

CHAPTER 7

REQUIREMENTS OF GROUP B OCCUPANCIES

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701 GROUP B OCCUPANCY DEFINED

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

DIVISION 1: Assembly set forth in Section 601 having an occupant content of 300 to 1,000 persons.

DIVISION 2: Assembly uses as set forth in Section 601 having an occupancy content of less than 300 persons except that the occupancy of any room or space for assembly purposes of less than 100 persons in a building of other occupancy and incidental to such other occupancy shall be classified as part of the other occupancy and subject to the provisions applicable thereto.

702 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

702.1 GENERAL:

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

Division	Type	Allowable Height	Basic Area
1	I	Not Limited	Not Limited
1	II	60 feet (4 stories)	22,500
1	III (Protected)	30 feet (2 stories)	10,100
1	III (Protected)	50 feet (1 story)	10,100
1	V (Protected)	20 feet (1 story)	3,300 (with sprinkler system)
2	I	Not Limited	Not Limited
2	II	75 feet (5 stories)	22,500
2	III (Protected)	30 feet (2 stories)	10,100
2	III (Protected)	50 feet (1 story)	10,100
2	III (Unprotected)	30 feet (1 story)	6,800
2	V (Protected)	20 feet (1 story)	3,300 (with sprinkler system)

(b) See Section 514 for allowable area increases.

702.2 SPECIAL PROVISIONS:

(a) In the assembly space of churches and gymnasiums in one-story buildings, the roof structure may be of unprotected incombustible materials where every part of the structural framework is 18 feet or more above any floor, or any balcony or gallery seating over 50 persons. Roof structure less than 18 feet above any balcony or gallery seating 50 or less persons, may be of unprotected incombustible materials.

(3) They have a nominal inside diameter not over two (2) inches and are spaced not less than three (3) diameters on centers.

(g) In addition to other requirements of Sub-section 2507.3 pipes that will contain liquid, gas, or vapor may be embedded in concrete under the following conditions:

(1) Pipes and fittings shall be designed to resist effects of the material, pressure, and temperature to which they will be subjected.

(2) Temperature of liquid, gas, or vapor shall not exceed 150°F.

(3) Maximum pressure to which any piping or fittings shall be subjected shall not exceed 200 psi above atmospheric pressure.

(4) All piping and fittings except as provided in (5) below shall be tested as a unit for leaks before concrete placement. Testing pressure above atmospheric pressure shall be 50 percent in excess of pressure to which piping and fittings may be subjected, but minimum testing pressure shall not be less than 150 psi above atmospheric pressure. Pressure test shall be held for 4 hours with no drop in pressure except that which may be caused by air temperature.

(5) Drain pipes and other piping designated for pressures of not more than 1 psi above atmospheric pressure need not be tested as required in (4) above.

(6) Pipes carrying liquid, gas or vapor that is explosive or injurious to health shall be tested again as specified in (4) above after concrete has hardened.

(7) No liquid, gas, or vapor, except water not exceeding 90°F nor 50 psi pressure, shall be placed in the pipes until the concrete has attained its design strength.

(8) In solid slabs the piping, unless it is for radiant heating, shall be placed between top and bottom reinforcement.

(9) Concrete cover for pipes and fittings shall not be less than one and one-half inches (1-1/2") for concrete exposed to earth or weather, nor three-quarters of an inch (3/4") for concrete not exposed to weather or in contact with ground.

(10) Reinforcement with an area not less than 0.002 times the area of concrete section shall be provided normal to the piping.

(11) Piping and fittings shall be assembled by welding, brazing, solder-sweating, or other equally satisfactory methods. Screw connections shall not be permitted. Piping shall be so fabricated and installed that cutting, bending, or displacement of reinforcement from its proper location will not be required.

2507.4 CONSTRUCTION JOINTS:

(a) Surface of the concrete construction joints shall be cleaned and laitance removed.

(b) Immediately before new concrete is placed, all construction joints shall be wetted and standing water removed.

(c) Construction joints shall be so made and located as not to impair the strength of the structure. Provision shall be made for transfer of shear and other forces through construction joints.

