for other floors in the building. Such corridors shall have exits at each extremity. All portions of the floor served whose occupant loads are tributory to the corridor shall have access to at least one additional exit leading to the exterior of the building except where an approved automatic fire extinguishing system is installed throughout the story in which such corridors are located.

(f) Openings located between the end of an exterior exit balcony and the nearest stairway shall be protected as required for corridors.

(g) Other openings to an exterior exit balcony need not be protected unless required by other provisions of this Code.

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 are exempt from the requirements of this Section.

(c) Escalators conforming to the requirements of Section 3205 may serve as required exit 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 and griprails of not more than 3½ inches per side shall not be considered to reduce the required width.

3105.3 RISE AND RUN: (a) The rise of every step in a stairway shall not exceed seven and one-half inches and the run or tread shall be not less than ten inches.

EXCEPTION: 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) Except as provided under Sub-section 3105.4 the maximum variations in the height of risers and the width of treads in any one flight shall be three-sixteenths inch.

(c) The height of every riser and width of every tread shall be so proportioned that the sum of two risers and one tread, exclusive of nosing, shall be not less than 24 inches nor more than 25 inches.

(d) The maximum variation from horizontal of a tread shall be no more than three-sixteenths inch.

3105.4 WINDING STAIRWAYS: In Group I Occupancies and in private stairways in Group H Occupancies, winders may be used if the required width of tread is provided at a point not more than 18 inches from the side of the stairway where the treads are the narrower.

3105.5 CIRCULAR STAIRWAYS: (a) Circular stairs may be used as an exit providing the minimum width of tread is not less than ten inches and the smaller radius is not less than twice the width of the stairway.

(b) All treads in any one flight between landings shall have identical dimensions within a three-sixteenths-inch tolerance.

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) Door 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 10 feet.

3105.7 BASEMENT STAIRWAYS: (a) Exit stairs that continue to the basement or other lower 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 Subsection 3112.6.

3105.8 GRIPRAILS: (a) Stairways shall have griprails on each side and every stairway required to be more than 176 inches in

width shall be provided with additional intermediate griprails, based on one intermediate griprail, for each full 176 inches of the required stairway width.

(b) Intermediate griprails shall be spaced approximately equal within the entire width of the stairway.

(c) Griprails shall be placed not less than 30 inches nor more than 34 inches above the nosing of treads, and ends of grip rails shall be returned or shall terminate in newel posts or safety terminals.

(d) EXCEPTIONS:

(1) Stairways 44 inches or less in width and stairways serving one individual dwelling unit in Group H or I Occupancies may have one griprail, except that such stairways open on one or both sides shall have griprails provided on the open side or sides.

(2) Stairways having less than four risers need not have griprails.

3105.9 GUARDRAILS: (a) Open (or glazed) sides of stairways, balconies, landings, unenclosed floor and roof openings, roofs for other than service of buildings, and any abrupt differences in level exceeding 24 inches in or about the premises shall be provided with well secured guardrails or otherwise protected as set forth herein.

(b) Guardrails shall be not less than 36 inches in height, and on floors above the third floor, shall be not less than 42 inches in height.

(c) Guardrails for stairs shall be not less than 32 inches above the nosing of treads.

(d) Guardrails in buildings of Group H and I Occupancy where the difference in level exceeds five feet shall provide protection for children by being designed and constructed so the openings in the guardrails shall have either a least dimension of six inches or a maximum area of 64 square inches.

(e) Guard rails in and about buildings other than for the Occupancies set forth in Paragraph 3105.9 (d) shall have intermediate rails or an ornamental pattern below the top rail. Where such guard rails are in areas or adjacent to areas accessible to public use or where the public is permitted, the space below the top of the rail shall be designed and constructed to reject a nine-inch diameter object.

(f) Guardrails shall be substantially designed and constructed to withstand a load of 20 pounds per lineal foot applied in any direction.

(g) Exterior guardrails shall also be designed and constructed to resist the wind loads set forth in Chapter 23.

(h) (1) At windows or wall openings 24 inches or more in width and not of safety glass, where the difference in floor level on opposite sides of the window or wall opening exceeds four feet and the wall sill is less than 32 inches above the finish floor, a single guard rail shall be provided. (see also 3508)

(2) Where such windows or wall openings are of safety glass a guard rail will not be required.

(i) (1) A solar screen may serve as a guard rail where such screen complies with the requirements of strength for a guard rail.

(2) A barrier such as planter, fixed bench or similar construction arrangement may be used in lieu of a guard rail.

(j) In single-family residences a natural barrier such as shrubbery may be used in lieu of a guard rail.

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.

(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 separation, as set forth in Parts IV and V of this Code, and as set forth in Sub-paragraph 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 STAIRWAY: (a) All openings in the exterior wall below or within ten feet measured horizontally, of an exterior exit stairway serving a building over two stories in height shall be protected by a self-closing fire assembly having a three-fourths-hour fire-resistive rating.

EXCEPTION: Openings may be unprotected when two separated exterior stairways serve an exterior exit balcony.

(b) Exterior stairways may have open risers where not exposed to severe fire exposure.

3105.13 STAIRWAY AND ACCESS TO ROOF: (a) In every building more than three stories in height, one stairway shall extend to the roof surface unless (1) the roof has a slope greater than three in 12; or (2) access to the roof is for no purpose other than maintentance to the roof and equipment thereon.

(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 frequent 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 not be 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 inclined. No negative incline shall be permitted.

3105.14 HEADROOM: (a) Every required stairway and landing shall have a head-room clearance of not less than seven feet.

(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.

3106 RAMPS

3106.1 GENERAL: A ramp conforming to the requirements of this Section may be used as an exit.

3106.2 WIDTH: The width of ramps shall be as required for corridors.

3106.3 SLOPE: The slope of a ramp shall not exceed one foot in eight feet.

TABLE NO. 31-C REQUIREMENTS FOR DUAL PURPOSE FIRE-EXIT DOORS (1) (2)

	Doors to Corridors			Exit Enclosure (In accordance with Section 3108)		
Occupancy	Hour Rating	Glazing per Leaf (Sq. In.)	Closing Device	Hour Rating	Glazing per Opening (Sq. In.)	Closing Device
A	¾	720	(A) or (B)	1	100	(A) or (B)
B	—(5)	1200[6]	(C)	1	100	(A) or (B)
C	—(5)	1200[6]	(C)	1	100	(A) or (B)
D-1	¾[7]	720	(C)	1½(8)	100	(A) or (B)
D-2	—(5)	1200[6]	(C)	1½(8)	100	(A) or (B)
E-1-2-3	¾	100	(A) or (D)	1½(8)	100	(A) or (B)
F-1	¾	100	(A) or (D)	1½(8)	100	(A) or (B)

	Boiler and Furnace Rooms (3)			Corridors Crossing Area Separation Walls		
Occupancy	Hour (4) Rating	Glazing (Square Inches)	Closing Device	Hour Rating	Glazing per Leaf (Sq. In.)	Closing Device
A	1	0	(A)		Not Applicable	
B	1	0	(A)		Not permitted except in combination with Group C Occupancies	
C	1	0	(A)	1	100	(A) or (B)
D-1	1	0	(A)		No exits permitted	
D-2	1	0	(A)	1	100	(A) or (B)
E-1-2-3	No interior openings permitted				No exits permitted	
F-1	1	0	(A)		No exits permitted	

TABLE NO. 31-C—REQUIREMENTS FOR DUAL PURPOSE FIRE-EXIT DOORS (1) (2) (CONTINUED)

	Doors to Corridors			Exit Enclosure (In accordance with Section 3108)		
Occupancy	Hour Rating	Glazing per Leaf (Sq. In.)	Closing Device	Hour Rating	Glazing per Opening (Sq. In.)	Closing Device
F-2	—(5)	1200[6]	(C)	1	100	(A) or (B)
G-1, 2	—(5)	1200[6]	(C)	1	100	(A) or (B)
H	—(5)	1200[6]	(C)	1	100	(A) or (B)
I	Not Applicable					

	Boiler and Furnace Rooms (8)			Corridors Crossing Area Separation Walls		
Occupancy	Hour Rating	Glazing (Square Inches)	Closing Device	Hour Rating	Glazing per Leaf (Sq. In.)	Closing Device
F-2	1	0	(A)		No exits permitted	
G-1, 2	1	0	(A)		No exits permitted	
H	1	0	(A)		No exits permitted	
I	Not Applicable					

(A)—Self Closing

(B)—Automatic-closing doors shall close automatically 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 work within that limitation.

(C)—None required.

(D)—Automatic closer at 165 degrees F., fusible link, or equal.

(1)—For occupancy separations and protection of openings see Table No. 5-A and Section 508.

(2)—For hardware requirements see Section 3706, for glazing see Section 3707.

(3)—Where oil-fired boilers are used, a six-inch incombustible sill (dike) shall be provided.

(4)—Mounted within the boiler room.

(5)—Tight-fitting smoke or draft stop door is required. See Section 3506. Glass if provided shall be wire glass not exceeding 720 square inches. Hardware shall be capable of holding door closed against fire for 25 minutes.

(6)—When included as part of the 25 percent area limitation specified in Sub-section 3104.7, a second light not to exceed 1200 square inches may be used in each door leaf.

(7)—Except jails, prisons, etc., where open barred cells are provided.

(8)—Less than five stories in height, one-hour will be permitted. Smoke-proof enclosures shall comply with Sub-section 3109.5.

3106.4 GRIPRAILS AND GUARDRAILS: A ramp with slope exceeding one foot in ten feet shall have griprails and guardrails as required for stairways, except that intermediate griprails shall not be required.

3106.5 CONSTRUCTION: Ramps shall be constructed as required for stairways.

3106.6 SURFACE: The surface of ramps shall be roughened or shall be of non-slip materials.

3107 HORIZONTAL EXIT

3107.1 USED AS A REQUIRED EXIT: If conforming to the provisions of this Chapter, a horizontal exit may be considered as a required exit.

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 nonambulatory 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 the outside exit without leaving the enclosure of a continuous path of egress.

(c) Not more than one-half of the required interior stairways from upper floors may discharge at a ground floor lobby or similar ground floor open space provided the number of exits and width of exits of the floor of convergence shall be as set forth in Sub-section 3102.1 and 3102.2 and further provided such lobby or open space is protected with automatic sprinklers as set forth in Sub-section 3801.2.

(d) In other than Group D Occupancies, an enclosure will not be required for a stairway, ramp, or escalator serving only one adjacent floor and not connected with corridors or stairways serving other floors. For enclosure of escalators, see also Sub-section 3203.9.

(e) Stairs in Group I Occupancies or within a one-family tenency of a Group H Occupancy need not be enclosed.

3108.2 ENCLOSURE CONSTRUCTION: Enclosure walls shall be of not less than two-hour fire-resistive construction in buildings more than four stories in height and shall be of not less than one-hour fire-resistive construction elsewhere.

3108.3 OPENINGS INTO ENCLOSURES: **(a)** There shall be no openings into exit enclosures except exit doorways and openings in exterior walls.

(b) All exit doors in an exit enclosure shall be protected as set forth in Table No. 31-C.

3108.4 EXTENT OF ENCLOSURE: **(a)** Stairway and ramp enclosures shall include landings and parts of floors connecting stair-

way 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 opening 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 is 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 walls 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 (b) 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 cupola, and an unobstructed open area equal to the area of the court is provided between the main building roof and the cupola.

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.

(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 which exceed five stories in height, not less than one-third of the required exits shall be smokeproof enclosures.

(b) Where a smokeproof enclosure is required, it shall be used to meet the requirements of Paragraph 3105.13(a).

3109.3 CONSTRUCTION: (a) Stairs in smokeproof enclosures shall be of incombustible construction.

(b) Treads shall be solid.

3109.4 OPENINGS AND ACCESS: (a) There shall be no openings in smokeproof enclosures, except exit doorways and openings in exterior walls or roof.

(b) There shall be no openings directly into the interior of the building.

(c) Access shall be through a vestibule with one wall at least 50 percent open to the exterior and having 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.

(d) In lieu of a vestibule, access may be by way of an open exterior balcony of incombustible materials.

3109.5 DOORS: (a) The opening 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.

3109.6 EXIT DISCHARGE: (a) A smokeproof enclosure shall exit 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) Exit discharge doors from smokeproof enclosures shall be provided with panic hardware.

3110 EXIT OUTLETS

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 exits 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 tributory exits, 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 guardrail at least three feet in height.

(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 griprail requirements see Sub-section 3106.4.

3111.4 NUMBER OF EXITS: Every exit court shall be provided with exits 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 exits 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 EXIT ILLUMINATION, EMERGENCY LIGHTING, AND SIGNS

3112.1 EXIT ILLUMINATION: (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) Every exit and the necessary ways of exit access thereto shall be illuminated to facilitate egress. Such illumination shall be continuous during the time that the conditions of occupancy require that the means of egress be available for use. 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 exit 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 exit ways 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) Exit illumination shall be from a source of reasonably assured reliability, such as public utility electric service.

(2) Where electricity is used as a source of exit illumination 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 exit illumination, but

may be used as an emergency source to the extent set forth in Subsection 3112.2.

(4) No luminescent or fluorescent or reflective material may be used as a substitute for any of the required illumination herein specified.

3112.2 EMERGENCY LIGHTING: (a) In places of assembly and in other Occupancies as set forth in Sections 3115 through 3123, emergency lighting facilities shall be provided for exits so arranged that necessary exit illumination will be maintained in the event of failure of the normal lighting of the building.

(b) Emergency lighting facilities shall be arranged to maintain the specified degree 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-Paragraphs 3112.3(a), (2) and (3), suitable for their intended use, and shall be provided with suitable facilities for maintenance in properly charged condition.

(e) Required emergency lighting facilities shall be automatic, not requiring any manual action to put them into operation after failure of normal lghting.

(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 fault in the main lighting system, due to any failure of public utility or 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 exit lighting, 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) An electric circuit or circuits used only for exit illumination, with two independent electric sources so arranged that on the failure of one the other will come automatically and immediately into operation. 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. 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. Dry cell batteries may be used in unit equipment subject to specific approval by the authority having jurisdiction (see Paragraph 3112.2(d).

(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 arrangements 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 exit lights are on a separate electric circuit, used for no purpose other than exit 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 exit illumination automatically in the event of failure of public utility electric service or other outside 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 an exit, shall be identified by a sign reading "NOT AN EXIT" or similar designation, or shall be identified by a sign indicating its actual character, such as "TO BASEMENT, "STOREROOM, "LINEN CLOSET" or the like.

(3) 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. No decorations, furnishings, or equipment which im-

pair 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 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 the elevator or escalator in question 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) 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. Such illumination shall be continuous as required under the provisions of Section 3112, Exit Illumination, and where emergency lighting facilities are required, exit signs shall be illuminated from the same source. 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.

(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:** (1) Every externally illuminated 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 ¾ inch wide.

(2) Every internally illuminated exit sign shall have the word "EXIT" in plainly legible letters not less than 4½ inches high, and in Group A Occupancy, not less than six inches high.

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 an exit.

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 an exit, cross aisle, or foyer and shall be increased by one and one-half inches for each five feet in length toward the exit, 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, one line of travel to an exit door by an aisle shall be not more than one hundred and fifty 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 exit doors are provided along each side aisle of the row of seats at the rate of one pair of exit doors for each five rows of seats.

(c) Such exit doors shall provide a minimum clear width of sixty-six inches.

3113.5 CROSS AISLES (a) Aisles shall terminate in a cross aisle foyer, or exit. 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 exit 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 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 7½ 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 nor less than twenty-seven inches plus the sum of the 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 MAIN EXIT: (a) Every Group A Occupancy shall be provided with a main exit.

(b) 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, exit passageways, and stairways leading thereto, and shall connect to a stairway or ramp leading to a public way.

3115.2 SIDE EXITS: (a) Every auditorium of a Group A Occupancy shall be provided with exits on each side.

(b) The exits on each side of the auditorium shall be of sufficient width to accommodate one-third of the total occupant load served.

(c) Side exits shall open directly to a public way or into an exit court, approved stairway, exterior stairway or exit passageway leading to a public way.

(d) Side exits shall be accessible from a cross aisle.

3115.3 BALCONY EXITS: (a) Every balcony having an occupant load of more than 10 shall be provided with a minimum of two exits.

(b) Balcony exits shall open directly onto an exterior stairway except that not more than 50 percent of the required balcony exits may open into another approved stairway or ramp.

(c) Balcony exits shall be accessible from a cross aisle.

(d) The number and distribution of exits shall be as otherwise specified in this Chapter.

3115.4 PANIC HARDWARE: Exit 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.

3115.5 EXIT ILLUMINATION, 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) Group B, Division 1 Occupancies shall have exits as required by Section 3115.

(b) In Group B, Division 2 Occupancies, exit 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 adjacent ground level and exits shall be by means of ramps.

3116.3 EXIT ILLUMINATION, EMERGENCY LIGHTING, AND EXIT SIGNS: (a) All 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. Where Type 2 emergency lighting is provided, 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) **EXCEPTION:** Churches of Group B Occupancy used exclusively for religious worship or assemblies will not be required to have emergency lighting.

(c) Exit signs shall be provided as set forth in Sub-section 3112.6.

3117 GROUP C OCCUPANCIES

3117.1 CORRIDORS AND EXTERIOR EXIT 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 exit balcony unless ramps are used.

3117.2 EXITS SERVING AUDITORIUMS: An exit 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.

3117.3 STAIRS: (a) Each floor above or below the ground floor level shall have not less than two exit stairs and the required 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. (See Section 3108.5).

(b) **EXCEPTION:** This Sub-section does not apply to rooms used for maintenance, storage, and similar purposes.

3117.4 DOORS: (a) The width of exit doors from corridors, halls and stairs shall be not more than two feet narrower than the width required by Sub-section 3117.1.

(b) Exit doors in school rooms having an occupant load of more than 20 shall swing in the direction of egress.

3117.5 ROOMS BELOW GRADE: One exit accessible to every room below grade shall lead directly to the exterior at grade level.

3117.6 PANIC HARDWARE: Exit 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).

3117.7 FENCES AND GATES: School grounds may be fenced in and such yards equipped with gates and shall comply with Sub-section 3111.6 herein.

3117.8 EXIT ILLUMINATION, EMERGENCY LIGHTING, AND EXIT SIGNS: (a) All Group C Occupancy buildings shall have adequate exit illumination in accordance with Section 3112. Buildings designed for night occupancy shall have Type 1 or Type 2 emergency exit illumination, as set forth in Sub-section 3112.3 or 3112.4.

(b) All Group C Occupancy buildings shall have signs designating the location of exits 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 exits is otherwise obvious and familiar to all occupants, such as in small elementary school buildings.

3117.9 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.

3118 GROUP D OCCUPANCIES

3118.1 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.

3118.2 MINIMUM SIZE OF EXITS: (a) Every exit 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 inches clear width.

3118.3 CORRIDORS: (a) The minimum clear width of corridors shall be not less than eight feet in width except that corridors not used by Group D Division 2 inmates shall be not less than 44 inches in width.

(b) There shall be no change of elevation in a corridor serving non-ambulatory persons unless ramps are used.

(c) In hospitals and nursing homes, an exit shall be so placed that 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 the nearest exit. If the entire building is completely protected by a standard automatic sprinkler system the distance may be 150 ft.

3118.4 BASEMENT EXITS: One exit accessible to every room below grade where persons with restricted liberties or nonambulatory persons are housed shall lead directly to the exterior at grade level.

3118.5 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.

3118.6 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 3118.6(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.

3118.7 EXIT ILLUMINATION, EMERGENCY LIGHTING, AND EXIT SIGNS: (a) Exit lighting 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 4505.1.

(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.

3118.8 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.

3119 GROUP E OCCUPANCIES

3119.1 Where floor areas are divided into rooms, there shall be at least two ways of escape from every room, however small, except for toilet rooms so located that the points of access thereto are out of or suitably shielded from areas of high hazard.

3119.2 In Divisions 1 and 2, no part of any room shall be more than seventy-five feet from an enclosed stairway, a horizontal exit, exit passageway, or an exterior exit door, measured along the line of travel.

3119.3 Exit illumination shall be provided as set forth in Subsection 3112.1, and exit signs shall be provided as set forth in Subsection 3112.6.

3120 GROUP F OCCUPANCIES

3120.1 DIVISION 1: No special requirements except as set forth in this Section.

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 PARKING GARAGES: (a) Vehicle ramps discharging to sidewalk or street grade shall have an average slope not steeper than one in 24 for down grades nor one in 12 for up grades for the last 20 feet to the point of discharge to sidewalk or street grade.

(b) Where persons other than parking attendants are permitted, stairs and exits shall be as otherwise set forth in Chapter 31.

(c) 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. Where cars are mechanically lifted and parked by attendants, one additional exit shall be provided where such ramp is omitted. Such ramp shall be considered an exit, and exits shall be remotely located so that maximum travel distance from any point to a floor exit shall not exceed 100 feet.

(d) Interior stairs shall be enclosed if the building is enclosed or if the structure exceeds three stories in height. The 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. Wall area shall be taken from the inside from floor to ceiling or ceiling structural member.

(e) Continuous belts or lifts without cages may be provided for attendant personnel but shall not be considered as required exit facilities.

(f) On the street floor at least two separate exit doors shall be provided except that any opening for the passage of automobiles may serve as a means of exit, provided that no door or shutter is installed thereon. Street floor exits 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.

(g) On floors above the street at least two means of exit shall be provided, one of which shall be an enclosed stairway, smokeproof tower, or outside stair or a horizontal exit. The other means of egress may be a second exit of any of the types permitted by the preceding sentence, or in a ramp-type garage with open ramps not subject to closure, the ramp may serve as the second means of exit.

(h) Vehicle ramp need not be enclosed.

3120.4 DIVISION 2: INDUSTRIAL OCCUPANCY: For rooms or areas with a total capacity of less than 25 persons having direct exit to the street or to an open area outside the building at grade level, with a total travel distance from any point of not over 50 feet, a single exit may be permitted. Such travel shall be on the same floor level, or if the traversing of stairs is required, there shall not be a vertical travel of more than 15 feet, and such stairs shall be provided with complete enclosures to separate them from any other part of the building, with no door openings therein.

3120.5 EXIT ILLUMINATION AND EXIT SIGNS: (a) Exit illumination 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.

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 one-story buildings where the fire division area is undivided and all parts thereof are clearly visible to all occupants.

3121 GROUP G OCCUPANCIES

3121.1 DIVISION 1: (a) Where floor areas are divided into rooms not used for sales purposes, such offices, rest rooms 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 maximum path of travel within the room to reach the room door does not exceed 50 feet.

(b) For a room or area with a total capacity of less than 100 persons, having direct exit to the street or to an open area outside the building at grade level, with a total travel distance from any point of not over 100 feet, a single exit may be provided. Such travel shall be on the same floor level, or if the traversing of stairs is required, these shall not be more than 15 feet in height, and such stairs shall be provided with complete enclosures to separate them from any other part of the building, with no door openings therein.

3121.2 EXIT ILLUMINATION, EMERGENCY LIGHTING, AND EXIT SIGNS: (a) Exit illumination 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 where emergency lighting is required and Type 3 emergency lighting is provided, enclosed main corridors and each enclosed stair-well 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) Exit signs shall be provided as set forth in Sub-section 3112.6.

3121.3 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 if more than 200 persons are employed above or below the street level.

3122 GROUPS H AND I OCCUPANCIES

3122.1 DOORS AND WINDOWS: (a) Every sleeping room of Group I Occupancy, unless it has two doors providing separate ways of escape, or has a door leading outside of the building directly, shall have at least one outside window which can be opened from the inside without the use of tools to provide a clear opening of not less than 16 inches in least dimension and 400 square inches in area, with the bottom of the opening not more than four feet above the floor.

(b) Door openings from guest rooms to public corridors shall be protected with a fire-resistive assembly as set forth in Table 31-C.

3122.2 STAIRS: All stairs and exits of Group H Occupancies shall open directly upon a street or alley or upon a yard or court not less than four feet in width directly connected to a street or alley by means of a passageway not less in width than the stairway opening into such passageway and not less than seven feet in height.

3122.3 TRANSOMS: Buildings more than one story in height shall have no transoms or ventilating openings from guest rooms to enclosed public corridors.

3122.4 APARTMENTS: Exits and means of access thereto shall be so located that it will not be necessary to travel more than 50 feet 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.

3122.5 DORMITORIES: Any dormitory shall have exits so arranged that from any sleeping room or open dormitory sleeping area there will be access to two separate and distinct exits 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 means of exit may be accepted.

3122.6 EXIT ILLUMINATION, EMERGENCY LIGHTING, EXIT SIGNS AND FIRE ALARMS: (a) HOTELS:

(1) Each public space, hallway, stairway, and other means of egress shall have exit illumination as set forth in Section 3112. Access to exits shall be continuously illuminated at all times. 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 exit to the outside of the building (as in motels) no emergency exit lighting shall be required.

(2) Every exit from public hallways or passageways on floors with sleeping accommodations shall have an illuminated sign as set forth in Section 3112. Where exits are not visible from every point in a hallway or passageway, illuminated signs shall be provided to indicate the direction to exits as set forth in Sub-section 3112.6.

(b) **APARTMENT BUILDINGS:** (1) Every enclosed public space, hallway, stairway and other means of egress shall have illumination as set forth in Section 3112. Any apartment building with more than 25 living units shall have Type 1 or 2 emergency exit lighting except that such lighting in enclosed main corridors and in each enclosed stair-well shall be provided with at least one source of Type 1 emergency lighting arranged to prevent total darkness in the event of power failure.

(2) 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:** Every dormitory shall have exit lighting as set forth in Section 3112. 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.

(d) **GROUP I OCCUPANCIES:** Single family or duplex residences shall not be required to have exit illumination.

3122.7 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.

(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 exit 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 to arouse all occupants of the building or section thereof endangered by fire.

(2) An alarm sending 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.

3123 GROUP J OCCUPANCIES

3123.1 DIVISION 3: (a) All reviewing stands, grandstands, and bleachers shall have exit facilities as set forth in the Standard in Paragraph 1502.3(a).

(b) Panic hardware may be waived on gates surrounding stadiums, when the 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.

(c) 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 exits as set forth in this Chapter except that where the gross floor area of such roof structure 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 exit.

3124 COVERED MALLS, WALKWAYS AND PASSAGEWAYS

3124.1 SCOPE: This section shall apply to connections between buildings such as covered malls and walkways or passageways, located at, above or below grade level, that are used as a means of travel by persons.

3124.2 DEFINITIONS:

Covered mall: is a covered or roofed interior area having a minimum horizontal dimension of 30 feet used as a pedestrian publicway and connecting buildings and/or group of buildings housing individual or multiple tenants.

Covered walkway: is a roofed, unobstructed walkway, where the least horizontal dimension is less than 30 feet, connecting buildings and used as a means of travel by persons and where less than 50 percent of the perimeter is enclosed.

Enclosed passageway: is a roofed, unobstructed walkway, where the least horizontal dimension is less than 30 feet, connecting buildings and used as a means of travel 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 shall be separated from adjoining buildings by not less than one hour fire-resistive construction.

(5) EXCEPTION: Where an approved automatic sprinkler system is provided, and Class 1 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(b).

(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 fire 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 EXITS: Exits 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 be in accordance with NFPA Standard No. 204-1968—Guide for Smoke and Heat Ventilating, or other accepted engineering practice.

3125 SPECIAL HAZARDS

3125.1 BOILER ROOMS: (a) Except in Group I 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 No. 31-C.

(c) EXCEPTION: Rooms not large enough for persons to walk around the equipment may have one door.

Note: Appendix D describes exit facilities by Group of Occupancy and use for some occupant loads and common exit facilities. The chart given in Appendix D is prepared for the convenience of designers and users of this code and is not a part of this code, the text of the code being the requirement in all instances. Where there are differences in interpretation between the text and chart, the text supersedes the chart.

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 3117.9.

(b) Buildings of Group D Occupancy as set forth in Sub-section 3118.8.

(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 3121.3.

(e) Buildings of Group H Occupancy as set forth in Sub-section 3122.7.

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 of 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 and have general charge of alterations and additions.

(e) Each system shall be tested at not less than weekly intervals, except as otherwise set forth.

(f) Fire alarm 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 exit 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.

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, wherein such standards are more restrictive than as set forth herein.

3201.2 STANDARDS: (a) The "American Standard Safety Code for Elevators, Dumbwaiters and Escalators," ANSI A17.1-1965 with A17.1a-1967, A17.1b-1968, A17.1c-1969, A17.1d-1970 supplements of the American National Standards Institute is hereby adopted to supplement, but not supersede, the specific requirements set forth herein and is hereinafter referred to as "The Elevator Safety Code."

(b) The "American Standard Safety Code for Manlifts," ANSI A90.1-1969 of the American National Standards Institute is hereby adopted to supplement, but not supersede, the specific requirements set forth herein.

(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 as set forth in Chapter 4 or in "The Elevator Safety Code" or as follows:

ALTERATION: Shall mean any change to an existing installation other than repair or replacement of worn or broken parts necessary for normal operation.

TRANSPORTING ASSEMBLIES: Shall mean any permanent or semipermanent 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 Building Official, and a permit therefor shall be issued upon approval as specified in Chapter 3 herein, subject to the following:

(1) Servicing and repairs and replacements necessary for normal maintenance, which are made with parts 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 exemptions shall not relieve the owners thereof from the provisions herein nor from the responsibility of requesting inspection and securing approval of such device by the Building Official before its use or service.

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:

(1) **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 subparagraph 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.

(2) **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 subparagraph 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 Building Official 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 the Building Official access for inspection of damage or cause of damage and shall prevent the use of such equipment or assembly until its use is approved by the

Building Official. The Building Official will inspect the site of an accident and record in detail all material facts and information available and the cause or causes, insofar as they can be determined, and said site shall be open to public inspection at all reasonable hours. Any damaged construction or operating mechanism shall not be removed from the premises until inspection by the Building Official.

3203.4 (a) INSPECTION: The Building Official may accept the inspection of a regular employee of any other 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.

(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 Building Official in writing at least three days before completion of the work, and shall, in the presence of the official or his representative, subject the new, moved or altered portions of the equipment to tests required to show that such equipment meets the requirements of this code.

(d) TRANSPORTING ASSEMBLIES AND AMUSEMENT DEVICES: The permit holder installing, moving or altering transporting assemblies or amusement devices shall, in the presence of the Building Official or his representative, make such tests as the official may prescribe in order to determine the safety of such equipment.

(e) CERTIFICATES OF INSPECTION: (1) ISSUING OF CERTIFICATES: The Building Official or his representative shall file a full report of each and every inspection made, showing the exact condition of the equipment, with a statement of any repairs or replacements required. If this report indicates that the equipment meets the requirements of this Code and is in a safe operating condition, the Building Official will issue a certificate of operation for a load capacity not to exceed that named in the report of inspection. This certificate shall be valid for three months after the date of issue for passenger elevators, six months after the date of inspection for freight elevators, escalators, building hoists and manlifts, and twelve months after date of inspection as to dumbwaiters of either electric or hand power type, freight elevators of the hand power type or other lifting apparatus, unless subsequent inspections indicate an unsafe condition.

No passenger elevator, freight elevator, dumbwaiter, escalator, building hoist or other lifting apparatus may be operated without this certificate first having been conspicuously posted.

A new certificate shall be issued or an endorsement made on the existing certificate by the Building Official 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: 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 certificates shall not be issued until the elevator shall have been tested under contract load, and the car-safety

and terminal-stopping equipment have been tested to determine the safety of the equipment for construction purposes, and until permanent or temporary guards or enclosures are placed on the car and around the hoistway and at the landing entrances on each floor. Landing-entrance guards shall be provided with locks that can be released from the hoistway side only. Automatic and continuous-pressure elevators shall not be placed in temporary operation from the landing push buttons unless door locking devices and/or interlocks required by the Elevator Safety Code are installed and operative.

(aa) PERIOD OF USE: Limited certificates shall be issued for a period not to exceed thirty days.

(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 by the Building Official as provided in paragraph 3203.4 (a) and tested by the owner or his agent in the presence of the Building Official in accordance with the requirements set forth in the Elevator Safety Code.

(b) AMUSEMENT DEVICES AND SPECIAL EQUIPMENT: Amusement devices and special equipment shall be tested and inspected on a semi-annual schedule in accordance with such rules and procedures as the Building Official may reasonably request.

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 without being reconstructed to comply with requirements of the Elevator Safety Code as herein adopted except as follows:

(1) Within a period of two years all power attachments on hand power elevators shall be removed.

(2) Within a period of three years all elevators and dumbwaiter hoistway entrance doors or gates shall be made to meet the requirements of the Elevator Safety Code.

(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.

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 or parts on which the support of the elevator car depends, shall not be repaired by welding.

3203.8 UNSAFE EQUIPMENT: Whenever an elevator, dumbwaiter, escalator or transporting assembly is, in the opinion of the Building Official, 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.

For the consideration of unsafe equipment, Section 202 herein, as it pertains to buildings, shall be applied to elevator and escalator installations, based on the total cost of such installation exclusive of the hoistway.

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 and in accordance with the Standards for such escalators as provided in the "Life Safety Code" of the National Fire Protection Association, NFPA No. 101-1970.

3204 ELEVATORS

3204.1 Guide rails for cars and counterweights shall be of steel.

3204.2 Elevators shall not be included in the calculation of required stairways.

3204.3 (a) Every passenger and freight elevator, except elevators having automatic or continuous-pressure operation, shall be operated only by qualified operators (b) Qualified operators shall conform to the following requirements:

(1) Be at least 18 years of age and physically and mentally capable.

(2) Make written application to the Building Official on forms provided by him for an Operator's Permit for the type of elevator he desires to operate.

(3) Pass an examination to test the applicant's experience and ability to operate an elevator of the type specified.

(4) Pay a fee of one ($1) dollar for such examination.

(c) Following such examination, the Building Official, at his discretion, shall issue to the applicant an Operator's Permit which shall specify the type or types of elevator the holder thereof is entitled to operate.

(d) No person shall operate an elevator requiring an Operator's Permit if the elevator to be operated is of a type different from that specified on the permit. Permits shall be valid for one year and may be renewed, at the discretion of the Building Official, for a fee of one ($1) dollar.

3204.4 (a) In any building where all elevators have automatic operation, one elevator, or more than one elevator if necessary to provide access to all landings, shall be arranged for Fire Department emergency use as follows:

(1) A key-operated switch with light jewel shall be provided adjacent to the elevator at the street floor landing and may be provided at other landings subject to the discretion of the authority having jurisdiction. The key-operated switch shall remove the elevator from normal service and place it on fireman's service.

(2) The key-operated switch shall, when operated, cancel existing car calls, prevent registration of further car calls, prevent the opening of the elevator doors except at the landing at which the switch is located and cause the car to travel to that landing bypassing other landing calls. The light jewel shall be illuminated when the car is returning to the fireman's landing in response to the operation of the key-operated switch.

(3) When the car arrives at the fireman's landing, the doors shall open and remain open until closed by the operation of the elevator from the car.

(4) A key-operated switch shall be provided in the car which can be operated only by the key which operates the fireman's landing switch and which, when operated, shall permit the operation of the elevator only from the car operating buttons and cause the elevator to bypass landing calls.

(5) The above-mentioned key shall be located adjacent to the switch in an accessable transparent container.

(b) The electric service for all elevators in buildings exceeding 10 stories in height, shall be connected on the supply side of the main disconnecting means or an emergency source of power provided.

3205 ESCALATORS, DUMB-WAITERS AND MOVING STAIRWAYS

3205.1 Escalators, dumb-waiters and moving stairways moved from one shaft or location to another shall conform to the requirements of Sub-section 3201.2.

3205.2 An escalator may be accepted as a 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 an 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 hoistway and platform may be constructed without a permit therefor, but shall not be assembled or constructed without the written approval of the Building Official.

(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: 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.

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 Building Official.

CHAPTER 33

PRECAUTIONS DURING BUILDING OPERATIONS

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3301 GENERAL

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 condition 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 useable 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 steps and landings shall 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 toppling 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 4007 herein, and operators in charge of such boilers shall be acceptable to the Building Official.

3307 DERRICKS AND CRANES

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 its maximum-rated load in any possible position. Such maximum-rated load shall be conspicuously posted on each derrick.

The foot-block of every derrick shall be firmly secured against motion in any direction.

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.

The moving parts of derricks and cranes shall be kept well lubricated, and all parts shall be inspected at least every other day.

3308 CABLES, ROPES, CHAINS AND BLOCKS

Cables, ropes, chains and blocks shall be of such size that 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 be 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 building 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 a 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 hoistway 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 hoistways 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 for 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 hoistways 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 landings 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 at 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 nor 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 a temporary stairway shall have a vertical rise in excess of 12 feet, and, when necessary, immediate 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

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 ground or above a permanent or temporary floor.

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 building exceeds 60 feet in height.

All ladders shall be substantial in construction and shall conform to the Florida Industrial Commission regulations for Portable and Fixed Ladders LAD-1959 adopted July 14, 1959 and amended November 1, 1960.

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.

Ladders, leading to floors, stagings or platforms, shall extend at least three feet above the level of such floors, stagings or platforms.

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.

Ladder rungs shall be spaced uniformly and as near to 12 inches as is practicable.

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.

Ladders, other than sectional or extension ladders, shall not be extended by joining two or more together.

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, hoistways or equipment.

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 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 sup-

port 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 GUARD RAILS AND TOE BOARDS

3317.1 GUARD RAILS: Guard rails, when required in this chapter, shall have the top rail not less than 36 inches high above the platform level, and an intermediate rail shall be provided between the top rail and the platform. All guard rails shall have adequate supports not more than eight feet apart. Every guard rail shall be constructed to withstand a horizontal force of 20 pounds per foot.

3317.2 TOE BOARDS: Toe boards, when required, shall be solid to full height, shall extend not less than six inches above the platform level and shall be placed to fit close to the edges of the platform. They shall be adequately supported, secured and braced along the entire length to resist the impact of workers' feet and the shifting of materials. Toe boards of wood shall be not less than one-

inch nominal thickness with supports not more than four feet apart, and toe boards of metal shall be not less than one-eighth inch thick, with supports not more than four feet apart.

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 an ample supply of iodine or mercurochrome and aseptic-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 gasses for welding or cutting shall be located at no greater distance from the work than is necessary for safety. Such tanks shall be securely 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 that 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 building 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, sprinkles 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 COVERINGS

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3403 MEMBRANE BASE FLASHINGS
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3406 SLATE AND COMPOSITION SHINGLES
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3410 METAL ACCESSORIES
3411 OTHER ROOFING MATERIALS

3401 GENERAL

3401.1 PERMITS: (a) A permit shall be required for the erection, construction, fabrication, application, or repair of any roof covering as set forth in Chapter 3 herein.

(b) Application for permit will be accepted from only qualified persons or firms. Qualification of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradesmen.

3401.2 INSPECTIONS: (a) The Building Official, upon notification from the permit holder, shall make a roofing inspection and shall either approve that portion of the work completed or order correction for compliance.

(b) On new roof construction, where the sheathing is exposed from below and for architectural appearance, the roofing nails are not driven through the sheathing, the permit holder shall notify the Building Official eight hours before the time that tin capping will be nearly completed, so that inspection may be made before the roof is mopped or covered.

(c) On replacement of roof coverings on existing buildings, the permit holder shall notify the Building Official eight hours before the time that tin capping will be nearly completed, so that inspection may be made before the roof is mopped or covered.

(d) On tile roofs, in addition to other inspections, the permit holder shall notify the Building Official eight hours before the time that tile laying will be nearly completed, so that inspection may be made during the process of laying the tile.

3401.3 FIRE-RETARDANT ROOF COVERINGS REQUIRED:

(a) Roof coverings shall be fire-retardant as set forth herein for roofs of all buildings in Fire Zone 1 and 2, and all buildings of Type I, II, III (Protected) and IV Construction.

EXCEPTIONS: (1) In Fire Zones 2 and 3 and for any Group of Occupancy the roofs and fascia of cornices and cantilevering overhang may be as set forth in Sub-section 1812.5.

(2) In any Fire Zone and for any Group of Occupancy combined roof-and-wall in buildings of Type III Construction may be as set forth in Sub-section 2003.4.

(b) A fire-retardant roof covering shall be any roof or any roof covering which meets the requirement of any one of the following or shall be any roof assembly bearing the label of the Underwriters' Laboratories, Inc. for Class A or B roofing.

(1) Any built-up composition roof consisting of materials whose fire-retardant values as set forth in Table 34-A equal not less than 15

points including a top covering selected from Parts (b), (c) or (d) of said Table.

(2) Hydraulic compressed rigid shingles not less than one-eighth inch thick, composed of Portland cement and asbestos fibers, laid over a layer of saturated felt weighing not less than 30 pounds to 100 square feet, or hydraulic compressed rigid sheets not less than seven thirty-seconds inch thick as set forth in Section 3506.

(3) Asphalt-saturated mineral-surfaced prepared composition shingles laid so there are not less than two thicknesses at any point. The combined weight of such shingles shall be not less than 200 pounds to 100 square feet.

(4) Concrete slab constructed as set forth in Chapter 25 without additional roof covering.

(5) Steel roof covering as set forth in Section 2809.

(6) Aluminum roof covering as set forth in Chapter 30.

(7) Concrete or clay roof-tile.

(8) Glass-fibered felts may be substituted for the inorganic felts set forth in Table 34-A subject to interpretation by the Building Official of the results of tests on such glass-fiber felts.

(c) Fire-retardant roofs shall comply with all other requirements of this Chapter.

3401.4 MATERIALS: Roofing materials applied to solid decks shall be as set forth in this Chapter and roof decks or sheets designed to be self-supporting between structural members and to provide protection from rain or sun shall be designed and constructed as follows:

(a) STEEL: Steel decking and roofing shall comply with Section 2809 herein.

(b) ALUMINUM: Aluminum roof sheeting shall comply with Chapter 30 herin.

(c) PLASTICS: Plastics used for roofs shall comply with Section 3505 herein.

(d) ASBESTOS-CEMENT: Corrugated asbestos-cement sheets used for roof coverings shall comply with Section 3506 herein.

3401.5 EXISTING ROOFS: (a) 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.

(b) Roofing felts, roll-slate roofing, asbestos-cement shingles and slate or composition shingles shall not be applied over existing roofs where the roof sheathing will not permit suitable grip for nailing, where old roofing is water-soaked or deteriorated so that suitable bond for additional plies is not possible or where the existing roof surface is of corrugated or standing-seam metal. Such additional materials may be applied over existing roofs only when the following conditions are satisfied:

(1) Where water blisters or air blisters exist in old roofing, blisters shall be removed and remopped before applying additional roofing.

(2) Where the existing roofing surface is gravel, existing gravel shall be completely removed before applying additional roofing.

(3) Where the existing roofing is on spaced sheathing, shingles shall be removed and the roof shall be solid sheathed, with tongue-and-groove sheathing, and filler strips between spaced sheathing shall not be permitted.

(4) Under no circumstances shall roofing felts, roll-slate roofing or shingles be applied over existing shingles or any other surfaces more uneven than solid wood sheathing. Asphalt shingles or 90# roll roofing may be applied over existing asphalt shingles having not more than one-eighth inch difference in level.

TABLE 34-A—FIRE-RETARDANT VALUES OF ROOFING MATERIALS

	SHIPPING WEIGHT (Pounds)	TYPES OF MATERIALS	Min. Wt. Per 100 Sq. Ft. of Roof Area (Pounds)	Fire Retardant Value
(a) Base Sheets	15	Asphalt-Saturated Felt	14	3
	30	Asphalt-Saturated Felt	28	6
	20	Asphalt-Saturated and Coated Dampcourse	18	4
	40	Asphalt-Smooth Surfaced Roofing	37	6
	15	Asphalt-Saturated Asbestos Felt	14	5
	20	Asphalt-Saturated Asbestos Felt	18	5
(b) Base or Cap Sheets	45	Asphalt-Saturated Asbestos Felt (Black Top)	41	9
	55	Asphalt-Saturated Asbestos Felt (Black Top)	50	10
	15	Asphalt-Saturated Asbestos Felt (minimum 2 layers)	28	10
(c) Cap Sheets Only	55	Mineral-Surfaced Split Sheets (minimum 2 layers)	106	12
	90	Mineral-Surfaced Asphalt Cap Sheet	83	10
	75	Smooth-Surfaced Cap Sheet	68	9
	65	Smooth-Surfaced Cap Sheet	60	7
	55	Smooth-Surfaced Cap Sheet	50	6
	39	Asphalt-Saturated Asbestos Roofing (White top)	37	9
	55	Asphalt-Saturated Asbestos Roofing (White top)	52	10
(d) Gravel and Tile		Gravel, ¼" to ½" in size	400	6
		Concrete or clay tile	300	4

(c) Additional layers of roofing felt and other materials may be applied over existing roofs as follows:

(1) Unless it can be shown, to the satisfaction of the Building Official, that the existing roofing is sufficiently anchored, the entire roof shall be tin-capped at 12-inch centers before additional layers of roofing are applied.

(2) If two or more layers of 15-pound felt or 30-pound felt are applied over an existing roof on a concrete, gypsum or steel deck, all layers of additional felt shall be solidly mopped to the existing roof.

(3) Tile shall not be applied over an existing roof where the added weight may increase stresses in the supporting structure to be greater than the allowable stresses set forth in this Code.

3402 BUILT-UP FELTS AND GRAVEL

3402.1 GENERAL: (a) PREPARATION OF SURFACE: (1) Before starting the application of all roofing membranes, all roof decks shall be broom-cleaned; parapet walls, vertical walls, penthouses and similar structures above the roof level shall have been completed; and all flat roof decks shall have been provided with a cant-strip where the roof deck joins a vertical surface.