(d) Construction joints in floors shall be located near the middle of spans of slabs, beams, or girders, unless a beam intersects a girder at the middle location, in which case, joints in the girders shall be offset a distance approximately twice the width of the beam.

(e) Beams, girders, or slabs supported by columns or walls shall not be cast or erected until concrete in the vertical support member is no longer plastic.

(f) Beams, girders, haunches, drop panels and capitals shall be placed monolithically as part of a slab system, unless otherwise shown on the design drawing.

2508 DETAILS OF REINFORCEMENT

2508.1 BENDING REINFORCEMENT:

(a) All reinforcement shall be bent, cold, unless otherwise permitted by the Professional Engineer of Record.

(b) Reinforcement partially embedded in concrete shall not be field bent, except as shown on the design drawings or permitted by the Professional Engineer of Record.

2508.2 SURFACE CONDITIONS OF REINFORCEMENT:

(a) At the time concrete is placed, reinforcement shall be free from mud, oil, or other nonmetallic coatings that adversely affect bonding capacity.

(b) Steel reinforcement, except prestressing tendons, with rust, mill scale, or a combination of both shall be considered satisfactory, provided the minimum dimensions (including height of deformations) and weight of a hand-wire-brushed test specimen are not less than applicable ASTM specification requirements.

(c) Prestressing tendons shall be clean and free from oil, dirt, scale, pitting, and excessive ruts. A light oxide is permissible.

2508.3 PLACING REINFORCEMENT:

(a) Steel reinforcement shall be accurately placed and adequately secured in position by concrete or metal chairs or spacers or other acceptable methods. The minimum clear distance between parallel bars, except in columns, shall be equal to the nominal diameter of the bars. In no case shall the clear distance between bars be less than one inch, nor less than one and one-third times the maximum size of the coarse aggregate. When reinforcement in beams or girders is placed in two or more layers, the clear distance between layers shall not be less than the diameter of the bars, and the bars in the upper layers shall be placed directly above those in the bottom layer.

(b) Unless otherwise permitted by the Building Official and Professional Engineer of Record, reinforcement, prestressing tendons, and prestressing ducts shall be placed within the following tolerances:

(1) Tolerance for depth d , and minimum concrete cover in flexural members, walls and compression members shall be as follows, where d represents the distance from the extreme compression fiber to the centroid of the tension reinforcement.

	Tolerance on minimum Tolerance on d	concrete cover
$d < 8$ in.	$\pm 3/8$ in.	$-3/8$ in.
$d > 8$ in.	$\pm 1/2$ in.	$-1/2$ in.

EXCEPTIONS:

(aa) Tolerance for the clear distance to formed soffits shall be minus one quarter (1/4) inch.

(bb) Tolerance for cover shall not exceed minus one-third (1/3) the minimum concrete cover-required in the contract drawings nor less than 1 inch when exposed to weather.

(2) Tolerance for longitudinal location of bends and ends of reinforcement shall be +2 inches except at discontinuous ends of members where tolerance shall be $\pm 1/2$ inch.

(c) Welded wire fabric (with wire size not greater than W5 or D5) used in slabs not exceeding ten (10) feet in span may be curved from a point near the top of slab over the support to a point near the bottom of slab at midspan, provided such reinforcement is either continuous over, or securely anchored at the support.

(d) Welding of crossing bars shall not be permitted for assembly of reinforcement unless approved by the Professional Engineer of Record.

(e) Spacing limits and concrete cover for reinforcement shall be shown on the design drawings.

2508.4 SPLICES IN REINFORCEMENT:

(a) In slabs, beams and girders, splices in reinforcement at points of maximum stress shall be avoided wherever possible. Such splices where used shall be welded, lapped or otherwise fully developed, but in any

case, shall transfer the entire stress from bar to bar without exceeding the allowable bond and shear stresses. The minimum overlap for a lapped splice shall be as required by ACI 318. The clear distance between bars shall also apply to the clear distance from a contact splice and adjacent splices or bars.

(b) Splices of reinforcement shall be made only as required or permitted on design drawings, or in specifications, or as authorized by the Professional Engineer of Record.