(2) Cant-strips shall be of nailable material and shall extend at least four inches up the vertical surfaces.

(3) Wood roof decks shall be solidly sheathed.

(4) Concrete roof decks shall be smooth and free from laitance.

(5) Portland cement roof decks shall be thoroughly dry.

(6) Gypsum decks shall be surface dry, before starting application of roofing.

(7) All eave facias shall be completed before starting application of roofing.

(b) MATERIALS: Mineral-surfaced cap sheets, asphalt shingles, and smooth-surface cap sheets shall bear the label of the Underwriters' Laboratories, Inc., for Class A, B, or C roofing. All materials shall be delivered in original packages bearing the manufacturer's label.

(c) ANCHORING: Roofing felts, sheets, plys and shingles shall be attached to the roof deck by mopping or mechanical fastening as set forth herein.

(d) NAILING: (1) Nails securing roofing to nominal one-inch lumber or to plywood 3/4 inch or more in thickness shall be untumbled hot-dipped galvanized wire nails or ring-shanked nails having not less than 20 rings per inch, not smaller than 12 gage, not less than 1 inch in length and with heads not less than 3/8 inch diameter.

(2) Nails securing roofing to plywood less than 3/4 inch in thickness shall be 12 gage wire ring-shanked nails having not less than 20 rings per inch and of not less length than will penetrate the plywood plus 3/16 inch and with heads not less than 3/8 inch diameter.

(3) Nails in gypsum concrete or other nailable concrete shall be hot-dipped galvanized nails not less than one and 3/4 inches in length.

(4) Nails securing shingles over felts may substitute in quantity for the number of nails required for the attachment of the felts.

(5) Nails securing felts shall be applied through tincaps not less than 1 and 5/8 inch nor more than 2 inch diameter not less in thickness than 32 gage sheet metal.

(6) The spacing of nails along the lap of sheets and both ways in the field between laps shall not exceed the following, based on height above grade:

HEIGHT ABOVE GRADE	CENTER-TO-CENTER SPACING
0 to 20′	12″
20′ to 30′	11″
30′ to 50′	10″
50′ to 80′	9″
Over 80′	6″

(7) EXCEPTION: Other mechanical methods or devices for attaching the anchor sheet or sheets to the decking may be approved provided such fastenings are spaced not to exceed 12 inches on centers and provided it can be demonstrated that the attachment is capable of resisting a load of not less than twice the design load set forth in Chapter 23 based on height above grade.

(8) EXCEPTION: Where the underside of sheathing is to be exposed, mechanical attachment shall be: (aa) 1¼ inch long, untumbled, hot-dipped galvanized-wire nails or 1¼ inch ring shanked nails 12 inches on center driven through tincaps along the rafters and with ring-shanked nails that do not penetrate the sheathing spaced as set forth in Sub-paragraph 3402.1 (d) (6) in the field between rafters, or (bb) the rafters nailing may be omitted and ring-shanked nails that do not penetrate the sheathing spaced to provide twice the number of nails set forth in Sub-paragraph 3402.1 (d) (6).

(9) Where nailing or other mechanical fasteners are used the anchor sheet shall be not less than one 30-pound (or two 15-pound felts mopped together) with each sheet lapped 2 inches over the preceding sheet.

(e) MOPPING: (1) Each additional sheet above the anchor sheet shall be thoroughly mopped between layers with a bituminous compound, or other approved adhesive providing the attachment set forth in Paragraph 3402.1 (c), so that in no place shall felt touch felt. Sheets shall be embedded without wrinkles or buckles. On new work, each felt sheet above the anchor sheet may be preforated felt.

(2) Bituminous compounds shall be air-refined asphalt or coal tar pitch.

(3) Hot asphalt shall be applied in a quantity of not less than 20 pounds per square per ply and 40 pounds per square for the flood coat and at a temperature of not less than 350 nor more than 400 degrees Fahrenheit (425° to 475° in kettle).

(4) Coal tar pitch shall be applied in a quantity of not less than 25 pounds per square per ply and 50 pounds per square for the flood coat and at a temperature of not less than 275 nor more than 350 degrees Fahrenheit (350° to 400° in kettle).

(5) Adhesive compounds other than bitumen may be approved and shall be applied subject to the conditions of approval.

(6) Where the incline of the roof exceeds two inches per foot the only bitumen cementing material used shall be steep asphalt or steep coal tar pitch.

(f) WEIGHT: Roofing felts, plys, adhesives and surface minerals shall be designated by the weight per 100 square feet, herein termed a square.

(g) LAP: Each sheet shall be lapped two inches over the preceding sheet, and turned up vertical surfaces four inches.

3402.2 ANCHORING TO ROOF DECK: (a) WOOD: (1) Attachment of the anchor sheet to wood or plywood decks shall be by nailing as set forth in Paragraph 3402.1(d).

(2) Sheathing paper shall be used on wood or plywood decks under tarred felts.

(b) CONCRETE AND LIGHT-WEIGHT CONCRETE: (1) Attachment of the anchor sheet to concrete and light weight concrete shall be by strip mopping or solid mopping. Strip or solid mop-

ping shall satisfy the uplift resistance set forth in Sub-paragraph 3402.1(d)(7).

(2) Where the incline of the roof deck exceeds three inches per foot, anchor sheets shall be attached by direct nailing to concrete or by wood nailer strips, pressure treated with an approved preservative, of minimum 1" x 2", chamfered or otherwise securely attached, spaced not more than 24 inches apart, shall be cast in the concrete and, in addition to mopping, the roofing membrane shall be secured to the nailer strips with ¾ inch long nails as set forth in Paragraph 3402.1(d).

(c) POURED-IN-PLACE GYPSUM: Attachment of the anchor sheet to poured-in-place gypsum shall be by nailing as set forth in Paragraph 3402.1(d).

(d) METAL: Attachment to metal decks shall be as set forth in Paragraph 3402.1(e).

(e) INSULATION: (1) Attachment of the anchor sheet to insulation having suitable interior cohesion to resist uplift forces set forth in Chaper 23 shall be by solid mopping and such insulation shall itself be either solid mopped or mechanically fastened to the supporting deck as set forth herein for the material of the deck.

(2) Attachment of the anchor sheet to insulation not having suitable interior cohesion to resist uplift forces set forth in Chapter 23 shall be by mechanical fastening through the insulation to the deck.

(f) OTHER: Attachment to decks other than those specifically listed herein shall be by a method determined by the Building Official as that most nearly the same as the material herein above set forth.

3402.3 GRAVEL OR SLAG SURFACING: Gravel or slag surfacing shall not be used on inclines of more than four inches per foot and where used shall be applied over base sheets as set forth in Sub-sections 3402.2 and 3402.3. A flood coat of hot asphalt or pitch shall be uniformly applied into which, while hot, shall be embedded not less than 400 pounds of gravel or 300 pounds of slag per 100 square feet and gravel or slag shall be approximately one-fourth to five-eighths inches in size, dry and free from dirt.

3402.4 MINERAL SURFACED ROOFING: (a) (1) Mineral surfaced roofing shall be applied over only the base felts set forth in Sub-section 3402.2, except that where the incline is one-half inch or less per foot mineral surfaced roofing shall not be permitted.

(2) The edges of sheathing at eaves and gable ends shall be covered and protected with non-corrosive metal as set forth in Section 3409 or with rolled edges of the mineral surfaced roofing.

(3) Where used under tile roofs or where incline exceeds 5 inches per foot, slate shall be back nailed 18 inches on centers.

(4) Mineral surfaced felts of glass or asbestos composition are not limited to slope requirements.

(b) Mineral surfaced roof may be two layers of 55-pound split sheet roofing, each layer lapped 19 inches and fastened to the deck with two rows of tincaps, spaced not more than eight inches staggered on center and nailed through the unsurfaced portion of the sheet.

3403 MEMBRANE BASE FLASHINGS

3403.1 Felt used in the construction of the built-up roof shall be carried over the cant strips or turned up the wall. When the layers of felt are carried over the cant strips they shall be nailed every 12 inches along a line one and one-half inches down from the top edge of the cant strip.

3403.2 Each layer of felt base flashing shall be uniformly mopped with hot bitumin or plastic cement and asphalt shall be steep

asphalt, applied at the rate of not less than 20 pounds per 100 square feet for each mopping.

3403.3 There shall be not less than one 30-pound felt starting at a point one inch out from the cant strip and carried up the wall three inches plus one mineral surfaced felt starting at a point two inches out from the cant strip and callied up the wall five inches.

3403.4 Roofing felts wrapping parapet walls shall be as follows: The built-up roofing felts plus one 30-pound felt shall start at a point two inches out from the cant strip and shall be carried up the face and over the top of the parapet to the center line, and nailed on 12-inch centers, two inches from the top of the wall. The mineral surfaced felt shall step out two inches beyond the 30-pound and be carried up and over the wall to a point three inches from the outside edge of the wall and be nailed on six-inch centers two inches from the top of the wall. The top edge is then stripped with a three-inch wide strip of membrane set in plastic cement and painted with aluminum paint.

3403.5 EXCEPTION: Membrane base flashing other than felt or adhesive other than bituminous compounds may be used provided the membrane and adhesive is approved and provided the attachment and application complies with the conditions of approval.

3404 ROOF TILE

Roof tile shall not be applied to the surface of roofs having an incline of less than two-and-one-half in 12.

3404.1 MATERIAL: Tile shall be of Portland cement concrete or of clay of various sizes and shapes, and shall be laid in accordance with manufacturer's directions where not conflicting with minimum building code requirements.

3404.2 QUALITY: **(a)** Portland cement concrete used for roof tile shall be of not less strength than 2,000 pounds per square inch in 28 days, as set forth in Chapter 25. Except for an overlapping lip, tile shall have a minimum thickness of not less than one-half inch for barrel tile and three-eighths inch for shingle tile.

(b) Roof tile shall comply with the physical test requirements as follows:

(1) Barrel tile shall be test loaded by being supported on sand two inches deep in a sand box four inches wider than the width of the tile. Shingle tile and Spanish S tile shall be test loaded by being supported on said-filled cloth tubes parallel to the edge of the tile. Sand tubes shall be 10" long two-inch diameter loosely filled with dry 40-60 silica sand and shall be placed under the edges of the tile with center-to-center distance equal to the laid width of the tile.

(2) A test load shall be applied on a three-inch-square steel plate bearing on a sand bag at the center of the tile.

(3) The breaking load of any individual shingle tile shall be not less than 200 pounds and the average breaking load of five shingle tile shall be not less than 250 pounds. The breaking load of any individual barrel tile shall be not less than 250 pounds and the average breaking load of five barrel tile shall be not less than 300 pounds.

3404.3 ABSORPTION: Roof tiles shall absorb not more than 12 percent of the dry weight of the tile during a 24-hour immersion test.

3404.4 MORTAR BED: **(a)** All tile shall be set in a bed of mortar and mortar shall be sandwiched in between all laps at the butt of shingle, pan and barrel tile and along the sides of barrel tile.

(b) Mortar for bedding roof tile shall be Type M or S as set forth in Paragraph 2702.10(c) herein.

3404.5 LAYING: (a) Tile shall be laid on only mineral surfaced roofing as set forth in Sub-section 3402.5 applied over one layer of 30-pound felt as set forth in Sub-section 3402.2. Mica surfaced roofing shall not be considered acceptable to bond tile mortar.

(b) Tile shall be applied wet, having been thoroughly wet with a hose and the excess water allowed to drain off.

(c) Tile shall have a headlap of not less than two and one-half inches, and, for barrel tile, not less than one and one-half inches lap at the sides.

(d) Tiles shall extend beyond the roof sheathing, at the eave, not less than three-fourths inch nor more than two inches.

The tile used for any one roof shall be stacked on that roof for a period of seven days before laying in setting bed.

3404.6 NAILING: (a) Where the incline of the roof is four in 12 or more but less than seven in 12, the bottom three courses of tile and every fourth course thereafter shall be nailed to the sheathing with non-corrosive nails and the mineral surface slate shall be backnailed 18 inches on centers except that such backnailing will not be required where all the tile are nailed, or:

(b) Two layers of 55-pound mineral-surface slate (19-inch selvage material) shall be mopped on with galvanized ½ inch Clinton cloth nailed and interlaced with every second ply of 19-inch selvage with all nails securing the Clinton cloth to be covered. Nails shall be spaced not more than 4 inches on center for the bottom row of Clinton cloth and 6 inches on centers for all other rows.

(c) Where the incline of the roof is seven in 12 or more, all roof tile shall be nailed to the sheathing.

(d) In addition to nailing, tile shall be laid in a mortar bed as set forth in Sub-section 3404.4.

3404.7 RESISTANCE TO UPLIFT: Roof tile shall be secured to the roof surface to resist an uplift force of 30 pounds applied at the eaveward edge of each tile. Where more than one tile in every ten so tested fail to resist the 30-pound force, the Building Official shall require necessary correction.

3404.8 WEEP HOLES: The eave ends of roof tile shall be cemented with weep holes provided for adequate drainage.

3405 ASBESTOS-CEMENT SHINGLES

3405.1 Asbestos-cement shingles conforming to the "Standard Specifications," ASTM Designation: C222-66 of the American Society for Testing Materials, may be applied over roofs having an incline of four in 12 or more.

3405.2 Asbestos-cement shingles may be applied over existing roofs, except as prohibited in Sub-section 3401.5, provided such existing roof is in good condition, or may be applied over a 30-pound felt nailed with tin-caps 18 inches apart, both ways.

3405.3 Asbestos-cement shingles shall be nailed with not less than two nails in each shingle and nails shall be non-corrosive and penetrating not less than three-fourths inch into solid wood deck. Corners shall be tabbed as set forth in Sub-paragraph 3406.2 (c) (1).

3405.4 Asbestos-cement shingles shall project not more than one-half inch at the eave or gable ends.

3405.5 All intersections shall be flashed with non-corrosive metal not less than 26 U. S. Standard gage.

3406 SLATE AND COMPOSITION SHINGLES

3406.1 SLATE SHINGLES: (a) Slate shingles shall not be

applied over roofs having an incline of less than three and one-half in 12.

(b) Slate shingles may be applied over existing roofs, except as prohibited in Sub-section 3401.5, provided such existing roof is in good condition, or may be applied over two 30-pound felt shingled in and mopped and fully nailed, as set forth in Section 3402.

(c) Slate shingles shall be nailed with not less than two nails in each shingle, and nails shall be non-corrosive and shall penetrate not less than three-fourths inch into solid wood sheathing.

(d) Base sheets shall be mopped over with hot steep asphalt and shingles laid in hot mop except that where the incline is five inches per foot or more, the mopping may be omitted.

(e) The edges of sheathing at eaves and gable ends shall be covered and protected and all intersections shall be flashed with non-corrosive metal not less than 26 U. S. Standard gage.

3406.2 COMPOSITION SHINGLES: Composition shingles of 12-inch x 36-inch three-tab square butt strip shall not be applied on roofs having an incline of less than two and one-half inches per foot and where an incline of two and one-half inches per foot or more shall be as follows:

(a) Felts shall be applied as set forth in Sub-section 3402.2.

(b) Composition shingles shall be applied with not more than five inches exposed to the weather and with not less than four nails per strip.

(c) All butts of shingles shall be tabbed with a spot of quick-setting plastic cement as follows:

(1) Under the center of the exposed portion of each tab there shall be a spot of plastic cement not less than 2 inches x 4 inches square in size. The tab shall be pressed firmly into the cement.

(2) The shingles at eaves and gable edges shall be set in a solid coating of plastic cement eight inches from all edges.

3407 METAL SHINGLES

3407.1 Ferrous shingles shall be of not less thickness than 30 gage and aluminum shingles shall be of not less thickness than 0.019 inches, and such metal shingles shall not be applied over roofs having an incline of less than five in 12. Metal shingles shall also comply with Sub-paragraph 3402.1(d)(7) herein.

3407.2 Metal shingles may be applied over any existing roof, provided it is in good condition and provided the deck below is solid sheathed.

3407.3 All roof decking shall be covered with a rosin sheet free from tar or acid. The felt shall be well lapped and nailed securely to the decking. Gutters shall be applied before the laying of any shingles. Shingles shall be laid in courses, the first course to a chalk line running horizontally from gable to gable. Shingles shall extend not more than one inch at the eave. Each shingle shall be nailed with not less than three-non-corrosive nails.

3408 WOOD SHINGLES AND SHAKES

3408.1 WOOD SHINGLES: (a) Wood shingles may be applied to roofs with solid or spaced sheathing.

(b) Spaced sheathing shall be spaced not to exceed four inches clear nor more than the width of the sheathing board. Spaced sheathing shall be not less than one inch by three inch nominal size.

(c) Shingles shall be laid with side lap of not less than 1½ inches between joints in adjacent courses, and ½ inch in alternate

courses. Spacing between shingles shall be not less than ½ inch nor more than ⅜ inch.

(d) Each wood shingle shall be fastened to the sheathing with two nails only.

(e) Shingles shall not be installed on a roof having a slope less than four inches to 12 inches unless installed over an underlay of not less than 30-pound felt, as required for a base sheet.

(f) Weather exposure shall not exceed those set forth in Table 34-B.

(g) Wood shingles shall be nailed with copper, zinc, zinc-coated, aluminum or commercially-pure iron nails of at least 14 B and S gage and not less than 1½ inches long.

3408.2 SHAKES: (a) Shakes may be applied to roofs with solid or spaced sheathing.

(b) Spaced sheathing shall be spaced not to exceed four inches clear. Spaced sheathing shall be of not less than one-inch by four-inch nominal size.

(c) Shakes may be laid in straight or staggered courses.

(d) Shakes shall be laid with a side lap of not less than 1½ inches between joints in adjacent courses. Edges shall be parallel within one inch. Spacing between shakes shall be not more than ½ inch.

(e) Each wood shake shall be fastened to the sheathing with two nails only.

(f) Shakes shall be laid with not less than 18 inch wide strips of not less than 30-pound felt shingled between each course in such manner that no felt is exposed to the weather below the shake butts.

(g) Shakes shall not be installed on a roof having a slope less than four inches to twelve inches unless installed over an underlay of not less than 30-pound felt, as required for a base sheet.

(h) Weather exposure shall not exceed those set forth in Table 34-B.

(i) Wood shakes shall be nailed with copper, zinc, zinc-coated, aluminum or comercially-pure iron nails of at least 14 B and S gage and not less than 1½ inches long.

TABLE 34-B

MAXIMUM EXPOSURE TO WEATHER
WOOD SHINGLES

SLOPE OR ROOF		SHINGLE LENGTH		
RISE	RUN	16-INCH	18-INCH	24-INCH
3″ to less than 4″	12″	3& ¾″	4& ¼″	5& ¾″
4″ to less than 5″	12″	4½″	5½″	7″
5″ or more	12″	5″	5½″	7½″

TAPERED WOOD SHAKES	
EXPOSURE TO WEATHER	LENGTH OF SHAKE
7½″	18″
10″	24″
13″	32″

STRAIGHT-SPLIT WOOD SHAKES	
5½″	18″
7½″	24″

3409 ROOF INSULATION

Where insulation is applied over roof decks, such insulation and the roofing shall be as herein set forth.

3409.1 VAPOR BARRIER: To prevent moisture absorption from a roof deck to the insulation applied above a roof deck, a vapor barrier may be installed and such vapor barrier shall be as follows:

(a) A vapor barrier applied over wood and gypsum decks shall be not less than two 15-pound felts lapped 19 inches or one 30-pound felt lapped four inches and shall be solidly mopped, at laps between plys, with hot bitumin and nailed each 12 inches along the lapped edge through tin-caps and both plys of felt. Where tarred felts are used on wood decks, the felts shall be applied over one layer of sheathing paper lapped two inches.

(b) A vapor barrier applied over concrete roof decks shall be not less than two 15-pound felts, lapped 19 inches and shingled in and solidly mopped with hot bitumin.

3409.2 INSULATION: (a) Where insulation is attached with solid mopping it shall be mopped with not less than 30 pounds of hot bitumin for each 100 square feet of roof area. Where insulation is attached with solid mopping it shall be pressed into position while the bitumin is hot and shall be laid with staggered joints.

(b) When more than one layer of insulation is used, each successive layer shall be mopped in with hot bitumin and joints shall be staggered.

(c) Insulation applied to roofs with incline of three in 12 or more, shall be nailed or screwed or bolted with tin-caps so that fastenings are spaced not more than 12 inches apart, both ways, and only steep roofing asphalt and steep coal tar pitch shall be used.

(d) Insulation shall be kept dry and be protected and sealed at the end of each day's work.

3409.3 WATER CUT-OFFS: Water cut-offs shall be installed in accordance with manufacturer's instructions.

3409.4 ATTACHMENT: Roof insulation may be applied under or over the anchor sheet but the attachment of the insulation and all membranes shall satisfy, or shall be attached in such manner as to satisfy, the standards set forth in Section 3402 herein.

3410 METAL ACCESSORIES

3410.1 GENERAL: Metal accessories for roofs shall be of noncorrosive metal not less in thickness than 26 US Standard gage iron, 16-ounce copper or 0.019 inch aluminum.

3410.2 GRAVEL STOP: Gravel stop for gravel roofs shall be as follows: (a) The deck flange shall be not less than a 3-inch width.

(b) The face minimum shall be 1½ inches.

(c) The face shall extend down not less than ½ inch below the sheathing or other member immediately contiguous thereto.

(d) The metal shall be attached to the sheathing each 6 inches on center with 12 gage ring-shanked nails one-inch in length.

(e) Gravel stop shall be installed after all of the roof felts have been applied.

(f) The deck flange shall be covered with a 6-inch wide strip of membrane or 15-pound asbestos felt applied in a bed of plastic roofing compound covering all nail heads and extending over onto mopped felts or stripped with one 6-inch and one 9-inch felt and mopped with bitumen or approved adhesive.

(g) Joints shall be one of the following: (1) Joints shall be lapped a minimum of 6 inches and the entire interior of the joint where metal fits to metal shall be coated with mastic from the lower

drip edge to the edge of the roof flange. There shall be a minimum of 3 nails through the deck flange at the joint.

(2) Joints shall be butted (not lapped) with a 1/16 inch gap. The gap shall be covered with a 6 inch long cover plate centered over the gap. The cover plate shall be 20 gage sheet metal or 24 oz. copper or .064 inch aluminum. The material of the cover plate shall be the same as that of the gravel stop and drip. The cover plate shall have holes punched in the deck flange section for nailing. The cover plate shall have a deck flange not less than 2½ inches in width and shall be precisely profiled to fit over the gravel stop with mastic from the lower drip edge to the edge of the roof flange then 6 ring-shanked nails symmetrically spaced about the butt-joint of the gravel stop described except that where the roof incline is one or more in 12 the gable drip shall be lapped not less than 2 inches and a cover plate shall not be used.

3410.3 EAVE AND GABLE DRIP: (a) Eave and gable drip for tile roofs, asbestos shingle roofs, composition roofs and mineral surface roofs shall be applied with not less than a 1½ inch flange on the roof.

(b) The drip shall be nailed 6 inches on center into the sheathing with three-quarter inch, ring-shanked nails.

(c) The joints shall be lapped not less than 3 inches.

(d) The drip shall be installed between layers of felt.

(e) The face shall be a minimum of 1½ inches but not less than ½ inch below the sheathing.

3410.4 VALLEYS: (a) Metal valleys shall be of corrosion-resistant metal not less than 12 inches in width.

(b) Metal valleys shall be installed on top of the sub-roof, set in hot asphalt or plastic cement, stripping edges of valley with not less than one layer of 15-pound felt with 4-inch minimum width and sealing edges with plastic cement before laying of the finished roof of tile, quarry slate, asbestos shingles, composition shingles or similar materials.

(c) Valley metal shall have a minimum 4-inch end lap.

3410.5 RAKE AND CAP FLASHINGS: Rake and cap flashings shall be installed in the same manner as metal counter flashings in Sub-section 3410.8.

3410.6 CRICKETS AND SADDLES: Crickets and saddles shall be installed to top of the sub-roof and stripped into the sub-roof with not less than one layer of 30-pound felt sealed with plastic cement. Crickets and saddles joining vertical surfaces shall be flashed in the same manner as metal counter flashings in Sub-section 3410.8.

3410.7 METAL BASE FLASHINGS: Metal base flashings shall be installed after the 15-pound roofing felts have been laid and turned up the vertical surfaces. Felts shall be imbedded in and mopped over with hot bitumin. The metal base flashing shall then be set to extend not less than eight inches up the vertical surface and six inches on the roof, being nailed to the roof deck on three-inch centers. Where the roof deck is not nailable, a wood nailing strip shall be installed. The roof flange shall be stripped with one 15-pound felt not less than four inches wide centered over the nailing course and one 15-pound felt not less than six inches wide completely covering the first. The end lap of flashing shall be locked and/or soldered.

3410.8 METAL COUNTER FLASHINGS: Metal counter flashing shall be turned down over base flashing not less than four inches and shall be set into a reglet one-half inch wide and one-half inch deep. The reglet shall be from nine to twelve inches above the

roof deck or above in-the-wall metal counter flashing, or above stucco shoulder metal counter flashing. Reglet block or metal form flashings shall be built into the wall and the base felt flashing shall be thoroughly caulked into flashing joints.

3410.9 VENT PIPE FLASHINGS: All vent pipes shall be properly flashed with approved lead, sleeve-type flashing, pitch pans or other approved methods. Where vent pipes extend more than 12 inches above the roof, a collar or draw band may be installed around the top of the lead flashings and thoroughly caulked into place.

3410.10 OVERFLOW SCUPPERS AND OUTLETS: Overflow scuppers and roof outlets shall be lined with metal or other approved materials and installed in compliance with the roof drainage requirements for the Type of Construction and Section 4611 herein.

3410.11 GUTTERS AND DOWNSPOUTS: Gutters and downspouts shall be constructed of metal with lapped or soldered or caulked joints and shall be securely fastened to the building with a standard type of fastening device.

3411 OTHER ROOFING MATERIALS

Other roofing materials may be applied provided the alternate material and method of attachment is in accordance with the material herein set forth that such alternate material most nearly resembles.

NOTES

CHAPTER 35
CLADDING AND GLAZING

3501 GENERAL
3502 LATHING
3503 PLASTER
3504 STUCCO
3505 PLASTICS
3506 ASBESTOS CEMENT
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3508 WINDOWS, DOORS, GLASS AND GLAZING
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3510 GYPSUM BOARD PRODUCTS AND ACCESSORY ITEMS
3511 SUSPENDED AND FURRED CEILINGS
3512 OTHER MATERIALS
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3501 GENERAL

3501.1 SCOPE: (a) Wall coverings and glazing shall be as set forth in this Chapter and be fire-resistive where required by this Code, except that the requirements of this Chapter shall be applicable to lath, plaster and drywall construction as follows:

(b) Where fire-resistive protection is required by this Code, lath, plaster, stucco and drywall construction shall be as set forth herein and shall also comply with the requirements of Chapter 37.

(c) Where fire-resistive protection is not required by this Code, lathing and the attachment of drywall shall be as set forth herein and plaster, stucco, and gypsum wallboard construction may be omitted or otherwise varied, and the specifications of this Chapter shall be considered standards of good practice.

3501.2 INTERIOR FINISHES: Interior finishes shall be as set forth in Section 3710.

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 Specifications for Interior Lathing and Furring," ANSI A42.4-1967, of the American National Standards Institute.

3502.2 GYPSUM LATH: (a) Gypsum lath shall conform to the requirements of the "Standard Specifications for Gypsum Lath," ASTM Designation: C37-69, of the American Society for Testing and Materials.

(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 nor 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 required, 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 ⅜ inch gypsum lath and shall not exceed 24 inches for ½ 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 ⅜ inch gypsum lath may be applied to metal studs spaced 24 inches on centers where a minimum of ¾ 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 spacings of supports shall conform to the requirements set forth in Table 35-A.

TABLE No. 35-A
WEIGHTS OF METAL AND WIRE LATH

TYPE OF LATH	MINIMUM WGT. (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″
⅜″ 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) Diamond mesh metal lath shall be lapped at sides not less than ½ inch. Rib metal lath with edge ribs no greater than ⅛″ in depth shall be lapped ½ inch at sides or outside ribs shall be nested. Sheet lath shall be lapped at sides by nesting outside selvage. All metal lath shall be lapped 1 inch at ends or nested.

(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 seven-sixteenths inch in diameter.

(f) Metal and wire lath shall be attached to horizontal and vertical metal supports with the equivalent of No. 18 W. and M. gage, galvanized annealed wire.

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 gage or light gage steel studs as set forth in Paragraph 2809.3 (c).

(b) Hollow nonbearing partitions of reinforced plaster or pneumatically-placed plaster shall have a shell thickness of not less than three-fourths inch.

(c) Metal reinforcing shall be as set forth in Table No. 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 nor 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 No. 35-B.

TABLE No. 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
¾ in.—0.3 lb. per ft.	2 ft. 0 in.	3 ft. 0 in.
1½ in.—0.475 lb. per ft.	3 ft. 0 in.	4 ft. 0 in.
1½ in.—0.475 lb. per ft.	3 ft. 6 in.	3 ft. 6 in.
1½ in.—0.475 lb. per ft.	4 ft. 0 in.	3 ft. 0 in.
1½ in.—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.
1½ x 1½ x ⅛ 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 spacings of main runners or other supports shall be not less than as set forth in Table No. 35-C.

TABLE No. 35-C
SIZES OF CROSS FURRING IN SUSPENDED AND FURRED CEILINGS

Size and Type	Maximum Span Between Supports	Maximum Spacing
¼" pencil rods	Up to 2 feet	12"
¾" channels	Up to 3 feet	24"
¾" 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 wtih 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 Hanger
12.5	8-gage wire
16	6-gage wire
18	$\frac{3}{16}$" rod
22.5	$\frac{1}{4}$" rod
25	1" x $\frac{3}{16}$" 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 with three-eighth-inch bolts to runner channels or bent tightly around corners and 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) The "Standard Specifications for Gypsum Plastering," A42.1-1964, of the American National Standards Institute is hereby adopted to supplement, but not supersede, the requirement for gypsum plastering set forth herein.

(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.

(e) Grounds shall be installed to provide for the thicknesses of plaster, as set forth in Table No. 35-D.

TABLE No. 35-D
REQUIRED THICKNESS OF INTERIOR PLASTER

Type of Lath	Thickness of Plaster
Metal or wire lath	$\frac{5}{8}$" minimum
Gypsum lath	$\frac{1}{2}$" 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 "Standard Specifications," ASTM Designation C35-70, of the American Society for Testing and Materials, except that the graduation 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 "Standard Specifications," ASTM Designation C28-68, of the American Society for Testing and Materials.

(c) LIME: Lime shall conform to the requirements of "Stand-

ard Specifications," ASTM Designation C5-59 or C206-49, of the American Society for Testing and Materials. Lime putty shall be made from quicklime or hydrated lime and shall be prepared in an approved manner, stored and protected for an approved period of time.

(d) KEENE'S CEMENT: Keene's cement shall conform to "Standard Specifications," ASTM Designation C61-64, of the American Society for Testing and Materials.

(e) PORTLAND CEMENT: Portland cement shall conform to the "Standard Specifications," ASTM Designation C150-70, of the American Society for Testing and Materials. 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 conforming to the "Standard Specifications," ASTM Designation C91-70, of the American Society for Testing and Materials.

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	Cu. Ft. Vermiculite or Perlite
TWO-COAT WORK (DOUBLE-UP METHOD)		
(1) Over gypsum lath	250	2½
(2) Over masonry*	300	3
THREE-COAT WORK		
(1) First (scratch) coat over lath	200[a]	2[a]
(2) First (scratch) coat over masonry	300	3
(3) All second (brown) coats	300[a]	3[a]

*—Except over monolithic concrete.

[a]—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 2½ 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 feet 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 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 sand-float 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 Subparagraph 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.

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.

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.

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 cementitious 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 coat shall be mixed in the proportion of one part Portland cement and 3½ parts of sand by volume, or one part Portland cement to one part Type S lime and 4½ parts sand by volume or shall be any approved prepared product containing not less than one-third, by weight, Portland cement.

(2) Finish-coat stucco shall be mixed in the proportion of one part Portland cement to 2 parts sand, by volume, with not more than 15 percent lime, by volume, or shall be one part Type II masonry cement to 2 parts sand, by volume.

(b) **MATERIALS:** The materials of stucco shall conform to the standards set forth in Section 3503.

(c) **ADMIXTURES:** Plasticity agents shall be of approved types and amounts; and if added to Portland cement in the manufacturing process, no later additions shall be made. Color may be added to the finish coat in approved amounts.

(d) **APPLICATION:** (1) Stucco applied to concrete or masonry shall consist of not less than two coats, and the total thickness shall be not less than five-eighths inch, nor shall any one coat be less than one-fourth inch thick.

(2) The masonry surface on which stucco is applied shall be clean, free from efflorescence, damp, and sufficiently rough to insure proper bond.

(3) 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. The first coat of two-coat work shall be rodded and water-floated with no variations greater than one-quarter inch under a five-foot straight edge in any direction.

(4) The base coat shall be damp cured for a period of not less than 24 hours.

(5) The finish coat shall be applied over a uniformly damp but surface-dry base.

(6) Stucco shall be kept damp for a period of not less than 48 hours after any type finish coat application.

(7) Where masonry cement with a minimum of 25 percent by weight of Portland cement is used, there shall be a period of not less than 24 hours of damp curing between subsequent coats.

3504.2 STUCCO ON WALLS OTHER THAN CONCRETE OR MASONRY: (a) GENERAL: Stucco shall be as provided in Subsection 3504.1.

(b) **BACKING:** Studs shall be wood-sheathed. Wood sheathing shall be covered with building paper and metal reinforcement.

(c) **METAL REINFORCEMENT:** (1) Stucco shall be reinforced with expanded metal weighing not less than 1.8 pounds per

square yard or welded or woven wire fabric, weighing not less than one pound per square yard.

(2) Metal reinforcement shall be furred out from the backing at least one-quarter inch by an approved furring method, which shall be spaced not more than six inches vertically and 16 inches horizontally. Nailing shall be by galvanized nails, driven to at least three-quarters inch penetration.

(3) Diamond mesh metal lath shall be lapped at sides not less ½ inch. Rib metal lath with edge ribs greater than ⅛ inch in depth shall be lapped at sides by nesting outside ribs. Rib metal lath with edge ribs no greater than ⅛ inch in depth shall be lapped ½ inch at sides or outside ribs shall be nested. All metal lath shall be lapped not less than 1 inch at ends. Stucco mesh shall be lapped one diamond at sides and ends.

(d) **APPLICATION:** (1) Stucco applied on metal lath shall be three-coat work.

(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 rodded and water-floated, with no variation greater than one-quarter inch in any direction under a five-foot straight edge.

(4) The third coat shall be troweled to a thickness of not less than one-eighth inch.

3504.3 PNEUMATICALLY-PLACED STUCCO: 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. Rebound material may be screened and reused as sand in an amount not greater than 25 percent of the total sand in any batch. Plasticity agents may be used as specified in Paragraph 3504.1 (b).

3505 PLASTICS

3505.1 GENERAL: (a) Plastic materials used in locations where required to resist loads shall be designed by methods admitting of rational analysis according to established principles of mechanics.

(b) Plastic materials may be used where ordinary window glass is permitted or where complying with Section 3708 for interior finishes or for structural sheets or members, any use of which shall be as set forth herein and/or as approved by the Building Official after review of the physical properties, chemical composition, weather resistance, electrical properties, fire resistance, flame spread characteristics, products of combustion and coefficient of expansion. On review of the data furnished, the Building Official may approve the material subject to such limitations as he may deem advisable.

(c) Application and plans submitted for proposed construction shall identify the plastic material intended.

(d) Plastic materials shall be wholly or principally those described in the "Technical Data on Plastics" as published by the Manufacturing Chemists' Association, Inc.

(e) The products of combustion of a plastic material shall be no more toxic in point of concentration than those of wood or paper burned under similar conditions.

(f) A plastic material shall burn no faster than two and one-half inches per minute in sheets sixty-thousands of an inch in thickness when tested in accordance with the "Standard Method for Flammability of Plastics over Fifty-thousands of an Inch in Thickness" (ASTM Designation: D635-68).

(g) Reinforced plastic shall be reinforced with glass fiber or other non-combustible material amounting to not less than one and one-half ounces per square foot and not less than 20 percent by weight.

(h) Reinforced plastics used in exterior locations shall be not less than one-sixteenth inch in thickness nor less than eight ounces per square foot in weight.

(i) Unreinforced plastics used in exterior locations shall be not less than one-fourth inch in thickness.

(j) Plastic structural members, other than sheets, shall be designed by a registered professional engineer.

3505.2 INSTALLATION: Plastics shall be secured to supports at intervals not exceeding six inches, and edges and sidelaps of sheets shall be secured at intervals not exceeding 12 inches. Fastenings shall be through one-half-inch diameter cushion washers and shall develop not less than 40 pounds pullout.

3505.3 EXTERIOR VENEER: Plastic veneer shall not be attached to an exterior wall to a height greater than 35 feet above grade in locations other than Fire Zone 1 and shall be limited to the first story above grade in Fire Zone 1.

3505.4 AREA LIMITATIONS: Where buildings or parts of buildings are enclosed with solid walls, other than screen, plastic panels in roofs shall be limited to one-fourth of the roof area and plastic panels in walls shall be limited to one-half of the wall area.

3506 ASBESTOS CEMENT

Asbestos-cement products used on exterior locations where required to resist wind load shall be as follows:

3506.1 Flat sheets shall conform to the "Standard Specifications," ASTM Designation C220-67 or C222-66 or C223-66, of American Society for Testing and Materials. Flat sheets having a thickness of one-fourth inch, or less than one-fourth inch, shall span not more than 12 inches. Sheets shall be secured at intervals not exceeding 12 inches, each way, nor less than two fastenings in each piece.

3506.2 Corrugated sheets shall conform to the "Standard Specifications," ASTM Designations C221-61, of the American Society for Testing and Materials. Sheets shall be secured to supports at intervals not exceeding eight inches, and edges and side laps shall be secured at intervals not exceeding 12 inches.

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 Subsection 2005.1 and protected by a waterproof membrane.

3507.2 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.

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. 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 and floor.

3508 WINDOWS, DOORS, GLASS AND GLAZING

3508.1 GENERAL: (a) Windows, doors, glass and glazing shall be as set forth herein and, where required to be fire-resistive for the protection of openings, shall also comply with the requirements of Chapter 37.

(b) Glass shall comply with Federal Specifications DD-G-451c adopted in 1968.

(c) The Standard ANSI Z97.1-1966 of the American National Standards Institute is hereby adopted as minimum standards for transparent and obscure safety-glazing materials to supplement but not supersede the requirements set forth herein.

(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 fire 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) Where there is a difference of level of less than four feet on opposite sides of a glazed panel appropriate construction arrangement to prevent persons from walking into or through such glazed panels or distinguishable materials to make the presence of such glazed panel obvious shall be provided.

(2) Where there is a difference of level of four feet or more on opposite sides of a glazed panel, a guard rail, horizontal bar, safety glazing or other physical barrier complying in strength and height with Sub-section 3105.9 shall be provided.

(3) Appropriate construction arrangement or distinguishable materials may be a guard rail, a horizontal bar complying in strength and height with Sub-section 3105.9, a flower bin, an 18-inch high opaque bulkhead, etched, transluscent or otherwise apparent glazing, safety glazing or similar approved arrangement of materials of a permanent nature.

(4) Where glazed panels positioned adjacent to doors, or other wall openings which may be mistaken for means of ingress or egress, are more than 24 inches in width, six feet in height and the top of the glazed panel is eight feet or less above the walking surfaces, such panels shall be safety-glazing. Where bulkheads are constructed 24 inches or more in height, safety-glazing will not be required.

(g) Replacement, except as set forth in Sub-paragraph 3508.1 (f) (4), of glazing shall conform to the requirements set forth above except that replacement of less than 30 percent of the total area of glazing of any class or one lite of glazing, whichever is greater, may be made of the size and thickness approved for the original construction, except as otherwise set forth in Paragraph 1602.1 (e).

3508.2 FIXED GLASS IN EXTERIOR WALLS: (a) LIMITS OF SIZE OF GLASS: (1) Regular plate and sheet glass used in exterior walls shall not exceed the areas set forth in TABLE 35-E. The table applies for width-to-length ratios from 2:10 to 10:10.

TABLE 35-E

MAXIMUM AREA OF GLASS IN SQUARE FEET
Wind velocity taken as 120 MPH at 30 feet above grade

Height above grade	Glass Thickness (Inches) S.S.	D.S. 3/16 & 13/64	7/32	1/4	5/16	3/8	1/2	5/8	3/4
0'-5'	10.0	15.5	30	37	46	64	83	120	163	205
5'-15'	8.2	12.5	24	30	37	52	67	98	133	169
15'-25'	6.8	10.3	21	24	31	43	56	81	110	138
25'-35'	5.9	9.2	18	22	27	38	49	72	97	122
35'-55'	5.3	8.3	16	19	24	34	44	64	87	111
55'-75'	4.8	7.4	14.5	17.5	22	31	39	57	78	99
75'-100'	4.4	6.7	13.2	16	20	28	36	53	72	91
100'-150'	4.1	6.2	12	14.7	18	26	33	48	66	83
150'-250'	3.6	5.4	10.5	12.8	16	22	29	42	57	72
250'-350'	3.1	4.8	9.3	11.3	14.1	19	26	37	51	64
350'-550'	2.8	4.2	8.3	10.1	12.5	17.5	23	33	45	57
550'-750'	2.5	3.8	7.4	9.0	11.3	15.8	21	30	41	53
750'-1000'	2.3	3.5	6.8	8.3	10.3	14.5	19	27	37	47
over 1000'	2.2	3.4	6.6	8.0	10.0	14.0	18	26	36	46

(2) The allowable area of glass, other than regular plate and sheet, used in exterior walls shall not exceed the areas obtained by multiplying the areas in Table 35-E by the following factors:

TEMPERED SAFETY GLASS	4.0
INSULATING (double glazed)	1.5
ROUGH ROLLED PLATE	1.0
LAMINATED	0.6
WIRED GLASS	0.5
SANDBLASTED OR ETCHED	0.4

An etched trademark or label not exceeding two square inches in area shall not be construed to classify the entire sheet as being etched.

(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 Section 2704.

(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) Glass in fixed lites shall be set in non-corrosive metal or other non-corrosive material where substantiated by load tests, 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 2907.2(a).

(4) Attachment shall be as set forth in Paragraph 2306.4(b) 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 rational 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 2306.

(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.

3508.3 DOORS AND OPERATIVE WINDOWS IN EXTERIOR WALLS: (a) The design and approval of doors and operative windows, including their supporting members in exterior walls shall be based on the proposed-use height above grade in accordance with Chapter 23 herein. Maximum glass sizes shall comply with Table 35-E herein.

(b) The design and approval of operative windows, sliding doors and swinging doors having more than one-half of the door area in glass shall be supported by tests as nearly as practicable simulating the conditions of use at the proposed height above grade.

(c) Window and door assemblies shall be tested in accordance with, and shall comply with Section 3, ANSI A134.1-1968 for windows and Section 3, ANSI A134.2-1968 for doors of the American National Standards Institute which are hereby adopted to supplement, but not supersede, the requirement set forth herein.

(1) Windows and doors with permanent muntin bars shall be tested with muntin bars in place.

(2) Pass-through windows serving from a single-family kitchen shall, where protected by a roof overhang of five feet or more, be excepted from the requirements of satisfying water infiltration.

(d) Doors shall be equipped to be readily operative without contact with glass.

(e) Swinging doors of glass in exterior walls without a continuous frame shall be only fully tempered glass not less than ½ inch in thickness.

(f) The glazing in sliding and swinging doors in exterior walls shall be safety glazing.

(g) Window and door assemblies shall be installed in accordance with the conditions of test and approval.

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 ⅜ inch in thickness.

(b) The glazing in sliding and swinging doors, including shower or tub enclosures, shall be safety glazing.

(c) The glazing in fixed panels adjacent to paths of egress shall comply with Paragraph 3508.1(f) 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 material 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.

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 nor 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 inch 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 hereby adopted to supplement, but not supersede, the requirements set forth herein.

(a) "Standard Specification for the Application and Finishing of Gypsum Wallboard" ANSI A97.1-1965 of the American National Standards Institute.

(b) "Specification for Gypsum Wallboard" ASTM C36-70 of the American Society for Testing and Materials.

(c) "Tentative Specifications for General Requirements for the Delivery of Zinc-Coated (Galvanized) Iron and Steel Sheets, Coils and Cut Lengths by the Hot Dip Method," A525-67 of the American Society for Testing and Materials.

(d) "Specification for the Installation of Screw Type Framing Members to Receive Gypsum Wallboard and Backing Board" adopted December 1969 by the Gypsum Association.

(e) "Standard Specifications for Joint Treatment Materials for Gypsum Wallboard Construction," C475-64 of the American Society for Testing and Materials.

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 ½-inch thick and ⅝-inch thick wallboard.

(c) Gypsum wallboard used in fire-rated assemblies shall be of a type for which test ratings are available.

3510.4 WOODSTUDS 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 be limited to a deflection of L/120 based on five pounds per square foot applied horizontal load. Where wall board is suitably attached 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 ⅞ inches long for ½-inch wallboard nor one inch long for ⅝-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 ⅝ inch or by 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.

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.

(b) Wood and wood-products used for wall cladding as non-structural 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 1812.8.