(c) Lap splices shall not be used for bars larger than #11 except as provided in ACI 318.

(d) Lap splices of bundled bars shall be based on the lap splice length required for individual bars within a bundle, increased 20 percent for a 3 bar bundle and 33 percent for a 4 bar bundle. Individual bar splices within a bundle shall not overlap.

(e) Bars spliced by noncontact lap splices in flexural members shall not be spaced transversely farther apart than one-fifth (1/5) the required lap splice length, nor six (6) inches.

(f) Welded splices may be used, provided the metallurgical properties of the bars are suitable as determined by the Professional Engineer of Record in accordance with AWS D1.4.

(g) End bearing splices.

(1) In bars required for compression only, compressive stress may be transmitted by bearing of square cut ends held in concentric contact by a suitable device.

(2) Bar ends shall terminate in flat surfaces within one and one-half (1-1/2) degrees of a right angle to the axis of the bars and shall be fitted within 3 degrees of full bearing after assembly.

(3) End bearing splices shall be used only in members containing closed ties, closed stirrups, or spirals.

(h) Welded splices in reinforcing bars shall be made by certified welders and shall comply with the Standard Structural Welding Code - Reinforcing Steel AWS D1.4 as set forth in Section 402 herein.

2508.5 CONCRETE PROTECTION FOR REINFORCEMENT (Non-prestressed):

(a) The reinforcement of footing and other principal structural members in which the concrete is deposited against the ground shall have not less than three inches of concrete between it and the ground contact surface. If concrete surfaces after removal of the forms are to be exposed to the weather or be in contact with the ground the reinforcement shall be protected with not less than two inches of concrete for bars larger than No. 5 and one and one half inches for No. 5 bars or smaller except as set forth in Paragraph 2508.5(e) of this Code.

(b) The concrete protective covering for reinforcement at surfaces not exposed directly to the ground or weather shall be not less than three fourth inch for slabs and wall; and not less than one and one half inches for beams, girders and columns. In concrete ribbed floors in which the clear distance between ribs is not more than thirty inches, the protection of reinforcement shall be at least three-fourths (3/4) inches.

(c) Concrete protection for reinforcement shall in all cases be at least equal to the diameter of bars except for concrete slabs and joists as set forth herein.

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

(e) For exterior balcony slabs, minimum concrete cover for negative moment reinforcement may be three-fourths (3/4) inch for #5 bars and smaller, provided the following are satisfied:

(1) Slab surface shall be sloped inch per foot or greater to safeguard against ponding of water.

(2) Placement of slab reinforcement shall be under the supervision of a Special Inspector as defined in Sub-section 305.3.

(3) For concrete made with normal weight aggregate water cement ratio shall not exceed 0.40 by weight. For concrete made with lightweight aggregate, specified compressive strength of concrete f'_c shall not be less than 4750 psi.

(4) A surface penetrant of the alkyl-alkoxy silane classification or approved equal is applied after proper surface preparation.

(f) Concrete cover for cast in place, precast and prestressed concrete shall be in accordance with ACI 318 if

not otherwise specified in this section. When this Code requires a thickness of cover for fire protection greater than the minimum concrete specified in ACI 318, such greater thickness shall be used.

(g) Exposed reinforcement, inserts, and plates intended for bonding with future extensions shall be protected from corrosion.

(h) For structures located in corrosive atmospheres such as within or eastward of the Coastal Building Construction Zone, reinforcement shall be epoxy-coated in accordance with the standard specification for Epoxy-Coated Reinforcing Steel Bars, ASTM A775, or the standard specification for zinc-coated (galvanized) steel bars for concrete reinforcement, ASTM A767 or the concrete mix shall be specifically designed by the Architect or Professional Engineer of Record or Specialty Engineer for use in a corrosive environment.

2509 PRECAST CONCRETE UNITS

2509.1 GENERAL:

(a) Precast concrete units shall comply with the minimum requirements set forth in this Chapter, and the Standards set forth in Sub-section 2502.1.

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

(c) Only the material cast monolithically with the units at the time of manufacture shall be used in computing stresses unless adequate and approved shear transfer is provided.

(d) The Building Official may promulgate and set forth in writing such reasonable rules for requiring tests to be made by an approved laboratory as he may consider necessary to insure compliance with this Code or uniformity of the products produced. The quantity of tests shall be based on consideration of safety or volume of output.

(e) The Building Official or his representative shall have free access to the plant of any producer at all hours of normal operation, and failure to permit such access shall be cause for revocation of approval.

(f) Failure of any product to satisfy in every respect the quality prescribed, or failure to conform with plans and specifications, shall be cause for rejection of the products.

2509.2 STATEMENTS OF RESPONSIBILITIES OF ARCHITECTS AND PROFESSIONAL ENGINEERS ON DESIGN OF STRUCTURES UTILIZING PRECAST CONCRETE COMPONENTS:

(a) The structural construction documents shall indicate the configuration of precast components and shall include details of supports, anchors and connections for those components.

(b) The Structural Engineer of Record and/or the Architect of Record may delegate responsibility for the design of precast concrete components, or systems utilizing those components to a Specialty Engineer. In that case the Structural Engineer of Record and/or the Architect of Record shall require structural submittals for his or her review as an indication that his or her intent has been understood and that the specified criteria have been used. The structural submittals shall bear the impressed seal, signature and date of the specialty engineer who prepared them.

(c) The structural submittals shall include component details, calculations and fabrication and erection drawings. All such submittals shall identify the specific project.

2509.3 AGGREGATE:

The maximum size of the aggregate for precast units shall be not larger than one-third of the narrowest dimension between sides of the forms of the member in which the unit is cast nor larger than three-fourths of the minimum clear spacing between 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 of the narrowest dimension between sides of the forms.

2509.4 STRENGTH OF CONCRETE:

(a) Concrete for precast structural units made up of crushed stone or other heavy aggregate shall have a compressive strength of not less than 2500 psi at 28 days.

(b) Concrete for precast units made of lightweight aggregate concrete shall follow the general provisions of Paragraph 2505.1(b) with consideration of the nature and limitations of the aggregate and the strength of the product.

2509.5 WORKMANSHIP:

(a) The mix, the gradation of the aggregate and the workability shall be such as to insure complete filling of the form and continuous intimate bond between the concrete and all steel.

(b) Handling and conveying before curing shall be reduced to a minimum. Machinery for this purpose should be so designed that the unit will not be subject to bending or shock which will produce incipient cracks, broken edges or corners. Precast units shall not be freely transported or placed until the concrete is at least 14 days old, if made with Type I cement, or at least seven days old, if made with Type III cement, or until its strength, as established by define tests, is at least 75 percent of the required 28 day strength.

(c) The use of precast structural units not complying with ACI requirements or having visible cracks, honeycomb, exposed reinforcing except at ends, or, with a compressive section dimension more than one eighth inch less than specified dimension shall not be permitted.

2509.6 CURING:

(a) No precast structural unit shall be removed from the form until the concrete has attained a compressive strength of 50 percent of the 28-day design strength but not less than 1250 psi as verified by representative tests.

(b) Curing by high pressure steam, steam vapor, or other accepted processes may be employed to accelerate the hardening of the concrete and to reduce the time of curing.

(c) To insure the eventual placement of the units in the structure without damage, the handling shall be done in such a manner that bending shall be reduced to a minimum or prevented.

2509.7 IDENTIFICATION AND MARKING:

(a) All joists, beams, girders, columns, slabs, panels and other units shall show some mark plainly indicating the top of the unit. This mark or symbol shall indicate the manufacturer, the date of the manufacture and the length, size and type of reinforcing.

2509.8 CUTTING OF HOLES:

(a) No openings or channels not provided for in the structural design shall be made on the job without the specific approval of the Professional Engineer in accordance with his or her written, detailed instructions covering such work.