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 Sub-section 3406.2.

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 Sub-section 3402.5.

3512.4 METAL SHINGLES: Metal shingles shall be applied only to solid wood sheathing and shall be secured with 6d nails spaced not more than 12 inches apart, each way, nor less than one nail in each piece of metal.

3512.5 STEEL SIDING: Steel siding shall be designed and applied as set forth in Sub-section 2809.5.

3512.6 ALUMINUM SIDING: Aluminum siding shall be designed and applied as set forth in Chapter 30.

3512.7 VENEERS: Masonry veneers shall be applied as set forth in Chapter 27.

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 3710.

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

Storm shutters are not herein required but where provided shall be designed and constructed to prevent contact with glass or its supporting division bars or frames as may be specifically designed to receive the load of storm shutters, and shall be designed to resist the wind pressures set forth in Section 2306 by methods admitting of rational analysis based on established principles of design. Deflection shall not exceed L/80 under design load.

NOTES

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 or 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 requirement or result 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 any 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 times 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 Chapters 43 and 44.

3603.3 MARQUEES: Marquees shall not be permitted to extend over public property except as follows:

(a) Marquees shall be constructed entirely of incombustible material.

(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 weatherhead more than ten feet above a sidewalk may project a reasonable distance.

(b) Siamese connections to standpipes shall be recessed and shall not project over public property.

(c) 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 projection shall not extend closer than 18 inches to the curb line.

(d) Such projections shall be constructed of incombustible materials.

(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 the 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 projection 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 is 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 projection 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.

NOTES

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

3701 GENERAL

3701.1 GENERAL: (a) Materials of construction and assemblies or combinations 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 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.

3701.2 STANDARDS: The following standards are hereby adopted to supplement, but not supersede, the requirements set forth herein:

(a) "Standard for the Installation of Air Conditioning and Ventilating Systems of Other Than Residential Type" NFPA No. 90A-69 of the National Fire Protection Association.

(b) "Standard Methods of Fire Tests of Building Construction and Material" ASTM Designation E119-69, of the American Society for Testing and Materials, herein after termed "Standard Fire Test."

(c) "Standard Method of Fire Tests of Door Assemblies" ASTM Designation E152-66 of the American Society for Testing and Materials.

(d) "Standard for Tin-Clad Fire Doors and Shutters," UL 10A-1968 of the Underwriters' Laboratories, Inc.

(e) "Standard Specification for Fire Tests of Window Assemblies," ASTM E163-65 of the American Society for Testing and Materials.

(f) "Standard for Fire Doors and Windows," Pamphlet 80-1970 of the National Fire Protection Association.

(g) "Standard for Smoke Detectors for Fire Protective Signaling Systems," UL 168-1969 of the Underwriters' Laboratories, Inc.

(h) "Fire Protection Equipment List" of the Underwriters' Laboratories, Inc.

(i) "Building Material List" of the Underwriters' Laboratories, Inc.

(j) "Standard Method of Test for Surface Burning Characteristics of Building Materials" ASTM Designation E84-70, of the American Society for Testing and Materials.

(k) "Method of Test for Determining Noncombustibility of Elementary Materials," ASTM Designation E136-67, of the American Society for Testing and Materials.

(l) "Design Data-Fire Resistance/Sound Control," 1969-70 Edition, published by the Gypsum Association for the fire-resistive values only of assemblies to supplement Tables 37-A, 37-B and 37-C.

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 lime-cement or Portland-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. Soffittile 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 is exposed to injury from moving vehicles, the handling of merchandise or by other means, it shall be jacketed to a minimum height of six feet from the floor with an adequate protective covering.

3703.6 CEILING PROTECTION: Where a ceiling is used to fire-protect floors or roofs of incombustible construction, the constructions and their supporting structural beams and girders need not be individually fire-protected; except that where such beams and girders support loads from more than one floor or roof or contributary areas, exceeding 2000 square feet, such members shall be individually protected. Such ceilings shall be continuous, but may have openings for incombustible pipes, ducts and electrical outlets, provided the areas of such duct and outlet openings through the ceiling aggregate not more than 100 square inches in each 100 square feet of ceiling area, and provided the area above such ceiling shall be separated into areas not exceeding 10,000 square feet. All duct openings in excess of 100 square inches in each 100 square feet of fire-resistive ceilings shall be protected by approved fire dampers. Ceiling diffusers or other devices, such as lighting fixtures, exceeding 100 square inches in each 100 square feet shall be protected in a manner which will give the same rating as the ceiling.

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 that 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 thicknesses 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 FIRE PROTECTION OMITTED: 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.

3704 WALLS AND PARTITIONS

3704.1 GENERAL: Fire-resistive walls and partitions shall have the ratings set forth in Table 37-B or shall be rated as set forth in Sub-section 3701.1.

3704.2 COMBUSTIBLE MEMBERS: 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.

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: (a) Fire-resistive floors shall be continuous and all openings for mechanical and electrical equipment shall be closed around the pipe or shaft.

EXCEPTIONS: (1) Occasional pipes, conduits, sleeves and electrical outlets of copper, sheet steel or ferrous construction may be installed within or through fire-resistive floor systems provided such installations do not unduly impair the required fire-resistance of the assembly.

(2) The provisions of this Section shall not apply when such openings are in accordance with the results of tests conducted as set forth in Sub-section 3701.2.

(b) Dampers shall be provided in ducts as set forth in Section 4103.

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.

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.

(2) Where the area of a suspended ceiling required to be fire-resistive exceeds 100 square feet, methods to resist uplift forces on the entire suspended system shall be provided for each 64 square feet of ceiling.

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	Insulating Material Used	Minimum Thickness of Insulating Material for Following Fire-Resistive Periods (In Inches)			
			4 Hr.	3 Hr.	2 Hr.	1 Hr.
Steel Columns and All Members of Primary Trusses	1	Grade A concrete, members 6″ x 6″ or greater (not including sandstone, granite, and siliceous gravel)[a]	2½	2	1½	1
	2	Grade A concrete, members 8″ x 8″ or greater (not including sandstone, granite, and siliceous gravel)[a]	2	1½	1	1
	3	Grade A concrete, members 12″ x 12″ or greater (not including sandstone, granite and siliceous gravel)[a]	1½	1	1	1
	4	Grade B concrete and Grade A concrete excluded above, members 6″ x 6″ or greater.[a]	3	2	1½	1
	5	Grade B concrete and Grade A concrete excluded above, members 8″ x 8″ or greater[a]	2½	2	1	1
	6	Grade B concrete and Grade A concrete excluded above, members 12″ x 12″ or greater[a]	2	1	1	1
	7	Clay or shale brick with brick and mortar fill.[a]	3¾	.....	.....	2¼
	8	4″ Hollow clay tile in two 2″ layers; ½″ mortar between tile and columns; ⅝″ metal mesh (wire diameter—.046″) in horizontal joints; tile fill.[a]	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[a]; plastered with ¾″ gypsum plaster.	3	.....	.....	.....

TABLE NO. 37-A (Continued)

Steel Columns and All Members of Primary Trusses (Cont'd.)	10	2″ Hollow clay tile with outside wire ties (.08″ diameter) at each course of tile or ⅝″ metal mesh (.046″ diameter wire) in horizontal joints; Grade A concrete fill[a] extending 1″ outside column on all sides.	—	—	3	—
	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.	—	—	—	2
	12	Solid gypsum blocks with woven wire mesh[b] in horizontal joints, laid with 1″ mortar on flanges[a] and plastered with ½″ gypsum plaster.	2½	2½	—	—
	13	Hollow gypsum blocks with ⅞″ wide No. 12 gauge metal clamps and woven wire mesh[b] in horizontal joints. PL denotes ½″ gypsum plaster.	3½ PL	3½ PL	3	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	1
	15	Portland cement plaster over metal lath wire tied to ¾″ 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[c]	⅞
	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	—	—	—

TABLE NO. 37-A (Continued)

Steel Columns and All Members of Primary Trusses (Cont'd.)	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 ¾" cold-rolled channels spaced 24" apart vertically and wrapped flatwise around column.	**1½**	—	—	—
	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**	—	—

TABLE NO. 37-A (Continued)

Steel Columns and All Members of Primary Trusses (Cont'd.)	22	Perlite or vermiculite gypsum plaster over ⅜" 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	1⅝	—
	23	Gypsum plaster over ⅜" perforated gypsum lath applied tight to column flanges and tied with doubled No. 18 gauge wire ties spaced 15" on center	—	2⅜	1¾	⅞
	24	Multiple layers of ½" gypsum wallboard adhesively[d] 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
	25	Three layers of ⅝" Type "X" gypsum wallboard. First and second layer held in place by ⅛" 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 space 12" on center.	—	—	1⅞	—

TABLE NO. 37-A (Continued)

Steel Columns and All Members of Primary Trusses (Cont'd.)	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.		—	1⅞	—	—
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.		—	—	2½[c]	⅞
Bonded Tendons in Pre-stressed Concrete[e]	30	Grade A[f] Concrete	Beams or girders	4[g]	3[g]	2½[g]	1½
			Solid slabs[h]	.....	2	1½	1

TABLE NO. 37-A (Continued)

Reinforcing Steel in Reinforced Concrete Columns, Beams, Girders and Trusses	31	Grade A concrete, members 12″ or larger, square or round (Size limit does not apply to beams and girders monolithic with floors)	1½	1½	1½	1½
	32	Grade B concrete, members 12″ or larger, square or round (Size limit does not apply to beams and girders monolithic with floors)	2	1½	1½	1½
Reinforcing Steel in Reinforced Concrete Joists[i]	33	Grade A concrete	1¼	1¼	1	¾
	34	Grade B concrete	1¾	1½	1	¾
Reinforcing and Tie Rods in Floor and Roof Slabs[i]	35	Grade A concrete	1	1	¾	¾
	36	Grade B concrete	1¼	1	1	¾

a Reentrant parts of protected members to be filled solidly.

b Woven wire mesh consists of three-eighths-inch mesh of No. 17 gauge wire.

c Two layers of equal thickness with a three-fourths-inch air space between.

d An approved adhesive qualified under the Standard in Paragraph 3701.2 (b).

e Cover for end anchorages shall be twice that shown for the respective ratings. Where lightweight Grade A concrete aggregates producing structural concrete having an oven-dried weight of 110 pounds per cubic foot or less are used, the tabulated minimum cover may be reduced 25 percent.

f For Grade B concrete increase tendon cover 20 percent.

g Adequate provisions against spalling shall be provided by U-shaped or hooped stirrups spaced not to exceed the depth of the member with a clear cover of one inch.

h Prestressed slabs shall have a thickness not less than that required in Table No. 37-C for the respective fire-resistive time period.

i For use with monolithic reinforced concrete slabs having a comparable fire endurance. Thicknesses do not apply to precast construction.

TABLE NO. 37-B—RATED FIRE-RESISTIVE PERIODS FOR VARIOUS WALLS AND PARTITIONS

Material	Item Number	Construction a	Minimum Finished Thickness Face-to-Face b (In Inches)			
			4 Hr.	3 Hr.	2 Hr.	1 Hr.
Brick of Clay or Shale	1	Solid units (at least 75 percent solid)	8	.....	6[c]	4
	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[d]	.....
	3	Hollow brick units[e] at least 71 percent solid	.....	8	.....	.....
	4	Hollow brick units[e] at least 71 percent solid, plastered each side with ⅝" gypsum plaster	8¾	.....	.....	.....
	5	Hollow (rowlock[f])	12	.....	8	.....
	6	Hollow (rowlock[f]) 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-bearing (End or Side Construction)	8	One cell in wall thickness, units at least 50 percent solid, plastered each side with ⅝" gypsum plaster	.....	.....	.....	4¼
	9	Two cells in wall thickness, units at least 45 percent solid	.....	.....	.....	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	.....

TABLE NO. 37-B (Continued)

Hollow Clay Tile, Load-bearing (End or Side Construction)	12	Two cells in wall thickness, units at least 40 percent solid	----	----	----	[illegible]
	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	----	----
	21	Three cells in wall thickness, units at least 43 percent solid. Plastered each side with ⅝" gypsum plaster	9	----	----	----
	22	Three cells in wall thickness, units at least 40 percent solid. Plastered each side with ⅝" gypsum plaster	13	----	----	----

TABLE NO. 37-B (Continued)

Hollow Clay Tile, Load-bearing (End or Side Construction) (Cont'd.)	23	Hollow cavity wall consisting of two 4″ nominal clay tile units (at least 40 percent solid) with air space between. Plastered one side (exterior) with ¾″ Portland cement plaster and other side with ⅝″ gypsum plaster. Portland cement plaster mixed 1:3 by volume, cement to sand	10	.....	.....	.....
Combination of Clay Brick and Load-bearing Hollow Clay Tile	24	4″ brick and 8″ tile	12	.....	.....	.....
	25	4″ brick and 4″ tile	.....	8	.....	.....
	26	4″ brick and 4″ tile plastered on the tile side with ⅝″ gypsum plaster	8½	.....	.....	.....
Concrete Masonry Units[g]	27	Expanded slag or pumice	4¾	4	3¼	2⅛
	28	Expanded clay or shale	5¾	4⅞	3⅞	2⅝
	29	Limestone, cinders or air-cooled slag	6	5	4	2¾
	30	Calcerous gravel	6¼ [m,n]	5⅜	4¼	2⅞
Solid Concrete	31	Horizontal reinforcement not less than 0.25 percent and vertical reinforcement not less than 0.15 percent. (Three-fourths as much for welded wire fabric) — Grade A Concrete	6½	6	5	3½
		Grade B Concrete	7½	6½	5½	4[d]
Hollow Gypsum Tile	32	3″ tile not less than 70 percent solid				
	33	3″ tile plastered one side with ⅝″ gypsum plaster	.....	.....	3⅝[d]	.....
	34	4″ tile plastered one side with ½″ gypsum plaster	.....	4½[d]	.....	.....
	35	3″ tile plastered both sides with ½″ gypsum plaster	.....	4[d]	.....	.....
	36	4″ tile plastered both sides with ½″ gypsum plaster	5[d]	.....	.....	.....
Glazed or Unglazed Facing Tile, Nonload-bearing	37	One 2″ unit cored 15 percent maximum and one 4″ unit cored 25 percent maximum with ¾″ mortar filled collar joint. Unit positions reversed in alternate courses	.....	6⅜	.....	.....

TABLE NO. 37-B (Continued)

Glazed or Unglazed Facing Tile, Nonload-bearing (Cont'd.)	**38**	One 2″ unit cored 15 percent maximum and one 4″ unit cored 40 percent maximum with ⅜″ mortar filled collar joint. Plastered one side with ¾″ gypsum plaster. Two wythes tied together every fourth course with No. 22 gauge corrugated metal ties	-----	6¾	-----	-----
	39	One unit with three cells in wall thickness, cored 29 percent maximum	-----	-----	**6**	-----
	40	One 2″ unit cored 22 percent maximum and one 4″ unit cored 41 percent maximum with ¼″ mortar filled collar joint. Two wythes tied together every third course with No. 22 gauge corrugated metal ties	-----	-----	**6**	-----
	41	One 4″ unit cored 25 percent maximum with ¾″ gypsum plaster on one side	-----	-----	**4¾**	-----
	42	One 4″ unit with two cells in wall thickness, cored 22 percent maximum	-----	-----	-----	**4**
	43	One 4″ unit cored 30 percent maximum with ¾″ vermiculite gypsum plaster on one side.	-----	-----	**4½**	-----
	44	One 4″ unit cored 39 percent maximum with ¾″ gypsum plaster on one side	-----	-----	-----	**4½**
Solid Gypsum Plaster	**45**	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[d]**
	46	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[d]**

TABLE NO. 37-B (Continued)

Solid Gypsum Plaster (Cont'd.)	47	¾" by No. 16 gauge 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[d]	2[d]
	48	Studless with ½" full-length plain gypsum lath and perlite or vermiculite gypsum plaster each side	----	----	2½[d]	2[d]
	49	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[d]
Solid Perlite and Portland Cement	50	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[h] studs 16" on center with 1" long by No. 11 gauge by 7/16" head annular ring shank nails	----	----	3⅛[d]	----
Solid Neat Wood Fibered Gypsum Plaster	51	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 each side	----	----	2[d]	----------
Solid Gypsum Wallboard Partition	52	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[d]	----------

TABLE NO. 37-B (Continued)

Solid Gypsum Wallboard Partition (Cont'd.)	**53**	One full-length layer of 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	----	----	2d	----
Hollow (Studless) Gypsum Wallboard Partition	54	One full-length layer of ⅝" Type "X" gypsum wallboard attached to both sides of wood or metal top and bottom runners 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 d
	55	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 d	----
Incombustible Studs—Interior Partition with Plaster Each Side	56	3¼" by No. 18 gauge steel studs spaced 24" on center. ⅝" gypsum plaster on metal lath each side mixed 1:2 by weight, gypsum to sand aggregate	----	----	----	4¾ d
	57	3⅝" No. 16 gauge approved nailable[i] studs spaced 24" on center. ⅝" neat gypsum wood fibered plaster each side over ⅜" rib metal lath nailed to studs with 6d common nails, 8" on center. Nails driven 1¼" and bent over	----	----	5⅝	----

TABLE NO. 37-B (Continued)

Incombustible Studs—Interior Partition with Plaster Each Side (Cont'd.)	58	2½" steel studs 16" on center formed with No. 16 gauge angle flanges and No. 7 gauge wire diagonals. ⅝" 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 d
	59	2½" steel studs 16" on center formed with No. 16 gauge angle flanges and No. 7 gauge wire diagonals. ⅝" 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 vermiculiite gypsum plaster applied each side	—	—	4¾ d	—
	60	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 d	—	—
Wood Studs Interior Partition with Plaster Each Side	61	2" x 4" wood studs 16" on center with ⅝" gypsum plaster on metal lath. Lath attached by 4d common nails bent over or No. 14 gauge by 1¼" x 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
	62	2" x 4" wood studs 16" on center with metal lath and ⅞" neat wood fibered gypsum plaster each side. Lath attached by 6d common nails, 7" on center. Nails driven 1¼" and bent over	—	—	5⅝ d	—

TABLE NO. 37-B (Continued)

Wood Studs Interior Partition with Plaster Each Side (Cont'd.)	63	2"x4" wood studs 16" on center with ⅜" 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
	64	2" x 4" wood studs 16" on center with ⅜" Type "X" gypsum lath and ½" gypsum plaster each side. Lath nailed with 1⅛" 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
	65	2" x 4" wood studs 16" on center with ⅜" plain gypsum lath and ½" neat wood-fibered gypsum plaster each side. Lath nailed with 4d common wire nails, 5" on center	—	—	—	5⅜
	66	2" x 4" wood studs 16" on center with ⅜" 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

TABLE NO. 37-B (Continued)

Wood Studs Interior Partition with Plaster Each Side (Cont'd.)	67	2″ x 4″ wood studs 16″ on center with ⅜″ perforated gypsum lath with 1″ hexagonal mesh of No. 20 gauge wire furred out 5/16″ and 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 ⅜″ head nails with ⅜″ furrings, 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	—
Incombustible Studs —Interior Partition with Gypsum Wallboard Each Side	68	No. 25 gauge channel-shaped studs 16″[1] on center with one full-length layer of ⅝″ 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.	—	—	—	4⅞[d]
	69	No. 25 gauge channel-shaped studs 24″ on center with two full-length layers of ⅝″ 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	—	—	6⅛[d]	—

TABLE NO. 37-B (Continued)

Incombustible Studs —Interior Partition with Gypsum Wallboard Each Side (Cont'd.)	70	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 1⅝″ 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	—	—	3⅝[d]	—
	71	No. 16 gauge approved nailable metal studs[i] 16″[12] on center with full-length ⅝″ 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	—	—	—	4⅞
Wood Studs— Interior Partition with Gypsum Wallboard Each Side	72	2″ x 4″ wood studs 16″ on center with two layers ⅜″ 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	—	—	—	5⅛
	73	2″ x 4″ wood studs 16″ on center with space between filled with mineral wool batts[j] nailed to studs and full-length ½″ regular gypsum wallboard applied vertically nailed with 5d cooler nails spaced 7″ on center	—	—	—	4⅝

TABLE NO. 37-B (Continued)

Wood Studs—Interior Partition with Gypsum Wallboard Each Side (Cont'd.)	74	2″ x 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
	75	2″ x 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
	76	2″ x 4″ fire-retardant treated wood studs spaced 16″[1] 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[d]
	77	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	—

TABLE NO. 37-B (Continued)

Exterior or Interior Walls	78	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 extension 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
	79	2″ x 4″ wood studs 16″ on center with metal lath and ¾″ exterior cement plaster[k] 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
	80	2″ x 4″ wood studs 16″ on center with ⅞″ exterior cement plaster (measured from the face of 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
	81	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, nonbearing, incombustible stud partitions in this Table. Plaster mix 1:2 for scratch coat and 1:3 for brown coat, by weight, cement to sand	—	—	—	Varies[l]

TABLE NO. 37-B (Continued)

Exterior or Interior Walls (Cont'd.)	82	2¼" x 3¾" clay face brick with cored holes over ½" gypsum sheathing on exterior surface of 2" x 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. Outer layer of wallboard placed horizontally or vertically and nailed 8" on center with 8d 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" x 6⅝" attached to each stud with two 8d cooler nails, every sixth course of bricks	—	—	10⅛	—

a. Staples with equivalent holding power and penetration may be used as alternate fasteners to nails for attachment to wood framing.

b. Thicknesses shown for brick and clay tile are nominal thickne sses unless plastered, in which case thicknesses are net. Thicknesses shown for concrete masonry units are "equivalent thi cknesses defined as follows:

Equivalent thickness is the average thickness of solid material in the wall and is represented by the formula

$$T_E = \frac{V_N}{LXH}$$

WHERE:

T_E = equivalent thickness in inches

V_N = net volume (gross volume less volume of voids) in cubic inches.

L = length of block in inches

H = height of block in inches.

Thickness includes plaster, lath and gypsum wallboard where mentioned. Plaster thickness is measured from face of lath or other plaster base unless otherwise stated.

TABLE NO. 37-B (Continued)

c. Single wythe brick.

d. Shall be used for nonbearing purposes only

e. 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.

f. Rowlock design employs clay brick with all or part of bricks laid on edge with the bond broken vertically.

g. See also Footnote b. The equivalent thickness may include the thickness of gypsum or Portland cement plaster applied in accordance with the requirements of Chapter 35 of this code.

h. Studs are doubled trussed wire studs each with No. 3 gauge flange wires and No. 11 gauge truss wires, welded together.

i. Nailable metal studs consist of two channel studs spot welded back-to-back with a crimped web forming a nailing groove.

j. 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.

k. Three pounds of asbestos fiber added for each bag of Portland cement.

l. 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.

m. 8″ block with 1¼″ face shell with voids filled with vermiculite shall be accepted as 4-hour.

n. ½″ plaster on each side of 8″ block with 1¼″ face shell shall be accepted as 4-hour.

TABLE NO. 37-C—MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a]

Floor or Roof Construction	Item Number	Ceiling Construction	Thickness of Floor or Roof Slab (In Inches)				Minimum Thickness of Ceiling (In Inches)			
			4 Hr.	3 Hr.	2 Hr.	1 Hr.	4 Hr.	3 Hr.	2 Hr.	1 Hr.
Concrete — Excluding Expanded Clay Shale or Slate (by Rotary Kiln Process) or Expanded Slag	1	Slab (no ceiling required)	6½	5½	4½	3½[b]	.....	.....	.....	.....
Concrete — Expanded Clay Shale or Slate (by Rotary Kiln Process) or Expanded Slag	2	Slab (no ceiling required)	5	4½	4	3	.....	.....	.....	.....
Reinforced Concrete Joists	3	Slab with suspended ceiling of vermiculite gypsum 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 Form[c]	4	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	⅝	.....
	5	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	.....	.....	.....	⅝	.....	.....
	6	Portland cement plaster over metal lath attached to the bottom chord of joists 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 for one-hour system and 1:1 for scratch coat, 1:1½ for brown coat for two-hour system, by weight, cement to sand	.....	.....	2¼	2	.....	.....	⅝[d]	⅝[e]

TABLE NO. 37-C—MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a]—Continued

Steel Joist Construction with a Reinforced Concrete Slab on Top Poured on a Metal Lath Form[c] (Cont'd.)	7	Perlite or vermiculite gypsum plaster on ⅜" perforated gypsum lath attached to ¾" 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	1⅜[f,h]	⅞[f] 1[g,h]	⅞[g]	1
	8	Gypsum plaster on ⅜" perforated gypsum lath attached to ¾" cold-rolled channels, with approved clips giving continuous support to lath. Channels attached to or suspended below joists and wire tied to bottom chord of joists	—	—	2	—	—	—	1[h]	—
	9	⅝" Type "X" gypsum wallboard attached to approved nailing channels 16" on center with 1¼" 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	—	—	—	⅝
	10	Ceiling of ⅝" Type "X" wallboard attached to ⅞" deep by 2⅝" 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	—	—	2½	—	—	—	⅝	—
Reinforced Gypsum Concrete Slab Poured on ½" Gypsum Formboard Supported on Unprotected Steel Bulb Tees, 32⅝" on Center, Supported on Individually Protected Steel Beams[i]	11	None	—	—	2½	2	—	—	—	—

TABLE NO. 37-C—MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a]—Continued

Reinforced Concrete Slab and Joists with Hollow Clay Tile Fillers Laid End to End in Rows 2½″ or More Apart; Reinforcement Placed Between Rows and Concrete Cast Around and Over Tile	12	⅝″ gypsum plaster on bottom of floor or roof construction	—	—	8[j]	—	—	—	⅝	—
	13	None	—	—	—	5½[k]	—	—	—	—
Steel Joist Construction with a Reinforced Concrete Slab on Top poured on a ½″ deep Steel Deck	14	Vermiculite gypsum plaster on metal lath attached to ¾″ cold-rolled channels with No. 18 gauge wire ties spaced 6″ on center	2½[l]	—	—	—	¾	—	—	—
8″ Deep Cellular Steel Deck with Concrete Slab on Top. Slab Thickness Measured to Top of Cells	15	Perlite or vermiculite gypsum plaster on ⅜″ perforated gypsum lath attached to ¾″ cold-rolled channels with approved clips. Channels suspended by No. 8 gauge hanger wire through units between cells	—	2½	—	—	—	⅞[g,h]	—	—
	16	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 1½″ cold-rolled channels spaced 36″ on center with No. 16 gauge wire. 1½″ channels supported by No. 8 gauge wire hangers at 36″ on center. Beams within envelope and with a 2½″ air space between beam soffit and lath have a 4-hour rating	2½	—	—	—	1⅛[m]	—	—	—

TABLE NO. 37-C—MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a]—Continued

1½" 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	17	Ceiling of gypsum plaster on metal lath. Lath 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.	—	—	1⅞	1	—	—	¾[h]	¾[h]
1½" 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	18	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	—	—	1½	1	—	—	⅞[h]	¾[h]

1½" 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	19	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	—	—	—	⅞	—
Double Wood Floor Over Wood Joists[n]	20	Gypsum plaster over ⅜" perforated gypsum lath attached to joists with 1⅛" by No. 13 gauge by 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 1¾" 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
	21	Perlite or vermiculite plaster over ⅜" perforated gypsum lath nailed with 1⅛" by No. 13 gauge by 19/64" head plasterboard blued nails.	—	—	—	—	—	—	—	⅞

TABLE NO. 37-C—MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a]—Continued

Double Wood Floor Over Wood Joists[n] (Cont'd.)	22	Gypsum plaster over ⅝" Type "X" gypsum lath. Lath initially applied with not less than four 1⅛" 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 1½" 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 1½" 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
	23	Portland cement or gypsum plaster on metal lath. Lath fastened with 1½" 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.	—	—	—	—	—	—	—	⅝
	24	Perlite or Vermiculite gypsum plaster on metal lath secured to joists with 1½" by No. 11 gauge by 7/16" head barbed shank roofing nails spaced 5" on center.	----	----	----	----	----	----	----	⅝
	25	⅝" 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.	----	—	—	----	----	—	—	⅝

TABLE NO. 37-C—MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a]—Continued

Plywood Stressed Skin Panels Consisting of ⅝" 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	26	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 ⅝" Type "X" gypsum wallboard applied with long dimension perpendicular to joists and attached with 8d cooler nails spaced 6" on center at end joints and 8" on center elsewhere. Wallboard joints staggered with respect to fiberboard joints.	—	—	—	—	—	—	—	1
Vermiculite Concrete Slab Proportioned 1:4 (Portland Cement to Vermiculite Aggregate) on a 1½" Deep Steel Deck Supported on Individually Protected Steel Framing. Slab Reinforced with 4" x 8" No. 12/14 Welded Wire Mesh.	27	None	—	—	—	3[1]	—	—	—	—
Perlite Concrete Slab Proportioned 1:6 (Portland Cement to Perlite Aggregate) on a 1¼" Deep Steel Deck Supported on Individually Protected Steel Framing. Slab Reinforced with 4"x8" No. 12/14 Welded Wire Mesh	28	None	—	—	—	3½[1]	—	—	—	—

TABLE NO. 37-C—MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a]—Continued

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.	29	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[o]	2[o]	—	—	⅞	¾	—
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) Perlite-Concrete Floor Slab on Top	30	Suspended envelope ceiling of perlite gypsum plaster on metal lath attached to ¾" cold-rolled channels, secured to 1½" cold-rolled channels spaced 42" on center supported by No. 6 wire 36" on center. Beams in envelope with 3" minimum air space between beam soffit and lath have a 4-hour rating.	2[o]	—	—	—	1[h]	—	—	—

a. Staples with equivalent holding power and penetration may be used as alternate fasteners to nails for attachment to wood framing.
b. The thickness may be reduced to three inches where limestone aggregate is used.
c. Slab thickness over steel joists measured at the joists.
d. Portland cement plaster with 40 pounds asbestos fiber per bag of cement.
e. Portland cement plaster with 15 pounds of hydrated lime and three pounds of asbestos fiber per bag of cement.
f. One inch by No. 20 gauge hexagonal wire mesh installed below lath and tied to each furring channel at joints between lath.
g. 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.
h. Furring channels spaced twelve inches on center.
i. Allowable working stress for bulb tees 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.
j. Six-inch hollow clay tile with two-inch concrete slab above.
k. Four-inch hollow clay tile with one and one-half-inch concrete slab above.
l. Thickness measured to bottom of steel form units.
m. Five-eighths inch of vermiculite gypsum plaster plus one-half inch of approved vermiculite acoustical plastic.
n. Double wood floor may be either of the following (see also Sub-section 3703.12 for conditions where flooring or ceiling may be omitted): (a) Subfloor of 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 interior type plywood with exterior glue, a layer of .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.
o. Thickness measured to top of steel deck unit.

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) For additional requirements for dual-purpose fire exit doors, see Table 31-B.

3706.2 IDENTIFICATION OF FIRE ASSEMBLIES: (a) All fire assemblies required to have fire-protection ratings of three hours, one and one-half hours, one hour and three-fourths hours shall bear a label or other identification showing the rating thereof except that such label shall not be required for doors complying with Sub-paragraph 3706.2 (c) (2) herein and windows complying with the paragraphs of Sub-section 3706.6 herein.

(b) 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.

(c) **EXCEPTIONS:** (1) 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 a type of hardware not necessarily set forth in this code, for a period of one hour in accordance with the standard set forth in Paragraph 3701.2 (c).

(2) Where a fire assembly having a fire-protection rating not exceeding three-fourths hour is required, any of the following doors may be installed provided such doors meet with other requirements of this section for frames, hardware, and glazing.

(aa) Sheet-metal doors constructed of two sheets of metal of not less than 26 U. S. gage, fastened to a structural steel frame in such manner as to leave a one-inch space between the panels, which space shall be filled with asbestos.

(bb) Metal-clad doors which shall be wood-panel doors with frame not less than one and three-fourths inch in thickness and with wood panels not less than three-fourths inch in thickness, the whole door covered with not less than 26 U. S. gage metal. The panels of such doors shall fit into the frame not less than three-fourths inch and all joints of metal shall be lapped and nailed tightly to the wood frames.

(cc) Doors as set forth in (bb) above but with one-fourth inch rigid asbestos board securely nailed to the face thereof and the edges protected by 26 U. S. gage sheet metal.

(dd) Doors of solid wood not less than one and three-fourths inches thick.

3706.3 FIRE-RESISTIVE TESTS: (a) The fire-protection rating of all type of required fire assemblies, except doors complying with Sub-paragraph 3706.2 (c) (2) and 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 minimum 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) & 3701.2 (e).

3706.4 HARDWARE: (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 hour, one-hour, or three-fourths-hour fire-protection rating shall be an automatic or self-closing type.

(c) **EXCEPTION:** (1) Dual purpose fire-exit doors shall have closing devices as set forth in Table 31-C.

(2) Closing devices may be omitted in three-fourths-hour fire-protections assemblies required as protection for openings in exterior walls.

(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.

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 ratings 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 openings 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) In addition to the general requirements set forth in this Sub-section, glazed openings in dual purpose fire-exit doors shall comply with Table 31-C herein.

(f) 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 shall 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 provided 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 surfaces 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.

3708.2 CLASSIFICATION: (a) Interior finish materials shall be classified in accordance with their average flame-spread 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.

(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

3708.3 REQUIREMENTS: (a) 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 exits, Class A, in general assembly areas, Class B, in rooms of less than 200 capacity, Class C.

(2) Group C Occupancy—in all exits, Class A, in unsprinklered open-plan buildings, Class B, in all other, Class C.

(3) Group D Occupancy—in all exits, Class A, in any room, Class A except that Class B materials may be used in individual rooms of not over four persons capacity.

(4) Group E and F Occupancy—Class C.

(5) Group G Occupancy Division 1 Over 3000 sq. ft. or over 3 stories:
Ceilings—Class B or, if completely sprinklered, Class C,
Wall—Class C.

Group G Occupancy Division 1 Not Over 3000 sq. ft. or not over 3 stories:
All interior finishes—Class C.

Group G Division 2 in exits and enclosed corridors furnishing access thereto or ways of travel therefrom—Class B; or, if sprinklered, Class C.

(6) Group H Occupancy—in all exits, Class B, in lobbies—Class B, in individual rooms or living units including dormitories or rooming houses, Class C.

(7) Group I Occupancy—Class C.

(8) Group J Occupancy—No requirement.

(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 rom 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 all new buildings, other than Group I Occupancy, Class B shall be used in all basements or other underground spaces from which there is no direct exit to the outside of the building if subject to occupancy for any purpose other than storage or service facilities.

NOTES

CHAPTER 38

FIRE-EXTINGUISHING APPARATUS

3801 AUTOMATIC-SPRINKLER SYSTEMS
3802 CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS
3803 STANDPIPES
3804 WATER SUPPLY
3805 FIRE-DEPARTMENT CONNECTIONS
3806 YARD HYDRANTS
3807 PORTABLE FIRE EXTINGUISHERS
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3801 AUTOMATIC-SPRINKLER SYSTEMS

3801.1. In new buildings or buildings altered to increase the area or height, and in existing buildings as set forth in Sub-section 104.9 and 503.1, approved automatic-sprinkler systems shall be installed and maintained in accordance with the following paragraphs, except that the Building Official shall require or may permit a carbon dioxide fire-extinguishing system, as set forth in Section 3802, to be used in lieu of such sprinkler system. The areas referred to shall be the areas set forth in Part III, "Groups of Occupancy," as allowable floor areas for the various Types of Construction. Combustible goods or merchandise shall include those made of wood, cloth or rubber; those containing flammable liquids; those packed with excelsior, paper or moss; and other goods or merchandise of equivalent, or greater, combustibility. Combustible shall be as defined in Chapter 4 herein. Approved automatic-sprinkler systems shall be required as follows:

(a) In the following locations in buildings of Group A, or in buildings of Group B or C Occupancy, having a stage:

(1) In motion-picture booths where nitro-cellulose film is used.

(2) In all accessible locations on the stage side of a proscenium opening, including under the stage floor, gridiron, and tie and fly galleries.

(3) In 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.

(b) In motion-picture booths of buildings of Group A or B Occupancy, not having a stage and having a seating capacity of 500, or more persons.

(c) In Group E Occupancy, Divisions 1 and 2 in buildings over one story in height, or in buildings of mixed occupancy, or in buildings one story in height and exceeding 1,500 square feet in area.

(d) **(1)** In buildings or within fire divisions of Group F, Division 1, and Group G Occupancy, one and two stories in height, used for the sale or storage of combustible goods or merchandise and exceeding 20,000 square feet in area.

(2) In buildings or within fire divisions of Group F, Division 1, and Group G Occupancy, three or more stories in height, used for the sale or storage of combustible goods or merchandise and exceeding 10,000 square feet in area.

(3) Any goods or merchandise packaged or packed in paper, cardboard or wood containers and similar packing or packaging shall be considered combustible.

(e) (1) In enclosed parking garages over 65 feet in height and exceeding 10,000 square feet per floor if of Type I Construction or 8,000 square feet per floor if of protected, non-combustible construction.

(2) In open-air parking garages over 65 feet in height and exceeding 10,000 square feet per floor in area.

(3) In repair garages over one story in height or located below another Occupancy, exceeding 10,000 square feet per floor in area where of Type I Construction, or 8,000 square feet per floor in area where of protected non-combustible construction.

(4) In one-story repair garages exceeding 15,000 square feet per floor in area where of Type I Construction, 12,000 square feet per floor in area where of protected, non-combustible construction, 9,000 square feet per floor in area where of unproteced, non-combustible construction or heavy timber or Type III Protected Construction.

(5) In any basement or underground garage where the area per floor exceeds 5,000 square feet.

(6) In Group F Occupancy, Division 2, shops, plants, or factories where loose combustible fibres, chips, shavings, and dusts are produced or generated, and the building is over one story in height, or in buildings of mixed occupancy exceeding 8,000 square feet in area, or in buildings one story in height and exceeding 15,000 square feet in area.

(f) In film storage rooms storing nitro-cellulose film, as set forth in Section 4104.

(g) In dry goods and apparel manufacturing shops:

(1) In one or two story buildings of Type II and Type III (protected construction of incombustible materials and exceeding 10,000 square feet in area per floor.

(2) In one or two story buildings of Type II and Type III (protected) construction of combustible materials and exceeding 2500 square feet in area per floor.

(3) In any building of Type III (unprotected), Type IV and Type V construction of any area.

(4) In any building 3 or more stories in height of any area.

(h) In any trash chute or linen chute on alternate floors.

(i) In every trash or garbage room and in every room served by a chute.

(j) Paint spray booths as required in Section 4107.

(k) (1) 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.

(2) 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 for storage of combustible goods exceeds 2,500 square feet.

(3) Basements of buildings used for assembly, educational or residential occupancies where the area of such basement exceeds 5,000 square feet.

(l) The provision of fire extinguishers or standpipes shall not reduce or nullify the requirement for automatic sprinkler systems as set forth herein.

3801.2 DETAILED REQUIREMENTS: (a) The "Standards for the Installation of Sprinkler Systems," NFPA Pamphlet No. 13-1969, of the National Fire Protection Association is hereby adopted as a part of this Code and supplements, but does not supersede, the requirements set forth herein.

(b) The alarm valve required for a standard sprinkler system shall be required only of Group A Occupancy and basements exceeding 3000 square feet of other Occupancies.

3801.3 WATER SUPPLY: The water supply for sprinkler systems shall be as set forth in Section 3804.

3802 CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS

3802.1 GENERAL: Carbon dioxide fire-extinguishing systems may be substituted for required sprinkler systems in places not commonly used by the public as follows:

(a) The Building Official may require such substitution.

(b) The Building Official may approve such substitution.

(c) Piping and materials shall comply with the standards set forth in Paragraph 4604.1(b).

3802.2 DESIGN AND CONSTRUCTION: Carbon dioxide fire-extinguishing systems shall comply in all respects with the "Standards for Carbon Dioxide Fire-Extinguisher Systems," NFPA Pamphlet No. 12-1968, of the National Fire Protection Associations.

3802.3 WHERE PERMITTED: Carbon dioxide fire-extinguishing systems may be used in rooms or enclosures containing flammable liquids in enclosed or open containers, ovens, dryers, electrical and other special machinery and apparatus and processes involving the use of flammable liquids, vapor or dusts, fur storage, lumber kilns, coal bins, loose textile stocks, 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; also in vaults, library stockrooms, organs and other such places where fires may be extinguished by carbon-dioxide gas with less loss than if water is used.

3803 STANDPIPES

3803.1 GENERAL: (a) REQUIRED: (1) Standpipes required herein shall be wet standpipe systems of combination Class II and Class III as set forth in the Standard in Paragraph 3803.1(b) except that the standpipes required by Sub-paragraph 3803.2(a)(3) may be Class II.

(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 requiring such standpipes.

(3) Standpipes shall be required for buildings under construction as set forth in Section 3323.

(b) STANDARD: Standpipe systems and materials required by this Code shall comply with the Standard for Standpipes and Hose Systems NFPA Pamphlet 14-1970 of the National Fire Protection Association which is hereby adopted to supplement, but not supercede, the requirements set forth herein.

(c) PERMIT: A permit for a standpipe system shall be required as set forth in Sub-section 4601.5 and inspections shall be as set forth herein.

3803.2 STANDPIPES REQUIRED: (a) Buildings, except open-air parking garages that are required to have automatic sprinkler systems by Section 3801, shall be equipped with standpipes as follows:

(1) Buildings exceeding 50 feet but not more than 75 feet in height shall have standpipes not less than 4 inches in diameter. EXCEPTIONS: Standpipes will not be required in one story buildings regardless of height.

(2) Buildings exceeding 75 feet in height shall have standpipes not less than 6 inches in diameter.

(3) On stages arranged or intended for theatrical, operatic or similar performances, one 2½ inch standpipe on each side of the stage.

(b) For the purpose of this Section, height shall be taken from grade to the top of the main roof. Grade shall be taken as the average level of the ground adjoining a building line, or the first floor level, whichever is lowest.

3803.3 NUMBER: The number of standpipe risers and hose stations shall be such that a water stream 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 except that where 2½ inch standpipes are required in Sub-paragraph 3803.2(a)(3) the service reach of a hose connected to such 2½ inch standpipes shall be within 20 feet of a fog nozzle connected to not more than 75 feet of hose.

3803.4 LOCATION: (a) Standpipes shall be so located that they are protected against mechanical and fire damage.

(b) Standpipes shall be located:

(1) Within an enclosed stairway where stairways are enclosed; or

(2) Within 10 feet of the floor landing of an open stairway.

(c) In buildings divided by partitions, standpipes shall be so located that the streams can be brought to bear in any room.

3803.5 MATERIALS: Standpipes shall be wrought iron or galvanized steel and, together with fittings and connections, shall be of sufficient strength to withstand 100 pounds per square inch water pressure at the topmost outlet.

3803.6 TESTS: Tests for new systems, altered systems and periodically as set forth in Section 3808 shall be as set forth in the Standard in Paragraph 3803.1(b).

3803.7 OUTLETS: (a) All standpipe hose stations shall be equipped with a 2½ inch valve adapted for a 2½ inch N.S.T. Fire Department hose connection in each outlet, including the basement, and located not less than 5 feet and 6 inches nor more than 6 feet above the floor.

(b) (1) Where standpipe outlets are located within stair enclosures as set forth in Sub-paragraph 3803.4(a)(b)(1), a valve and 2½ inch outlet without hose shall be provided in the stair enclosure and 1½ inch outlet through the stair enclosure wall to a hose station shall be provided.

(2) Where standpipe outlets are not located within stair enclosures as set forth in Sub-paragraph 3803.4(b)(2), a valve, a 2½ inch outlet and an easily removable 2½" x 1½" adapter to the hose station shall be provided.

(c) All standpipes in buildings 50 feet or more in height shall extend full size above the roof a minimum of 18 inches and be equipped with an Underwriters approved duplex roof manifold. Where stairways are not otherwise required, access to the roof shall be provided by a scuttle and ladder.

3803.8 HOSE AND REELS: (a) Each hose station outlet shall be fitted with a hose not less than 1½ inch minimum in diameter except as set forth in Paragraph 3803.8(d).

(b) Such hose shall be equipped with an approved, adjustable, brass or bronze fog nozzle with the pattern; off, fog, stream.

(c) An approved standard form of wall-hose reel or rack shall be provided for the hose and shall be located to make the hose readily accessible at all times.

(d) (1) Hose stations shall not be located within stairway enclosures.

(2) Where standpipe outlets are located within stairway enclosures the hose station shall be located immediately outside and within ten feet of the doorway to the stair enclosure.

(3) Where standpipe outlets are not located within stairway enclosures the hose station shall be located within 10 feet of the floor landing of an open stairway.

(4) The required fire-resistive rating of the wall receiving recessed cabinets shall be maintained.

3803.9 WATER SUPPLY: (a) The water supply for standpipes shall be as set forth in Section 3804.

(b) Where the standpipe system is interconnected with a sprinkler system, the service and piping shall be sized for simultaneous flow and at the specified pressures.

3804 WATER SUPPLY

3804.1 REQUIRED: (a) All sprinkler systems, standpipe systems and yard hydrants shall be connected to the community water supply wherever available.

(b) "Available" shall be considered to be within 150 feet from a street water main of not less than 4-inch diameter as measured from the nearest point of the building.

(c) Where community water service is not available and/or where the community service pressure is insufficient to maintain 65 pounds residual pressure at the topmost outlet (not including roof outlets), with 100 GPM flowing, connection to a gravity tank, pressure tank or fire pump shall be required. Tests for residual pressure may be made at the roof outlet with consideration of pressure reduction based on head.