2509.9 ANCHORAGE:

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

2509.10 BRIDGING:

(a) Joists shall be secured against lateral displacement by cast-in-place bridging, and such bridging shall be spaced not to exceed 32 times the width of the compression flange of the joist except that for roof systems, cast-in-place Portland-concrete slabs embedding the top flanges not less than one half inch, or steel inserts cast in the joist heads to which bulb-tees supporting gypsum decks are welded, shall be accepted in lieu of bridging.

2509.11 CONNECTIONS:

(a) All joists and connections will perform their function at all stages of loading without overstress and with proper safety factors against failure due to overload. Loading conditions to be considered in the design of joints and connections are service loads, including wind forces, volume changes due to shrinkage, creep, and temperature change erection loads, and loading encountered in stripping forms, shoring and removal of shores and the storage and transportation of members.

(b) INSPECTIONS:

(1) All structural precast units shall be inspected for quality control by an Architect or Professional Engineer qualified to perform these inspections prior to the concrete placement at the casting yard.

(2) All structural precast units and their attachments to the main structure shall be inspected after erection, but before concealment. Such inspections shall be performed by a qualified special inspector in accordance with Sub-section 305.3 of this Code or F.S. 553.71 Threshold Building Law.

2510 PRESTRESSED CONCRETE

2510.1 GENERAL:

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

(b) All prestressed structural items shall be designed by a Professional Engineer. Openings or channels not provided for in the structural design shall not be made on the job without the specific approval of the Professional Engineer.

(c) The Building Official may promulgate and set forth in writing such reasonable rules for requiring tests to be made by an approved laboratory as he may consider necessary to insure compliance with this Code or uniformity of the products produced.

(d) The Building Official or his representative shall have free access to the plant of any producer at all hours of normal operation and failure to permit such access shall be cause for revocation of approval.

(e) Failure of any product to satisfy the quality prescribed or failure to conform with plans and specifications shall be cause for rejection of the product.

2510.2 STATEMENT OF RESPONSIBILITIES OF ARCHITECTS AND PROFESSIONAL ENGINEERS ON THE DESIGN OF CAST-IN PLACE POST-TENSIONED CONCRETE STRUCTURAL SYSTEMS:

(a) The structural construction documents shall show the magnitude and location of all prestressing forces and all design assumptions.

(b) The Structural Engineer of Record and/or the Architect of Record shall require the submission of calculations and installation drawings from a Specialty Engineer for post-tensioning systems for review by the Structural Engineer of Record's and/or the Architect of Record's review as an indication that his or her intent has been understood and that specified criteria have been used. The installation drawings shall provide full details of materials to be used including necessary accessories and instructions for construction and shall identify the specific project and shall bear the impressed seal, signature and date of the Specialty Engineer who prepared them.

(c) It is the responsibility of the Structural Engineer of Record and/or the Architect of Record to review the post-tensioning system installation drawings so that the drawings are coordinated with the reinforcing steel shop drawings.

(d) The effect of post-tensioning on other parts of the building is the responsibility of the Structural Engineer of Record and/or the Architect of Record.

2510.3 DESIGN AND CONSTRUCTION:

(a) Design and construction shall be in accordance with ACI 318.

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

2510.4 TENDON ANCHORAGE ZONES:

(a) Reinforcement shall be provided where required in tendon anchorage zones to resist bursting, splitting, and spalling forces induced by tendon anchorage. Regions of abrupt change in section shall be adequately reinforced.

(b) End blocks shall be provided where required for support bearing or for distribution of concentrated prestressing forces.

(c) Post-tensioning anchorages and supporting concrete shall be designed to resist maximum jacking force

for strength of concrete at time of prestressing.

(d) Post-tensioning anchorage zones shall be designed to develop the guaranteed ultimate tensile strength of prestressing tendons using a strength reduction factor (ϕ) of 0.90 for concrete.

2510.5 CORROSION PROTECTION FOR UNBONDED PRESTRESSING TENDONS:

(a) Unbonded tendons shall be completely coated with suitable material to ensure corrosion protection.

(b) Tendon wrapping shall be continuous over entire length to be unbonded, and shall prevent intrusion of cement paste or loss of coating materials during concrete placement.

2510.6 POST-TENSIONING DUCTS:

(a) Ducts for grouted or unbonded tendon shall be mortar-tight and nonreactive with concrete, tendons, or filler material.