3804.2 COMMUNITY WATER SUPPLY: (a) Connection to a community water supply shall be equipped with control valve located in the public street or other public space, and an Underwriters Laboratories listed check valve protecting the main and accessibly located.

(b) The minimum size for water supply service shall be not less than the size required for the equipment used.

(c) The minimum size of water supply service serving not more than 2½ inch standpipes shall be three inches.

3804.3 GRAVITY TANKS: (a) Tanks shall have a capacity of not less than 2500 gallons for the first standpipe plus 1000 gallons for each additional standpipe and/or an amount to operate the sprinkler system (if any) on any one floor for a period of not less than 30 minutes.

(b) Tanks shall be located to provide not less than 25 pounds flow pressure at the topmost hose station outlet for its entire supply; and where storage tanks are used for domestic purposes, the supply pipe for domestic purposes shall be located to maintain such minimum fire-fighting capacity.

(c) Tanks shall be equipped with a ladder and platform, drainpipe, water and pressure gages.

(d) Incombustible supports shall be provided for all supply tanks.

(e) Supply pipe for fire-extinguishing apparatus shall lead from the bottom or from the side of the tank and within one foot of the

bottom and shall be provided with a check and gate valve protecting the tank.

(f) Where the pressure at any fire hose outlet for 1½ inch hose exceeds 100 psi, an approved, calibrated pressure-reducing valve shall be installed to reduce the pressure to such valve that the nozzle pressure will be approximately 80 psi.

3804.4 PRESSURE TANKS: (a) Detailed plans shall be submitted to the inspector having jurisdiction where pressure tanks are proposed.

(b) Pressure tanks shall be equipped with a sight glass, cut off valves and a pressure gage.

(c) Pressure tanks shall be designed and maintained as set forth in the NFPA Standard No. 22-1970 which is hereby adopted to supplement, but not supercede, the requirements set forth herein.

3804.5 FIRE PUMPS: (a) Where pumps are proposed, detailed plans shall be submitted to the inspector having jurisdiction.

(b) Where capacity of 500 gpm or more is required, fire pumps shall be UL Inc. listed.

(c) Fire pump controllers shall be UL Inc. listed and may be limited service for motors of 30 HP or less.

(d) (1) Pumps for buildings not exceeding 75 feet in height shall have a capacity sufficient to provide 100 gallons per minute.

(2) Pumps for buildings exceeding 75 feet in height and not more than 275 feet in height shall have a capacity sufficient to provide 500 gallons per minute and where more than one standpipe is required, the pump capacity shall be 750 gallons per minute.

(3) Pumps for buildings exceeding 275 feet in height shall comply with the standard set forth in Paragraph 3803.1(b).

(e) The source of water supply shall be a street water main of not less than four-inch diameter and capable of supplying the quantity of water at which the pump will operate or a well or cistern having a one-half hour supply.

(f) Pumps shall be supplied with an adequate source of power and shall be automatic in operation with compatible controls.

(g) Pump installations shall be fitted with a full sized bypass equipped with approved gate and check valve.

(h) Pressure on the fire system shall be maintained by a jockey pump actuated by a pressure switch or by connection to a suitable domestic system through two 175 psi check valves, one with soft seat and one with hard seat.

3805 FIRE-DEPARTMENT CONNECTIONS

3805.1 (a) STANDPIPES: (1) One Siamese (duplex) Fire Department connection shall be provided for each of the first two required standpipe risers.

(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 pipe diameter of the largest diameter of any standpipe connected thereto and be protected by an Underwriter's approved 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 connections shall be 2½ inch N.S.T. hose connection located on the street-front wall not less than one foot nor more than three feet above grade.

(b) Piping shall not project over public property more than two inches.

3805.3 A permanent, legible sign with letters at least one inch high shall be attached to the exterior of the building adjacent to the connection, and such sign shall read "STANDPIPE" and/or "SPRINKLER" as applicable.

3805.4 Location of all Siamese connections shall be approved by the Fire Department.

3806 YARD HYDRANTS

3806.1 WHERE REQUIRED: Boatyards, oil - storage tanks, lumber yards or exhibition parks or other similar enclosures, when deemed necessary by the inspector having jurisdiction, shall have not less than one yard hydrant and hose for each 20,000 square feet of area.

3806.2 DETAILED REQUIREMENTS: (a) Where required, yard hydrants shall not be located over 250 feet apart.

(b) The piping for yard hydrants shall be not less than four inches and shall be connected by screw fittings, flanges or unions.

(c) Hydrants shall have two and one-half inch connections with N.S.T. threads uniform with that of the local fire-department with not less than 100 feet of standard two and one-half inch fire hose and an approved-type nozzle.

(d) A hose house 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 nouses 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 as specified in this section as follows:

(a) In buildings for Group A occupancy: In every projection room and one for each 2500 square feet of floor area or within a travel distance of 75 feet.

(b) In buildings for Groups B, C, D, and E occupancies: One to each 2500 square feet of floor area, but not less than one to each story or within a travel distance of 75 feet.

(c) In buildings for Groups F, G, and H occupancies: One to each 2500 square feet of floor area, but not less than one to each path of egress or within a travel distance of 75 feet. EXCEPTION: 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 the NFPA Standard in Sub-section 3807.2 herein.

(d) In buildings of Group I occupancies other than single family residences and duplexes: One for each 2500 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 REQUIREMENTS: (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 equipped that pressure may be generated and the contents discharged through a hose and nozzle, or a portable extinguisher of other type, approved as equal by the inspector having jurisdiction.

(b) The Standard for the Installation, Maintenance and Use of Portable Fire Extinguishers of the National Fire Protection Association, No. 10-1970 is hereby adopted as a part of this code to supplement, but not supersede, the specific requirements set forth herein.

(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 fire-extinguishing apparatus required in this Code shall be inspected at least once a year, and such other tests shall be made as the inspector having jurisdiction shall require.

(b) Tests shall be conducted by the Fire Department having jurisdiction and equipment satisfying such tests shall be tagged as acceptable stating the date of the test and the date re-testing is recommended.

(c) The cost of making such tests shall be borne by the owner.

(d) All required fire-extinguishing apparatus shall be maintained in sound operative condition and hose and other parts which, in the expressed and written opinion of the inspector having jurisdiction, is defective or not in compliance with the standard set forth herein shall be replaced or suitably repaired with reasonable dispatch.

3808.2 PRESSURE TESTS: Every system of automatic sprinklers, standpipes or yard hydrants, and all parts thereof, except linen hose, shall satisfactorily meet the pressure test of the Standards as set forth in Paragraph 3801.2(a) and Paragraph 3803.1(b).

CHAPTER 39

CHIMNEYS, FLUES, VENTS AND FIREPLACES

3901 GENERAL
3902 TYPE A FLUES OR VENTS
3903 TYPE B FLUES OR VENTS
3904 TYPE C FLUES OR VENTS
3905 SMOKEPIPES
3906 FIREPLACES

3901 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 Chapter 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 to 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 conduits or passageways for conveying products of combustion to the outer 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 meets the approval of the Building Official.

FIRE-CLAY FLUE LINING is flue lining made of fire clay.

FLUE 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 not less than eight inches in thickness and bonded thereto, such wall shall be considered proper lateral support.

(4) Chimneys shall be supported on reinforced concrete footings 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-eighths-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. Firebrick shall be laid in fire-clay.

(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 of 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 any 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 to any chimney shall enter the side thereof and shall be of not less than one-eighth-inch thick metal or five-eighths-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, not over 12 inches	No. 12 gage
More than 12 inches, not over 16 inches	No. 10 gage
More than 16 inches, not over 24 inches	No. 8 gage
More than 24 inches, not over 30 inches	3/16 inch
More than 30 inches, not over 43 inches	¼ 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 or 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:** 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. No stack shall be nearer than 24 inches in any direction from a door, window or other wall opening or from a required exit.

(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 TYPE B FLUES OR VENTS

Type B flues and vents shall comply with the requirements set forth in Chapter 47.

3904 TYPE C FLUES OR VENTS

Type C flues and vents shall comply with the requirements set forth in Chapter 47.

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 combusion 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 has 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 opening 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 condensats 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 permitted by NFPA No. 54-1969.

(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 when used on medium-heat appliances and 36 inches when used on high-heat appliances; except that such clearances may be reduced with insuluating materials, as set forth in the National Fire Protection Association Pamphlet NFPA No. 90B 1968.

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 ASTM Designation: C 315-56 which is hereby adopted to supplement, but not supercede, the requirements set forth herein.

(f) Fire brick shall conform to the Standard ASTM Designation: C 106-67 which is hereby adopted to supplement, but not supercede, the requirements set forth herein.

3906.2 FIRE-BOX CONSTRUCTION: (a) Where a lining of fire brick 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 as set forth for the walls of the firebox. Other smoke chamber walls shall be constructed as set forth for chimney walls except the ⅝ 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 ⅝ 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 enclosing 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 sides 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 materials 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-eighth inch for each one-inch clearance from 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-eighth 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 recesses 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 plate 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 Laboratories 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 a 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 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.

4001.4 CLEARANCES FOR HEAT PRODUCING APPLIANCES: Clearances for heat producing appliances shall comply with the Standard "Clearances for Heat Producing Appliances" NFPA No. 89M-1970 of the National Fire Protection Association which is hereby adopted to supplement, but not supersede, the specific requirements set forth herein.

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 No. 31-1968 of the National Fire Protection Association which is hereby adopted to

supplement, but not supersede, the specific requirements set forth herein.

4005 SOLID-FUEL-BURNING APPLIANCES

4005.1 Solid-fuel-burning appliances shall comply with the standard Code For the Installation of Heat Producing Appliances AIA 1967 of the American Insurance Association which is hereby adopted to supplement, but not supersede, the specific requirements herein.

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 Standards of "The Boiler and Pressure Vessel Code," 1968 of the American Society of Mechanical Engineers, including all addendas thereto published prior to the adoption of this code, is hereby adopted to supplement, but not supersede, the requirements set forth herein.

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 a one-hour fire-resistive assembly complying with Section 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 ceiling of not less than one-hour fire-resistive construction.

(b) There shall be no openings in such enclosure except 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 standard set forth in Paragraph 4006.1(b).

4006.5 DETAILED REGULATIONS: (a) High-pressure steam boilers may be blown off only to a blow-off tank complying with the requirements of the pamphlet "Boiler Blow Off Equipment" (1968) of the National Board of Boiler and Pressure Vessel Inspectors.

(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 and a Certificate shall be applied for and 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 six months.

(e) A Certificate of Inspection for a low-pressure boiler shall be for a period of not more than 12 months.

(f) A Certificate 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 re-testing or re-inspection 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 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 HEATERS

4008.1 Solar tanks, coils and systems shall be as set forth herein and in Part XII. Permits for the erection and alteration thereof shall be plumbing permits.

4008.2 Coil boxes shall be made of not less than 24-gage, corrosion-resistant metal, securely constructed, supported and anchored. Anchorage to sloping roofs shall be by bolting through the roof to the supporting members or rafters; and standard anchorage to wood-rafted roofs shall be by means of a 7/16-inch J-bolt, through the frame of the coil box and under the rafter, for each four square feet of coil box, but not less than four bolts. Anchorage for coil boxes, where the slope is different from that of the roof, shall be through back braces of 1¼" x 1¼" x ⅛" steel angle iron, spaced not more than four feet apart and bolted with not less than 7/16-inch bolts to the coil box and roof. Pitch pans shall be provided at roof anchor points where through bolts penetrate roofing felts.

4008.3 Tanks for solar heaters shall be of corrosion-resistant metal and shall be securely supported and anchored. No single tank shall exceed 60 gallons unless the supports are designed therefor.

Tanks shall be designed to operate under pressure not less than 100 pounds per square inch. Enclosures for tanks may be of wood, provided such wood is suitably treated for decay and water repellency. Enclosures for tanks, of wood, shall be not less in size than 2" x 4" and sheathed with one-inch sheathing or one-half inch, exterior-grade plywood, either of which is protected by expanded-

wire lath and stucco; or shall be a metal frame of 1¼" x 1¼" x ⅛" steel angle iron covered with expanded-wire lath and stucco; or shall be a cover box of .027-inch thickness of corrosion-resistant sheet metal. Tanks and enclosures shall be bolted through the roof to the supporting members with not less than four bolts, 7/16-inch in diameter.

4009 COMBUSTION ENGINES

4009.1 The installation and operation of stationary combustion engines and gas turbines in or within 15 feet of a building shall be as set forth herein.

4009.2 The Standard for installation and Use of Stationary Combustion Engines and Gas Turbines, NFPA No. 37-1967, of the National Fire Protection Association, is hereby adopted to supplement, but not supersede, the requirements set forth herein.

4009.3 When engine installations totalling more than 2000 horsepower are located inside structures which are frequented by the public, such engines shall be in rooms having walls, floor and ceiling of 3-hour fire-resistive construction. Openings in the engine room that open into other sections of the structure shall be provided with automatic fire-doors. Installations on roofs are not required to comply with this Sub-section if the roof is of Type I Construction. Rooms housing such engines shall have provision 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 atmospheres 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.

NOTES

CHAPTER 41
SPECIAL HAZARDS

4101 TRANSFORMER VAULTS
4102 FLAMMABLE LIQUIDS
4103 VENTILATING DUCTS
4104 FILM
4105 EXPLOSIVES
4106 RADIATION PROTECTION
4107 PAINT SPRAY BOOTHS AND DIP TANKS

4101 TRANSFORMER VAULTS

4101.1 STANDARDS: Article 450, Transformers and Transformer Vaults, of the standard set forth in Paragraph 4505.1(a) 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 Concete	Solid Masonry	Hollow-Unit Masonry
Above Grade	6″	8″	12″
Below Grade	6″	8″	8″

Transformer-vault floors on the ground shall be of 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 walls, 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 louvres.

(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.

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 louvres, 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 insuluated electrically from the exterior of the vault. Vaults shall not be used for storage, nor for 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 Pamphlet No. 30, 1969 and "Standard for the Installation of Oil Burning Equipment," NFPA Pamphlet No. 31, 1968, of the National Fire Protection Association is hereby adopted as a part of this Code to supplement, but not supersede, the requirements set forth herein.

4102.2 SCOPE: These provisions shall apply to new buildings, equipment and installation and to existing buildings, equipment and installation which constitute a hazard.

4102.3 CLASSIFICATION: (a) FLAMMABLE LIQUIDS shall mean any liquid having a flash point below 140 degrees F. and having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100 degrees F.

(b) Flammable liquids shall be divided into classes of liquids as follows:

Class I liquids shall include those having flash points below 100 degrees F. and may be subdivided as follows:

Class IA shall include those having flash points below 73 degrees F. and having a boiling point below 100 degrees F.

Class IB shall include those having flash points below 73 degrees F. and having a boiling point at or above 100 degrees F.

Class IC shall include those having flash points at or above 73 degrees F. and below 100 degrees F.

Class II liquids shall include those having flash points at or above 100 degrees F. and below 140 degrees F.

(c) COMBUSTIBLE LIQUIDS shall mean any liquid having a flash point at or above 140 degrees F. (60 degrees C.), and shall be known as Class III liquids. Class IIIA shall include those having flash points at or above 140 degrees F. (60 degrees C.) and below 200 degrees F. (93.4 degrees C.). Class IIIB shall include those having flash points at or above 200 degrees F. (93.4 degrees C.).

(d) This code does not cover Class IIIB liquids. Where the term combustible liquids or Class III liquids is used in this code, it shall mean only Class IIIB liquids.

(e) 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 herein set forth.

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 Group 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 fire-resistive wall or partition.

(d) In buildings of other than Group I Occupancy, there shall be not less than two remote paths of egress from the point of storage or use of Class I or II flammable liquids; except that a single exit from a room may be permitted where the travel distance does not exceed 15 feet.

(e) Flammable liquids for agricultural use at the point of use shall be exempted 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 by incandescent lamps installed to conform to Chapter 45 herein.

(k) Pumps for dispensing gasoline to the tanks of operating equipment shall not be located inside of buildings 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 than 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 free from any source of ignition.

(o) Underground tanks temporarily out of service for a period not exceeding 90 days 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 from 90 days to one year shall be removed or filled with

sand or water or other non-combustible material. Underground tanks out of service for more than one year shall be considered permanently abandoned and shall be removed or filled with sand. The responsibility for such protective measures shall be that of the owner of the property.

(p) The limits referred to in 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 16 of this Code.

4103 VENTILATING DUCTS

4103.1 STANDARDS: (a) The following standards of the National Fire Protection Association are hereby adopted to supplement, but not supersede, the requirements set forth herein.

(1) "Installation of Air-Conditioning and Ventilating Systems (Non-Residential)", NFPA Pamphlet No. 90A-1969.

(2) "Installation of Residential Warm Air Heating and Air-Conditioning," NFPA Pamphlet No. 90B-1968.

(3) "Ventilation of Cooking Equipment," NFPA Pamphlet No. 96-1970.

(4) "Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying," NFPA Pamphlet No. 91-1961.

(5) "Code for the Prevention of Dust Explosions in Wood Working and Wood Floor Manufacturing Plants," NFPA Pamphlet No. 664-1962.

(b) Where in NFPA pamphlets 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) NFPA Pamphlet 90A applies to all Group H Occupancies and NFPA Pamphlet 90B shall apply to only Group I Occupancies.

4103.2 GENERAL: (a) All air ducts shall be constructed entirely of metal or other approved incombustible materials of suitably-equal strength.

(b) In attic-fan installations, a firestat shall be installed to shut off the fan and a fusible link to close the opening in lieu of the aforementioned requirements.

(c) Ducts shall be tight throughout, with no openings except those essential to the required functioning of the system. Ducts shall be substantially braced or supported by metal hangers, brackets or their equivalents from substantial structural members.

(d) Ducts shall not pass through fire walls unless unavoidable, and, in such cases, approved, automatic fire doors or shutters shall be provided.

(e) Ducts shall be constructed of metal, or other incombustible materials, to provide structural strength and durability at least equal to the requirements set forth in the Standards in Paragraph 4103.1 (a).

(f) Each joint of round, metal duct shall be secured against disarrangement with not less than one sheet metal screw except that in buildings of Group I Occupancy where approved plastic tape is used to seal and secure the joints such sheet metal screw will not be required.

4103.3 HOODS OVER RESTAURANT EQUIPMENT: (a) **HOODS REQUIRED:** Restaurant-type ranges, candy kettles and appliances for the frying of bakery or confectionery products shall be provided with ventilating hoods and ducts to take off the smoke, gases and vapors, unless such appliances are enclosed and vented in an approved manner.

EXCEPTIONS: (1) Hoods shall not be required in kitchens used solely for the preparation of food for one family.

(2) Hoods to carry off heat only from kitchen units such as dishwashers, coffee urns and water heaters, and where grease is not anticipated, may be exempt from the provisions of this sub-section.

(b) **LOCATION:** Such hoods shall not be raised more than seven feet from the floor. The length and width of kitchen hoods shall extend a minimum of 12 inches beyond the appliance over which they are installed. Where space conditions permit, 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. Range hoods shall be located as low as possible to increase their effectiveness. 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 equipments shall be constructed of incombustible materials, with tight joints and having a clearance of at least 18 inches from all unprotected combustible material.

(2) 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. The average air velocity across the face of any hood in the exhaust system shall be not less than 100 feet per minute.

(3) Range or grease filters or equally-effective grease traps shall be installed in all commercial-use installations and shall be of noncombustible construction, proportioned not to decrease the air velocity in the duct below the limit set forth in Paragraph 4103.3 (d) (2).

(4) In range hoods where mechanical draft is used, a suitable firestat shall be installed.

(e) **DUCTS:** (1) Ducts from hoods shall be constructed of 20 U. S. standard gage or heavier sheet metal, with tight joints and separated at least 18 inches from all unprotected combustible material. Inside laps in duct joints shall project in a direction against the air flow.

(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 firewalls. 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.

4103.4 SHELVING, HOODS AND VENTILATING DUCTS OVER DOMESTIC RANGES: (a) All shelving over domestic ranges and other fixed heating elements shall for gas burning

ranges comply with the standard set forth in Sub-section 4702.1, and for solid fuels, liquid fuels and electric ranges shall be not less than 30 inches above or within 4 inches horizontally of the heating element.

(b) (1) Range hoods, where installed, shall be vented to the outside of the building with an incombustible duct.

(2) Range hoods and ducts of metal shall have tightly-fitted joints and be of not less thickness than 26 U. S. Standard Gauge.

(3) Ductless range hoods may be installed.

(4) Ducts from residential kitchen range-hoods or ventilating systems shall comply with the Standard set forth in Sub-paragraph 4103.1(a)(1).

(5) The requirements set forth in this Sub-section shall apply to only such ranges as are within the unit of a single-family residential unit.

4103.5 EXHAUST SYSTEMS FOR FLAMMABLE VAPORS: (a) Exhaust systems for flammable vapors shall comply with the Standard set forth in Sub-paragraph 4103.1(a) (4).

(b) Where fans are used in connection with the exhausting of flammable vapors, protective devices shall be installed to stop the operation of the fan in event of fire.

4104 FILM

The storage and handling of cellulose nitrate motion-picture film shall conform to the "Standards for Storage and Handling of Cellulose Nitrate Motion Picture Film," NFPA Pamphlet No. 40-1967 of the National Fire Protection Association, 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 motion-picture booths.

4105 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.

4106 RADIATION PROTECTION

Radiation apparatus and devices for medical or industrial uses shall comply with the recommendations of the following National Bureau of Standards Handbooks:

Handbook 48-1951: Control and Removal of Radioactive Contamination in Laboratories.

Handbook 49-1951: Recommendations for Waste Disposal of Phosphorous-32 and Iodine-131 for Medical Users.

Handbook 50-1952: X-Ray Protection Design.

Handbook 51-1952: Radiological Monitoring Methods and Instruments.

Handbook 53-1953: Recommendations for the Disposal of Carbon 14 Wastes.

Handbook 55-1954: Protection Against Betatron-Synchratron Radiations up to 100 Million Electron Units.

Handbook 57-1954: Photographic Dosimetry of X and Gamma Rays.

Handbook NCPR 58-1954: Radioactive Waste Disposal in the Ocean.

Handbook 59-1954: Permissible Dose from External Source of Ionizing Radiation.

Handbook 61-1955: Regulations of Radiation Exposure by Legislative Means.

Handbook NCPR 65-1958: Safe Handling of Bodies Containing Radioactive Isotopes.

Handbook 69-1959: Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure.

Handbook 73-1961: Protection Against Radiations from Radium, Cobalt-60 and Cesium-137.

Handbook NCPR 76-1961: X-Ray Protection.

Where recommended in the standards, radiation apparatus shall be used only where provided with the protective barriers and structural shielding as set forth. The safe working practices set forth in the standards shall be followed. The suitability of protective barriers and handling practices shall be effectively tested before the handling of radioactive isotopes is put in general use.

4107 PAINT SPRAY BOOTHS AND DIP TANKS

4107.1 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 processes; and dip tank operations in which articles 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.

4107.2 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 buildings of Group E, F and G Occupancy where spraying apparatus is used repeatedly, such operations shall be conducted in spray booths or spray areas 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, "Spray Finishing" NFPA Pamphlet No. 33-1969 of the National Fire Protection Association which is hereby adopted to supplement, but not supersede the requirements set forth herein.

4107.3 DIP TANKS: Dip tank operations shall conform to the Standard "Dip Tanks" NFPA Pamphlet No. 34-1966 of the National Fire Protection Association, which is hereby adopted to supplement but not supersede the requirements set forth herein.

NOTES

PART IX
SIGNS

CHAPTER 42
SIGNS

4201 GENERAL
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4203 ERECTION PERMITS
4204 INSPECTION
4205 DESIGN
4206 LIMITATIONS ON ROOF SIGNS
4207 LIMITATIONS ON GROUND SIGNS
4208 LIMITATIONS ON PROJECTING SIGNS
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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 location, 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 purposes 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 any zoning regulation and the area or measuring size for such purposes shall be that set forth in such applicable zoning regulation.

AWNING SIGN: Any sign painted, stamped, perforated or stitched on an awning, canopy, roller curtain or umbrella.

BANNER SIGN: Any 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.

FLAT SIGN: Any 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.

GROUND SIGN: Any sign wholly or partially supported directly on the ground.

MARQUEE SIGN: Any sign attached to or supported from a marquee.

PROJECTING SIGN: HORIZONTAL: Any 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: Any 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: Any sign which is fastened to, supported by or erected over the roof of a building or within the outside dimensions of the building. This definition shall not be construed to be applicable to any zoning regulation.

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 hereafter be erected, constructed, pasted, painted, altered, maintained, or relocated, except the changing of copy of a bulletin board or poster board or marquee, until application has been made and a permit therefore 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 governing 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 or 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 24 square feet in area shall be accepted from only qualified persons or firms. Qualification of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradesmen.

(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 when required by the Building Official; and the application for permit for all signs, other than a sign painted on a wall, exceeding 24 square feet in area shall be accompanied by plans prepared by, and bearing the impress seal of, 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 roof 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 UNSAFE SIGNS: Any sign found to be unsafe at any time shall be ordered to be made safe. If, after due and reasonable notice, such sign is not made safe, it shall be ordered removed, as set forth in Section 202 herein.

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 (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.

4206 LIMITATIONS ON ROOF SIGNS

4206.1 Roof signs shall be constructed of only incombustible materials.

4206.2 Roof 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 an outside wall of the building shall be not less than 3 feet from the outside wall of the building and 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 shall be so placed as to provide a minimum of five feet vertical clear height above the roof, except that such vertical clearance above the roof shall not be required for signs ten feet or less in length where clear passage to all parts of the roof is not impeded thereby.

4206.5 Roof signs exceeding 40 square feet in area shall be supported only by steel or concrete.

4207 LIMITATIONS ON GROUND SIGNS

4207.1 Ground signs shall be constructed of rot and deterioration resistive materials. Wood shall be pressure treated as set forth in Paragraph 2907.2 (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 ends of a ground sign at an angle of 30 degrees or more with adjacent lot lines may extend to the lot line.

4208 LIMITATION ON PROJECTING SIGNS

4208.1 Projecting signs shall be constructed of only incombustible material.

4208.2 No sign projecting over public streets shall extend or project nearer than 18 inches to the curb.

4208.3 No sign projecting over any part of a public sidewalk shall be erected 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 sign.

4209 DETAILED REQUIREMENTS

4209.1 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.

4209.2 No sign shall be placed to obstruct the required egress, light or ventilation, set forth in this Code.

4209.3 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 imitation 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 of from 25 to 300 feet.

4209.4 Signs shall be constructed with adequate rain-water drains.

4209.5 Structural 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.

4210 LIGHTING

4210.1 Signs shall be illuminated by electrical means only.

4210.2 Electrically-illuminated signs shall comply with the requirements of Part XI of this Code.

4210.3 Gooseneck, spot or floodlights shall not be placed as to extend over public property.

PART X

AWNINGS, CANOPIES AND TENTS

CHAPTER 43

CANVAS AWNINGS, CANOPIES AND TENTS

4301 GENERAL
4302 DEFINITIONS
4303 PERMITS AND INSPECTIONS
4304 LOCATION AND USE
4305 CONSTRUCTION
4306 TENTS

4301 GENERAL

4301.1 GENERAL: Canvas awnings, canopies and tents 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 awnings and canopies on private property and to set forth the conditions under which awnings may be constructed over public property.

4302 DEFINITIONS

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 canvas roof and walls, on a fixed metal frame.

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 tent or cabana as set forth herein.

CANVAS: Cloth or any material similarly flexible or woven.

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 canvas-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, or any other canvas 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 canvas 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 bear the seal of, a registered professional engineer.

(c) Where the proposed structure is to be erected over public property, applications will be accepted from only 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 feet of the erection site except that where a tent is to be erected on private property for a period not to exceed 24 hours the 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

4304.1 LOCATION: **(a)** Canvas 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 canvas awning or canopy shall be less than seven feet and 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 awnings or canopies located over state highway rights-of-way shall be as required by the Florida State Road Department.

(b) No cantilevered portion of an awning or 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) 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 36 or in applicable zoning regulations.

(d) Structures, in whole or in part of canvas, erected in connection with gasoline service stations may not be erected within 15 feet of where flammable liquids are transferred.

4304.2 USE: **(a)** Canvas awnings or canopies may be used for the shading and weather protection of windows, door entrances, fruit and vegetable display, restaurant tables not enclosed with insect screen and seats and playgrounds. Canvas 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.

(b) Canvas awnings and canopies may not be used for general storage of combustible materials or goods packaged in combustible materials.

(c) Canvas awnings and canopies may not be enclosed with any material other than a valance not more than 18 inches in vertical depth or canvas roller curtains for temporary shade and weather protection.

4305 CONSTRUCTION

4305.1 AREA: **(a)** No canvas awning or canopy shall exceed the area of the building to which it is attached.

(b) No canvas awning or canopy shall exceed ten percent of the area of the lot on which such awning or canopy is located.

4305.2 MATERIAL: (a) Canvas used for any purpose herein defined shall be a minimum of 10.10 army duck. Canvas for tents shall be flame-resistant.

(b) Supports for canvas awnings and canopies shall be of metal or similar durable material.

4305.3 DESIGN: (a) The minimum size of structural members for cantilevering awnings, or canopies or cabanas shall be not less than as set forth hereinafter, nor less than required to resist two-thirds of the wind load set forth in Sub-section 2306.6. Design of the structural frame shall not be based on the removal or repositioning of parts, or the whole, during periods of high wind velocity. All canvas shall be designed for quick removal.

MINIMUM SIZE OF FRONT BARS

3′ width between supports	½″ pipe
9′ width between supports	¾″ pipe
14′ width between supports	1″ pipe

EXTENSIONS ON AWNINGS AND TRUSS EXTENSIONS ON CANOPIES

Rafters up to 5′ in extension from supporting wall	½″ pipe
Rafters up to 9′ in extension from supporting wall	¾″ pipe
Rafters up to 12′ in extension from supporting wall	1″ pipe

Rafters on canopies shall be not more than five feet apart.

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

Length of Awning	Quantity
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 treated to resist rot and weather deterioration.

(e) When attaching awnings or canopies to masonry walls or columns, lags and expansion bolts in metal shields shall be required. Wood plugs are hereby prohibited. Fastenings shall be not less than three-eights-inch bolts, nor more than three feet apart.

(f) 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, variance may be permitted by the Building Official, based on special design and construction. All canvas awnings, except roller-gear awnings with folding arms, must 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. Such chains and fastenings shall be of sufficient strength to withstand the stress of the awning's 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 of any character whatsoever and may not be used for sleeping purposes.

4306.3 All canvas, curtains, cloth, rope, netting and decorative material used for, or in, or on, a tent shall be rendered flameproof, provided that flameproofing will not be required for tents open on one side and with standing capacity only for 20 or less persons. Tents required to be of flame-proofed materials shall be inspected by the Building Official and the flameproofing certified on the Application for Building Permit, issued for the erection of such tent.

4306.4 All tents shall be constructed and erected to withstand a wind pressure of ten pounds per square foot. No tier of seats shall rise to a height exceeding 12 feet. All lighting shall be by electricity. A minimum of two exits shall be provided where a tent is used as a place of assembly for 100, or more, persons. 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. Exits shall be spaced not more than 75 feet apart. Aisles shall be not less than 44 inches in width, provided such aisles shall not be less in width than the combined width of aisle that they connect. 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.

CHAPTER 44

RIGID AWNINGS, CANOPIES AND SCREEN ENCLOSURES

4401 GENERAL
4402 PERMITS AND INSPECTION
4403 DESIGN
4404 LOCATION

4401 GENERAL

4401.1 GENERAL: Rigid awnings and canopies and screen enclosures shall be of the materials, proportions and strength as set forth in this chapter.

4401.2 DEFINITIONS:

AWNING: 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.

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 of 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 when the building is unattended or act as a storm shutter during periods of high wind velocity.

RIGID: Not flexible, as distinguished from canvas.

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.

SELF-SUPPORTING: Supported to the ground or construction below by columns or walls, but not cantilevered.

4402 PERMITS AND INSPECTION

4402.1 PERMITS: **(a)** A permit will be required as set forth in Chapter 3 herein for the construction, fabrication, installation, alteration or repair of any rigid awning, canopy or canopy shutter, or screen enclosure.

(b) Application for permit shall be accompanied by plans, and, when required by the Building Official, such plans shall be prepared by, and bear the seal of, a registered 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 legible and readily visible decal or painted 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.

4403 DESIGN

4403.1 LOADS: Rigid awnings, 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 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 Sections 2306 and 3511.

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, canopies or canopy shutters located over public property shall be of incombustible materials unless specifically exempted by zoning reguluations.

4403.4 SCREEN ENCLOSURES: (a) The maximum allowable deflection of roof supporting members shall not exceed a ratio of L/80 based on design load alone. The top flange of these members shall be laterally supported by positive means at 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 having openings of less than 40 percent of the gross area shall be designed to resist 30 psf wind load on the screen. The supporting members of screens having openings of 40 percent or more but not more than 60 percent shall be designed to resist 20 psf wind load on the screen. The supporting members of screens having openings of more than 60 percent shall be designed to resist 10 psf wind load on the screen. The shape factors set forth in Sub-section 2306.6 shall be applied.

(d) Application for permit shall be accompanied by scaled drawings and, where required by the Building Official, shall be prepared by and bear the impressed seal of a Registered 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 foundation not less than 8 inches deep, 8 inches wide and reinforced with one #5 continuous bar, or 16" x 16" pads with two #4 bars each way. The vertical members supporting beams, at all corners, and at least every 18 feet along all sides shall be attached to the foundation with at least a 3/8 inch diameter bolt at each such column.

(f) Screen enclosure roof framing members may be attached to a facia at the end of rafter overhang only where such facia is not less than 1 and 5/8 inches in thickness and the facia is attached to each rafter with an anchor capable of resisting 1000 pounds vertical load. 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 ¼ 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.

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 setbacks for buildings.

4404.4 Screen enclosures below overhead wires shall be grounded.

4404.5 Service drop conductors and any other overhead wiring shall not be installed above the swimming pool or surrounding area extending 5 feet horizontally from the pool edge, diving structure, observation stand, tower or platform nor shall such structures be constructed under existing overhead wires as regulated herein.

NOTES

PART XI
ELECTRICAL

CHAPTER 45
ELECTRICAL

4501 ADMINISTRATION
4502 STANDARDS
4503 DEFINITIONS
4504 MATERIALS AND TYPES OF CONSTRUCTION
4505 PERMITS AND INSPECTIONS
4506 RULES AND REGULATIONS
4507 MISCELLANEOUS

4501 ADMINISTRATION

4501. TITLE AND SCOPE: (a) TITLE: This Chapter shall be known as "THE SOUTH FLORIDA ELECTRICAL CODE," may be cited as such, or as the "ELECTRICAL 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 light, heat or power; and to secure the expressed intent for reasons of public safety.

(c) SCOPE: (1) New electrical systems and apparatus or parts thereof or additions, alterations, repairs or changes to existing systems or apparatus or equipment shall conform to the requirements 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: Electrical wiring, apparatus and equipment, and installations for light, heat or power as are required and/or regulated in this electrical code, now existing or hereinafter installed, shall be maintained in a safe condition and all devices and safeguards maintained in good working order.

4501.2 INSPECTION: (a) APPOINTMENT, POWERS AND DUTIES OF ELECTRICAL INSPECTOR: There shall be appointed, by the appointing authority, a person qualified by holding a certificate of competency as a journeyman and having at least 10 years experience as a journeyman electrician, or a degree in electrical engineering and 5 years as a master electrician or journeyman electrician working in the area of jurisdiction of this code and within the County in which the legally constituted authority adopting this code is located. Such person shall herein be termed the Electrical Inspector and shall have the responsibility and duty of enforcing this electrical code. The Electrical Inspector shall be construed to mean the chief or head of the division or department of electrical inspection.

(b) EMPLOYEES: (1) The Electrical Inspector shall have the power to delegate powers and assignments to subordinate employees working under his authority.

(2) Each such employee shall have 5 years experience as a practical electrician and have in his possession a current recognized Certificate of Competency as a journeyman or master electrician.

(3) Such employees shall have the duties and powers as delegated by the Electrical Inspector except that the chief or head of

the division or department of electrical inspection may not delegate authority to subordinates to interpret provisions of this code.

(c) **RIGHT OF ENTRY:** Upon presentation of proper credentials, the Electrical Inspector may enter, at any reasonable time, any building or structure or premises for the purpose of inspection as to prevent violations of this electrical code.

(d) **POWERS AND DUTIES:** (1) It shall be the duty of the Electrical Inspector to inspect all wiring, apparatus and equipment, and installations for light, heat, or power and to enforce all the laws, rules and regulations relating thereto in the area of jurisdiction and to enforce all the provisions of this code.

(2) The Electrical Inspector will issue a Certificate of Approval on the wiring installations, apparatus, equipment or light fixtures provided they comply with the rules and regulations of this electrical code. If defects, omissions, or violations exist on any other part of the wiring system, the issuance of a Certificate of Approval will be withheld until corrections have been made to the defective portion of the wiring system, and the same are made to comply with this code.

(3) A 30-day temporary electric service connection may be approved by the Electrical Inspector if the wiring installation, apparatus, or equipment are found to be in a safe operating condition and provided an urgent necessity for electric current exists. Under these circumstances, an application for temporary service must be made in writing by the electrical contractor, firm, corporation, or owner requesting the temporary service connection to the public utility system or isolated generating plant.

(4) The Electrical Inspector is hereby empowered to inspect or re-inspect any wiring, equipment or apparatus conducting or using electric current for light, heat or power, and if conductors, equipment or apparatus are found to be unsafe to life or property, the inspector shall serve notice in writing to the owner and/or operator of the hazardous wiring or equipment, to correct the condition within a reasonable period of time.

(5) The Electrical Inspector is hereby given the power to disconnect extension cords, temporary wiring, branch circuits, sub-feed conductors, or the main service supplying electrical energy to any portion of an electrical wiring system on or in buildings, or on premises, if this wiring is in the opinon of the inspector, considered to be hazardous to life or property. Any person, firm or corporation supplying current, must disconnect service from source of supply upon instructions from the 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 Section 203.

4502 STANDARDS

The following standards are hereby adopted as part of this code and supplement, but do not supersede, the specific requirements set forth herein:

4502.1 The National Electrical Code, NFPA No. 70-1968.

4502.2 Underwriters' Laboratories, Inc., "Standard for Electric Signs," UL 48-1966.

4502.3 Underwriters' Laboratories, Inc., "Standard for Electric Lighting Fixtures, and Portable Lamps," UL 153-1970 and UL 57-1969.

4502.4 The Florida Hotel and Restaurant Commission regulations applicable to emergency lighting, Florida Statutes 509.221 (5) (g) and 509.211 (6).

4502.5 (a) Inhalation Anesthetics Code, NFPA No. 56A-1970.

(b) Inhalation Therapy, NFPA No. 56F-1968.

(c) Hospital Laboratories, NFPA No. 56C-1970.

(d) Hyperbaric Facilities, NFPA No. 56D-1970.

(e) Non-flammable Medical Gas Systems, NFPA No. 56F-1970.

4502.6 Rules and Regulations for Nursing Homes and Related Facilities Licensure, as adopted by the Florida Department of Health and Rehabilitation Services, Division of Health, Feb., 1964.

4502.7 The minimum standards for grounding of portable electric tools PE-1958 as recommended by the Florida Industrial Commission.

4502.8 Standard For The Installation of Centrifugal Fire Pumps, NFPA No. 20-1967.

4502.9 Essential Electrical Systems for Hospitals, NFPA No. 76A-1970.

4503 DEFINITIONS

(a) The term "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, or power, and all appurtenances, apparatus, or equipment used in connection therewith, inside of or attached to any building or structure, lot, or premises.

(b) The term "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 tradesmen.

4504 MATERIALS AND TYPE OF CONSTRUCTION

4504.1 No electrical materials, devices or appliances designed for attachment to, or installation on any electrical circuit or system for light, heat or power, shall be installed, used, sold, or offered for sale in the area of jurisdiction of this code, unless they are in conformity with the approved methods of construction for safety to life and property.

4504.2 Conformity of electrical materials, devices or appliances with the Standard of the Underwriters' Laboratories, Inc., shall be held to mean that these materials are included in an indicated list of inspected electrical appliances published and distributed by the Underwriters' Laboratories, Inc., and the Standards approved by the American Standards Association.

4504.3 The maker's name, trade-mark, or other identification symbol shall be placed on all electrical materials, devices or appliances which are sold or offered for sale or use in the area of jurisdiction of this Code. These markings and others such as voltage, amperage, wattage and power-factor or appropriate ratings described in the National Electrical Code are necessary to determine the character of the material, device or equipment and the use for which it is intended.

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, materials or methods of design not specifically mentioned in this Electrical Code shall file with the Electrical Inspector authentic proof in support of claims that may be made regarding the sufficiency, and request approval and permission for use. The Electrical Inspector shall approve such alternates if it is clear that the Standards of the Electrical Code are at least equalled. If, in the opinion of the Electrical Inspector, the Standards of the Electrical Code will not be satisfied by the requested alternate, he 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 may be offered for approval, and their consideration shall be as set forth in this section.

4504.7 Any person whose request for alternate types of construction, materials or methods of design has been refused by the Electrical Inspector, or any person in whose considered opinion an action by the Electrical Inspector in approving or disapproving construction under this Electrical Code does not satisfy the Standards of the Electrical 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.

4505 PERMITS AND INSPECTIONS

4505.1 GENERAL: (a) PERMITS REQUIRED: It shall be unlawful to do or commence to do any electrical work on a new installation of permanent or temporary wiring, any electrical apparatus or equipment or make extensions and/or changes to existing wiring systems for light, heat or power, upon premises, inside, outside and/or attached to buildings or structures of any character without having first filed application and obtained an electrical permit therefore from the Electrical Inspector.

(b) APPLICATIONS: Applications for permit will be accepted from only qualified persons or firms. Qualification of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradesmen.

4505.2 PLANS: Plans and specifications completely describing all proposed electrical work shall be submitted to the Electrical Inspector at the same time application is made for a building permit. Plans shall be mechanically reproduced prints on substantial paper or cloth, drawn to scale except that an isometric or riser diagram need not be to scale.

Plans for new construction requiring an aggregate service capacity of 600 amps or more on residential and 800 amps on commercial or industrial shall be prepared by and bear the impress seal of a Professional Engineer. The plans shall show the size of service and feeder wires and conduit, the location of service switches and center or centers of distribution, the arrangement of circuits showing number of outlets connected thereto and a load schedule for each panel.

The Electrical Inspector 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 as required.

4505.4 CONDITIONS OF PERMIT: The installation of the wiring, apparatus or equipment for light, heat or power, 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 must be approved by the Electrical Inspector and the request for the approval of such change shall be made by the permit holder, approved by the owner or his representative, in the form of a letter to the Electrical Inspector setting forth the changes and accepting the responsibilities for the changes.

4505.5 INSPECTIONS: (a) A request for the inspection of electrical work, such as roughing-in, equipment installations, final inspection of electrical work for light, heat or power of any character, shall be made at the office of the Electrical Inspector as soon as the job is ready. The request for inspection must be made by the person, firm or corporation installing the wiring. Failure to request such inspections constitutes a violation of this code.

(b) (1) The Electrical Inspector shall inspect all work for which a request for inspection is made and shall, after inspection, either approve the work by signing the appropriate sections of the building permit card and/or approved plans or disapprove the work and notify the permit holder by telephone of the discrepancies found and order corrections within a reasonable period of time.

(2) Where direct burial service laterals are owned, installed and maintained by the utility company, the utility inspector shall place a tag on the utility meter attesting that utility company inspection and approval has been made.

(c) Any person, firm or corporation who fails to correct defective work within five days after having been duly notified of such defects, shall not be issued any further permits by the Electrical Inspector until said defects have been corrected, inspected and approved.

(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 or power until the appropriate sections of the building permit card and/or approved plans are signed, signifying that the wiring has been inspected and approved.

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 RULES AND REGULATIONS

4506.1 SERVICES: (a) (1) All services shall be run in rigid aluminum, galvanized, sheradized threaded conduit or rigid non-metallic conduit set forth herein. Underground services and feeders may be run in approved non-metallic raceways of the thin wall type, encased in a concrete envelope not less than three inches thick on all sides of the raceways or multiples thereof, and shall maintain a depth of 18 inches coverage, from the top of the envelope.

EXCEPTION: Types SE and USE service entrance cable may be installed in accordance with Article 338 of the National Electrical Code.

(2) Underground services and feeders may be run in approved non-metallic raceways of the heavy-wall type without encasement in concrete, provided such non-metallic raceways have not less than 18 inches of cover and except that encasement shall be required at railroad, street and driveway crossings where such raceways have less than 24 inches cover.

EXCEPTION: All secondary service laterals owned, installed and maintained by an electric utility under the jurisdiction and regulation of the Florida Public Service Commission shall be exempt from Sub-paragraph 4506.1(a)(1), (2) and (3), except that facilities crossing municipal rights-of-way shall comply with all other applicable municipal ordinances and regulations.

(3) The above-mentioned non-metallic raceways shall not be used above ground on services extended up poles or on buildings, but shall be limited to underground portions of the service. Isolated metallic sections shall be grounded in accordance with the National Electrical Code.

(b) Service switches, conduit and conductors shall be installed in accordance with TABLE 45-A.