(b) Ducts for grouted single wire, strand, or bar tendons shall have an inside diameter at least ½-inch larger than tendon diameter.

(c) Ducts for grouted multiple wire, strand, or bar tendons shall have an inside cross-sectional area at least 2 times net area of tendons.

2510.7 GROUT FOR BONDED PRESTRESSING TENDONS:

(a) Grout shall consist of Portland cement and water; or Portland cement, sand and water.

(b) Materials for grout shall conform as specified in ACI 318 and be as follows:

(1) Portland cement.

(2) Water content shall be minimum necessary for proper pumping of grout, however, water-cement ratio shall not exceed 0.45 by weight.

(3) Sand, if used, shall conform to Standard Specifications for Aggregate for Masonry Mortar, (ASTM C144), except that gradation may be modified as necessary to obtain satisfactory workability.

(4) Admixtures conforming to ACI 318 and known to have no injurious effects on grout, steel, or concrete may be used. Calcium chloride shall not be used.

(5) Water shall not be added to increase grout flowability that has been decreased by delayed use of grout.

(6) Group temperatures shall not be above 90°F during mixing and pumping.

2510.8 PROTECTION FOR PRESTRESSING TENDONS:

Burning or welding operations in the vicinity of prestressing tendons shall be carefully performed, so that tendons are not subject to excessive temperatures, welding sparks, or ground currents.

2510.9 APPLICATION AND MEASUREMENT OF PRESTRESSING FORCE:

(a) Prestressing force shall be determined by both of the following methods:

(1) Measurement of tendon elongation: Required elongation shall be determined from average load-elongation curves for prestressing tendons used.

(2) Observation of jacking force on a calibrated gage or load cell or by use of a calibrated dynamometer.

(3) Cause of any difference in force determination between (1) and (2) above that exceed 5 percent shall be ascertained and corrected.

(b) Where transfer of force from bulkheads or pretensioning bed to concrete is accomplished by flame cutting prestressing tendons, cutting points and cutting sequence shall be predetermined to avoid undesired temporary stresses.

(c) Long lengths of exposed pretensioned strand shall be cut near the member to minimize shock to concrete.

(d) Total loss of prestress due to unreplaced broken tendons shall not exceed 2 percent of total prestress.

2510.10 POST-TENSIONING ANCHORAGES AND COUPLERS:

(a) Couplers shall be placed in areas approved by the Professional Engineer and enclosed in housing long enough to permit necessary movements.

(b) In unbonded construction subject to repetitive loads, special attention shall be given to the possibility of fatigue in anchorages and couplers.

(b) Anchorage and end fittings shall be permanently protected against corrosion.

2511 PNEUMATICALLY PLACED CONCRETE (SHOTCRETE)

2511.1 (a) Pneumatically placed concrete is a proportioned combination of fine aggregate Portland cement and water which, after mixing, is pneumatically projected by air directly onto the surface to which it is to be applied.

(b) Pneumatically placed concrete shall conform to all requirements of Specifications for Materials, Proportioning and Application of Shotcrete ACI 506.2, published by the American Concrete Institute, except as modified herein.

(c) Pneumatically placed concrete shall be composed of Portland cement, aggregate, and water and so proportioned as to produce a concrete suitable for pneumatic application.

(d) Concrete ingredients shall be selected and proportioned in such manner as will produce concrete which will be extremely strong, dense, and resistant to weathering and abrasion.

2511.2 SAMPLING AND TESTING CEMENT AND AGGREGATE The Contractor shall determine the source, kind and quality of the Portland cement and aggregates to be used in the work well in advance of the time scheduled for starting the work and when so directed shall submit such information for approval before starting shotcrete operation.

2511.3 SURFACE PREPARATION: To insure adequate bond, the newly chipped and sand-blasted surface shall be thoroughly moistened with water prior to application to shotcrete. In no instance shall shotcrete be applied in an area where free running water exists.

2511.4 PROPORTIONING: Prior to start of shotcreting the Contractor shall submit to the Professional Engineer of Record the recommended mix as a ratio of Portland cement to aggregate. Recommended mix shall be on the basis of test data from prior experience.