TABLE 45-A

Service Size	Switch Size	Minimum Size Conductor or ampere (Neutral & Hileg according to load)	Minimum Single Raceway	Minimum Ground Conductor & Threaded Rigid
0-30-Amp.	30-Amp.	#8 AWG	1"	Conduit
31-60-Amp.	60-Amp.	60-Amp.	1¼"	see
61-100-Amp.	100-Amp.	100-Amp.	1½"	Table 250
101-150-Amp.	200-Amp.	150-Amp.	2½"	94 (a)
101-150-Amp.	200-Amp.	**150-Amp.	*2"	and
151-200-Amp.	200-Amp.	***200-Amp.	2½"	Table #1
Mobile home & trailer parks				NEC

Table #1 NEC

The minimum size conductor No. 8.

Where service entrance cable is used for services, the ground shall be in a raceway when mechanical protection is required.

*Residential (domestic) use only.

**2/0 60° copper or 2/0 aluminum 75° (residential only)

***4/0 60° copper or 4/0 aluminum 75° (residential only)

(1) If phase wires are made larger for voltage drop or other reasons, the neutral shall be increased in proportion.

(2) In multiple unit dwellings the feeders/conductors shall be considered the same as services.

(c) In areas where ready access to the service conductors is not otherwise available (such as underground network systems) a single main disconnecting means shall be provided ahead of all other equipment, including meters, gutters and distribution panels, with the exception of exit and emergency systems.

(d) All buildings equipped with six or more meters or which are more than two stories in height shall be as follows unless specifically approved for other methods by the authority enforcing the Code:

(1) There shall be an electric meter room of not less than 3' x 5' x 7' nor less than required to enclose the proposed equipment.

(2) The meter room shall be accessible to all tenants of the building at all times, unless there is a full time, qualified maintenance electrician on duty.

(3) The meter room shall be ventilated.

(4) The meter room shall house the main disconnecting means, feeder disconnects, meters, time clocks and panels for the house or exit lighting. No other equipment, except a telephone terminal board, a TV antenna distribution center and/or fire-alarm control panel, all of which shall be in a separate area from the electrical equipment, shall be allowed in this room.

(5) There shall be no storage in this room and a durable, waterproof sign with letters not less than 7/16 inches high shall be mounted on the outside of the door reading "ELECTRIC METER ROOM. NO STORAGE PERMITTED."

(6) The construction of meter rooms 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 panel board, except that for buildings of Type I, II, III, or IV construction the walls shall be of incombustible materials.

(7) There shall be a cold water pipe of ¾ inch minimum trade size stubbed into the meter room for connection of the service ground.

(8) In existing multiple-tenancy buildings where a meter room is not available the service equipment may be located in a convenient and readily accessible place inside the building or on a semi-enclosed porch where it will be protected from the weather.

(9) Where more than one main switch is installed, they shall be grouped in the same room or location and each main be identified and painted numbers affixed showing both numerical order number and the maximum number of mains.

(e) In buildings equipped with less than six meters or which are two stories or less in height, a meter room shall not be required, and:

(1) Meters may be placed on the exterior of the building.

(2) One weather-proof enclosure containing not more than six disconnects, or not more than six weatherproof disconnects may be placed on the exteiror of the building.

(3) If disconnecting means are placed inside each tenancy, each shall comply with the requirements for service disconnecting means set forth in the standard in Paragraph 4502.1.

(f) (1) Point of service drop conductor attachment to the building shall be not less than ten feet above the ground.

(2) Service drop conductors and any other overhead wiring shall not be installed above a swimming pool, surrounding area extending five feet horizontally from the pool edge, diving structure, observation stand, tower, platform or metal supported screen enclosure.

(g) The minimum size feeder and service shall be not less than that as computed by use of Table 45C and 45D. Neutral conductors may be calculated as per N.E.C.

(h) The minimum size rigid steel conduit to be used for a service mast shall be 2 inches and it shall extend no less than 2 feet above the roof and no more than 38 inches above the last point of support. There shall be no coupling above the last point of support. Where greater clearances are provided the mast diameter shall be increased accordingly.

(i) Raceways on poles used to protect high-voltage service cables shall, on the pole end, be provided with an approved type of cable support and insulated bushing and be sealed with waste and a filling compound made for that purpose. The end of the raceway within the building shall be sealed in a like manner to prevent the entrance of moisture. Spare ducts shall be sealed or capped.

(j) Single outlets or taps for signalling transformers, bell ringing transformers, clocks and similar low current consuming appliances or equipment need not be counted when the location of the tap or outlet precludes the use of the tap or outlet for other purposes than for which it was installed.

(k) Separately metered conductors shall not be installed in the same raceway, except in load gutters in meter room.

(l) The service and equipment ground shall be taken from the nearest possible point of the system service after the service is attached to the building. This ground shall start at the meter socket, main switch, C. T. can or gutter. Point of attachment of ground clamps or approved ground connectors shall be readily accessible, and shall not be in attics, under floor or behind any equipment. When copper water pipe is used, ground connection shall be attached on a fitting only.

(m) Temporary services for construction shall be installed on a substantially erected pole, braced or guyed to withstand the strain

of a service-drop cable. A service rated at 30 amps, shall consist of not less than three No. 8 service conductor in not less than one-inch electrical metallic tubing to supply two 20 amp., 3 wire polarized receptacles served by a separately fused circuit for each receptacle. When heavy loads will be encountered such as terrazzo grinders or floor sanders, the service shall consist of not less than three No. 4 conductors in 1¼ inch Electrical Metallic Tubing, supplying two 20 amp. 3 wire polarized receptacles (fused at 30 amps.) and a 50 amp. receptacle protected by the main fuses. A weatherproof switch may be used, and the receptacles mounted on the underside of this switch. In no instance may plug-fuse be mounted in other than 30 amp. fuse holders. If other than weatherproof switch is used, a raintight box with hinged door must be built to contain the switch and receptacles. Receptacles of three wire type shall not use neutral conductor for grounding purposes. Inspectors are empowered to disconnect immediately and without notice, any temporary service used to supply ungrounded or unfused equipment, and in no instance shall point of attachment of service drop conductors be less than 10 feet above the ground.

(n) The master service for a store or stores must provide at least 30-ampere capacity to each store, either single-phase, three-wire, or three-phase four wire. The conductor size shall be not less than No. 8 and the raceway not less than 1¼ inches trade size.

(o) The sub-feed to each store must provide at least three-wire, single-phase current or four-wire, three-phase current of 30-ampere capacity, and the conductor size shall be not less than No. 8. The conduit raceway shall be not less than 1¼ inches trade size.

4506.2 GENERAL REQUIREMENTS: (a)(1) All wiring shall be installed in rigid metal conduit, raceways, electrical metallic tubing or rigid non-metallic conduit.

(2) Type UF cable for underground feeder and branch circuits may be installed in accordance with Article 339 of the National Electrical Code.

EXCEPTION: Non-metallic sheathed cable may be installed in compliance with the National Electrical Code.

(b) Flexible watertight raceway shall be required for weatherproof flexible conduit where flexibility is needed.

(c) Short-radius ells, often referred to as "telephone" ells, shall not be used in a run of conduit over five feet long, measured from outlet-to-outlet, or from outlet-to-fitting. The run of the pipe shall be straight and shall not include any additional ells.

(d) The use of ⅜ inch flexible metal conduit, referred to as Greenfield, shall be permitted for connection of water heaters, small motor-operated appliances, small motors, recessed fixtures and similar equipment.

(e) Aluminum conduit shall not be installed in the earth or the ground floor slab.

(f) Raceways for telephone outlets, where installed in the wall or floor spaces that will be in the concealed portion of the building after construction, must be approved by the Electrical Inspector, and where embedded in a concrete slab or under a concrete slab on fill shall be rigid threaded conduit, E.M.T. with approved concrete type fittings, direct burial cable or rigid non-metallic conduit.

4506.3 BRANCH CIRCUITS: (a) The wiring for all electric ranges over 8¾ KW shall be a minimum wire capacity of 50 amperes to an approved receptacle located within three feet of the range. For ranges of 8¾ KW capacity or less, conductor size shall be of at least 40-ampere capacity. When oven unit is separate from surface unit, each unit shall be installed on a separate circuit, served with conductors of not less than 30-ampere capacity. An approved method of connection shall be provided for each unit. (A range as referred to

above would be a complete cooking unit, consisting of both oven and surface burners.

(b) Continuity of neutral on multi-wire branch circuits shall not be made on any device as terminal blocks, but shall be spliced and a tap brought out, thereby assuring no openings of the neutral in the replacement of a device.

(c) The wiring for all water heaters shall be with a minimum wire capacity of 20-amperes. Water heaters of over 1,000 watts shall operate on not less than a 208 volt circuit. Non-automatic water heaters shall be equipped with a pilot light and indicating switch. The switch and pilot light shall be located in a conspicuous place inside the building, preferably in the kitchen or hall. Points of electrical connections for heaters and replacement of elements shall be readily accessible.

(d) Branch circuit wiring within fluorescent fixtures used as a wireway run closer than three inches from a ballast shall be rated at least 75°C.

(e) For 277/480 volt systems color coding for multi-wire circuiting shall be of colors different from 120/240 volts or 120/208 volt systems.

(f) A separate circuit is that portion of any phase leg extending beyond its final overcurrent protection.

(g) Each leg of a 3-phase motor shall be thermally protected.

4506.4 SPECIAL REQUIREMENTS: (a) (1) Receptacles shall be installed in every kitchen, dining room, breakfast room, living room, parlor, library, den, sunroom, recreation room, Florida room and bedroom so that no point on the wall or floor at the perimeter of the room will be more than six feet distant from a convenient receptacle.

(2) Any usable wall space of two feet or more, in these rooms specified in Sub-paragraph 4506.4(a) (1), shall have receptacles.

(3) Receptacles in garages, storage rooms and utility rooms of Group H and I Occupancy shall be not less than 18" above the floor.

(4) Where sliding glass doors in walls are 12 feet or more in length there shall be a receptacle placed within two feet of each side of the door opening. Where there is an adjacent wall within two feet of the side of the door the receptacle may be located on the adjacent wall not more than two feet from the corner.

(5) After the requirements of this Code and Table 45-C have been complied with in residential occupancies, additional receptacles may be installed in any one room without an increase in the number of branch circuits, provided the possible demand has not been increased.

(b) The installation of floor outlets shall be at the discretion of the designer.

(c) There shall be at least one light outlet in each carport, garage and utility or storage room.

(d) All fixture light outlets in bathrooms, kitchens and where they can be reached from a grounded surface of floor shall be wall switched. One wall receptacle shall be installed in every bathroom within three feet of a mirror and higher than the rim of the lavatory. If the lavatory is located outside the bathroom proper, its mirror shall govern the location of the receptacle.

(e) Permanently installed electrical space heaters in bathrooms shall be installed so that heaters will not be easily exposed to combustible materials. A minimum height of five feet from floor to the lowest point of heater shall be maintained, but said heaters shall not be installed behind doors, under or near towel racks, or near shower curtains or window curtains. Conductors shall enter the lower two

inches of the heater can. Space heaters that will not cause combustion are excluded from this rule.

(f) Low voltage systems shall conform to the Standard set forth in Sub-section 4502.1, except wiring in inaccessible locations shall be enclosed in raceways.

(g) 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. Qualified electricians shall be required to patrol these temporary installations when considered necessary by the electrical inspector for safety to life and property, or, the disconnect switches (except emergency circuits) may be locked in the "off" position.

(h) All stairways and parts of buildings under demolition, erection or repair shall be adequately lighted while persons are engaged at work as set forth in Section 3318.

(i) All electric outlets used for portable electric tools shall be provided with three-wire polarized plugs, and all portable electric tool cables shall be of the three conductor type, and shall be grounded in accordance with the National Electrical Code.

(j) Low power-factor transformers and ballasts shall not be used. Any power-factor rating below 85 percent shall be considered low power-factor. Each ballast and/or auto transformer shall be provided with overcurrent protection on the primary side, either self-contained or otherwise, and by approved methods. (This does not apply to neon window sign transformers or fluorescent fixtures up to and including 20 watts.)

(k) For window display lighting, a minimum of two outlets shall be required, at least one above and one below. All fixed lighting shall be equipped with switches.

(l) One branch-circuit for signs shall be provided for each store frontage for each individual occupancy, said outlets to terminate outside, on or near the front of the building.

(m) Cut-nails shall not be used for securing boxes, panels, etc., in place, but may be used for securing straps in concealed dry areas if installed in a workmanlike manner.

(n) Where fans are used in connection with the exhausting of flammable vapors, automatic protective devices shall be installed to stop the operation of the fan in event of fire. Attic fan installations shall be as set forth in Paragraph 4103.2(b). Range hood installations shall be as set forth in Sub-paragraph 4103.3(d) (4).

(o) Any ceiling fan installed lower than seven and one-half feet from the floor to the bottom of the blade must have an approved protective guard enclosing the blade.

(p) Only grounding type receptacles shall be permitted for receptacle outlets installed over concrete or terrazzo floors or any other grounded surface.

(q) On all new construction, or alteration in construction of building at refrigeration location, each domestic refrigerator shall be installed on a separate circuit.

(r) For the small appliance load in kitchens, laundry areas, pantries, dining areas and breakfast-rooms of dwelling occupancies, one or more branch circuits shall be provided for all receptacle outlets (other than outlet for clock) in these rooms, and such circuits shall have no other outlets thereon. The conductors for such circuits shall be not smaller than 20-amp. capacity

(s) All music boxes requiring 600 watts or more shall be installed on a circuit separate from other wiring, and equipped with attachment cord not to exceed six feet. A convenience receptacle

shall be within 18 inches of a wireless selector box, adequately grounded with 3-wire cord and attachment cap, and the bridge condensors or capacitors shall be installed by a licensed electrical contractor. The condensors or capacitors must be at least 600-volt AC rating, properly grounded if of the metal case type, and protected with a fuse (in each lead) not over 15-ampere. Pin ball machines, shuffleboards, and similar equipment not in excess of 5-ampere capacity may be plugged into an existing receptacle, but the attachment cord shall not exceed six feet in length.

(t) Portable cords attached to music boxes, marble machines, floor or table lamps and other similar equipment, shall not exceed six feet in length where measured from the equipment to the outlet supplying its current. Cords shall not be nailed down, tacked, or held with strings or other supports, but shall be left free and clear.

(u) For air-conditioning units and/or air-handling units other than those that are cord and cap connected, there shall be a switch within sight of the unit disconnecting all ungrounded conductors.

EXCEPTION: Where individual disconnection of such units or motors could adversely affect a group process or create a hazard.

(v) The electric service for all elevators in buildings exceeding 10 stories shall be as set forth in Paragraph 3204.6 (b).

(w) (1) The maximum number of outlets permitted per circuit in secondary areas of residential and commercial buildings shall not exceed that set forth in TABLE 45-B.

(2) Secondary areas, for both residential and commercial buildings, include such locations as: lavatories, hallways, aisles, storage rooms, yard and landscape lighting.

(3) For residential buildings, a minimum of 15 amperes per branch circuit shall be provided for each secondary area.

(4) For commercial buildings, a minimum of 20 amperes per branch circuit shall be provided for each secondary area.

(5) In secondary areas the total load of a branch circuit shall not exceed 80 percent of its ampacity when the load is continuous.

TABLE 45-B

MAXIMUM NUMBER OF OUTLETS PER CIRCUIT FOR LIGHTS AND RECEPTACLES (US)

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

(x) In mobile home and travel trailer parks the service grounds shall be driven approved electrodes.

TABLE 45-C
RESIDENTIAL, APARTMENT, HOTEL AND MOTEL ROOMS
BRANCH CIRCUIT LOADING FOR THE COMPUTATION OF FEEDER AND SERVICE SIZES

TYPICAL CIRCUIT LOAD	Br. Cir. Voltage Level (B)	Br. Cir. Amperes (E)	Feeder 1 ϕ 120/240 (F)	Feeder 3 ϕ 120/208 (F)	No. of Outlets	Footnotes and Tables
Appliance (small appl. Circuits) (US)	120	20	4.5	3	4	(A)
Air Conditioner—Windows (S)	120	(C)	(C)	(C)	1	(J) (R)
Air Conditioner—Window (US)	120	20	6	4	1	(J) (R)
Air Conditioner—Window (US)	208-240	20	12	8	1	(J) (R)
Air Conditioner—Window (S)	208-240	(C)	(C)	(C)	1	Spec. nameplate Amps (J) (R)
Air Conditioner (S) Package Unit (in amps—all auxiliaries)	208-240	(C)	(C)	(C)	1	(J) (R)
Circuit, spare or space in panel (future use)	120	15	3	2	—	
Circuit, spare or space	208-240	20	6	4	—	
Dishwasher (US)	120	20	4.5	3	1	
Dryer (US)	120-240	40	22.5	15	1	
Dryer (S)	120-240	(C)	(C)	(C)	1	
Freezer (US)	120	20	3	2	1	
Garbage Disposal	120	20	3	2	1	
Heater, Space (S)	120	20	(C)	(C)	(G)	(J) (R)
Heater, Space (US)	120	20	4.5	3	1	(J) (R)
Heater, Space (S)	208-240	(C)	(C)	(C)	(G)	(D) (J) (R)
Heater, Space (US)	208-240	30	9	6	1	(J) (R)
Ironer, Residential	120-240	30	15	10	1	#12 neutral permitted

TABLE 45-C

RESIDENTIAL, APARTMENT, HOTEL AND MOTEL ROOMS BRANCH CIRCUIT LOADING FOR THE COMPUTATION OF FEEDER AND SERVICE SIZES

TYPICAL CIRCUIT LOAD	Br. Cir. Voltage Level (B)	Br. Cir. Amperes (E)	Feeder 1 ϕ 120/240 (F)	Feeder 3 ϕ 120/240 (F)	No. of Outlets	Footnotes and Tables
Lighting (US)	120	15	3	2	12	(H)
Lighting (S)	120	15	(C)	(C)	(G)	(D) (H)
Lighting, Luminous Ceiling (S)	120	15	(C)	(C)	(G)	(D)
Motors (S) rated amps	120-240	(C)	(C)	(C)	(G)	(D)
Outlet, Spec. Purpose	120-240	(C)	(C)	(C)	(G)	(D)
Oven, Residential	120-240	30	—	—	1	
Range, Cooking Top only	120-240	40	—	—	1	
Range, Residential	120-240	50	—	—	1	
Range, less than 8¾ KW (S)	120-240	40	—	—	1	(T)
Receptacle (convenience outlet)	120	15	3	2	6	(H)
Receptacle-strip, multi-outlet	120	15	3	2	—	30 ft. constitutes one cir.
Receptacle-strip, multi-outlet-appliance	120	20	4.5	3	—	6 ft. constitutes one cir.
Refrigerator	120	20	3	2	1	
Washing Machine	120	20	4.5	3	1	
Waterheater Residential (US)	208-240	20	15	10	1	
Waterheater Apartment (US)	208-240	20	9	6	1	
Waterheater (S)	208-240	(C)	(C)	(C)	1	

Amended 31 July 1971

TABLE 45-D
COMMERCIAL AND INDUSTRIAL BRANCH CIRCUIT LOADING FOR COMPUTATION OF FEEDER AND SERVICE SIZES

TYPICAL CIRCUIT LOAD	Br. Cir. Voltage Level (B)	Br. Cir. Amperes (E)	Feeder 1 ϕ 120/240 (F)	Feeder 3 ϕ 120/208 (F)	No. of Outlets	Footnotes and Tables
Emergency Lighting	120	20	(C)	(C)	12	(Q) (N)
Incandescent Lighting (US)	120	20	4.5	3	4	(Q) (N)
Incandescent Lighting (S)	120	(C)	(C)	(C)	(G)	(M) (D) (Q) (N)
Hi-Hats (US)	120	20	4.5	3	4	(Q) (N)
Hi-Hats (S)	120	20	(C)	(C)	(G)	(Q) (N) (D)
Show Window Lighting (US)	120	20	4.5	3	8	(L) (Q) (N)
Show Window Lighting (S)	120	20	(C)	(C)	(G)	(L) (Q) (N) (D)
Lighting, Fluorescent (S)	120 or 277	20	(C)	(C)	(G)	(Q) (D) (N) (K)
Lighting, Fluorescent (US)	120 or 277	20	4.5	3	4	(Q) (D) (N) (K)
Iron, Commercial (US)	120	20	4.5	3	1	Pilot light and switch mandatory (J)
Motors (S) Less than ¼ Hp	120	20	(C)	(C)	(G)	(J) (D)
Motors (S) ¼ HP	120	20	(C)	(C)	2	(J) (D)
Motors (S) Over ¼ HP	120-240	(C)	(C)	(C)	1	(D) (Q) (R)
Receptacles Gen. Purp. (US)	120	20	3	2	4	(D)
Receptacles, Strip (US)	120	20	3	2	—	*
*Each 30 ft. in other than appliance areas. Each 6 ft. for portable lamp display.						
Outlet, Special Purpose (US)	120-240	20	(C)	(C)	1	(D)
Outlet, Special Purpose (S)	120-240	(C)	(C)	(C)	(G)	(D)
Transformers, Sign (US)	120	20	4.5	3	3	(J) (N)
Signs (S)	120	20	(C)	(C)	(G)	(J) (N)
Spares or Spaces in Panel (future)		20	4.5	3	—	

NOTE: See Table 45-C for residential type of loads employed in Commercial or Industrial Buildings.

SUMMARY DEMAND FACTORS—COMMERCIAL AND INDUSTRIAL LOADS

Motor Loads, Intermittent as permitted by N.E.C.

	First 100 Amps	Next 100 Amps	That Portion Over 200 Amps.
Receptacles, General Use (US)	100%	75%	50%
Receptacles, Strip (US)	100%	75%	50%

SUMMARY DEMAND FACTORS—SECONDARY AND RESIDENTIAL

NOTE: "Summary Demand Factor" may be applied to the sums of Column F (ampere requirements) of Tables No. 45-C and 45-D where applicable; except air conditioning loads, space heating loads, and manually controlled motor loads operating normally over long periods of time, i.e. pool pumps, etc.; in accordance with the following:

First 50 amperes (0 thru 50)	100%
Second 50 amperes (51 thru 100)	80%
Third 50 amperes (101 thru 150)	60%
Fourth 50 amperes (151 thru 200)	50%
Next 800 amperes	35%
That portion over 1000 amperes	30%

Summary demand factors for ranges and dryers shall be as set forth in N.E.C.

FOOTNOTES AS INDICATED BY LETTER DESIGNATION IN TABLES 45-C AND 45-D

Note: (US) "Unspecified" denotes that a legend symbol has been employed and that the full name-plate data has not been shown on the drawing.

Note: (S) "Specified" denotes that the full name-plate data and information necessary to determine the branch circuit requirements per NEC are shown on the electrical drawings and that the computations for service and feeder sizes shall be provided by the designer.

Note: (A) Clock outlets shall not be installed on these circuits. They shall be installed on the lighting branch circuit and no load shall be computed for the outlet.

Note: (B) "Voltage Level" designates the usual voltage employed for the circuit, or the range of voltage normally permitted in residential wiring practice and in the majority of commercial and industrial systems.

Note: (C) This symbol indicates that full branch circuit, feeder and service capacity shall be employed for the individual item of load. See Note (J).

Note: (D) Under no circumstances shall the actual loading of the branch circuit exceed the rating of the branch circuit conductors, based on the use of insulation of the conductors and ratings as defined by the National Electric Code.

Note: (E) "Branch Circuit Amperes" defines the rating of the circuit in amperes and assumes use of overcurrent devices (circuit-breakers or fuses) of the branch circuit rating as a maximum size permitted, except for motor loads where requirements of the N.E.C. shall apply in questionable case. This ampere rating also determines the rating of the branch circuit conductor and the size of conductor in turn determines the size of raceway per N.E.C. minimum requirements.

Note: (F) The column of "Amperes" represents the minimum value of the branch circuit contribution which must be supplied by service or feeder conductors in consideration of the individual branch circuit normal usage. Although in general agreement with technical requirements, these values have been approximated for convenience of application. 120/240 indicates single phase, three wire service or feeder. 120/208 indicates requirement for three phase, four wire "Wye" services or feeders.

Note: (G) The number of outlets per branch circuit must be flexible to best serve the particular "specified" load.

Note: (H) The number of outlets indicated are for that particular type of branch circuit only, as for instance, all incandescent lighting outlets only. Since combinations of receptacles and lighting outlets are permitted on the same branch circuit, Table 45-B will be used for such combinations.

connections shall be arranged so that they can be covered by one straight glass alcove or housing.

(d) This straight glass sleeve, alcove, or housing shall be securely fastened in place. The transformer wires feeding window signs shall drop in the same vertical plane from the transformer to the window signs. Electrodes on window signs which connect to the transformer wires shall be designed and placed so that the wires from the transformer will drop straight and be readily covered by straight glass sleeves of sufficient size.

(e) Transformer wires shall swing clear in the air and shall not be supported by or against any combustible material.

(f) Complete secondary wiring systems shall be installed in rigid threaded conduit, electric metallic tubing, or flexible conduit. Other approved means may be used if special permission is obtained from the Electrical Inspector.

4507.5 INTERIOR NEON OR COLD CATHODE LIGHTING: (a) Approved housing and fittings must be used on all interior series neon or cold cathode lighting, regardless of the milliampere rating of the transformer or the color of the tubing. This shall include interior window border lighting.

(b) Neon transformers with a rating over 60-milliamperes are not approved for use on any neon or cold-cathode tubing exposed to the weather, or in excess of 750 volts for residential use.

4507.6 COVES: Construction of coves for indirect light shall provide the following minimum dimensions for installation and maintenance:

(1) Minimum vertical depth, fourteen and one-half inches from ceiling.

(2) Minimum horizontal width for one tube, four and one-half inches (add two inches to width for each additional tube).

(3) Minimum lip or face of cover, four and one-half inches, to provide ten inches of free working space from top of lip to ceiling.

4507.7 FIRE-ALARM OR SIMILAR SYSTEMS: Fire-alarm systems or similar systems which are devised and installed for safety to life and property, must be installed by a qualified person, regardless of voltage or amperage, and permits obtained for same. Each of such systems shall be inspected semi-annually, and certified by the Electrical Inspector.

4507.8 STRUCTURAL MEMBERS: (a) Conduit raceway and tubing embedded in concrete shall be set forth in Sub-section 2507.3.

(b) Cutting of holes in precast concrete members shall be limited as set forth in Sub-section 2508.8 and Paragraph 2509.4 (i).

(c) Cutting of holes in steel members shall be limited to a hole not larger than one-sixth of the depth and located in the vertical center of the member except as designed in Chapter 29.

(d) Notching or boring of wood studs shall be limited as set forth in Chapter 29.

(e) Notching or boring of wood joists shall be limited as set forth in Chapter 29.

4507.9 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 otherwise required by this Code.

4507.10 METAL BUILDINGS: All metal frame and metal clad buildings or portions thereof which may become energized and are subject to personal contact shall be grounded.

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
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4615 SEPTIC TANKS AND DRAINFIELDS
4616 SUPPLY AND DISPOSAL WELLS
4617 FIRE-EXTINGUISHING APPARATUS
4618 SWIMMING POOLS
4619 TRAILER COACHES AND TRAILER PARKS

4601 ADMINISTRATIVE

4601.1 TITLE AND SCOPE: (a) TITLE: This Chapter shall be known as "THE SOUTH FLORIDA PLUMBING CODE," 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, and 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.

(3) Appurtenances for heating and storing water shall be so designed and installed that dangers from overheating and explosion are eliminated.

(4) Each family dwelling on premises abutting on a sewer or with a private sewage disposal system shall have installed at least one kitchen sink, one water closet, one lavatory, one bathtub or shower and one clothes washing machine outlet.

(5) 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.

(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 and similar materials by backflow of sewage.

(11) All plumbing fixtures shall be installed in regard to spacing so that they will be readily accessible for their intended use.

(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 by the Florida State Board of Health.

(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, louver 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, insanitary or a menace to life, health or property, in the opinion of the Plumbing Inspector.

(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 of owner, to create, keep, cause, maintain, propagate or permit the existence of a nuisance as defined in this Code.

(3) The Plumbing Inspector 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 reeasonable length of time.

4601.2 POWER AND DUTIES OF PLUMBING INSPECTOR: There shall be appointed by the Appointing Authority, a person qualified by holding a certificate of competency as a journeyman and having at least ten years experience as a practical plumber, or a degree in sanitary engineering and five years of experience as a practical plumber, and having the responsibility of enforcing this Plumbing Code. Such person shall hereinafter be termed the Plumbing Inspector.

(a) POWER AND DUTIES: The Plumbing Inspector is hereby authorized and directed to interpret and enforce all of the provisions of this Plumbing Code, subject to the powers vested in the Board of Rules and Appeals as set forth in Section 203.

(b) EMPLOYEES: The Plumbing Inspector shall have the power to delegate powers and assignments to subordinate employees working under his authority. Such employees shall have the duties and powers as delegated by the Plumbing Inspector; provided that all plumbing inspectors shall have had ten years' experience as a practical plumber.

(c) RIGHT OF ENTRY: Upon presentation of proper credentials, the 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.

(d) 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 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 Plumbing Official, have been made, at which time he may order the work to proceed.

(e) CONCEALED WORK: The 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 insanitary condition, or that there is wilful or negligent concealment of a violation of this Plumbing Code.

(f) OCCUPANCY: Whenever any building or portion thereof is being used or occupied contrary to the provisions of this Plumbing Code, the Plumber 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 201.5.

4601.3 UNSAFE BUILDING AND PREMISES: (a) The Plumbing Inspector 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 Inspector shall examine or cause to be examined every plumbing or drainage system or fixture or appliance or portion thereof reported to be dangerous or insanitary or inadequate.

(c) Any building or premises found to be insanitary 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 Inspector, 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 Inspector 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 Inspector. 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 Inspector 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 INSPECTOR, UNSAFE, INSANITARY 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 INSPECTOR."

(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 Inspector shall report the condition to the Building Official who shall proceed as set forth in Section 202, including the directive of the Unsafe Structures and Housing Appeals 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 provision 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 Inspector authentic proof in support of claims that may be made regarding the sufficiency, and request approval and permission for use. The Plumbing Inspector shall approve such alternates if it is clear that the Standards of the Plumbing Code are at least equalled. If, in the opinion of the Plumbing Inspector, 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 or materials or methods of design has been refused by the Plumbing Inspector, or any person in whose considered opinion an action by the Plumbing Inspector in approving or disapproving construction under this Plumbing 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 Inspector 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, sewage 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 Inspector, 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 authority 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 sewerage 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 Inspector.

(d) **APPLICATION:** (1) Any person desiring a plumbing permit to be issued by the Plumbing Inspector, as required hereby, shall file an application therefore in writing on a form furnished by the Plumbing Inspector 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 Inspector; and shall be signed by the permittee or his authorized agent, who may be required to submit evidence to indicate such authority.

(2) Application for permit will be accepted from only qualified persons or firms. Qualification of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradesmen.

(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 Inspector. The Plumbing Inspector may authorize the issuance of a plumbing or building permit without plans or specifications for relatively small and unimportant work.

(2) For all new buildings or additions or plumbing systems where more than 125 fixture units are proposed to be installed or added to an existing building, the plans and specifications shall be prepared by, and each sheet shall bear the impress seal of, a Professional Engineer duly registered in the State of Florida.

(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 Inspector, 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 Inspector" 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 Inspector before a contract for the proposed work is entered into by the owner. It is the duty of the Plumbing Inspector to cooperate with owners, designers and contractors to provide precontract examination of plans and specifications, to insure 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 Inspector 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 Inspector, such approval shall be affixed on the plans before examination by the Plumbing Inspector. If the application or plans do not conform to the requirement of all pertinent laws or regulations, the Plumbing 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 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 Inspector to insure compliance with the requirements of the Plumbing Code.

(2) The plumbing permit holder shall notify the Plumbing Inspector 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 Inspector 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 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 opening provided all lead joints are made and tested. Free standing stacks shall not exceed 14 feet above the horizonal 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 bath tub 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 Inspector. Above the first floor, tub connections shall be tested by the plumber 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 the 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 Inspector.

(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 Inspector 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 shall be considered a violation of this Code, and shall be subject to the penalties as set forth. 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 Inspector to the permit holder.

(q) TEST OF EXISTING INSTALLATIONS: The Plumbing Inspector may require that a suitable test be applied to any existing plumbing system which he has reason to believe has become insanitary or defective. The Plumbing Inspector 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 insanitary conditions are, by such tests, found to exist, correction of the defects or insanitary 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 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 46.

ACCESSIBLE Visible, unobstructed and within physical reach.

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.

APPROVED: Approved means accepted under an applicable specification stated or cited in this Code, or accepted as suitable for the proposed use under procedures and powers of the Administrative Authority.

AREA DRAIN: An area drain is a receptacle designed to collect surface or rain water from an open area.

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.

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: A level of a building, the floor of which is two feet or more below grade and the ceiling of which is not more than four feet and six inches above grade.

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 horozontal 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".

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.

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.

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 trap 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 values 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".

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.

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, or 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 of 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 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 be not less than seven feet.

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 include plural; male includes female.

PITCH: "Grade."

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.

PENTHOUSE: An enclosed structure extending not more than 12 feet above the roof of a building other than a roof structure which occupies not more than 25 per cent of the roof area and considered a story.

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 INSPECTOR: 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 equpment, 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.

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.

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 hotel 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 OFFICIAL: See Administrative Authority.

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.

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 of this Code a rim is an unobstructed open edge at the overflow point of a fixture.

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 cemented 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.

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 subsurface system of open-joint 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.

SLOPE: See Grade.

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: That part of a building comprised between a floor and a floor or roof next above, including a basement with a ceiling which is four feet, six inches or more above the line and grade of the sidewalk, but neither a cellar, an attic nor a penthouse.

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.

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 water outlets.

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 re quiring 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.

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: All plumbing systems hereafter installed shall conform to the minimum requirements and provisions as set forth in 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 FITTINGS 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 Inspector. Any previously installed fixture 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 insure 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, 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 from 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 FOOTINGS OR FOUNDATION WALLS: All piping passing under a footing shall have a clearance of at least two inches between the top of the pipe and bottom of the footing. All piping passing through cast-in-place concrete construction shall be sleeved to provide ½ inch annular space around entire circumference of pipe to be sleeved.

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; oils; grease; 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 Health Department and as directed by the Plumbing Inspector 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 com-

pound, lead, or other material found equally effective and approved as such by the Plumbing Inspector.

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 Inspector because of wear, damage, defects, or sanitary hazards, shall not be re-used 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 normal operation of windows, doors, or other exit openings.

4603.19 FLOOR CONNECTIONS FOR INTEGRAL TRAP FIXTURES: (a) **LEAD AND CAST IRON:** Four-inch lead or cast iron bends and stubs shall be used on floor-standing water closets or similar integral trap fixtures except that cast iron stubs shall not be used on wood floors. The outlet may be dressed or swedged to receive a three-inch ferrule. Three-inch lead stubs may not be used for fixtures with integral trap. On slab-on-fill construction, cast iron closet bends with horns extending above the floor may be used, provided the horizontal portion of the bend is below the slab. Deep or offset water closet flanges shall not be used.

(b) **COPPER:** Copper DWV stubs having a minimum 4 inch diameter may be used with floor connected fixtures with integral traps provided the waste stack is securely anchored on the first and not less frequently than every other floor. Copper stubs shall be accepted only on floors constructed of concrete.

(c) **REDUCING:** Four-by-three-inch reducing one-quarter bends or 4x4-inch or 3x3-inch one-quarter bends are acceptable.

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: A water closet shall be provided for each 25 workmen or fraction thereof, and, where the building under construction is multi-storied, such facilities shall also be provided on the fifth and tenth floors.

(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 Table 46-P herein 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 shall 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 with 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 platfrom 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 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 Inspector and Health 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 places 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 31A.

(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 or 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.

(2) Use of plastic pipe and fittings shall be limited to Group H Occupancy not exceeding two stories and Group I Occupancy not exceeding three stories. Comingling of plastic pipe 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 which are hereby adopted to supplement, but not supersede, the specific requirements set forth herein.

(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.

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 centrifugally-spun service-weight cast-iron, cast iron, galvanized wrought 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 BUILDINGS: (1) All drains within buildings, where underground, shall be cast-iron soil pipe, lead pipe, brass pipe or plastic pipe; except that copper tube and fittings Type K or L may be used for underground drainage installations for single family or duplex residences including indirect waste lines.

(2) All underground piping within buildings not covered by Paragraph 4604.2 (c) and in buildings not exceeding three stories in height shall be of not less quality than service-weight cast-iron pipe.

(3) For the purpose of this Paragraph, any space for human occupancy above the third floor shall constitute an additional story.

(4) All cast-iron soil and vent piping shall be centrifugally-spun or extra-heavy pipe in buildings exceeding three stories.

(c) UNDERGROUND PIPING WITHIN BUILDING OVER DELETERIOUS FILL: (1) In buildings where the presence of hydrogen sulphide gas is known and in filled 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, tar-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 or bituminized fiber pipe and fittings with tapered, friction joints.

(1) Installation, backfill and depth of cover for bituminized fiber pipe shall be as set forth for bituminized fiber storm sewer in Sub-section 4611.8. The method of bedding where the pipe is subjected to heavy traffic in shallow trenches, installed in muck, marl, swampy or filled ground or unduly exposed to root action or similar sub-surface conditions shall be by encasing the pipe with a minimum of six inches of cement stabilized soil (one to four ratio cement to soil) around the entire perimeter of the pipe and fittings.

(2) Installation methods of bedding, backfill and depth of cover for vitrified clay pipe and plastic pipe shall be the same as set forth for asbestos cement pipe storm sewer in Sub-section 4611.9.

(b) OLD BUILDING 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, bituminized fiber, asbestos cement, concrete pipe or plastic pipe. Installation methods of bedding, backfill and depth of cover for vitrified clay pipe and approved plastic pipe shall be the same as set forth for bituminous or asbestos cement pipe in Sub-sections 4611.8 and 4611.9.

(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 lead, cast iron, copper tube, brass, galvanized wrought iron, galvanized steel pipe or plastic pipe. Roof drains shall be provided with recessed drainage fittings.

(c) COLLECTION BOXES: Connection to sheet metal collection boxes shall be made only with lead pipe wiped on a ferrule or an adaptor flared and soldered to the bottom of each box. Cast iron or brass roof drains with domes or strainers shall be connected with oakum and lead caulked joints, screw threads or copper tube with soldered sweat joints.

(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 PIPES: 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, such as brass to iron, or other approved connection, shall have a screwed plug, shall conform to the weight and materials required for pipe and fittings, and plugs shall extend not less than one-quarter inch above the hub.

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 Inspector.

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	2¼	4¼	16	2	4	12
3	3¼	4½	28	3	4	25
4	4¼	4½	40	4⅛	4½	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.)
1¼	0	6
1½	0	8
2	0	14
2½	1	6
3	3	2
4	3	8

TABLE 46-C MATERIALS FOR PLUMBING INSTALLATIONS

Materials	ANSI	ASTM	Federal Specs		Other Standards, Remarks
Non-Metallic Piping					
Clay Sewer Pipe	A 106.3—1967	C13-69	SS-P-361d	(1966)	Standard strength
Clay Draintile		C200-69	SS-P-361d	(1966)	Extra strength
Concrete Sewer Pipe for Sizes 4-in. to 24-in.		C8-62	SS-P-375d	(1968)	Reinforced
Concrete Draintile		C76-70 C14-70	SS-P-371e	(1967)	Non-reinforced (Type I)
Bituminous Fiber Sewer Pipe and Fittings		C412-65	SS-P-356	(1955)	CS-116-54
Asbestos Cement Sewer Pipe			SS-P-351a SS-P-331c	(1953) (1967)	
Plastic Pipe and Fittings					
ABS-DWV Pipe		D2661-67	L-P-322a	(1969)	CS-270-65 & Seal of Approval of NSF
ABS-DWV Fittings		D2661-67	L-P-322a	(1969)	CS-270-65 & Seal of Approval of NSF
Solvent Cement		D2235-67			CS-270-65 & Seal of Approval of NSF
PVC-DWV Pipe		D2665-67	L-P-320a	(1969)	CS-272-65 & Seal of Approval of NSF
PVC-DWV Fittings		D2665-67	L-P-320a	(1969)	CS-272-65 & Seal of Approval of NSF
PVC-DWV Solvent Cement		D2564-67			Seal of Approval of NSF
Plastic Pipe and Fittings Pressure Rated (For Water Service Pipe)					
ABS Pipe 1208	B 72.3—1967	D1527-68			CS-218-59
Acrynotrile 1210		D2282-66			CS-254-63 & Seal of Approval of NSF *See Sub-section 4614.9
Butadiene 2112					
Styrene 1316					
Fittings		D2468-68			Seal of Approval of NSF
Solvent Cement		D2235-67			Seal of Approval of NSF
PB Pipe (*2110)					
Polybutylene		D2662-68			Seal of Approval of NSF *See Sub-section 4614.9
Tubing (2110)		D2666-67T			Seal of Approval of NSF

TABLE 46-C (Continued)

PE Pipe *2305	B	72.1—1967	D2104-68	L-P-00315b	CS-197-60 *See Sub-section 4614.9
Polyethylene & Tubing 2306 3206			D2239-67		CS-255-63 & Seal of Approval of NSF
Fittings 3306	B	16.27—1962	D2609-67		Seal of Approval of NSF *See Sub-section 4614.9
PVC-Pipe*	B	72.2—1967	D1785-68	L-P-1036	CS-207-60 *See Sub-section 4614.9
Polyvinyl 1120			D2241-67		CS-256-63 & Seal of Approval of NSF
Chloride 1220					
Fittings			D2467-67		Seal of Approval of NSF
Solvent Cement			D2564-67		Seal of Approval of NSF
Ferrous Pipe and Fittings					
Cast-Iron Soil Pipe and Fittings XH	A	112.5.1—1968	A74-66	WW-P-401d (1963)	See 3, 2, 1 Extra heavy
Cast-Iron Soil Pipe and Fittings Service Weight			A74-66		CS-188-66
Cast-Iron Water Pipe	A	21.6—1970		WW-P-421c (1967)	AWWA C106-70
Cast-Iron (Threaded) Pipe	A	40.5—1943		WW-P-356a (1963)	
Cast-Iron (Screwed) Fittings	B	16.4—1963		WW-P-501d (1967)	
Cast-Iron Drainage Fittings	B	16.12—1965		WW-P-491b (1946)	
Wrought-Iron Pipe	B	36.2—1966	A72-68	WW-P-441c (1964)	
Steel Pipe			A120-68a	WW-P-406c (1964)	Type I and II
Malleable-Iron Fittings (150 & 300 lbs.)	B	16.3—1963	*A338-61	WW-P-521f (1964)	
Hubless Cast Iron Soil Pipe, Fittings and Joints					CISPI-301-69T
Non-Ferrous Pipe and Fittings					
Brass Tubing			B135-67	WW-T-791 (1933)	
Brass Pipe, Ferrules, Nipples & Bushings	H	27.1—1967	B43-70	WW-P-351a (1963)	
Brass or Bronze Flanges and Flanged Fittings (150 & 300 lbs.)	B	16.24—1962			For Copper water tube
Cast Brass Soldered Joint Fittings	B	16.18—1963			
Cast Brass Soldered Joint Drainage Fittings	B	16.23—1969			
Bronze Screwed Fittings	B	16.15—1964		WW-P-460b (1961)	
Copper Pipe	H	26.1—1967	B42-70	WW-P-377d (1962)	
Seamless Copper Tubing			B75-68	WW-T-797c (1963)	
Copper Water Tube (KLM) Nipples & Bushings	H	23.1—1970	B88-70a B251-70	WW-T-799b (1963)	SPR-217-49
Wrought Copper and Wrought Bronze Solder Joint Fittings	B	16.22—1963			
Copper Drainage Tube (DWV)			B306-70a		

TABLE 46-C (Continued)

Flared Fittings for Copper (water) Tubes	B 16.26—1967				
Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings	B 16.29—1966				
Lead Pipes and Traps			WW-P-325a	(1967)	CS-95-41 CS-96-41
Miscellaneous					
Caulking Lead			QQ-C-40 Type I	(1965)	CS-94-41
Sheet Lead			QQ-L-201f	(1965)	Grade A
Sheet Brass		B36-67	QQ-B-613c	(1967)	
			QQ-B-626c	(1967)	
		B121-66			
Sheet Copper		B152-66	QQ-C-576b	(1964)	
Galvanized-Iron and Steel Sheets		A525-67	QQ-S-775d (3)	(1967)	
Galvanized Pipe and Fittings		A120-68a	WW-P-406b	(1964)	Section D6
Cement Lining	A 21.4—1964	A120-68a	WW-P-406b	(1964)	Section D7
Coal-Tar Enamel (protective coating)					AWWA C-203-62
Silver Solder		B 260-62T			ASSE Standard No. 1003
Soft Solder		B 32-70	QQ-S-571d	(1963)	
Fixture Setting Compound			HH-C-536a	(1954)	
Air Gap Standards	A 40.4—1942				
Backflow Preventors	A 40.6—1943				
Water Pressure Regulators					
Valves—Bronze Gate			WW-V-54c	(1966)	
Cast-Iron Gate			WW-V-58a	(1966)	
Ball Cocks			**WW-P-541b	(1954)	
Plumbing Fixtures (for) Land Use, F.S.			**WW-P-541b	(1954)	
Domestic Hot Water Heaters	Z21.10.1—1966 Z21.10.2—1968 Z21.10.3—1966		WH-196f	(1967)	UL174-1970

*Intended only for use where ANSI B16.3 (150 lb. and 300 lb.) are not adequate.
**Including amendment 4 adopted March 22, 1962.

NOTES

(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 80.

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.

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 structures served without first securing written approval to do so from the Engineering Department and the Plumbing Inspector.

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 Inspector of a properly executed easement which has been recorded with the Clerk of the Circuit Court. Such easement properly executed and recorded as aforesaid must be filed with the Plumbing Inspector 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 Inspector and the 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 4615.1 (h) herein.

4605.2 REGULATIONS GOVERNING THE DISCHARGE OF LIQUID WASTES AND/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 over-load 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 impeding, 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, benzine, 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.

4605.3 SEWAGE AND LIQUID WASTE DISPOSAL WHERE A PUBLIC SEWER IS AVAILABLE: (a) Sewage and liquid waste shall discharge into a 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 Inspector 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 therefor shall be obtained from the Plumbing Inspector. 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 over-loaded 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 overloaded 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 Inspector 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 connection 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 Inspector, 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 Inspector. 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 Inspector 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 basis

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[1] 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 Inspector.

(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.

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 such 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.

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 Inspector.

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, a notary public, duly authorized to administer oaths and to take acknowledgments, 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_____

(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 insure 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 fittings 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.

(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 tank 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 State Board of Health.

(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 unit 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 Tables of sizes for soil, waste, and drain pipes for which the permissible load is given in terms of fixture units.

TABLE 46-I
FIXTURE UNITS PER FIXTURE

Fixture Type	Fixture Unit Valve as Load Factors		Minimum Size of Trap Inches
Bathtub (with or without overhead shower)	2		1½
Bidet	1		1½
Dental unit or cuspidor	1		1¼
Dental lavatory	1		1¼
Drinking fountain	½		1¼
Dishwasher domestic	2		1½
Floor drains	3		3 or 4
Lavatory Small P.O.	1		1¼
Lavatory Large P.O.	2		1½
Lavatory, barber, beauty parlor	2		1½
Lavatory, surgeon's	2		1½
Laundry tray (1 or 2 compartments)	2		1½
Shower stall, domestic	2		2
Showers (group) per head[1]	3		2
Sinks			
Combination sink-and-tray	3	Nominal	1½
Combination sink-and-tray with food disposal unit	3		1½
	3	See 4613.10(b)	1½
Kitchen sink, domestic	2		1½
Kitchen sink, domestic with food waste grinder and/or dishwasher	2	See 4613.10(b)	1½
Surgeon's sink	3		1½
Flushing rim sink (with valve)	8		3
Service sinks, combination trap standard	3		3 or 4
Service sink (P Trap) ordinary	2		2
Pot, scullery, etc., sink	4		1½ or 2
Wash sink,[1] (circular or multiple), each set of faucets	1		1½
Urinal, pedestal	8	Nominal	3
Urinal, wall	4		2
Urinal stall, washout	4		2
Water closet, tank operated	4	Nominal	3
Water closet, valve-operated	8	Nominal	3
Automatic dish washer (domestic[1])	2		1½
Automatic clothes washer	4		1½

(b) Fixtures not listed in Table 46-I shall be estimated in accordance with Table 46-J.

TABLE 46-J

Fixture drain or trap size	Fixture-unit value
1¼ inches and smaller	1
1½ inches	2
2 inches	3
2½ inches	4
3 inches	5
4 inches	6

4605.7 DETERMINATION OF SIZES FOR THE DRAINAGE SYSTEM: (a) MAXIMUM FIXTURE-UNIT LOAD: The maximum number of fixture units that may be connected to a given size vertical soil or waste stack is given in Table 46-H.

(b) SIZES OF SEWERS AND DRAINS: The required sizes of building drains, building sewers, and horizontal branches shall be determined on the basis of the total number of fixture units drained by them in accordance with the following table:

TABLE 46-G
BUILDING DRAINS, SEWERS AND HORIZONTAL BRANCHES

Diameter of Pipe Inches	Maximum Number of Fixture Units That May Be Connected to any Portion[1] of the Building Drain or the Building Sewer		
	1/16 Inch	Fall per Foot ⅛ Inch	¼ Inch
1¼	1	1	1
1½	2	4	6
2	4	10	21
2½	12	18	24
3	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 inaccessible 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 and 46-K.

TABLE 46-H
SIZE AND PERMITTED LENGTH OF SOIL AND WASTE STACKS

Diameter of Pipe in Inches	Maximum Number of Fixture Units	Permitted Length In Feet	Total Fixture Units at One Story or Branch Interval
1¼	1	45	1
1½	8	60	6
2[1]	24	80	12
2½	36	105	18
3	72	150	36
4	500	225	120
5	1,100	300	200
6	1,900	400	350
8	3,600	600	600

[1] No kitchen sinks or other sinks receiving greasy wastes shall be installed in a waste stack less than 2" in diameter; nor on any wet vent 2" or less in diameter except as set forth in Paragraph 4613.10(b). No pump discharge fixtures shall be installed on a cross less than 2½" stack diameter. Domestic food grinders and domestic dish washing machines 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 is made 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 valve 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 stored or prepared.

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 water tight.

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) of 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 main-

tained 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°. When higher temperature exists, proper cooling methods 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 openjointed or horizontally split or perforated clay tile, or perforated bituminized fiber pipe or asbestos cement pipe, 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.

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 refrigerators, ice boxes, bar sinks, cooling or 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.

(c) CONNECTIONS: Indirect waste connections shall be provided for drains, overflows, or relief vents from the water supply system.

(d) STERILE MATERIALS: Appliances, devices or apparatus such as stills, sterilizers, and similar equipment requiring water and waste connections and used for sterile material shall be indirectly connected and provided with an air gap between the trap and the appliance.

(e) DRIPS: Appliances, devices, or apparatus not regularly classed as plumbing fixtures but which have drips or drainage outlets may be drained by indirect waste pipes discharging into an open receptacle or as accepted by the Plumbing Inspector. Air-conditioning condensate drains shall be as set forth in Sub-section 4606.7.

(f) LOCATION: Indirect waste pipes or other service pipes, tube or conduit, shall be below the floor or at least three inches above the floor when under a fixture or appliance which is not sealed by a baseboard, and shall be installed to permit sanitary floor cleaning.

4606.2 MATERIAL AND SIZE: (a) Indirect wastes when above the floor shall be a minimum of three-quarter inches diameter but not less than the size of fixture or appliance outlet and if less than one and one-quarter inches diameter shall be of copper tube. If galvanized waste pipe is used below floor in slab or fill it shall be encased in concrete throughout with drainage fittings. If waste is below slab or in fill it shall be a minimum of one and one-quarter inches in diameter and shall be cast iron pipe, lead, brass or copper tube with drainage fittings. Indirect waste piping shall be so installed as to permit ready access for flushing and cleansing.

(b) Indirect waste pipes carrying a discharge of not more than one fixture unit shall be not less than one and one-quarter inches in diameter. For a greater number of fixture units discharged, the

indirect waste shall be sized in accordance with Table 46-I and 46-J except drains above floors from defrosting pans which may be a minimum of three-quarter inch tubing.

(c) 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. The drip pipe shall be equipped with a flap check as close as possible to the drain outlet. Such floors shall be two inches above overflow point or receiving fixture.

(d) Any fixture or appliance 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 whose overflow level is below the bottom of such fixture or receptacle.

4606.3 CLEAR WATER WASTES: Water lifts, expansion tanks, cooling jackets, sprinkler systems, drip or overflow pans, or similar devices, which waste clear water only shall discharge into the building drainage system through an indirect waste, as permitted by the Administrative Authority.

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 system 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 totalling 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 regrigeration 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 may be vented.

(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, ade-

quate soakage pit, drainfield or the building drainage system except where such discharge is specifically prohibited by the Administrative Authority.

(2) Connections to storm or building drains shall be by indirect connections.

(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) 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.

(1) **PLASTIC PIPE AND FITTINGS:** Plastic pipe and fittings shall be solvent welded using procedures recommended by the manufacturer, and/or Plastic Institute. Solvent cement shall be manufactured under the specifications set forth under ASTM D2235-67 or D2564-67 and further bearing the seal of the NSF. No Schedule 40 pipe shall be threaded on the job site. All such transitions shall be with approved adapter fittings. Connections between plastic pipe and other materials shall be through approved adapter fittings only. The co-mingling of plastic pipe or fittings shall not be permitted.

(b) **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 301-69T.

(c) **COMPRESSION-TYPE GASKET JOINTS:** Neoprene rubber gaskets for hub and spigot cast iron soil pipe and fittings shall conform to the American Society for Testing and Materials Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings, ASTM C 564-68 and the Cast Iron Soil Pipe Institute Standard for Neoprene Rubber Gaskets for Hub and Spigot Cast Iron Soil Pipe and Fittings, CISPI Designation HSN-68T.

(d) **THREADED JOINTS — SCREWED JOINTS:** Threaded joints shall conform to American National Taper Pipe thread, ANSI B2.1-1968 or FS WW-P-351a(1963). All burrs shall be removed. Pipe ends shall be reamed or filed out to size of bore and all chips removed. Pipe-joint cement and paint shall be used only on male threads.

(e) **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.

(f) **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 Table 46-C. Screwed joints from copper to cast iron or steel pipe shall be made by the use of approved adaptors. Caulk joints between DWV copper and cast iron pipe shall be made by the use of an approved caulking adapter.

(g) **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 deg. F. nor be soluble in any of the waste carried by the drainage system. Approximately 25 per cent 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.

(h) **COMPRESSION-TYPE JOINTS FOR NON-METALLIC PIPE:** Neoprene rubber gaskets for vitrified clay bell and spigot pipe shall conform to the American Society for Testing and Materials Standard Specification for Compression Joints for Vitrified Clay Bell and Spigot Pipe, ASTM Designation C 425-66T.

(i) **BRAZED JOINTS:** Brazed joints shall be made in accordance with the provisions of Section 6 of the Code for Pressure Piping. ANSI B31.1.0-1967 and B31.2-1968.

(j) **CEMENT MORTAR JOINTS:** Cement joints shall be used only when specifically permitted in other chapters of this Code or when approved by the Plumbing Inspector, 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 per cent 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.

(k) **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.

(l) **ASBESTOS CEMENT SEWER PIPE JOINTS:** Joints in asbestos cement pipe shall be made with sleeve couplings of the same composition as the pipe, sealed with rubber rings. Joints be-

tween asbestos cement pipe and metal pipe shall be made by means of an adapter coupling caulked as required in Paragraph 4607.2 (a). All installations to be made in accordance with manufacturer's specifications.

(m) **BITUMINIZED FIBER PIPE JOINTS:** Joints in bituminized fiber pipe shall be made with tapered type couplings of the same material as the pipe. Joints between bituminized fiber pipe and metal pipe shall be made by means of an adapter coupling caulked as required in Paragraph 4607.2 (a). All installations to be made in accordance with manufacturer's specifications.

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 FLOOR CONNECTED FIXTURES WITH INTEGRAL TRAP: A brass floor flange shall be wiped or soldered to lead pipe. The connection shall be bolted, with an approved gasket or washer or setting compound between the earthenware and the connection. The floor flange shall be set on an approved firm base. The use of commercial putty or plaster is prohibited. Floor connected fixtures with integral trap shall also comply with Sub-section 4603.19.

4607.6 PROHIBITED JOINTS AND CONNECTIONS IN DRAINAGE SYSTEMS: (a) Any fittings 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.

4607.7 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 drain in Inches	Maximum distance, trap to vent in Feet
1¼	5 feet
1½	5 feet
2	5 feet
Floor connected fixtures with integral traps	5 feet
Floor drains and interceptors	15 feet

(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.

(3) Traps in covered or concealed places shall be of cast iron, cast brass lead or plastic.

(4) Accessible traps except integral traps, including tail pieces, trap arms, overflow and trap assembly, shall be of cast iron, cast brass, lead or (.045 inch) 17 gauge brass or copper.

(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.

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 equippetd 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 to the outside of the building into a pit or box with incombustible 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.

(b) **EXCEPTIONS:** In one story buildings, where the building drain has not more than one 90 degree change of direction, cleanout locations may be as follows:

(1) A full-size cleanout may be located outside, in building drain line and within five feet of building wall from point of exit of building drain providing such cleanout permits upstream rodding to the base of the stack and permits downstream rodding. Such cleanout need not be brought to grade.

(2) A stack extending through the roof and which is vertical throughout and is full waste size or as follows:

Waste	Vent
4″	reduced to not less than 3″
3″	reduced to not less than 2″
2″	reduced to not less than 1½″

(3) Cleanout provisions meeting the requirements of these exceptions for one-story buildings, shall, under all conditions, be located to permit rodding all portions of the waste system with a 75-foot cable.

4609 HANGERS AND SUPPORTS

4609.1 STRAINS AND STRESSES: Piping in a plumbing system shall be installed without undue strain and stresses and provisions shall be made for expansion, contraction and structural settlement.

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 not less than at every story height and its base.

(c) SCREWED PIPE COLD: Screwed pipe (I.P.S.) shall be supported at not less than every other story height.

(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) LEAD PIPE: Lead pipe shall be supported at intervals not exceeding four feet.

(h) PLASTIC PIPE: Plastic pipe shall be supported at each story.

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 ten foot intervals.

(d) COPPER TUBING: Copper tubing shall be supported at approximately eight foot intervals.

(e) LEAD PIPE: Lead pipe shall be supported for its entire length.

(f) 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 judgment of the Plumbing Inspector.

(g) PLASTIC PIPE: Plastic pipe shall be supported at intervals of not more than four feet.

4609.4 HANGERS AND ANCHORS: (a) MATERIAL: Hangers and anchors shall be of metal of sufficient strength 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 Inspector.

(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 it.

(b) All extensions of soil, waste, and vent stacks shall be run full size at least one-half foot above the roof. 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 three feet if of cast-iron or ten feet if of screw pipe or copper tube. Screw pipe or copper tube shall extend in one piece at least five feet under the roof 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. Vent stack distances from air conditioning intakes shall be as set forth in Sub-section 4903.7.

(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 ventilating opening shall extend not less than three feet above such door, window or ventilating 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 CORRECTIONS: (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.

(c) **HEIGHT ABOVE FIXTURES:** A connection between a vent pipe and a vent stack or stack-vent shall be made at least six inches above the flood-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. (EXCEPTION: See Combination Waste and Vent Sub-section 4610.11).

(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 or sinks except as set forth in Paragraph 4613.10 (b).

(2) 2½" Vent: 10 Fixture units. No water closets or other fixtures requiring a waste opening greater than 2 inches shall be permitted.

(3) 3" Vent: 16 fixture units. No water closets or other fixtures having an opening greater than 3 inches.

(4) 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 stack 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.

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.

(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	1½″
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: Urinal traps and floor drains installed downstream from a water closet in a circuit or loop vent group shall be three inches. Any other fixture trap installed downstream from a water closet shall be revented.

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 stock. 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 OF INDIVIDUAL VENTS: The diameter of an individual vent shall be not less than 1¼ inches nor 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 4612.4 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.

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	2½	3	4	5	6	8
1¼	1	70								
1½	4	70	190							
1½	6	50	175							
2	8	50	150	400						
2	12	45	75	300						
2	24	20	50	200						
2½	36	—	35	140	400					
3	12	—	30	100	300	1200				
3	36	—	—	50	200	800				
3	72	—	—	40	70	400				
4	100	—	—	35	150	300	1200			
4	200	—	—	30	100	240	900			
4	500	—	—	20	45	100	450			
5	200	—	—	—	35	80	450	1300		
5	500	—	—	—	30	70	300	1000		
5	1100	—	—	—	20	45	180	600		
6	350	—	—	—	30	50	200	600	1300	
6	620	—	—	—	15	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

4610.10 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.

(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.

4610.11 COMBINATION WASTE AND VENT: (a) Fixture branches other than water closets or fixtures requiring a flushometer valve on the water supply and requiring a waste opening not greater than two inches 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
2½ inch	10	40 feet
3 inch	16	50 feet
3½ inch	25	75 feet
4 inch	32	100 feet
5 inch	50	200 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.

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) To a storm sewer or a storm sewer catch basin where permitted by the Engineering Department.

(2) To a street gutter but only if first approved by the Engineering Department.

(3) Into a drainage well, if approved by the Florida Department of Health and Rehabilitation Services, Division of Health.

(4) Into a soakage pit. (See Sub-section 4611.6).

(5) Upon pervious ground.

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
SIZE OF STORMWATER DRAINS, LEADERS AND GUTTERS

Nominal Pipe Size (Inches)	MAXIMUM ROOF AREA (Square Feet) Building Storm Sewers and Drains ⅛" per ft. slope	¼" per ft slope	½" per ft. slope	Gutters	Leaders
1½	127	190	222		222
2	270	380	460		460
2½	413	610	700		700
3	745	1,080	1,270	635	1,270
4	1,560	2,210	3,080	1,540	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 a 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 strainers 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 areas, 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 or 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 Inspector.

(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) The following table based on United States Weather Bureau rainfall statistics of one-half inch rain in five minutes over one square foot of roof or impervious, or paved area shall be used to compute the drainage requirements for the disposal of rainwater.

1 minute	.00833	cu. ft. or	14.4	cu. inches	or	.0625 gallons
2 minutes	.01667	cu. ft. or	28.8	cu. inches	or	.1250 gallons
5 minutes	.0417	cu. ft. or	72.0	cu. inches	or	.3125 gallons

(f)(1) Pipe to carry rainwater only, where located under a sidewalk and discharging into a street gutter, shall be cast iron pipe with oakum and lead caulked and/or one ring oakum and one-half cement and one-half sand mortar joints. 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, bituminous fiber pipe, a 14-inch gauge (5/64 in.) galvanized sheet metal flume box, asbestos cement oval flume, of equivalent cross-sectional area may be substituted for the pipe.

(2) The following table shall be used to compute such cross-sectional area:

Diameter of Pipe	Area in Inches
2″	3.141
3″	7.068
4″	12.566
5″	19.635
6″	29.274
8″	50.265
10″	78.54
12″	113.09
14″	153.93

(3) A concrete cover not less than two inches thick, reinforced with 6 in. x 6 in. No. 10 gauge road mesh wire shall be required over a pipe or flume box under a public sidewalk. The bottom and sides of a flume box through which bituminous fiber or asbestos cement pipe pass shall be of poured concrete at least four inches thick and the concrete shall be of not less strength than 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 Inspector. 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 projection 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 Storm Sewers of Various Slopes		
	⅛″ per ft. slope	¼″ per ft. slope	½″ per ft. 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 46-0.

(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 4615.5(s).

4611.5 PROTECTION FROM MOSQUITOES: (a) A film of oil or other equally effective substance shall be maintained on the surface of all liquids in any exposed basin, trap, tank, or receptacle not in regular use.

(b) A flap check 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 mosquitoes 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.

(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 Inspector, 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 but 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″	"	"	3″	7″	10″	12″	12″	12″
4′	7″	"	"	No	6″	7″	10″	12″	12″
5′	7″	"	"	No	No	5″	7″	10″	12″
6′	8″ *	"	"	No	No	No	6″	8″	10″

*Eight-inch slab over six-foot trenches require additional No. 5 bars six inches o.c. placed 3/4 inch from top of slab.

(b) Reinforcing across trench is to be placed 3/4 inch up from bottom of slab. Temperature reinforcing lengthwise in the lid shall be No. 4 bars 9 in. 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 lids, 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 a 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 uncovered pervious areas for rainwater seepage shall be provided on each building site on a minimum ratio of ten square feet of impervious area to one square foot of pervious 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 Inspector may require that the owner submit the results of a percolation test to support his request for disposal thereto.

4611.8 BITUMINIZED FIBER STORM SEWER: (a) Bituminized fibre pipe shall not be used inside of any building or structure.

(b) The pipe shall be laid in straight alignment and grade, with approved fittings for changes of direction.

(c) Cast iron spigot connections to bituminized fibre shall be made by the insertion of the spigot end of cast iron pipe into a bituminized fibre adaptor coupling or hub fittings.

(d) Bituminized fibre joints shall be tapered. The pipe taper shall be made by a field tooling lathe or field machine.

(e) Pipe and fittings shall be fully seated with no open space in the pipe invert.

(f) Pipe and fittings shall be joined together by driving on a wood block placed against coupling or fitting bumpers — never against face of pipe.

(g) Joint material for bituminized fibre pipe and fittings shall be either of the following: an oakum and lead caulked joint, hot coal tar pitch, asphalt sewer pipe compounds, sulphur base compounds or other special acid-resisting material. In each case the

manufacturer's direction shall be followed in the use of joint compounds.

(h) The bottom quadrant of bituminized fibre pipe shall be continuously and uniformly in contact with and supported by the trench bottom. Fine, uniform material 4 inch in depth that will pass through a ¼ inch screen shall be used to afford full support to the pipe. Hub and coupling projections shall be excavated so that no part of the pipe load is supported by the hub or coupling. Fine material that will pass through a ¼ inch screen shall extend 4 inches on each side of the pipe.

(i) Backfill for bituminized fibre pipe shall be firmly compacted with fine, selected material which will pass through a ¼ inch screen from the trench bottom to a point six inches over the top of the pipe. The minimum cover over bituminized fibre pipe shall be 12 inches.

4611.9 ASBESTOS CEMENT STORM SEWER: (a) Asbestos cement pipe shall be limited to storm sewers only and the use of asbestos cement pipe for soil, waste, plumbing vents, building drains or other pipes of the plumbing system inside a building is expressly prohibited.

(b) The pipe shall be laid in straight alignment and grade, with approved fittings for changes of direction.

(c) Cast iron spigot connections to asbestos cement shall be made by the insertion of the spigot end of cast iron pipe into an asbestos cement adaptor coupling or hub fitting.

(d) Asbestos cement joints shall be tapered. The pipe taper shall be made by a field tooling lathe or field machine.

(e) Pipe and fittings shall be fully seated with no open space in the pipe invert.

(f) Pipe and fittings shall be joined together by driving on a wood block placed against coupling or fitting bumpers — never against face of pipe.

(g) Joint material for asbestos cement pipe and fittings shall be an oakum and lead caulked joint, or with ring tight couplings. In each case, the manufacturer's direction shall be followed in the use of joint compounds.

(h) The bottom quadrant of asbestos cement pipe shall be continuously and uniformly in contact with and supported by the trench bottom. Fine, uniform material 4 inch in depth that will pass through a ¼ inch screen shall be used to afford full support to the pipe. Hub and coupling projections shall be excavated so that no part of the pipe load is supported by the hub or coupling. Fine material that will pass through a ¼ inch screen shall extend 4 inches on each side of pipe.

(i) Backfill for asbestos cement pipe shall be firmly compacted with fine, selected material which will pass through a ¼ inch screen from the trench bottom to a point six inches over the top of the pipe. The minimum cover over asbestos cement pipe shall be 12 inches.

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 wastes 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

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 Paragraph 4615.5 (u).

4613 PLUMBING FIXTURES

4613.1 GENERAL REQUIREMENTS: Plumbing fixtures shall be constructed from approved materials, have smooth impervious surfaces, be free from defects and concealed fouling surfaces, and, except as permitted elsewhere in this Code, shall conform in quality and design to one of the Standards in Table 46-C. Fixtures constructed of pervious material and equipped with a waste outlet to retain water, shall not be permitted.

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) CLEANING: Plumbing fixtures shall be installed and spaced in a manner to afford easy access for cleaning and for the intended use.

(2) Where practical, all pipes from fixtures shall be run to the nearest wall.

(3) Closet bowls, and the roughing in of bends, shall be spaced to leave a minimum of 16 inches from the center of the closet bowl to any finished wall or to the center of a stall partition either of which is parallel to the long axis of the toilet bowl.

(4) Urinals shall be spaced to leave a minimum of 12 inches from the center of the urinal to any finished wall or to the center of a stall partition and, in battery installations, 24 inches center-to-center of waste.

(b) GROUTING OR SEALING: Where fixture surface comes in contact with wall or floor, the point of contact shall be grouted.

(c) SECURING FIXTURES: Floor-outlet fixtures shall be rigidly secured to brass flange and floor by brass bolts and/or screws.

(d) WALL-HUNG FIXTURES: Wall-hung water-closet bowls and urinals shall be rigidly supported by a concealed metal supporting member with brass bolts so that no strain is transmitted to the fixture pipe connection. Suitable backing shall be provided for other wall hung fixtures including shower rods.

(e) SETTING: Fixtures shall be set level and in proper alignment with reference to adjacent walls. (See paragraph 4613.3 (a).)

4613.4 PROHIBITED FIXTURES AND CONNECTIONS: Fixtures, pan, valve, plunger, offset, washout, 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. Trough urinals are prohibited except for temporary use during construction. Pedestal urinals are prohibited 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. Wash down bowls shall not be accepted or approved for water closets.

(c) FLOAT VALVES: Float valves in flush tanks shall close tight and provide water to properly refill the trap seal in the fixture.

(d) 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.

(e) 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 Inspector.

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 not less than the following:

For safe pans, not less than 4 lbs. psf.
Lead bends, lead stubs and lead straps shall not be less than ⅛ inch wall thickness. (8 lbs. psf).

(b) COPPER: Sheet copper shall be not less than the following:

Safe pans—12 oz. per sq. ft.

4613.8 SHOWER RECEPTORS AND COMPARTMENTS: (a) SHOWER: All shower compartments, except free-standing, prefabricated shower compartments, shall have approved pans of lead, copper or other approved material and shall turn upon all sides at least two inches above the finished curb level or 3½ inches above the rough curb level. 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. 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. 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. Shower receptacle waste outlets on all showers shall be not less than two inch and shall have remov-

able strainers. Before the completed pan is placed in the space provided for the stall shower, a 30-pound asphalt saturated felt or a ½-inch thick layer of sand shall be placed under the pan for protection against rough surfaces or projecting nails. Strainers for 2-inch stubs shall have a minimum three and one-half square inches of free area including the removable plate. All strainers and pans shall be installed and ready for inspection at time of tub and/or waterpipe inspection. Free standing prefabricated shower stalls or receptors shall require individual approval.

(b) DIMENSIONS: Shower compartments shall have not less than 1,024 square inches in floor area.

(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.

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 direct 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 2-inch line shall waste through a 2" x 1½" 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 American National Standards Institute Standards for Self-Contained Mechanically Refrigerated Drinking-Water Coolers, ANSI-A112.11.1-1968 or Specifications for Drinking Fountains, ANSI-Z4.2-1942.

(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:** Floor drains serving indirect waste pipes serving food or drink storage rooms or appliances shall not be installed in any toilet room nor in any inaccesible or unventilated space such as a closet or store room. 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.

(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 backwater 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 Inspector 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.

(e) **FLOOR DRAINS SHALL BE PROVIDED WITH TRAPS AND STRAINERS:** Approved bucket type traps 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 insure 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 of 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.

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 Sub-section 4614.4.

(b) APPROVAL: Specialties requiring water and waste connections shall be submitted to the Plumbing Inspector for approval before installation.

4613.19 MINIMUM FACILITIES: Wherever installation of plumbing fixtures is required or provided, the minimum number of each type of fixture installed shall comply with TABLE 46-P, based on the number of persons set forth in Sub-section 4603.22, except as may be otherwise specifically provided:

TABLE 46-P

MINIMUM FIXTURE REQUIREMENTS — GENERAL

(See Footnote No. 13)

Type	Water Closets 1 per dwelling unit	Lavatories 1 per dwelling unit	Tub or Shower 1 per dwelling unit	Kitchen Sinks 1 per dwelling unit	Laundry Tub or Washing Machine 1 minimum (See Footnote 1)
Single Family, Duplex Apartments, Apartment Houses					

Factories, (Stores*), Office Buildings, Places of Employment or Similar Establishments See Footnote No. 5, 7, 10 and 12

1-9 Employees—1 Water Closet and 1 Lavatory for the use of both sexes. (See Footnote 2) (Males and Females)

MALES				FEMALES			
No. of Males	Water Closets	Urinals	Lavatories[4]	No. of Females	Water Closets	Urinals	Lavatories[4]
10-30	1	1	2	1-12	1	See Footnote 3	2
31-46	2	1	3	13-34	2		3
47-63	2	2	4	35-58	3		4
64-80	3	2	5	59-83	4		5
81-96	3	3	6	84-109	5		6
97-116	4	3	7	110-138	6		8
117-136	5	3	8	139-170	7		9
137-156	5	4	9	171-200	8		11
157-177	6	4	10	1 Water Closet and 1 Lavatory for each 30 Females over 200.			
178-200	7	4	11				

1 Water Closet or 1 Urinal, and 1 Lavatory for each 25 males over 200.

For service sink requirements see Footnote No. 9.

For Drinking Fountain requirements see Footnotes No. 6 and 8.

1 Shower shall be provided for each 15 persons subject to excess heat or to contamination, infections or irritating material.

Arcades

Arcades containing stores which are 400 sq. ft. or less in area, may have centrally located toilet facilities accessible to all stores in the arcade sector.

*Stores

Each store shall have a minimum of one lavatory or sink and a one and one-half (1½) inch fixture branch connected to a three (3) or four (4) inch waste stack. (See Chapter 9 for dry vent requirements).

TABLE 46-P (Continued)

MINIMUM FIXTURE REQUIREMENTS— WHERE FOOD AND DRINK ARE SERVED

Where no alcoholic beverages are served and where employees and patrons do not exceed 20, one toilet room with a minimum of one water closet and one lavatory shall be provided. Where employees and patrons exceed 20, use restaurant schedule.
See Footnote 10 for bar space. Curb service to be based on a minimum of one person per 100 sq. ft. of parking area.

See Footnotes (a), (b), (c), and (d).

	MALES				FEMALES			
Juice Bars, no seats.	No. of Males	Water Closets	Urinals	Lava-tories	No. of Females	Water Closets	Urinals	Lava-tories
Barbeque Stands, Drive-in Stands, Cafeterias, Counter Service, Private Clubs and Similar Establishments, where no alcoholic beverages are served. Footnote 12	1-62	1	1	1	1-30	1	See Footnote 3	1
	63-98	2	1	1	31-62	2		1
	99-138	2	2	2	63-98	3		1
	139-181	2	3	2	99-138	4		2
	182-226	3	3	2	139-181	5		2
	227-272	3	4	3	182-226	6		2
	273-320	3	5	3	227-272	7		3
	321-369	4	5	3	273-320	8		3
	370-420	4	6	4	321-369	9		3
					370-420	10		4

	MALES				FEMALES			
Restaurants, Bowling Alleys, Beer and Liquor Bars, Private Clubs, Nite Clubs, and Eating and Drinking Establishments. Footnote 12	No. of Males	Water Closets	Urinals	Lava-tories	No. of Females	Water Closets	Urinals	Lava-tories
	1-42	1	1	1	1-20	1	See Footnote No. 3.	1
	43-65	2	1	1	21-42	2		1
	66-90	2	2	2	43-65	3		1
	91-117	2	3	2	66-90	4		2
	118-147	3	3	2	91-117	5		2
	148-178	3	4	3	118-147	6		2
	179-212	3	5	3	148-178	7		3
	213-247	4	5	3	179-212	8		3
	248-282	4	6	4	213-247	9		3
	283-317	4	7	4	248-282	10		4
	318-352	5	7	5	283-317	12		4
	353-390	5	8	5	318-352	12		5
					353-390	13		5

MISCELLANEOUS REQUIREMENTS WHERE FOOD OR DRINK ARE PREPARED OR SERVED TO THE PUBLIC:

(a) One 3 compartment sink (16 x 16 x 16) shall be required.

(b) Floor drains shall be provided for each 50 square feet of back-bar or back-counter working space. Accessibly located in bar or counter area adjacent to fixtures drained.

(c) Sinks must have a constant supply of hot water not less than 180° F.

TABLE 46-P (Continued)

(d) Where the number of employees exceed 9, added toilet facilities shall be provided for employees as per schedule for places of employment.

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, one such required. For apartment houses, one such tub or clothes washing machine for the first five apartments and one such tub or clothes washing machine for each additional 15 apartments. Such laundry tub or clothes washing machine shall be available to all residents of the building.

Footnote No. 2 Where the minority sex exceeds 3 persons, separate toilet rooms and facilities shall be provided for each sex. Where there are more than 5 males, a urinal shall be added.

Footnote No. 3 Female urinals may be substituted for water closets up to one-half of the required number of water closets.

Footnote No. 4 Wash-up sinks may be substituted for lavatories where type of employment would warrant.

Footnote No. 5 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. 6 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. 7 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 subtracted 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. 8 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.

Footnote No. 9 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. 10 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, and shall be located on the same floor with, and under the responsible direction of the management of the premises served; and shall be not over 50 feet along the line of travel from the nearest exit to the dining room, bar or food service area except that 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 on the same floor.

TABLE 46-P (Continued)

Footnote No. 11 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 Inspector for approval.

Footnote No. 12 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. 13 All calculations shall be on the basis of equal numbers of male and female where sanitary facilities are required for both sexes.

MINIMUM FIXTURE REQUIREMENTS—HOSPITALS

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
86-100	4	3	4	3	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		1 per 40	1 per 40	1 per 80

MISCELLANEOUS REQUIREMENTS:

Other requirements, such as sterilizers, slop sinks, special fixtures, etc., shall be special problems, and shall be submitted to the Plumbing Inspector for approval.

See schedule for "Places of Employment" for employees facilities.

MINIMUM FIXTURE REQUIREMENTS—PLACES OF DETENTION

Fixture requirements in places of detention are special requirements and plans for proposed installation shall be submitted to the Plumbing Inspector for approval.

TABLE 46-P (Continued)

MINIMUM FIXTURE REQUIREMENTS—PLACES OF PUBLIC ASSEMBLY

Theatres, Churches, Arenas, Stadiums, Lodge Halls, etc.
(See Footnote No. 12)

MALES				FEMALES		
No. of Males	Water Closets	Urinals	Lavatories	No. of Females	Water Closets	Lavatories
1-100	1	1	1	1-50	1	1
101-250	2	1	1	51-140	2	1
251-360	2	2	1	141-250	3	2
361-470	2	3	2	251-360	4	2
471-580	3	3	2	361-470	5	3
581-700	3	4	3	471-690	6	3
701-820	3	5	3	691-960	7	4
821-975	4	5	4	961-1300	8	4
976-1150	4	6	4	1301-1640	9	5
1151-1325	4	7	4	1641-2000	10	6
1326-1490	5	7	5	2001-2350	11	7
1491-1675	5	8	5	2351-2700	12	8
1676-1875	5	9	5	Above 2700 add one water closet for each additional 350 females and one lavatory for each additional 500 females. Female urinals may be substituted for water closets up to one-half of the required number of water closets.		
1876-2075	6	9	6			
2076-2250	6	10	6			
2251-2475	6	11	6			
2476-2700	6	12	7			
Above 2700 add 1 water closet and 1 lavatory for each additional 500 males and 1 urinal for each additional 300 males.						

MISCELLANEOUS REQUIREMENTS:

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.

The occupancy control of drive-in theatres shall be based on 3 persons per parking space.

TABLE 46-P (Continued)

MINIMUM FIXTURE REQUIREMENTS—DORMITORIES

MALES			FEMALES		
Water Closets	Urinals	Lavatories	Water Closets	Lavatories	Drinking Fountains
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.	1 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 for the first 8 females. Over 8, one for each additional 20 females.	1 for each 12 females up to 75 females. Over 75, one for each additional 15 females. Additional separate dental lavatories should be provided in communal toilet rooms at 1 for each 20 females.	One per each 75 persons and a minimum of one per floor and a minimum of 2 per dormitory.

Note: Bath or shower requirements same as for lavatories.

For service sink requirements see Footnote No. 9.

MINIMUM FIXTURE REQUIREMENTS—FILLING STATIONS

MALES		FEMALES	
Water Closets	Lavatories	Water Closets	Lavatories
1	1	1	1

MISCELLANEOUS REQUIREMENTS:

Grease and oil interceptors shall be provided as set forth in Subsection 4612.3 herein and such interceptors shall have a basket-type floor drain and a trap.

TABLE 46-P (Continued)

DAY NURSERIES

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	2	
31-50	3	4	2	
Night Care				
1-8	1	1	1	
9-18	2	2	2	
19-30	3	3	3	
31-50	4	4	3	

MISCELLANEOUS REQUIREMENTS:

Toilets shall be accessible from the playground as well as from inside building; 10″ rim height on water closets for children under 8 years; 13″ rim height for children 8 years or over.

MINIMUM FIXTURE REQUIREMENTS—SCHOOLS

One water closet, lavatory and drinking fountain in each classroom, or common toilet rooms

KINDERGARTEN THROUGH 2nd GRADE

MALE				FEMALE	
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 THROUGH 6th GRADE					
1 per 75 males	1 per 30 males	1 for each 50 males, minimum of one. (28″ rim height)	1 per 75 pupils and a minimum of 1 per floor and a minimum of 1 accessible to the playground area. (28″ height)	1 per 35 females	1 per 50 females
7th THROUGH 12th GRADE					
1 per 75 males	1 per 30 males	1 per 50 males, minimum of one. (30″ rim height)	1 per 75 total pupils and a minimum of 1 per floor and one accessible to the playground area. (36″ height)	1 per 45 females	1 per 50 females

MISCELLANEOUS REQUIREMENTS:

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 pupils (boys and girls) divided by 12.)

I example school has 16 classrooms.

$16 \times 2.5 = 40$ of each sex to be provided for.

hence $40 \div 5 = 8$ showers for the boys

$40 \div 4 = 10$ showers for the girls

II example total school enrollment—480 pupils

$480 \div 12 = 40$ of each sex to be provided for

$40 \div 5 = 8$ showers for the boys.

$40 \div 4 = 10$ showers for the girls.

TABLE 46-P (Continued)

NUMBER FIXTURE REQUIREMENTS—ROOMING AND BOARDING HOUSES

No. of Males	Water Closets	Urinals	Lavatories	Tub or Shower	No. of Females	Water Closets	Lavatories
1-11	1	1	See Below 1	1	1-11	1	1
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

MISCELLANEOUS REQUIREMENTS:

Over 5 males a urinal is required.

The above schedule applies for each floor.

Both hot and cold water shall be supplied to showers, tubs and lavatories.

Where accommodations exceed 15 persons per floor a service sink is required on each floor.

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 three-fourths 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.

(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 State Board of Health and Plumbing Inspector and/or other authority having jurisdiction.

(c) **ACCEPTABLE SOURCES:** Where a public supply of potable water is not available, the requirements of the Florida State Board 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: (a) WATER DISCHARGE OUTLETS: Potable water supply piping and water discharge outlets shall have backflow prevention devices or similar equipment and shall not be so located as to make possible their submergency in any liquid or substance.

(b) APPROVAL OF DEVICES: Before any device for the prevention of backflow or back-siphoning is installed, it shall have first been certified as meeting the requirements of ANSI A40.6-1943 by a recognized testing laboratory acceptable to the Plumbing Inspector. Devices installed in a potable water supply for protection against backflow shall be maintained in good working condition by the person or persons having control of such devices. The Plumbing Inspector having jurisdiction may inspect such devices and, if found to be ineffective or inoperative, shall require the replacement thereof.

(c) BACKFLOW: The water-distributing system shall be protected against backflow. Every water outlet shall be protected from backflow, preferably by having the outlet end from which the water flows spaced a distance above the flood-level rim of the receptacle into which the water flows sufficient to provide a "minimum required air gap" as defined in ANSI A40.4-1943. Where it is not possible to provide a minimum air gap, the water outlet shall be equipped with an accessibly located backflow preventer complying with ANSI A40.6-1943, installed on the discharge side of the last manual or mechanically controlled control valve.

(d) SPECIAL DEVICES: Where it is not possible to provide either a minimum air gap or a backflow preventer, as may be the case in connection with cooling jackets, condensers or other industrial or special appliances, the Plumbing Inspector shall require other approved means of protection.

(e) HOSE CONNECTED FAUCETS: Except as otherwise specifically set forth herein, every water outlet threaded for a hose attachment, except for hose attachments used for automatic clothes washing machines only, shall be provided with a back-flow preventor securely attached to the body of the faucet.

4614.4 VACUUM BREAKERS AND AIR GAPS: (a) FLUSHOMETER: Flushometer shall be equipped with an approved vacuum breaker. The vacuum breaker shall be installed on the discharge side of the flushing valve with the critical level at least one inch above the top of any fixture or appliance with integral waterway except such fixtures as conform to ANSI Standard A40.4-1942 for required air gaps.

(b) FLUSHING TANKS: Flushing tanks shall be equipped with an approved ball-cock. The ball-cock shall be installed with the 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.

(c) **LAWN SPRINKLERS:** Lawn sprinkler systems using potable water shall be equipped with an approved backflow preventer on the discharge side of each valve. The backflow preventer shall be at least six inches above the highest head, and at no time less than six inches above the surrounding ground.

(d) **VALVE OUTLET:** The hot and cold water supply to fixtures with hose attachments, and other appliances physically connected to a water supply system, shall be protected from backflow, back-siphonage and back pressure. Where hot and cold water valves are connected to supply tempered water to another valve for use in fixtures such as bed pan washers, bidets and needle showers, check valves or combined valve and check devices shall be provided to prevent the cross flow of water in the water distributing system.

4614.5 WATER SERVICE PIPE: (a) The water-service pipe may be placed in the same trench with the building drain and building sewer provided the following conditions are satisfied:

(1) The water-service pipe and all other pipe or piping 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 ten 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, softeners, and all other appliances and devices shall be protected against contamination.

(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 to 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:** 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.

(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. Rain water 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 not be 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) Materials for water-distributing pipes and tubing shall be brass, copper, lead, cast iron water pipe, wrought iron, block tin or steel, with appropriate approved fittings. All wrought iron and steel pipe and fittings shall be galvanized (zinc coated). Copper pipe and tubing shall be type K or type L. Plastic pipe and fittings may be used for water service only in accordance with Table 46-C.

(b) Pipes conveying fire lines and domestic water lines shall not be installed underneath a concrete slab on fill in any location inside the building walls of buildings on filled ground where the presence of hydrogen sulfide gas or other injurious elements is known and especially the ground east of the west shore of Biscayne Bay and east of the west shore of the inland waterway, and in areas being or having been recently filled below high tide areas. Such piping and fittings may be installed in concrete trenches with removable covers or in an approved conduit.

(c) 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 and abrasion may be anticipated.

(d) (1) Domestic cold water piping placed above a roof or within 10 inches above 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) All plastic pipe and fittings approved in Table 46-C shall be properly marked as specified by their respective standards. All material shall be installed as recommended by the manufacturer and/or the Plastic Pipe Institute. No materials shall be co-mingled within the same system except which are specifically approved in writing by the respective standards. All water service piping shall have a minimum working pressure of 160 psi, with permanent indentation identification markings.

(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 to 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 water control valve, independent of the meter valve. Each apartment or store in a building shall have a separate independent control valve or individual fixture control valve 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 such valve.

(c) Each water closet and urinal supply shall have an independent water control valve placed above the floor and all single fixtures or groups of fixtures in hotels, office buildings, hospitals, clinics, places of public assembly and manufacturing plants shall either have separate fixture control valves or a single control valve for each group of fixtures in a single room. Each water storage tank shall have a water 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.

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.

4614.13 PROCEDURE IN SIZING THE WATER DISTRIBUTION SYSTEM OF A BUILDING: The sizing of the water distribution system shall conform to good engineering practice. Methods used to determine pipe sizes shall be approved by the Plumbing Inspector and shall be in accordance with ANSI A40.8-1955 of the American National Standards Institute, or the following tables:

TABLE 46-Q

MINIMUM WATER SERVICE PIPE SIZE FOR ONE- AND TWO-STORY BUILDINGS

Hotels, Motels and Residential Occupancy Only

No. of Bathrooms and Kitchens Tank Type Closets		Diameter of Water Service Pipe	Recommended Meter Size	Appr. Pressure Loss Meter and 100′ of Pipe	No. of Bathrooms and Kitchens Flush Valve Closets	
Copper	Galv.	Inches	Inches	p.s.i.	Copper	Galv.
1-2	.....	¾	⅝	27	.....	.....
..	1-2	¾	⅝	40	.....	.....
.....	.....	1	1	30	1	.....
3-4	.....	1	1	22	.....	.....
.....	3-4	1	1	24	.....	.....
.....	.....	1¼	1	32	2-3	.....
.....	.....	1¼	1	36	.....	1-2
5-9	.....	1¼	1	28	.....	.....
.....	5-8	1¼	1	32	.....	.....
.....	.....	1½	1½	29	4-10	.....
.....	.....	1½	1½	30	.....	3-7
10-16	.....	1½	1½	17	.....	.....
.....	9-14	1½	1½	21	.....	.....
.....	.....	2	1½	26	11-18	.....
.....	.....	2	1½	32	.....	8-18
17-38	.....	2	1½	27	.....	.....
.....	15-38	2	1½	32	.....	.....
.....	.....	2	2	25	19-33	.....
.....	.....	2	2	24	.....	19-24
39-56	.....	2	2	25	.....	.....
.....	39-45	2	2	24	.....	.....
.....	.....	2½	2	28	34-57	.....
.....	.....	2½	2	32	.....	25-57
57-78	.....	2½	2	28	.....	.....
.....	46-78	2½	2	32	.....	.....
.....	.....	3	3	16	58-95	.....
.....	.....	3	3	19	.....	58-95
79-120	.....	3	3	16	.....	.....
.....	79-120	3	3	19	.....	.....

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.

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.

Where conditions do not conform to the above table, the provisions of BMS-66 National Bureau of Standards publications shall apply.

TABLE 46-Q (Continued)

MINIMUM WATER SERVICE PIPE SIZE FOR ONE- AND TWO-STORY BUILDINGS

Commercial

No. of Fixture Units Flush Tank Water Closet		Size Service	Size Meter	Appr. Loss	No. of Fixture Units Flush Valve Water Closet	
Copper	Galv. Iron or Steel	Nom. Size Inches	Nom. Size Inches	p.s.i.	Copper	Galv. Iron or Steel
18	.....	¾	⅝	30	.....	.....
.....	15	¾	⅝	30	.....	.....
19-55	.....	1	1	30	.....	.....
.....	16-36	1	1	30	.....	.....
.....	.....	1	1	30	9	.....
56-85	.....	1¼	1	30	.....	.....
.....	37-67	1¼	1	30	.....	.....
.....	.....	1¼	1	30	10-20	.....
.....	.....	1¼	1	30	.....	14
86-255	.....	1½	1½	30	.....	.....
.....	68-175	1½	1½	30	.....	.....
.....	.....	1½	1½	30	21-77	.....
.....	.....	1½	1½	30	.....	15-52
226-350	.....	2	1½	30	.....	.....
.....	176-290	2	1½	30	.....	.....
.....	.....	2	1½	30	78-175	.....
.....	.....	2	1½	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	.....	2½	2	30	.....	.....
.....	451-580	2½	2	30	.....	.....
.....	.....	2½	2	30	316-392	.....
.....	.....	2½	2	30	.....	288-343
641-1340	.....	3	3	22	.....	.....
.....	581-1125	3	3	22	.....	.....
.....	.....	3	3	22	393-940	.....
.....	.....	3	3	22	.....	344-785

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.

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.

Where conditions do not conform to the above table, the provisions of BMS-66 National Bureau of Standards publications shall apply.

TABLE 46-R

RATE OF FLOW AND REQUIRED PRESSURE DURING FLOW FOR DIFFERENT FIXTURES

Fixture	Flow Pressure[a] p.s.i.	Flow Rate gpm
Ordinary basin faucet	8	3.0
Self-closing basin faucet	12	2.5
Sink faucet—⅜ inch	10	4.5
Sink faucet—½ inch	5	4.5
Bathtub faucet	5	6.0
Laundry tub cock—½ inch	5	5.0
Shower	12	5.0
Ball-cock for closet	15	3.0
Flush valve for closet	10-20	15-40[b]
Flush valve for urinal	15	15.0
Garden hose, 50 ft. and sill cock	30	5.0

[a] Flow pressure is the pressure in the pipe at the entrance to the particular fixture considered.

[b] Wide range due to variation in design and type of flush-valve closets.

4614.13 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	½	
Combination sink and tray	½	
Drinking fountain	⅜	
Dishwasher (Domestic)	½	
Hot water heaters	¾	Minimum
Kitchen sink, residential	½	
Kitchen sink, commercial (over one compartment)	¾	
Lavatory	½	
Laundry tray, 1, 2 or 3, compartments	½	
Shower (single head)	½	
Sinks (service, slop)	½	
Sinks flushing rim	1	
Urinal (flush tank)	½	
Urinal (direct flush valve)	¾	
Water closet (tank type)	½	
Water closet (flush valve type)	1	
Hose bibbs	¾	

A group of not more than two fixtures shall be connected to a half-inch, cold water supply.

4614.14 MINIMUM PRESSURE: Minimum, fairly constant, service pressure, at the point of outlet discharge shall not be 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 VARIABLE STREET PRESSURES: When the street main has a wide fluctuation in pressure during the day, the water distribution system shall be designed for minimum pressure available.

4614.16 HAZARD AND NOISE: Water pipe installations shall be adequately protected from water hammer by use of air chambers or other approved 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.

4614.17 HOT-WATER DISTRIBUTION: The sizing of the hot-water distribution piping shall conform to good engineering practice.

4614.18 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 a 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 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: Combination pressure and temperature valves, or temperature relief valves shall be located in the tank or in hot water outlet from tank so as to be actuated by the water in the top of the tank served and in no case more than four inches developed length away from such tank. Pressure-relief valves may be located adjacent to the equipment they serve. There shall be no check valve or shut-off valve between a relief valve and the heater or tank for which it is installed.

(e) RELIEF OUTLET WASTES: The outlet of a pressure, temperature, or other relief valve shall not be connected to the drainage system as a direct waste.

(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 LINES: Relief valve discharge line shall be sized as follows:

Up to 69,000 B. T. U.	⅜ inch ID
Above 69,000 to 127,000 B. T. U.	½ inch ID
Above 127,000 to 340,000 B. T. U.	¾ inch ID
Above 340,000 to 600,000 B. T. U.	1 inch ID

This table shall apply to single or manifold lines and the length of the line shall be considered. The size of the manifold lines shall be determined by the cumulative B.T.U. total of the appliances served thereby. Reducers shall be with smooth transition and without abrupt shoulders.

4614.19 STORAGE TANKS: (a) APPLICABLE REQUIREMENTS: All storage tanks for domestic hot water shall meet the applicable A.S.M.E. and listed requirements of Table 46-C.

(b) MARKING: Any tank hereafter installed for the storage of domestic hot water shall have clearly and indelibly stamped in the metal of the tak, or marked upon a plate welded thereto, or otherwise permanently affixed, the maximum allowable working

(2) No reduction in required septic tank capacity or drainfield area for septic tank system shall be made when separate disposal is used for laundry wastes.

(h) House drains installed in connection with new construction where waste disposal is to a septic tank shall be as follows:

(1) If a building site is served by both street and utility easement or alley 12 feet or more in width, the house drains shall be installed to extend from either side of the building.

(2) Where no utility easement or alley 12 feet or more in width exists, the house drain shall extend from the front street side of the building, or from either side thereof.

(3) Where buildings are so located as to provide no side yards and no utility easement or alley 12 feet or more in width exists, the house drain shall extend from the front street side of the building.

(4) Where buildings are so located as to provide no side yards and utility easement or alley 12 feet or more in width does exist the administrative authority shall determine and establish the location of the house drain, to either the front or the rear of the building.

4615.2 PERMITS: (a) Septic tanks and drainfields shall not be constructed, installed or altered until a permit for such proposed work has been obtained from the enforcing authority.

(b) For septic tanks over 1200 gallon capacity, plans and specifications shall be first submitted to the Florida Department of Health and Rehabilitation Services, Division of Health for approval and such approval together with plans shall be then submitted to the Plumbing Inspector for approval and a permit issued before construction work is commenced.

4615.3 UNLAWFUL TO SELL: No person, firm or corporation shall install, contract for, sell, manufacture or offer for sale within the area of jurisdiction of this code, any septic tank, liquid waste collection or disposal system, sewage treatment system or similar device, including chemical additives, which does not conform to the requirements of the Florida Department of Health and Rehabilitation Services, Division of Health, and which has not received prior approval therefore from the Florida Department of Health and Rehabilitation Services, Division of Health, and the Plumbing Inspector.

4615.4 FACTORS COVERING THE TYPE AND METHOD OF DISPOSAL OF SEWAGE AND LIQUID WASTE: (a) The construction and/or installation of sewage and/or liquid waste disposal systems shall be based on the governing factors set forth herein.

(b) Where a public sewer exists, factors governing shall include:

(1) The character and quality of sewage and/or liquid waste.

(2) The availability of a public sewer.

(3) The design or unused flow capacity of the available public sewer as set forth in Sub-sections 4605.2 and 4605.4.

(4) For rainwater disposal Sub-sections 4605.2, 4605.4 and 4611.4.

(5) The design or unused flow capacity of the existing plumbing system; whether such system is capable of accommodating the load as determined by the Plumbing Inspector and as otherwise limited by this Code.

(c) Where no public sewer exists or where a public sewer or

plumbing system is inaccessible or is not capable of accommodating an added load, governing factors shall include:

(1) The character and quality of sewage and/or liquid waste.

(2) Location of the disposal system.

(3) Soil Porosity.

(4) Underground water level.

(5) Underground potable water.

(6) Chloride content of underground water.

(7) For rainwater disposal see Section 4611.

(8) The design and unused flow capacity of the existing plumbing system; whether such system is capable of accommodating the proposed load as determined by the Plumbing Inspector and as otherwise limited by this Code.

(9) Elevation of ground level.

(10) Where flood criteria elevation is established by the administrative authority, the invert of any draintile shall be not more than 24 inches below the flood criteria elevation.

4615.5 SEPTIC TANKS: (a) The minimum effective capacity of any septic tank installation shall be 750 gallons to receive not more than 450 gallons per day, but not less than otherwise set forth herein.

(b) The minimum effective capacity of septic tanks for sewage flows greater than 450 gallons and up to 900 gallons per day shall equal the estimated daily flow plus 300 gallons sludge storage volume.

(c) The minimum effective capacity of septic tanks for sewage flow exceeding 990 gallons per day shall be considered special problems and treatment process and disposal shall comply with the requirements and be as approved by the Florida Department of Health and Rehabilitation Services, Division of Health.

(d) The quantity of sewage flow used for the determination of size of disposal facilities shall be not less than set forth in the requirements of the Florida Department of Health and Rehabilitation Services, Division of Health.

Inspector 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 all septic tanks shall be finished smooth and impervious. Voids, pits, or protuberances on or in the inside walls of septic tanks are prohibited. The Plumbing Inspector may require that plans for proposed septic tanks bear a statement by a person known by the Plumbing Inspector to be qualified, as to the character of the soil and the sufficiency of the support for the tank.

(l) Precast concrete septic tanks shall have a minimum wall and bottom thickness of two inches and for tanks exceeding 1200 gallon capacity the minimum concrete cover over the reinforcing shall be not less than 1½ inches. Tops shall have a minimum thickness of three inches, and be reinforced with No. 3 bars set on six inch centers across the carrying span and 12 inches on centers for temperature reinforcement. Precast tanks shall be sufficiently reinforced to resist cracking during handling or installation with a minimum reinforcement of 6x6 10/10 wire mesh or equivalent area. Precast septic tanks shall have a monolithically poured bottom. Precast septic tanks 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 septic tank and reinforced as set forth in Sub-section 4611.6.

(m) Cast-in-place septic tanks shall have a minimum wall, floor and lid thickness sufficient to provide 3 inches of concrete cover between the reinforcing and any ground-contact surface and 1½ inches of concrete cover between the reinforcing and any formed wall surface but not less than 4 inches.

(n) Cast-in-place septic tanks subject to overburden loads not in excess of 2 feet of fill and not subject to vehicular loads shall be as follows: **(1)** Walls and floors shall be reinforced with No. 4 bars, 6 inches on centers each way with continuity around corners.

(2) Bars shall have the cover set forth in (m) above.

(3) Lids spanning not more than 4 feet 6 inches may be reinforced with No. 4 bars 6 inches on centers short way and No. 3 bars 6 inches on centers long way and such bars shall be located ¾ inch from the bottom of the slab.

(o) Cast-in-place septic tanks subject to overburden loads in excess of the loads set forth in Paragraph (n) 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 Paragraphs 4611.6(a) and (b). Traffic lids for cast-in-place septic tanks 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.

(p) Ventilation of septic tanks and drainpipes shall be provided through septic tank inlet and outlet tees thence through the plumbing system and in no other manner.

(q) All septic tank inlet and outlet tees shall be terra cotta, or concrete with a wall thickness of at least one inch, and a cross-section area not less than the building sewer in connection therewith and not more than two times greater. The outlet invert shall be not less than one inch below the inlet invert nor more than three inches lower than the inlet. Inlet and outlet tees shall be installed at opposite ends of the septic tank and shall be not less than 5 inches above and 18 inches below the liquid level line.

(r) Where the tank is placed under asphalt or concrete paving and for all cast-in-place lids, a manhole located directly above the inlet and outlet tee and having a least dimension of 22 inches shall be provided. Such manholes shall be brought to grade and have cast iron ring and cover.

plumbing system is inaccessible or is not capable of accommodating an added load, governing factors shall include:

(1) The character and quality of sewage and/or liquid waste.

(2) Location of the disposal system.

(3) Soil Porosity.

(4) Underground water level.

(5) Underground potable water.

(6) Chloride content of underground water.

(7) For rainwater disposal see Section 4611.

(8) The design and unused flow capacity of the existing plumbing system; whether such system is capable of accommodating the proposed load as determined by the Plumbing Inspector and as otherwise limited by this Code.

(9) Elevation of ground level.

(10) Where flood criteria elevation is established by the administrative authority, the invert of any draintile shall be not more than 24 inches below the flood criteria elevation.

4615.5 SEPTIC TANKS: (a) The minimum effective capacity of any septic tank installation shall be 750 gallons to receive not more than 450 gallons per day, but not less than otherwise set forth herein.

(b) The minimum effective capacity of septic tanks for sewage flows greater than 450 gallons and up to 900 gallons per day shall equal the estimated daily flow plus 300 gallons sludge storage volume.

(c) The minimum effective capacity of septic tanks for sewage flow exceeding 990 gallons per day shall be considered special problems and treatment process and disposal shall comply with the requirements and be as approved by the Florida Department of Health and Rehabilitation Services, Division of Health.

(d) The quantity of sewage flow used for the determination of size of disposal facilities shall be not less than set forth in the requirements of the Florida Department of Health and Rehabilitation Services, Division of Health.

TABLE OF FLOW DETERMINATION

TYPE OF ESTABLISHMENT	GALLONS PER PERSON PER DAY	TYPE OF ESTABLISHMENT	GALLONS PER PERSON PER DAY
Multiple apartments (over 4 units)	75	Dayschools with cafeterias, gyms and showers	**11.5
Rooming houses	40	Dayschools without cafeterias, gyms or showers	** 8.5
Hotels & motels	50		
Restaurants (Toilet & kitchen wastes per meal served)	10		
Bars & cocktail lounges	5	Dayschools with cafeterias but no gyms or showers (quantity to be estimated from number of meals served or 80 percent of enrollment)	**9.5
Kitchen wastes—restaurants, hotels, boarding houses, etc. (per meal served)	3		
Tourist camps or trailer parks	50	Boarding schools	75
Resort camps (night & day) with limited plumbing	50	Day workers at schools and offices	15
Luxury camps	75	Hospitals (per bed)	150-250
Work or construction camps (semi-permanent)	50	Public institutions other than hospitals	75-125
Factories (gal. per person per shift, exclusive of industrial wastes)		Airports (per passenger)	5
(showers not provided)	15	Stores—without kitchen wastes (per toilet room)	400
(showers provided)	35		
Public picnic parks (toilet wastes only)	5	Service stations (per vehicle served)	10
Public parks, with bath house, showers and flush toilets	10	Bowling alleys (toilet wastes only per lane)	100
Swimming pools and bathing places	10		
Country clubs per resident member	100	Stadiums, frontons, ball parks, etc. (per seat)	3
Country clubs per member present	25		
Drive-in theatres (per car space)	5	Self-service laundries (toilet waste only per machine)	40
Movie theatres, auditoriums, churches (per seat)	3		

**Estimated flow values to be determined and specified by the State Board of Health.

The above table does not provide for garbage or laundry wastes.

(e) Minimum capacity requirements for septic tanks serving normal residential use other than hotels, apartment houses and rooming houses, shall be as follows based on the number of bedrooms.

TABLE 46-T

BEDROOMS	MINIMUM LIQUID CAPACITY REQUIRED (GALLONS)	INSIDE LENGTH	INSIDE WIDTH	AIR SPACE	LIQUID DEPTH
2 or less	750	7'2"	3'6"	8"	4'
3	900	8'0"	3'9"	8"	4'
4	1050	8'6"	4'2"	8"	4'
5	1200	9'0"	4'6"	8"	4'

Capacities listed in Table 46-T provide for a single system to serve combined household wastes, from all plumbing fixtures and appliances including food waste grinder, dishwasher and automatic clothes washer.

(f) The minimum septic tank capacity for hotels, apartment houses and rooming houses shall be based on 24 hour detention time interval for efficient sedimentation plus sludge storage volume and except as set forth in Paragraph 4615.5(b) and (c). The number of persons to be served shall be determined from the number of bedrooms on the basis of two persons per bedroom or from the maximum number of persons to be served by the tank whichever may be greater.

(g) Septic tank installations serving schools, hospitals, bathing places, swimming pools, bars, eat and drink establishments and/or other establishments not specifically covered in this Code shall be considered special problems and shall be first submitted to the Florida Department of Health and Rehabilitation Services, Division of Health and to the Plumbing Inspector for approval before permit is issued.

MINIMUM DISPOSAL FACILITIES—EAT AND DRINK ESTABLISHMENTS

	Up to 25 persons	26 to 50 persons	51 to 100 persons	101 to 150 persons
Liquid capacity of grease trap in gals.	600	750	1200	1600
Capacity of septic tank in gals.	1200	1500	2400	3600
Total daily flow-gals.	1300	2600	4900	7200

The effluent from the grease interceptor shall discharge to the septic tank which is sized to receive combined flow.

Drainfield absorption area to be based on percolation rate and total daily flow.

MINIMUM DISPOSAL FACILITIES—BARS

	Up to 25 persons	26 to 50 persons	51 to 100 persons
Septic tank capacity	750 gals.	900 gals.	1200 gals.
Drainfield area based on average conditions	270 sq. ft.	360 sq. ft.	540 sq. ft.

(h) A grease trap is required where food is commercially prepared or served.

(i) The minimum capacity of septic tanks and size of drainfields for stores, factories and places of employment other than residences, bars and/or eat and drink establishments shall be based on the number of persons that could be anticipated to be occupying the building and the quantity of flow per person as required by the Florida Department of Health and Rehabilitation Services, Division of Health. If the occupancy of the building is changed to be occupied by a greater number of persons the septic tank and drainfield shall be provided based on the increased number of persons or as may be determined based on actual water-use records.

MINIMUM DISPOSAL FACILITIES—STORES

	1 Store	2 Stores	3 Stores
Septic tank capacity	750 gals.	1100 gals.	1500 gals.
Drainfield area based on average conditions	270 sq. ft.	480 sq. ft.	720 sq. ft.

(j) Septic tanks 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 Health and Rehabilitation Services, Division of Health.

(k) Septic tanks shall be constructed of concrete, either precast or poured-in-place. All concrete used in the construction of septic tanks shall have a strength of not less than 3000 psi in 28 days. Tests to determine water tightness may be required by the Plumbing

Inspector 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 all septic tanks shall be finished smooth and impervious. Voids, pits, or protuberances on or in the inside walls of septic tanks are prohibited. The Plumbing Inspector may require that plans for proposed septic tanks bear a statement by a person known by the Plumbing Inspector to be qualified, as to the character of the soil and the sufficiency of the support for the tank.

(1) Precast concrete septic tanks shall have a minimum wall and bottom thickness of two inches and for tanks exceeding 1200 gallon capacity the minimum concrete cover over the reinforcing shall be not less than 1½ inches. Tops shall have a minimum thickness of three inches, and be reinforced with No. 3 bars set on six inch centers across the carrying span and 12 inches on centers for temperature reinforcement. Precast tanks shall be sufficiently reinforced to resist cracking during handling or installation with a minimum reinforcement of 6x6 10/10 wire mesh or equivalent area. Precast septic tanks shall have a monolithically poured bottom. Precast septic tanks 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 septic tank and reinforced as set forth in Sub-section 4611.6.

(m) Cast-in-place septic tanks shall have a minimum wall, floor and lid thickness sufficient to provide 3 inches of concrete cover between the reinforcing and any ground-contact surface and 1½ inches of concrete cover between the reinforcing and any formed wall surface but not less than 4 inches.

(n) Cast-in-place septic tanks subject to overburden loads not in excess of 2 feet of fill and not subject to vehicular loads shall be as follows: (1) Walls and floors shall be reinforced with No. 4 bars, 6 inches on centers each way with continuity around corners.

(2) Bars shall have the cover set forth in (m) above.

(3) Lids spanning not more than 4 feet 6 inches may be reinforced with No. 4 bars 6 inches on centers short way and No. 3 bars 6 inches on centers long way and such bars shall be located ¾ inch from the bottom of the slab.

(o) Cast-in-place septic tanks subject to overburden loads in excess of the loads set forth in Paragraph (n) 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 Paragraphs 4611.6(a) and (b). Traffic lids for cast-in-place septic tanks 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.

(p) Ventilation of septic tanks and drainpipes shall be provided through septic tank inlet and outlet tees thence through the plumbing system and in no other manner.

(q) All septic tank inlet and outlet tees shall be terra cotta, or concrete with a wall thickness of at least one inch, and a cross-section area not less than the building sewer in connection therewith and not more than two times greater. The outlet invert shall be not less than one inch below the inlet invert nor more than three inches lower than the inlet. Inlet and outlet tees shall be installed at opposite ends of the septic tank and shall be not less than 5 inches above and 18 inches below the liquid level line.

(r) Where the tank is placed under asphalt or concrete paving and for all cast-in-place lids, a manhole located directly above the inlet and outlet tee and having a least dimension of 22 inches shall be provided. Such manholes shall be brought to grade and have cast iron ring and cover.

(s) Septic tanks shall not be located under any building or within five feet thereof, within ten feet of water supply pipe lines, within five feet of property lines other than public streets, within 25 feet of the shore line of open bodies of water, within 50 feet of any private water supply well or within 100 feet of any public water supply well where such private or public well is used for human consumption, bathing or swimming.

(t) Unless otherwise approved by the Building Inspector, 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 of an excavation on a 45 degree angle.

(u) Sludge and contents from septic tanks shall not be deposited in any canal, reservoir, bay or other 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 Health and Rehabilitation Services, Division of Health.

4615.6 DRAINFIELDS, GENERAL: (a) The minimum size and capacity of drainfields shall be as set forth and shall also comply with the specific requirements otherwise set forth in this Chapter.

(b) Construction of new drainfields shall be in accordance with rules of the Florida Department of Health and Rehabilitation Services, Division of Health with the exception that the drainfield may be under pavement provided that the absorption area under pavement is increased as follows:

Percolation Rate	Area Increase
0 to 5	10%
5 to 10	17%
10 to 15	25%

(c) Where ground is exceptionally impervious; where the water table is too close to the surface; in an old installation to correct an insanitary condition; or where other exceptional conditions prevail making the installation of a drainfield in accordance with the provisions of this Code impractical, then the Plumbing Inspector may waive the usual requirements herein and permit the installation of such type of drainfield or substitute therefore as he and the Florida Department of Health and Rehabilitation Services, Division of Health may deem practical.

(d) Any liquid wastes containing material which retards or prevents absorption of drainage in the ground shall be disposed of and treated in a manner acceptable to the Plumbing Inspector and the Florida Department of Health and Rehabilitation Services, Division of Health.

(e) The drainfield absorption area per bedroom required for single family and duplex residences shall be determined as follows based on percolation rate:

TABLE 46-U

Percolation Rate Time in minutes for water to fall one inch	Absorption area in square feet per bedroom
1 or less	70
2	85
3	100
4	115
5	125
10	165
15	190
Over 15	Unsuitable for absorption field

The absorption area shall not be based on a percolation rate of less than 3 minutes per inch unless substantiated by percolation tests.

(f) Where soil porosity appears to be less than usual, the Plumbing Inspector may require, when in his opinion it is necessary, a percolation test and/or core boring to be made. The tests will be conducted in accordance with the rules of the Florida Department of Health and Rehabilitation Services, Division of Health and the results

of such tests interpreted in accordance with those rules. Results of tests shall be submitted to the Plumbing Inspector for approval of the facility. The cost of such tests shall be borne by the owner.

(g) (1) Drainfield relays for single family or duplex residences shall comply with the requirements in effect at the time the drainfield being replaced was installed.

Number of Bedrooms	Basic Drainfield Requirement	With Garbage Grinder or Dishwasher
2	100 square feet	140 square feet
3	125 square feet	165 square feet
4	150 square feet	190 square feet
5	175 square feet	215 square feet

(2) Drainfield relays for other than single family and duplex residences and for all commercial occupancies shall be equivalent to the requirements as set forth for new installations.

(h) Drainfields shall comply with the distance separations set forth in Paragraph 4615.5(s) and as follows:

(1) Minimum distance from a drainfield to a soakage pit shall be ten feet.

(2) Minimum distance from a drainfield to a basement wall or lower terraced area shall be ten feet.

(i) A distribution box shall be required where multiple laterals are provided and boxes shall be of durable material, watertight, of adequate structural strength and sufficient size to accommodate the required number of lateral lines except that where there are only two lateral lines, a Y may be used.

(k) Minimum earth cover over and above tile, block or distributor shall be 10 inches.

(l) The maximum depth of earth cover taken from the invert of the tile, block or distributor shall not exceed 24 inches.

(m) Drainfield materials shall comply with the standards, tests and testing procedure set forth in Sub-section 4615.10.

(n) Drainfield laterals shall slope not more than 5 inches per 100 feet. (This is ½ inch in 10 feet maximum.)

4615.7 RESERVOIR-TYPE DRAINFIELDS: (a) A reservoir-type drainfield having two or more laterals or lines within the width of the trench or bed may be used where constructed as set forth in this Sub-section.

(b) Lateral lines shall be block or cradle units, and shall not be tile.

(c) Block or cradle lines shall comply with Sub-section 4615.8 except as otherwise set forth herein.

(d) The bottom of the bed shall be level or may slope away from the distributor box.

(e) The maximum distance between centers of distribution lines shall not exceed 4 feet.

(f) Distance between side wall of bed and center of outside distribution line shall not exceed 2 feet.

(g) All lateral lines within any reservoir bed shall be the same length.

(h) A tight-jointed pipe, from either the septic tank or the distribution box, shall be laid into the fixed reservoir unit and the pipe mortared closed. The tight-jointed pipe shall enter or connect with the reservoir unit to make useable, without flooding the inlet pipe to the septic tank, the storage capacity used in calculating the required capacity of the reservoir unit. **EXCEPTION:** Officially designated critically low areas.

(i) The joints of reservoir units shall be covered as set forth in Paragraph 4615.8(h).

(j) The entire area of filter material shall be covered with untreated paper and where sugar sand is to be used for back fill such paper shall be 15-pound asphalt saturated felt.

4615.8 BLOCK OR CRADLE TRENCH DRAINFIELDS: (a) Minimum spacing of block laid in trenches shall be 8 feet center-to-center.

(b) The minimum width of block trench drains shall be 24 inches and the maximum width 48 inches.

(c) The maximum length of a single block drain line shall be 100 feet and where two or more lines are used, the length shall be the same as near as practicable.

(d) The area of the drainfield shall be taken as the length of the trench multiplied by the width of the trench.

(e) Block and cradle units shall have an effective internal cross-section area of not less than 50 square inches.

(f) Where a suitable slot or fixed opening is provided for seepage, block shall be butted to each other. To be suitable, a slot or fixed opening shall be in the bottom of the unit and provide a minimum of 1½ square inches of opening per lineal foot of drain.

(g) Where a suitable slot or fixed opening is not provided, units shall be separated a distance of ¼ inch.

(h) There shall be a layer of minimum 30-pound bituminous saturated paper (or equal) over the space between block and such paper shall be not less than 4 inches wide and of suitable length to cover the top seam and 4 inches down each side; or the joints shall be mortared at the top and 4 inches down each side.

(i) The terminus of a block line shall be sealed by mortar or by mortaring a concrete block across the opening.

(j) No single change of direction of a block line shall exceed 90 degrees.

(k) Washed drainfield rock shall encase the block or cradle units with a minimum depth of 6 inches under the bottom of the units and a minimum depth of 8 inches above the bottom of the units.

4615.9 TILE TRENCH DRAINFIELDS: (a) The minimum spacing of drainfield tile laid in trenches shall be 6 feet center-to-center.

(b) The minimum width of drainfield tile trenches shall be 16 inches and the maximum width shall be 24 inches.

(c) Maximum length of a single tile drainfield lateral line shall be 40 feet.

(d) Each lineal foot of drainfield tile shall be considered as one square foot regardless of width of trench.

(e) Minimum inside diameter of drainfield tile shall be four inches.

(f) Washed drainfield rock shall encase the tile with a minimum depth of 6 inches under the tile and have a total depth of at least 12 inches for the full width of the trench.

(g) There shall be a space of ¼ inch between the ends of tiles.

(h) There shall be a layer of minimum 30-pound bituminous saturated paper (or equal) over the space between tile and such paper shall be not less than 4-inch by 16-inch in size.

4615.10 TESTING AND STANDARDS FOR DRAINFIELD MATERIALS: (a) **DRAINFIELD ROCK:** Rock filler material

for use in connection with drainage works as set forth in Paragraph 4615.8(k) shall be rock, complying with State Road Department Specifications for #11 rock which is:

95 to 100% passing 1" sieve.
0 to 30% passing ½" sieve.
0 to 6% passing ⅜" sieve.

(b) **FOUR-INCH DRAINTILE:** Four-inch draintile shall conform to the Standard ASTM C4-62 for clay draintile and C412-65 for concrete draintile.

(c) **RESERVOIR DRAINFIELD UNIT:** Reservoir drainfield units shall conform to or exceed the strength requirements of the Standards set forth in Paragraph (b) above.

(d) **TESTS AND REPORTS:** All persons, firms or corporations selling or offering for sale three-fourths-inch drainfield rock, four-inch draintile or reservoir drainfield units or components of reservoir drainfield units shall have such tests made as are necessary to maintain product control within the limits set forth above and cause to have not less than one monthly report made to the Plumbing Inspector by a recognized, qualified and independent testing laboratory stating all test results of the preceding month.

(e) **TEST RESULT:** Any product, the required monthly reports of which do not show maintenance of minimum product standards as set forth in this Code shall not be approved for use. Any installations made during a period when monthly reports indicate the product fails to comply shall be investigated and representative tests made. If the products in such installation fail to comply, the Plumbing Inspector shall order removal of the products from the site or redesign based on the qualities indicated by test.

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) Well casing shall be continuous, of new pipe and shall be driven to a suitable aquifer. Pipe 6 inches or less in diameter shall be galvanized.

(c) Well shall be developed and free of all loose sand and stone.

(d) Draw down shall not be excessive.

(e) 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.

(f) 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.

(g) The suction line shall be of a size to furnish water in sufficient volume and adequate pressure.

(h) The suction line from the well to the pump shall be not 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.

(i) A union or slip coupling shall be installed in the suction line just before the pump.

(j) Piping from well pump to hydropneumatic tank or other approved water system pressurizing device shall not be smaller than the discharge outlet size of the pump.

(k) 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.

(l) 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.

(m) 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.

(n) The pump and tank system shall be subject to such tests as will effectively disclose all leaks and defects.

(o) The pump and water pressurizing system shall be installed with regard to spacing as to be reasonably accessible for repair.

(p) Wells shall be so located as to be free of danger of contamination from unsafe water supply and shall be at least 50 feet from a septic tank, drain field, soakage pit or discharge well and of sufficient depth to provide pure and wholesome water.

(q) 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.

(r) A water supply well used for domestic purposes shall be drilled to a depth of not less than 20 feet, except and unless a lesser depth is specifically approved by the Division of Health.

(s) The type and capacity of the pump, equipment, suction and pressure lines and tank shall not be less than specified in Table 46-X.

(t) 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 Inspector.

(u) A concrete pad, 4 inches thick, shall be poured around the well and shall extend 18 inches on all sides. This pad shall be placed immediately below the tee and suction line and shall slope outwardly.

4616.2 WORKING CODE: Any person, firm or corporation submitting application to the Plumbing Inspector 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 meet. 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 Paragraphs 4616.1 (a), (b), (c), (d), (e), (p), (t), and (u).

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.

NOTES

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 Tank	H. P.	Families	Stores	Well Size
23	720	1	¾	¾	42	½	1	.....	1½
30	900	1¼	1	1	82	¾	1	.....	2
40	1200	1¼	1	1	120	¾	1	.....	2
11	720	1	¾	¾	42	½	.....	1	1½
24	900	1¼	1	¾	82	¾	2	2	2
37	1300	1½	1¼	1	120	¾	3	3	2
45	1500	1½	1¼	1	220	1	4	4	2
53	1650	2	1¼	1¼	220	1	5	5	2
62	1860	2	1¼	1¼	220	1½	6	6	2
71	2130	2	1½	1¼	315	1½	7	7	2½
80	2400	2	2	1½	315	2	8	8	2½
89	2600	2	2	1½	525	2	9	9	2½
98	2700	2	2	1½	525	3	10	10	3

EXCEPTIONS: Variance from the above table may be permitted provided that detailed plans and calculations are submitted to the Plumbing Inspector 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) A discharge well shall be drilled to an aquifer yielding water having a well for a public swimming pool shall, if such stratum is not available, then be deeper than any supply well in the area. A discharge chloride content of not less than 1500 P.P.M. of chloride. A discharge well for an area drain, rain water or roof water disposal shall be preceded by a settling tank of approved design and capacity.

(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 Where a sprinkler is provided in a trash or linen chute, heads shall be provided at each third floor and an accessible gate valve shall be required.

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 travel trailers which are properly plumbed 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 any recreation vehicle where such vehicle is used as or for 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:	**Men:**
1 water closet for each 15 women	1 water closet for each 20 men
1 lavatory for each 20 women	1 shower bath for each 20 men
1 shower bath for each 20 women	1 urinal for each 25 men

For completely sewered trailer parks, the toilet facilities shall be as follows:

Women:	**Men:**
1 water closet	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.

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 therefore 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 a 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 bear the approval of the County 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 ⅛" per ft.)	Max. No. of Trailers Individually Vented System	Max. No. 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 coach 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 a 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" x 4" 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 p.s.i. 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 in diameter.

(d) When a trailer coach is physically connected to the park distributing system, a separate service shutoff valve and spring-loaded, soft-seat check-valve shall be installed on the branch service line, at or near, the service connection to each trailer.

(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 disconnect 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 Inspector 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 of the trailer sanitary facilities and connection of each trailer to the park water and sewage system shall be placed by the inspector 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.

NOTES

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 liquified 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 liquified petroleum gas shall comply with Chapter 527, 1969 Florida Statutes and 1970 amendment to Subsection (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 nor pass through any walls, partitions, ceiling or floors.

4701.6 GAS PIPING IN MULTI-FAMILY RESIDENTIAL AND COMMERCIAL BUILDINGS

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:

(a) 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).

(b) 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 of 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) Liquified 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 to supplement, but not supersede, the specific requirements set forth herein:

4702.1 Standard for the Installation of Gas Appliance and Gas Piping, NFPA No. 54-1969, of the National Fire Protection Association.

4702.2 Standard for the Storage and Handling of Liquified Petroleum Gases, NFPA No. 58-1969, of the National Fire Protection Association.

4702.3 Standard for Consumer-owned Gas Piping and Gas Equipment on Industrial and Commercial Premises in accordance with information letter No. 90, January 1958, of the American Gas Association.

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 Subsection shall be deemed tampering as prohibited by applicable ordinances.

4703.2 Application for gas permit will be accepted only from 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 data 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.

NOTES

PART XIII

MECHANICAL VENTILATION

CHAPTER 48

FORCED VENTILATION

4801 GENERAL
4802 REQUIREMENTS BASED ON USE

4801 GENERAL

4801.1 SCOPE: 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.

4801.2 APPLICATION: Mechanical ventilation shall be forced ventilation supplying outside air, as set forth in this chapter, or shall be air conditioning, as set forth in Chapter 49. Required forced ventilation supplying outside air shall be in operation when 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 main rooms need not be individually ventilated. The Building Official 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 the hazards, arrangement of building components and equipment, and of special equipment for specific conditions of use. The published "Standards" of the National Fire Protection Assn. and the "Guide," published by the American Society of Heating and Ventilating Engineers, shall be accepted as standards of good practice.

4802 REQUIREMENTS BASED ON USE

Subject to the consideration of the standards of good practice as set forth in Sub-section 4801.2, there shall be not less than one complete change of air in each occupied room or space every 30 minutes, except as follows:

(a) In buildings of Group A, B, C, or D occupancy there shall be a minimum of ten cubic feet per minute of outside air per occupant, but not less than one change of air every 30 minutes. If the velocity at the intake exceeds ten feet per second, the intake shall be placed not less than eight feet above the floor directly beneath.

(b) In all buildings used for storage or handling of automobiles 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 ten minutes. Such exhaust ventilation shall be taken from a point at or near the floor.

(c) In buildings or portions thereof used for dry-cleaning plants, there shall be a complete change of air every three minutes.

(d) In toilet rooms there shall be a complete change of air every three minutes except that where the ventilating air has been conditioned there shall be a complete change of air every 7½ minutes.

(e) In below-grade vaults and equipment rooms, unless continuous ventilation is provided, there shall be a complete change of air every three minutes during periods of human occupancy.

(f) In paint-spray booths, woodworking shops, manufacturing places using plastics and similar hazardous locations, there shall be a complete change of air every minute.

NOTES

CHAPTER 49

AIR CONDITIONING AND REFRIGERATION

4901 GENERAL
4902 STANDARDS
4903 GENERAL REQUIREMENTS

4901 GENERAL

4901.1 (a) 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 in mechanical apparatus and equipment to secure the expressed intent for reasons of public safety.

(b) SCOPE: All air conditioning and refrigeration equipment shall be as herein set forth and existing installations not conforming with the requirements of this Chapter shall be made to comply, when re-located, resized, or when altered or repaired, the cost of which exceeds 25 percent of the value of the existing installations.

4901.2 (a) A permit, as set forth in Chapter 3, shall be required for the installation, alteration or major repair of any air conditioning or refrigeration 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) Application for permit will be accepted from only qualified persons or firms. Qualification of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of construction tradesmen.

(c) Applications 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 a system of more than one and one-half ton capacity or is connected 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 ten thousand ($10,000) dollars or more, such plans shall be prepared by and bear the impress of a qualified Registered Professional Engineer.

4901.3 INSPECTION: Inspections shall be requested and made at the following stages:

(a) Before concealing any portion of the system.

(b) Final inspection.

4902 STANDARDS

4902.1 The following standards are hereby adopted as a part of this Code and supplement, but do not supersede, the specific requirements set forth herein:

(a) The American National Standards Institute "Safety Code for Mechanical Refrigeration," ANSI B9.1-1964.

(b) The National Fire Protection Association Pamphlet 90A-1969, Air Conditioning and Ventilating Systems of Other than Residential Type.

(c) The National Fire Protection Association Pamphlet 90B-1968, Residential Type Warm Air Heating and Air Conditioning Systems.

(d) The American National Standards Institute "Code for Pressure Piping," ANSI 31.1.0-1967 and 31.2-1968 including B.31.1a-1965.

(e) Where in NFPA Pamphlets 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.

4902.2 The guide published by the American Society of Heating, Refrigerating and Air Conditioning Engineers shall be accepted as a standard of good practice.

4903 DETAILED REQUIREMENTS

4903.1 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 ten feet above grade shall be secured to the structure by bolts or screws to resist horizontal wind loads. Such units cantilevering more than eight inches 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.

4903.2 FIRE RESISTIVE RATINGS: Where walls or 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 applicable sections of this Code, including Sub-section 3703.5 herein and the standards set forth in Section 4902 and such wall and ceiling assemblies shall be constructed in accordance with the conditions of the standard fire test made on such assembly.

4903.3 WASTE WATER: 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 Inspector. Condensate drain lines from air conditioning and refrigeration equipment shall be of the materials set forth in Sub-section 4606.7.

4903.4 MAINTENANCE OF SYSTEMS: All refrigerating systems shall be maintained by the user in a clean condition, free from accumulations of oily dirt, waste, and other debris, and shall be kept readily accessible at all times.

4903.5 SIGNS REQUIRED: (a) Each refrigerating system shall be provided with legible and securely attached permanent sign indicating thereon the names 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:

(a) Instruction for shutting down the systems in case of an emergency.

(b) The name, address, and day and night telephone numbers for obtaining service.

(c) The name, address, and telephone number of the Building Official and instructions to notify said Building Official immediately in case of emergency.

4903.6 LOCATION AND ACCESS: (a) All air-conditioning units, air handlers refrigeration equipment and/or appliances shall be accessible for inspection, service, repair and replacement.

(b) No corridor, stair enclosure, passageway or other path of egress in a building, any part of which is normally used for sleeping purposes, shall be used for the supply or return of air; nor shall any air-conditioning or refrigeration equipment be installed therein.

(c) No attic, basement or concealed space in a building shall be used as an integral part of a duct system, unless it conforms to all the requirements for ducts.

4903.7 OUTSIDE AIR SUPPLY: (a) All air conditioning or mechanically refrigerated spaces normally occupied by persons shall be provided with outside air at a rate of not less than seven and one-half cubic feet per minute per person.

(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.

4903.8 DUCTS: All duct used shall be of incombustible materials and comply with the construction as set forth in Section 4902 and Section 4103.

4903.9 COOLING TOWERS: The recommendations set forth in the Standard on Water-Cooling Towers NFPA 214-1968 of the National Fire Protection Association shall be used as a guide to fire-protection of water cooling towers. Induced draft cooling towers of combustible construction located on the roofs of buildings more than 2 stories in height shall be protected with automatic sprinkler devices as set forth in the standard.

uplift forces on the bottom of the pool and lateral earth forces on the walls.

(2) Design criteria shall be taken when the pool is empty and the ground water is at flood criteria elevation at the site.

(3) 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 device shall not be credited for more than two feet of the difference of head between the pool bottom and the flood criteria.

(4) The design of the pool walls and bottom slab for hydrostatic pressure and lateral pressure of adjacent soil with ground water at flood criteria elevation may be based on an increase of 33⅓ percent of the allowable stresses set forth in this Code for the materials used.

5002.5 MINIMUM EQUIPMENT: (a) (1) A pool main outlet shall be provided at the lowest point of each pool for emptying the pool.

(2) A grate 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) All public pools installed prior to the effective date of this regulation shall meet the requirements as set forth in Sub-paragraph 5002.5(a)(2) above within six months from the effective date of this regulation.

(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 sq. ft. of pool water surface, or fraction thereof. The entire recirculation inlet piping system shall be of such size that the velocities do not exceed ten feet per second using the design flow. Suction lines shall not exceed 5 feet per second using the design flow during the filtration period. Where the main outlet is used for a 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 5 times the cross sectional area of the suction line.

(d) Where approved by the Building Official, 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 once every 18 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 furtherest 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.

(e) A vacuum fitting or other approved device serving the same function shall be provided on all pools and should be a minimum of 1½" in diameter and located not more than 18" below the water line in an accessible position.

(f) A valve shall be installed on the main suction line located in an accessible place outside the walls of the pool.

(g) The turnover rate for all private pools shall be a minimum of once every 18 hours of operation.

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 p.s.i

(b) Reinforced concrete shall have not less reinforcing, in both directions, than the minimum set forth in the Standard in Sub-section 2502.1 for temperature reinforcing.

(c) Reinforcing bars shall have not less than 3 inches of concrete cover when placed in contact with earth and not less than two inches 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 2-cell block laid with nominal 8-inch thickness in the wall and all voids shall be poured full with concrete having a minimum strength of 2500 p.s.i. in 28 days, and containing no aggregate larger than will pass a #3 sieve. Filling of voids will proceed in stages not to exceed 24 inches in height, or 12 times least dimension of void, whichever is the greater. Concrete shall be thoroughly rodded into voids. Walls with a height greater than 3 feet 4 inches shall have a minimum vertical steel of #3 bars, 16 inches o.c.

5003.3 PNEUMATICALLY PLACED CONCRETE: Pneumatically placed concrete shall be as set forth in Sub-sections 5003.1 and 5003.2 except that walls shall have a minimum thickness of 6 inches at the bottom and 4 inches 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 and shall be of Portland cement concrete having a 28-day compressive strength of not less than 3000 p.s.i. Floors shall have a minimum thickness of 6 inches and walls shall have a minimum thickness of 8 inches. 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: Plumbing permits shall be required for pool piping. Actual connections to potable water supply and sanitary sewers 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 objectionable 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 method of disposing of backwash water and a method of emptying the pool shall be provided by one of the following methods; except that backwash water from pressure diotamite filters so piped to permit backwash to waste, shall be deployed to a settling basin before final disposal by methods (a), (c), and (e) below.

(a) 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. The methods of connection shall be as set forth in Chapter 46 and there shall be no direct connection.

(b) By disposal to an open waterway, bay or ocean where permitted by the Health Department.

(c) By disposal to a drainfield. The installation and method of construction of a drainfield shall be as set forth in Section 4615.

(d) By disposal through a sprinkler system for irrigation purposes. Disposal shall be within the confines of the property from which it originates. There shall be no flow on or across any adjoining property or sidewalk either public or private. Backwash water shall not be discharged through a sprinkler system.

(e) By disposal to a soakage pit having a volume as set forth in Table 50-A and an effective depth not greater than 5 feet 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# asphalt saturated felt for a distance of 3 feet out each side and the effective depth shall be not greater than 5 feet below grade. Soakage pits shall conform to requirements set forth in Sub-section 4611.6 except that the lids thereof shall conform with the requirements for septic tanks as set forth in Sub-section 4615.5.

(f) Where sufficient pervious area exists remote from water-supply wells, disposal systems, soakage pits, septic tanks, drainfields and non-tidal bodies of water; such pervious area may be used for the disposal of pool water and backwash water under the following conditions:

(1) Surface grading is such as to confine any ponding to this area and such ponding or standing water shall not persist for more than one hour after discharge.

(2) A minimum distance of 50 feet is maintained between this area and any supply well and 25-feet minimum distance to any disposal works.

(3) The pervious area shall be a minimum of fifteen times the area set forth in Table 50-A. The Building Official may require percolation tests where the percolation ability of the soil is questionable.

(g) The turnover rate for all private pools shall be a minimum of once every 18 hours of operation.

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 p.s.i

(b) Reinforced concrete shall have not less reinforcing, in both directions, than the minimum set forth in the Standard in Sub-section 2502.1 for temperature reinforcing.

(c) Reinforcing bars shall have not less than 3 inches of concrete cover when placed in contact with earth and not less than two inches 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 2-cell block laid with nominal 8-inch thickness in the wall and all voids shall be poured full with concrete having a minimum strength of 2500 p.s.i. in 28 days, and containing no aggregate larger than will pass a #3 sieve. Filling of voids will proceed in stages not to exceed 24 inches in height, or 12 times least dimension of void, whichever is the greater. Concrete shall be thoroughly rodded into voids. Walls with a height greater than 3 feet 4 inches shall have a minimum vertical steel of #3 bars, 16 inches o.c.

5003.3 PNEUMATICALLY PLACED CONCRETE: Pneumatically placed concrete shall be as set forth in Sub-sections 5003.1 and 5003.2 except that walls shall have a minimum thickness of 6 inches at the bottom and 4 inches 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 and shall be of Portland cement concrete having a 28-day compressive strength of not less than 3000 p.s.i. Floors shall have a minimum thickness of 6 inches and walls shall have a minimum thickness of 8 inches. 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: Plumbing permits shall be required for pool piping. Actual connections to potable water supply and sanitary sewers 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 objectionable 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 method of disposing of backwash water and a method of emptying the pool shall be provided by one of the following methods; except that backwash water from pressure diotamite filters so piped to permit backwash to waste, shall be deployed to a settling basin before final disposal by methods (a), (c), and (e) below.

(a) 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. The methods of connection shall be as set forth in Chapter 46 and there shall be no direct connection.

(b) By disposal to an open waterway, bay or ocean where permitted by the Health Department.

(c) By disposal to a drainfield. The installation and method of construction of a drainfield shall be as set forth in Section 4615.

(d) By disposal through a sprinkler system for irrigation purposes. Disposal shall be within the confines of the property from which it originates. There shall be no flow on or across any adjoining property or sidewalk either public or private. Backwash water shall not be discharged through a sprinkler system.

(e) By disposal to a soakage pit having a volume as set forth in Table 50-A and an effective depth not greater than 5 feet 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# asphalt saturated felt for a distance of 3 feet out each side and the effective depth shall be not greater than 5 feet below grade. Soakage pits shall conform to requirements set forth in Sub-section 4611.6 except that the lids thereof shall conform with the requirements for septic tanks as set forth in Sub-section 4615.5.

(f) Where sufficient pervious area exists remote from water-supply wells, disposal systems, soakage pits, septic tanks, drainfields and non-tidal bodies of water; such pervious area may be used for the disposal of pool water and backwash water under the following conditions:

(1) Surface grading is such as to confine any ponding to this area and such ponding or standing water shall not persist for more than one hour after discharge.

(2) A minimum distance of 50 feet is maintained between this area and any supply well and 25-feet minimum distance to any disposal works.

(3) The pervious area shall be a minimum of fifteen times the area set forth in Table 50-A. The Building Official may require percolation tests where the percolation ability of the soil is questionable.

TABLE 50-A

MINIMUM AREA AND VOLUME OF SOAKAGE PITS FOR SWIMMING POOLS

Pool Capacity Gallons	Diameter S & G Filter	SOIL PERCOLATION RATES MINUTES/INCH											
		1		2		3		4		5		6	
		Sq. Ft.	Gals.	Sq. Ft.	Gals.	Sq. Ft.	Gals.	Sq. Ft.	Gals.	Sq. Ft.	Gals.	Sq. Ft.	Gals.
17,000	24″	53.5	2,000	96	3,590	130	4,860	158	5,910	182	6,800	202	7,560
17,000 to 26,000	30″	83	3,100	149	5,560	200	7,550	247	9,240	280	10,500	315	11,780
26,000 to 38,000	36″	120	4,490	215	8,050	292	10,910	358	13,400	408	15,290	452	16,900
38,000 to 52,000	42″	163	6,100	293	10,970	400	14,980	485	18,150	555	20,800	618	23,100

NOTE: Effective depth of soakage pits — 5′0″.
Square feet refers to area of bottom of pit.

5005 EQUIPMENT

5005.1 **FILTRATION EQUIPMENT: (a) STANDARDS:** Filtration equipment for public pools shall be in accordance with the requirements of the State Board of Health. Filtration equipment for private pools shall be as set forth herein.

(b) SAND FILTERS: (1) Pressure sand filters shall have a filtration rate not to exceed five gallons per minute per square foot of filter area.

(2) Pressure sand filters shall have a backwash rate not less than 12 gallons per minute per square foot of filter area.

(3) Filtering materials shall consist of not less than 19 inches of suitable grades of screened, sharp silica sand properly supported on a graded silica gravel bed, with the effective size of particles of sand from 0.4 to 0.5 mm and with a uniformity coefficient of 1.5 to 2.0.

(4) There shall be a sufficient free-board above the surface of the sand and below the overflow troughs or pipes of the filter to permit a 50 percent expansion of the sand during backwash cycles without loss of sand

(5) Pressure gages shall be installed on the influent and effluent lines.

(6) A sight glass shall be installed on the backwash line.

(7) Steel filter tanks shall be of welded sheet steel construction and shall be hydrostatically tested to a pressure of 50 p.s.i.

(8) An inlet baffle shall be provided.

(9) An indirect underdrain shall be provided to prevent loss of sand, and re-entry of sand into the pool.

(10) Steel tanks placed underground shall be not less than 10 gage material, and with non-corrosive exterior coating except that such tanks may be of not less than 14 gage steel where such tanks are hot-dip, zinc-coated (galvanized) after fabrication with not less than 1.25 oz. per square foot of surface.

(11) A manhole 11″ x 15″ minimum, and cover, shall be provided on tanks 24 inches or longer.

(12) Tanks of construction other than steel may be used subject to approval.

(c) DIATOMITE - TYPE FILTERS: (1) Diatomite-type filters shall be either pressure or vacuum.

(2) The filtration rate shall not exceed three gallons per minute per square foot of effective filter area.

(3) Provision shall be made to introduce filter aid into the filter in such a way as to evenly precoat the filter septum or element before the filter is placed in operation.

(4) The filter piping shall be so designed that during the precoating operation the effluent from the filter shall be recirculated or run to waste and shall not be fed to the pool until free of filter aid.

(5) There shall be provision for removing the cake by either backwash or simple disassembly.

(6) Filters shall be so designed and installed to permit ready disassembly and removal of filter elements.

(7) Filters shall be equipped with pressure or vacuum gages and such gages shall be located to determine the differential across the filter and the need for cleaning.

(8) For pressure diatomite filters, pumps shall have the capacity for a minimum head of 75 feet.

(d) 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 of below ground installations is not water tight, the pit shall have approved drainage.

(e) AIR RELIEF: An air relief device shall be installed on each pressure filter tank at the high point of the tank.

(f) OTHER EQUIPMENT: Other types of filtration equipment may be used if shown by test to be equal in efficiency as compared to a sand and gravel filter.

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 four inches at the throat** and the interior of the gutter not less than three inches wide. The **bottom of the gutters shall slope uniformly to drains with a slope of not less than ⅛ inch per foot. One drain shall not serve in excess of 15 feet of scum gutter. The drains shall be provided with outlet pipes at least two inches 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 gutters shall be not less than eight inches 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 and the skimming devices are approved by the Building Official. 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 inches thick for the outer 2 inches 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 inches 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 inches.

(3) An easily removable or changeable basket or screen shall be provided to trap large solids except on "lily pad" type skimmers.

(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 inches 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, Type K or L	All lines
Galvanized Steel, Std. Wt.	All lines
Wrought Iron, Std. Wt.	All lines
Brass pipe or tubing	All lines
Cast Iron, Service Wt.	Gutter lines only
Stainless Steel, AISI, type 300 series	All lines
Monel	All lines

(2) Thermoplastic pipe and fittings may be used as follows:

(aa) Acrylonitrile-Butadiane-Styrone (A.B.S.) Schedule 40 I.P.S. conforming to U. S. Commercial Standard PS 10-69.

(bb) Polyvinyl Chloride (P.V.C.) Schedule 40, I.P.S. High Impact unplasticized, conforming to U. S. Commercial Standard PS 21-70.

(cc) Polyethylene, series 3, conforming to U. S. Commercial Standard PS 18-69. (Note: If pool heaters are used, manufacturer's specifications shall be complied with.)

(dd) All thermoplastic pipe shall be continuously marked on opposite sides setting forth size, type, schedule, U. S. Commercial Standard and bearing the National Sanitation Foundation 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 seal of approval.

(ff) ABS and PVC may be used on all pressure, suction and gravity lines around the pool and well connections. Polyethlene may be used on pressure lines only.

(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.

(4) All fittings used in the gutter lines shall be of the drainage type.

(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, 4603.18 (b), 4603.20, 4605, 4606, 4607, 4609 and 4614.4.

(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, plumber's strap, or concrete column pedestals which shall be secured to the pool wall at maximum 5 foot centers. Valves, check valves, pump streamers and other piping devices shall be supported directly.

(4) Where thermoplastic pipe and fittings are used, all pipe trenches and backfill shall be free of rock.

(c) APPROVED EQUIPMENT: All pool equipment used for water care or treatment shall be required to bear the seal of approval of the National Sanitation Foundation, and/or be required to conform to any U. S. Commercial Standards and/or conform to the standards of the State Board of Health.

5005.4 DIVING BOARDS: A diving board shall not be installed in a pool whose greatest depth is less than 8 feet. A depth of not less than 8 feet and 6 inches shall be required for a one-meter board. A depth of not less than 10 feet shall be required for a 3-meter board. The deepest section of the pool shall be not closer than ten feet from the deep end where the board is attached, and the break point in slope shall be five feet or deeper at a distance of twenty 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 seven feet six inches, and the board shall extend at least two feet from the deep end wall.

5005.5 WALL AND FLOOR SLOPES: All walls shall be vertical except pool walls may run to the floor slab in a circular arc starting

from the bottom of a 30 inch vertical section of wall measured downward from the waterline in depths of 3′ 6″ or greater. The slope of the floor in the shallow end of a pool shall not exceed one foot vertical to seven feet horizontal. The transition point between shallow and deep water shall be not less than 5 feet deep.

5005.6 LADDER: Pools having a depth greater than 3½ feet shall be provided with a ladder or steps.

5005.7 POOL HEATERS: (a) Gas-fired swimming pool heaters and swimming pool boilers shall comply with all applicable American Standards requirements including A.G.A. and A.S.M.E. 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 other applicable requirements of the Code.

(b) Pool-heating equipment shall have not less than 70 percent thermal efficiency across the unit.

(c) Water heaters and boilers shall be provided with a thermostatic or high temperature control with a maximum temperature differential of 15°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°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 Building Official shall inspect all wet and dry niche pool lights, pump motors, and other electrical equipment or accessories installed in conjunction with a private pool and such electric work and inspection shall be as set forth in Chapter 45.

5006.2 POOL PIPING: A permit shall be required for, and the Building Official shall inspect the installation of the water supply and disposal as set forth in this Chapter. Pool pressure piping, filter installation and waste disposal shall be tested and approved with all joints visible. The entire pool pressure piping system including the main drain shall be tested with a water test of 40 p.s.i. and proved tight before being covered or concealed. 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. A waterproof instruction sheet shall be conspicuously posted at the control station which shall show the following:

(1) Complete instruction in the filter and backwash operation and the requirements for pool cleanliness.

(2) Instructions for the regular use of chlorine or an equivalent sterilizing agent and the quantity and frequency of use. Such quantity and frequency shall conform to Section 21, Chapter XX of the State Sanitary Code.

(3) General instructions on technique of adding required chemicals and use of test set for ph and chlorine.

APPENDIX A
STANDARDS ADOPTED IN SFBC—CHRONOLOGICAL ORDER

Code Section	Standard Number	Topic
3510.2	ASTM C475-64	Gypsum wallboard
	ASTM A525-67	Gypsum wallboard
	ASTM C36-68	Gypsum wallboard
	ASTM C975-64	Gypsum wallboard
	ANSI A97.1-1965	Gypsum wallboard
	ANSI A97.1-1965	Gypsum wallboard
3701.2	NFPA 90A-69	Air conditioning
	ASTM E119-69	Standard fire test
	ASTM E152-66	Door assemblies
	UL 10A-1968	Doors and shutters
	ASTM E163-67	Window assemblies
	NFPA 80-1970	Fire doors and windows
	UL 168-1969	Smoke detectors
	UL Fire Protection Equipment List	
	UL Building Materials List	
	ASTM E84-70	Flame spread test
	ASTM E136-67	Non combustibility test
	Design Data GA 1969-70	Fire resistance
3801.2	NFPA 13-69	Sprinkler systems
3802.2	NFPA 12-68	Fire extinguishing systems
3803.1	NFPA 14-70	Standpipes
3804.4	NFPA 22-70	Pressure tanks
3807.2	NFPA 10-70	Fire extinguishers
3905.2	NFPA 54-69	Smoke pipes
3905.3	NFPA 90B-68	Non-res. air conditioners
3906.1	ASTM C315-56	Flue liners
3906.1	ASTM C106-67	Fire brick
4001.4	NFPA 89M-70	Clearances
4004	NFPA 31-68	Oil-burning equipment
4005.1	AIA Code 1967	Heating appliances
4006.1	ASME (1968)	Pressure vessels
4006.5	NBB PVI Boiler blowoff equipment (1968)	Boiler blowoff
4102.1	NFPA 30-69	Flammable liquids
	NFPA 31-68	Oil-burning equipment
4103.1	NFPA 90A-69	Non-res. air conditioners
	NFPA 90B-68	Residential air conditioners
	NFPA 91-61	Blower systems
	NFPA 96-70	Restaurant Cooking
4103.5	NFPA 91-61	Blower systems
	NFPA 664-62	Dust explosions
4104	NFPA 40-67	Motion picture film
4106	NBS Handbooks 48, 49, 50	Radiation
	51, 53, 55, 57, 58, 59,	Radiation
	61, 65, 69, 73, and 76	Radiation
4107.2	NFPA 33-69	Paint spraying
4107.3	NFPA 34-66	Diptanks
4502.1	NFPA 70-1968	Electric code
4502.2	UL 48-1966	Signs
4502.3	UL 153-1970	Portable lamps
4502.3	UL 57-1969	Portable lamps
4502.4	Florida Statutes: 509.211(5) (g) 509.211 (6)	Emergency lighting
4502.5	NFPA 56A-1970	Hospital operating
	NFPA 56B-1968	rooms lighting
	NFPA 56C-1970	

APPENDIX A

STANDARDS ADOPTED IN SFBC—CHRONOLOGICAL ORDER

Code Section	Standard Number	Topic
4502.5	NFPA 56D-1970	
	NFPA 56F-1970	
4502.6	FDHR 64 Nursing Homes	Nursing homes lighting
4502.7	FIC PE-1958 Portable tools	Grounding portable tools
4502.8	NFPA 20-1967	Fire pumps
4502.9	NFPA 76A-1970	Hospital wiring
4604.1	As listed in Table 46-C	Plumbing
4606.7	CS C272-65	PVC schedule 40
4607.2	ASTM 2235-67	Solvent cement
	ASTM 2564-67	Solvent cement
	CISPI 301-69T	Hubless pipe
	ASTM C564-68	Rubber gaskets
	CISPI HSN-68T	Rubber gaskets
	ANSI B2.1-1968	Pipe thread
	FS WW-P-351a (1963)	Pipe thread
	ASTM C425-66T	Compression joints
	ANSI B31.1.0-1967	Brazed joints
	ANSI B31.2-1968	Brazed joints
4613.11	ANSI A112.11.1-1968	Drinking fountains
	ANSI Z4.2-1946	Drinking fountains
4614.3	ANSI A40.6-1943	Back flow device
	ANSI A40.4-1943	Back-flow air gap
4614.4	ANSI A40.4-1942	Back-flow air gap
4614.12	ANSI A40.8-1955	Pipe sizes
4615.10	ASTM C4-62	Drain tile
	ASTM C412-65	Drain tile
4702.1	NFPA 54-69	Gas piping
4702.2	NFPA 58-69	L P Gas
4702.3	AGA Letter 90-1958	Consumer gas
4902.1	ASA B9.1-1964	Mechanical refrigeration
	NFPA 90A-69	Non-res. air conditioning
	NFPA 90B-68	Residential air-conditioners
	ANSI B31.1-1955	Pressure piping
	ANSI B31.1.0-1967	
	ANSI B31.2-1968	
4902.2	ASHR & AE guide	Air conditioning
4903.9	NFPA 214-68	Water-cooling towers
5005.3	PS 10-69	PVC
	PS 18-69	PVC
	PS 21-70	PVC

APPENDIX B
STANDARDS ADOPTED BY SFBC—BY AUTHORITY

STANDARD	CODE SECTION	STANDARD	CODE SECTION
B16.15-1964	**4604.1**	B72.2-1967	4604.1
B16.18-1963	**4604.1**	B72.3-1967	4604.1
B16.22-1963	**4604.1**	H23.1-1970	4604.1
B16.23-1969	4604.1	**H26.1-1967**	**4604.1**
B16.24-1962	**4604.1**	**H27.1-1967**	**4604.1**
B16.26-1967	**4604.1**	**Z21.10.1-1966**	**4604.1**
B16.27-1962	4604.1	Z21.10.2-1968	4604.1
B31.1.0-1967	4607.2	**Z21.10.3-1966**	**4604.1**
B31.2-1968	4902.1		
B36.2-1964	**4604.1**	Z4.2-1946	4613.11
B72.1-1967	4604.1	**Z97.1-1966**	**3508.1**

American Plywood Association — APA
1119 A Street
Tacoma, Washington 98401

Plywood Design Specification 1969	**CODE SECTION**	2902.2

American Society of Mechanical Engineers — ASME
345 E. 47th Street
New York, N. Y. 10017

Pressure Vessels (1968)	**CODE SECTION**	4006.1

American Society of Sanitary Engineers — ASSE
228 Standard Building
Cleveland, Ohio 44113

STANDARD		
ASSE 1003	**CODE SECTION**	4604.1

American Society for Testing and Materials — ASTM
1916 Race Street
Philadelphia, Pa. 19103

STANDARD	CODE SECTION	STANDARD	CODE SECTION
A29-67	**2404.7**	C5-59	4604.1
A72-68	4604.1		& 3503.2
A74-69	4604.1	C13-69	4604.1
A90-69	2604.1	C14-70	4604.1
A120-69	4604.1	C28-68	3503.2
A185-70	2604.1	C31-69	2505.2
A245-64	2404.6	**C33-67**	**2504.2**
A252-69	2404.6	**C34-62**	**2702.6**
A306-64	**2404.7**	C35-70	3503.2
A325-70	2801.3	C36-70	3510.2
A338-61	4604.1	C37-69	3502.2
A361-67	**2904.4**	**C39-66**	**2505.2**
A490-70	2801.3		& 2510.3
A525-67	**2801.3**	C42-70	2505.2
	3510.2	C52-70	2702.7
	& 4604.1	C55-70	2702.2
A615-70	2502.5	**C56-62**	**2702.6**
B6-70	2604.1	**C57-57**	**2702.6**
B32-70	4604.1	**C61-64**	**3503.2**
B36-69	**4604.1**	C62-69	2702.2
B42-70	4604.1	**C67-66**	**2702.2**
B43-70	4604.1	**C73-67**	**2702.2**
B75-68	**4604.1**	C76-70	4604.1
B88-70a	4604.1	C90-70	2702.5
B121-66	**4604.1**	C91-70	3503.2
B135-67	**4604.1**	C94-69	2506.2
B152-68	4604.1	**C106-67**	**3906.1**
B251-70	4604.1	C112-70	2702.6
B260-62T	**4604.1**	C144-70	2702.10
B306-70a	4604.1	C150-70	2504.1
C4-62	4615.10		& 2510.2
			& 3503.2

APPENDIX B

STANDARDS ADOPTED BY SFBC—BY AUTHORITY

STANDARD	CODE SECTION	STANDARD	CODE SECTION
C200-69	4604.1	D2235-67	4604.1
C206-49	3503.2		& 4607.2
C220-67	3506.1	D2239-67	4604.1
C221-61	3506.2	D2241-67	4604.1
C222-66	3405.1	D2282-66	4604.1
	& 3506.1	D2467-67	4604.1
C223-66	3506.1	D2564-67	4604.1
C270-68	2702.10		& 4607.2
C315-56	3906.1	D2609-67	4604.1
C330-69	2504.2	D2661-67	4604.1
C412-65	4615.10	D2662-68	4604.1
C425-66T	4607.2	D2664-67	4604.1
C471-66	2702.7	D2665-67	4604.1
C472-70	2702.7	D2666-67T	4604.1
C473-68	2702.7	E84-70	3701.2
C475-64	3510.2		& 2908.1
C564-68	4607.2		& 2908.3
D635-68	3505.1	E119-69	3701.2
D1527-68	4604.1	E136-67	3701.2
D1559-70	2403.4	E152-66	3701.2
D2104-68	4604.1	E163-65	3701.2
		E329-70T	305.1

American Waterworks Association Inc. AWWA
2 Park Avenue

STANDARD	CODE SECTION
AWWA C106-70 Centrifugally Spun pipe	4604.1
AWWA C203-66 Coal Tar Enamel	4604.1

American Welding Society AWS
345 E. 47th Street
New York, N. Y. 10017

STANDARD	CODE SECTION	STANDARD	CODE SECTION
B3.0-41T	2801.3	D12.1-61	2507.6
D10.9-69	2801.3	D1.0-69	2801.3

American Wood Preservers Association AWPA
1012 Fourteenth Street, N. W.
Washington, D. C. 20005

STANDARD	CODE SECTION
C1-69	2404.3 & 2907.2 & 2908.1
C3-69	2404.3
C4-69	2907.2
C12-69	2404.3
M6-69	2907.2

American Wood Preservers Institute AWPI
2600 Virginia Avenue, N.W.
Washington, D. C. 20037

STANDARD	CODE SECTION	STANDARD	CODE SECTION
LP-2-69	2907.2	LP-22-69	2907.2
LP-3-69	2907.2	LP-33-69	2907.2
LP-4-69	2907.2	LP-44-69	2907.2
LP-5-69	2907.2	LP-55-67	2907.2
LP-7-69	2907.2	LP-77-69	2907.2

APPENDIX B
STANDARDS ADOPTED BY SFBC—BY AUTHORITY

Cast Iron Soil Pipe Institute — CISPI
2029 K Street N. W.
Washington, D. C. 20006

STANDARD			CODE SECTION
301-69T	4607.2	HSN-68T	4607.2

Florida Industrial Commission — FIC
Tallahassee, Florida 32304

Ladders LAD-1959	CODE SECTION	3315
Portable Tools PE-1958	CODE SECTION	4505.1

Florida Statutes — FS

Chapter 527-1969		4701.2
509.211 (5) (g) & (6)	CODE SECTION	4505.1

Florida Department of Health and Rehabilitation Services—
Division of Health
P. O. Box 210
Jacksonville, Florida

Regulations for Nursing Homes Feb. 1964	CODE SECTION	4505.1

General Services Administration — GSA
Specifications Activity, Printed Materials
Supply Division
Building 197, Naval Weapons Plant
Washington, D. C. 20407

STANDARD	CODE SECTION
DD-G-451c (1968)	3508.1
GGG-P-351a (1944)	**4607.2**
HH-C-536a (1954)	**4604.1**
L-P-320a (1969)	4604.1
L-P-003156	4604.1
L-P-1036	4604.1
QQ-B-613c (1967)	**4604.1**
QQ-B-626c (1967)	**4604.1**
QQ-C-576b (1964)	**4604.1**
QQ-C-40 (1965)	**4604.1**
QQ-L-201f (1965)	**4604.1**
QQ-S-571d (1963)	**4604.1**
QQ-S-775d (1967)	**4604.1**
SS-P-331c (1967)	**4604.1**
SS-P-351a (1953)	**4604.1**
SS-P-356 (1955)	**4604.1**
SS-P-361d (1966)	4604.1
SS-P-371c (1967)	4604.1
SS-P-375d (1968)	4604.1
W-H-196f (1967)	**4604.1**
WW-P-441c (1964)	**4604.1**
WW-P-325a (1967)	**4604.1**
WW-P-351a (1963)	**4604.1**
WW-P-356a (1963)	4604.1
WW-P-377d (1962)	**4604.1**
WW-P-401d (1963)	4604.1
WW-P-406c (1964)	4604.1
WW-P-421c (1967)	**4604.1**
WW-P-460b (1961)	4604.1
WW-P-491b (1946)	4604.1
WW-P-501d (1967)	**4604.1**
WW-P-521f (1964)	4604.1
WW-P-541b (1954)	**4604.1**
WW-T-791 (1933)	**4604.1**
WW-T-797c (1963)	**4604.1**
WW-T-799b (1963)	**4604.1**
WW-V-54c (1966)	**4604.1**
WW-V-58a (1966)	**4604.1**

APPENDIX B

STANDARDS ADOPTED BY SFBC—BY AUTHORITY

Gypsum Association — GA
201 North Wells Street
Chicago, Illinois 60606

	CODE SECTION
Standard specification for screw type framing members to receive gypsum wallboard and backing board-1969	3510.2
Design data—Fire Resistive/Sound Control 1969-70 edition	3701.2

National Board of Boiler and Pressure Vessel Inspectors — NBBPVI
1155 N. High Street,
Columbus, Ohio 43201

	CODE SECTION
Boiler blowoff equipment (1968)	4006.5

National Bureau of Standards — NBS
Products Standard Section
Office of Engineering
Standards Services
Washington, D. C. 20234

STANDARD	CODE SECTION		CODE SECTION
CS94-41	4604.1	CS254-63	4604.1
CS95-41	4604.1	CS255-63	4604.1
CS96-41	4604.1	CS256-63	4604.1
CS116-54	4604.1	CS272-65	4606.7
CS197-60	4604.1	PS1-66	2902.2
CS207-60	4604.1	PS10-69	5005.3
CS188-66	4604.1	PS18-69	5005.3
CS218-59	4604.1	PS20-70	2902.3
CS253-63	2902.5	PS21-70	5005.3

Handbooks	
48-1951, 49-1951, 50-1952, 51-1952	4106
53-1953, 55-1954, 57-1954	4106
59-1954, 61-1955, 69-1959	4106
73-1961	4106

National Bureau of Standards — NBS
Clearing House for Federal Scientific and
Technical Information
Springfield, Va. 22151

STANDARD	CODE SECTION
SPR-217-49	4604.1

National Bureau of Standards — NBS
National Council of Radiation Protection & Measurements
4201 Connecticut Ave.
P. O. Box 4867
Washington, D. C., 20008

	CODE SECTION
NCPR 58-1954	4106
NCPR 65-1958	4106
NCPR 76-1961	4106

NOTES

APPENDIX C

Appendix to Chapter 31—
(See note at end of Chapter 31)

Group of Occupancy and Use	Occupant Load (L)	Required Number of Exits	Horizontal Exits: Minimum Width of Corridors (A)	Horizontal Exits: Doors *: Total Width (B)	Horizontal Exits: Doors *: Suggested arrangement	Stairs **: Total Width (C)	Stairs **: Suggested arrangement	Panic Hardware	Travel Distance
Group A (Assembly uses of over 1000 or more persons)	1000	4	220″	200″	5-40″	297″	1-66 3-77	Yes	150′ in unsprinklered buildings 200′ in sprinklered buildings
	1026	”	231	210	6-36	”	” ”		
	1050	”	”	”	”	308	4-77		
	1064	”	242	220	6-40	”	”		
	1100	”	”	”	”	319	3-77 1-88		
	1102	”	253	230	”	”	” ”		
	1140	”	”	”	”	330	2-77 2-88		
	1150	”	”	”	”	341	1-77 3-88		
	1178	”	264	240	”	”	” ”		
	1200	”	”	”	”	352	4-88		
	1216	”	275	250	7-36	”	”		
	1250	”	”	”	”	363	3-88 1-99		
	1252	”	286	260	8-36	”	” ”		
	1290	”	”	”	”	374	2-88 2-99		
	1300	”	”	”	”	385	1-88 3-99		
	1328	”	297	270	”	”	” ”		
	1350	”	”	”	”	396	4-99		
	1366	”	308	280	”	”	”		
	1400	”	”	”	”	407	3-99 1-110		
	1404	”	319	290	4-36 4-40	”	” ”		
	1442	”	”	”	” ”	418	2-99 2-110		
	1450	”	”	”	” ”	429	1-99 3-110		
	1480	”	330	300	2-36 6-40	”	” ”		
	1500	”	”	”	” ”	440	4-110		
	1518	”	341	310	” ”	”	”		
	1550	”	”	”	” ”	451	3-110 1-121		
	1556	”	352	320	8-40	”	” ”		
	1594	”	”	”	”	462	2-110 2-121		
	1600	”	”	”	”	473	1-110 3-121		
	1632	”	363	330	10-36	”	” ”		
	1650	”	”	”	”	484	4-121		
	1670	”	374	340	”	”	”		
	1700	”	”	”	”	495	3-121 1-132		
	1708	”	385	350	”	”	” ”		
	1746	”	”	”	”	506	2-121 2-132		
	1750	”	”	”	”	517	1-121 3-132		
	1788	”	396	360	”	”	” ”		
	—and so on—								

*Minimum width—32″
**Minimum width—44″
A=L x 11/50 B=L x 10/50 C=L x 11/33

APPENDIX C

Appendix to Chapter 31—
(See note at end of Chapter 31)

Group of Occupancy and Use	Occupant Load (L)	Required Number of Exits	Horizontal Exits			Stairs **		Panic Hardware	Travel Distance
			Minimum Width of Corridors (A)	Doors * Total Width (B)	Doors * Suggested arrangement	Total Width (C)	Suggested arrangement		
Group B Division 1 (Assembly uses of 300-1000 persons)	300	3	66″	60″	2-32″ 1-36″	2 req'd	3-44″	Yes	150′ in unsprinklered buildings. 200′ in sprinklered buildings
	304	”	77	70	” ”	”	”		
	342	”	”	”	” ”	99″	”		
	350	”	”	”	” ”	110	”		
	380	”	88	80	” ”	”	”		
	400	”	”	”	” ”	121	”		
	418	”	99	90	” ”	”	”		
	450	”	”	”	” ”	132	”		
	456	”	110	100	1-40 2-32	”	”		
	494	”	”	”	” ”	143	2-44 1-55		
	500	”	”	”	” ”	154	1-44 2-55		
	532	”	121	110	2-40 1-32	”	” ”		
	550	”	”	”	” ”	165	3-55		
	570	”	132	120	3-40	”	”		
	600	”	”	”	”	176	2-55 1-66		
	603	”	143	130	3-40 1-32	”	” ”		
	646	”	”	”	” ”	187	1-55 2-66		
	650	”	”	”	” ”	198	3-66		
	684	”	154	140	” ”	”	”		
	700	”	”	”	” ”	209	2-66 1-77		
	722	”	165	150	” ”	”	” ”		
	750	”	”	”	” ”	220	1-66 2-77		
	760	”	176	160	6-32	”	” ”		
	798	”	”	”	”	231	3-77		
	800	”	”	”	”	242	2-77 1-88		
	836	”	187	170	”	”	” ”		
	850	”	”	”	”	253	1-77 2-88		
	874	”	198	180	”	”	” ”		
	900	”	”	”	”	264	3-88		
	912	”	209	190	”	”	”		
	950	”	”	”	”	275	2-88 1-99		
	988	”	220	200	4-32 2-40	286	1-88 2-99		
	999	”	”	”	” ”	297	3-99		
	1000 or more occupant load becomes Group A								

*Minimum width—32″
**Minimum width—44″

A=L x 11/50 B=L x 10/50 C=L x 11/33

APPENDIX C

Appendix to Chapter 31—
(See note at end of Chapter 31)

Group of Occupancy and Use	Occupant Load (L)	Required Number of Exits	Horizontal Exits: Minimum Width of Corridors (A)	Horizontal Exits: Doors *: Total Width (B)	Horizontal Exits: Doors *: Suggested arrangement	Stairs **: Total Width (C)	Stairs **: Suggested arrangement	Panic Hardware	Travel Distance
Group B Division 2 (Assembly use of less than 300 persons)	10	1	44″	NR	1-32″	NR	1-36″	Yes for over 100 persons	150′ in unsprinklered buildings 200′ in sprinklered buildings
	[1]50	2	”	40″	1-32 1-36	2 req'd	2-36		
	152	”	”	”	” ”	88	2-44		
	190	”	”	”	” ”	”	”		
	200	”	”	”	” ”	”	”		
	228	”	55	50	” ”	”	”		
	250	”	”	”	” ”	”	”		
	266	”	66	60	” ”	”	”		
	299	”	”	”	” ”	”	”		
	300 or more occupant load becomes Group B—Division 1								
Group C (Schools & Shops. See Section 801)	[2]10	[3]1	72″	NR	1-32″	2 req'd	2-36″	Yes for over 100 persons and from all corridors	150′ in unsprinklered buildings 200′ in sprinklered buildings
	[1]50	2	”	64	1-32 1-36	”	”		
	99	”	”	”	” ”	”	2-44		
	200	”	”	”	” ”	120	2-60		
	250	”	79	”	” ”	”	”		
	300	”	90	66	2-36	”	”		
	330	”	101	77	2-40	121	2-66		
	350	”	”	”	”	132	”		
	360	”	112	88	4-36	”	”		
	390	”	”	”	”	143	1-66 1-77		
	400	”	”	”	”	154	2-77		
	420	”	123	99	”	”	”		
	450	”	”	”	”	165	1-77 1-88		
	480	”	134	110	”	176	2-88		
	500	3	”	”	”	”	3-66		
	510	”	145	121	”	187	”		
	540	”	”	”	”	198	”		
	550	”	”	”	”	209	2-66 1-77		
	570	”	156	132	”	”	” ”		
	600	”	”	”	”	228	1-66 2-77		
	630	”	167	143	”	231	3-77		
	650	”	”	”	”	242	2-77 1-88		
	660	”	178	154	5-36	”	” ”		
	690	”	”	”	”	253	1-77 2-88		

Continued on next page

*Minimum width—32″
**Minimum width—44″
A=L x 11/50 B=L x 10/50 C=L x 11/38

*Minimum width—32″
**Minimum width: Less than 50 occupants—36″
50-100 occupants—44″
More than 100 occupants—60″

[1]In general, this group requires minimum of 2 exits where occupancy load is more than 50. See Table 31-A for specific uses that require 2 exits for less than 50. (Locker rooms etc.)
[2]See Group I where occupancy is less than 7.
[3]2 exits required if more than 1 story building.

APPENDIX C

Appendix to Chapter 31—
(See note at end of Chapter 31)

Group of Occupancy and Use	Occupant Load (L)	Required Number of Exits	Horizontal Exits (A) Minimum Width of Corridors	Horizontal Exits (A) Doors * Total Width (B)	Horizontal Exits (A) Doors * Suggested arrangement	Stairs ** Total Width (C)	Stairs ** Suggested arrangement	Panic Hardware	Travel Distance
Group C (Cont.)	700	3	178″	154″	5-36″	264″	3-88″	Yes	150′ in unsprinklered buildings 200′ in sprinklered buildings
	720	”	189	165	”	”	”		
	750	”	”	”	”	275	2-88 1-99		
	780	”	200	176	”	286	1-88 2-99		
	800	”	”	”	”	297	3-99		
	810	”	211	187	6-36	”	”		
	840	”	”	”	”	308	2-99 1-110		
	850	”	”	”	”	319	1-99 2-110		
	870	”	222	198	”	”	” ”		
	900	”	”	”	”	330	3-110		
	930	”	233	209	”	341	2-110 1-121		
	950	”	”	”	”	352	1-110 2-121		
	960	”	244	220	7-36	”	” ”		
	990	”	”	”	”	363	3-121		
	1000	4	”	”	”	374	2-88 2-110		
	—and so on—							For over 100 persons and from all corridors	
	A=L x 11/50 B=L x 10/50 C=L x 11/30								
Group D Division 1 (Jails, etc.)[4]	1-5	[4]1	NR	NR	1-32″	NR	1-36[4]	No	NR Group D-1 and Group I Group H: See notes on next page
	6-50	2	44″	64″	1-32″ 1-36″	2 req'd	2-36[7]		
	184	”	”	”	” ”	88	2-44		
	200	”	”	”	” ”	99	1-44 1-55		
	207	”	55	”	” ”	”	” ”		
Group H (Multiple residential other than dormitories)[5]	230	”	”	”	” ”	110	2-55		
	250	”	”	”	” ”	121	1-55 1-66		
	253	”	66	”	” ”	”	” ”		
	276	”	”	”	” ”	132	2-66		
	299	”	”	”	” ”	143	1-66 1-77		
	300	”	”	”	” ”	154	2-77		
Group I (Dwellings)[6]	322	”	77	70	2-36	”	”	See sub-section 3118.6 (Group D-1) NR for Groups H & I	
	345	”	”	”	”	165	1-77 1-88		
	350	”	”	”	”	176	2-88		
	368	”	88	80	2-40	”	”		
	391	”	”	”	”	187	1-88 1-99		
	400	”	”	”	”	198	2-99		
	414	”	99	90	1-36 2-32	”	” ”		
	437	”	”	”	” ”	209	1-99 1-110		
	450	”	”	”	” ”	220	2-110		

Continued on next page

*Minimum width—32″
**Minimum width: Private stairs in occupancy less than 10—30″
Less than 50 persons—36″
More than 50 persons—44″
[4]Sub-paragraph 3118.1 requires all Group D buildings to have at least 2 exits.
[5]Occupancy load of more than 6.
[6]Occupancy load of 6 or less.
[7]Sub-paragraph 3123.2 provides for 1 exit only from roof structures

APPENDIX C

Appendix to Chapter 31—
(See note at end of Chapter 31)

Group of Occupancy and Use	Occupant Load (L)	Required Number of Exits	Horizontal Exits: Minimum Width of Corridors (A)	Horizontal Exits: Doors *: Total Width (B)	Horizontal Exits: Doors *: Suggested arrangement	Stairs **: Total Width (C)	Stairs **: Suggested arrangement	Panic Hardware	Travel Distance
Group D Division 1 (Cont.)	460	2	110″	100″	1-40 2-32″	220″	2-110″	No	Group H: 150′ in unsprinklered buildings (100′ from any door) 200′ in sprinklered buildings (150′ from any door)
	485	”	”	”	” ”	231	1-110 1-121		
	500	3	”	”	” ”	242	2-77 1-88		
	506	”	121	110	2-40 1-32	”	” ”		
Group H (Other than dormitories) (Cont.)	529	”	”	”	” ”	253	1-77 2-88		
	550	”	”	”	” ”	264	3-88		
	552	”	132	120	3-40	”	”		
	575	”	”	”	”	275	2-88 1-99		
	598	”	”	”	”	286	1-88 2-99		
	600	”	”	”	”	297	3-99		
	621	”	143	130	3-40 1-32	”	”		
	644	”	”	”	” ”	308	2-99 1-110		
	650	”	”	”	” ”	319	1-99 2-110		
	667	”	154	140	” ”	”	” ”		
	690	”	”	”	” ”	330	3-110		
	700	”	”	”	” ”	341	2-110 1-121		
	713	”	165	150	” ”	”	” ”		
	736	”	”	”	” ”	352	1-110 2-121		
	750	”	”	”	” ”	363	3-121		
	759	”	176	160	4-40	”	”		
	782	”	”	”	”	374	2-121 1-132		
	800	”	”	”	”	385	1-121 2-132		
	805	”	187	170	4-40 1-32	”	” ”		
	828	”	”	”	” ”	396	3-132		
	850	”	”	”	” ”	407	2-132 1-143		
	851	”	198	180	” ”	”	” ”		
	874	”	”	”	” ”	418	1-132 2-143		
	897	”	”	”	” ”	429	3-143		
	900	”	”	”	” ”	440	2-143 1-154		
	920	”	209	190	” ”	”	” ”		
	943	”	”	”	” ”	451	1-143 2-154		
	950	”	”	”	” ”	462	3-154		
	966	”	220	200	” ”	”	”		
	989	”	”	”	” ”	473	2-154 1-168		
	1000	4	”	”	5-40	484	4-121		
	—and so on—								

A=L x 11/50 B=L x 10/50 C=L x 11/23

See sub-section 3118.6 (Group D-1) NR for Groups H & I

*Minimum Width—32″
**Minimum Width—44″

APPENDIX C

Appendix to Chapter 31—
(See note at end of Chapter 31)

Group of Occupancy and Use	Occupant Load (L)	Required Number of Exits	Horizontal Exits			Stairs **		Panic Hardware	Travel Distance
			Minimum Width of Corridors (A)	Doors * Total Width (B)	Doors * Suggested arrangement	Total Width (C)	Suggested arrangement		
Group D Division 2 (Hospitals etc., other than inmates) [4]	1-5	[4]2	[9]44″	64″	2-32″	2 req'd	2-36″	See sub-section 3118.6	150′ in unsprinklered buildings. (100′ from any door) 200′ in sprinklered buildings. (150′ from any door)
	6	″	″	″	″	88″	2-44		
	75	″	55	″	″	″	″		
	88	″	66	″	″	″	″		
	90	″	″	″	″	99	1-44 1-55		
	99	″	77	70	2-36	″	″ ″		
	105	″	″	″	″	110	2-55		
	110	″	88	80	2-40	″	″		
	120	″	″	″	″	121	1-55 1-66		
	121	″	99	90	2-46	″	″ ″		
	132	″	″	″	″	132	2-66		
	135	″	″	″	″	143	1-66 1-77		
	143	″	110	100	4-36	″	″ ″		
	150	″	″	″	″	154	2-77		
	154	″	121	110	″	165	1-77 1-88		
	165	″	″	″	″	″	″ ″		
	176	″	132	121	″	176	2-88		
	180	″	″	″	″	187	1-88 1-99		
	187	″	143	130	″	″	″ ″		
	195	″	″	″	″	198	2-99		
	198	″	154	140	″	″	″		
	209	″	″	″	″	209	1-99 1-110		
	210	″	″	″	″	220	2-110		
	220	″	165	150	4-40	″	″		
	225	″	″	″	″	231	1-110 1-121		
	231	″	176	160	″	″	″ ″		
	240	″	″	″	″	242	2-121		
	242	″	187	170	4-44	253	1-121 1-132		
	253	″	″	″	″	″	″ ″		
	255	″	″	″	″	264	2-132		
	264	″	198	180	4-48	″	″		
	270	″	″	″	″	275	1-132 1-143		
	275	″	209	190	″	″	″ ″		
	285	″	″	″	″	280	2-143		
	286	″	220	200	6-36	″	″		
	297	″	″	″	″	297	1-143 1-154		
	300	″	″	″	″	″	″ ″		
	—And so on—								

*Minimum width—32″
**Minimum width—Private stairs in occupancy less than 10—30″
Less than 50 persons—36″
More than 50 persons—44″
[4]Sub-paragraph 3118.1 requires all Group D buildings to have at least 2 exits.
[9]Sub-paragraph 3118.3 requires that all corridors be not less than 44″

A=L x 11/15 B=L x 10/15 C=L x 11/11

APPENDIX C

Appendix to Chapter 31—
(See note at end of Chapter 31)

Group of Occupancy and Use	Occupant Load (L)	Required Number of Exits	Horizontal Exits: Minimum Width of Corridors (A)	Horizontal Exits: Doors *: Total Width (B)	Horizontal Exits: Doors *: Suggested arrangement	Stairs **: Total Width (C)	Stairs **: Suggested arrangement	Panic Hardware	Travel Distance
Group E (Hazardous use and storage)	10	1	NR	NR	1-32"	NR	1-36"	No	75' All Group E Uses.
	50	2	44"	64"	1-32 1-36	2 req'd	2-36		
	184	"	"	"	" "	88	2-44		
	Over 184 same as Group D								
	Division 1 & Group H other than dormitories								
	A=L x 11/50 B=L x 10/50 C=L x 11/30								
Group H (Dormitories)	10	1	NR	NR	1-32"	NR	1-36"	No	150' in unsprinklered buildings. (100' from any door). 200' in sprinklered buildings. (150' from any door).
	50	2	44"	64"	1-32 1-36	2 req'd	2-36		
	60	"	"	"	" "	88	2-44		
	75	"	"	"	" "	"	"		
	90	"	"	"	" "	"	"		
	105	"	55	"	" "	"	"		
	120	"	"	"	" "	"	"		
	125	"	"	"	" "	99	1-44 1-55		
	135	"	66	"	" "	110	2-55		
	150	"	"	"	" "	"	"		
	165	"	77	70	2-36	121	1-55 1-66		
	175	"	"	"	"	132	2-66		
	180	"	88	80	2-40	"	"		
	195	"	"	"	"	143	1-66 1-77		
	200	"	"	"	"	154	2-77		
	210	"	99	90	3-32 1-36	"	"		
	225	"	"	"	" "	165	1-77 1-88		
	240	"	110	100	" "	176	2-88		
	250	"	"	"	" "	187	1-88 1-99		
	255	"	121	110	" "	"	" "		
	270	"	"	"	" "	198	2-99		
	275	"	"	"	" "	209	1-99 1-110		
	285	"	132	120	" "	"	" "		
	300	"	"	"	" "	220	2-110		
	315	"	143	130	" "	231	1-110 1-121		
	325	"	"	"	" "	242	2-121		
	330	"	154	140	4-36	"	"		
	345	"	"	"	"	253	1-121 1-132		
	350	"	"	"	"	264	2-132		
	360	"	165	150	5-32 1-36	"	"		

Continued on next page

*Minimum width—32"

**Minimum width: Less than 50 persons—36"
More than 50 persons—44"

A=L x 11/25 B=L x 10/25 C=L x 11/15

NOTES

NOTES

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