2511.5 MIXING:

(a) Shotcrete shall be thoroughly mixed by machine and then passed through a sieve to remove all large particles before placing in hopper of the cement gun. The mixture shall not be permitted to become damp. Each batch should be entirely discharged before recharging is begun. The mixer should be cleaned thoroughly enough to remove all adherent materials from the mixing vanes and from the drum at regular intervals.

(b) Water in any amount shall not be added to the mix before it enters the cement gun. Quantities of water shall be controlled by a valve at the nozzle of the gun. Water content shall be adjusted as required for proper placement, but shall in no case exceed four gallons of water per sack of cement, including the water contained in the aggregate.

(c) Remixing or tempering shall not be permitted. Mixed material that has stood 45 minutes without being used shall be discarded. Rebound materials shall not be reused.

2511.6 APPLICATION:

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

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

(c) In shooting slabs, the nozzle shall be held at a slight angle to the work so that rebound is blown on to the finished portion where it shall be removed.

(d) Corners shall be filled first. "Shooting" shall be from an angle as near perpendicular to the surface as practicable, with the nozzle held approximately 3 feet from the work (except in confined control). If the flow of

material at the nozzle is not uniform and slugs, sand spots, or wet sloughs result, the nozzle man shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.

(e) Shotcreting shall be suspended if:

(1) Air velocity separates the cement from the sand at the nozzle.

(2) Temperature approaches freezing and the newly placed shotcrete cannot be protected.

(f) The time interval between successive layers in sloping, vertical or overhanging work shall be sufficient to allow initial but not final set to develop. At the time the initial set is developing, the surface shall be cleaned to remove the thin film of laitance in order to provide a good bond with succeeding applications.

2511.7 CONSTRUCTION JOINTS:

(a) Construction joints or day's work joints shall be sloped off to a thin, clean, regular edge, preferably at a 45 degree slope. Before placing the adjoining work, the slope portion and adjacent shotcrete shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.

2511.8 CURING AND PROTECTION:

(a) Curing shall be in accordance with ACI 506.2 depending upon atmospheric conditions.

(b) Immediately after placement, shotcrete shall be maintained in a moist condition for at least the first 24 hours.

(c) Final curing shall continue for 7 days after placement if Type I Portland cement is used, or for 3 days if high-early-strength Type III Portland cement is used, or until the specified strength is attained. Final curing may consist of the initial curing process or an approved moisture-retaining covering.

(d) Natural curing may be used when relative humidity remains at or above 85% when approved by the Professional Engineer of Record.

CHAPTER 26

REINFORCED GYPSUM CONCRETE AND INSULATING CONCRETE

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2601 GENERAL

2601.1 SCOPE: This chapter prescribes requirements for Reinforced Gypsum Concrete and Insulating Concrete.

2601.2 APPLICATION: Reinforced Gypsum Concrete and Insulating Concrete used in construction regulated by this Code shall comply with the requirements of this chapter.

2601.3 UPLIFT: Minimum roof deck uplift loads shall comply with the design requirements of Chapter 23 utilizing rational analysis, but not less than U.L. 580, class 90.

2601.4 FASTENINGS: Fastenings shall be by bolting, welding or other approved fastening device that provides a resistance to lateral movement as required by rational analysis or test, but not less than 400 pounds per lineal foot.

2602 DEFINITIONS AND STANDARDS

2602.1(a) DEFINITIONS: The terms used in this chapter shall be defined as set forth in Section 401.

2602.2 STANDARDS:

(a) Standards referenced in this Chapter shall be those set forth in Section 402.

(b) Standards in Chapter 28 of this Code.

(c) Guideline for Structural Condition Assessment of Existing Buildings, ANSI/ASCE II.

(d) Specifications for the Design and Construction of Composite Slabs and Commentary on Specifications for the Design and Construction of Composite Slabs, ANSI/ASCE 3.

2603 DESIGN OF REINFORCED GYPSUM CONCRETE

2603.1 (a) Design: Reinforced Gypsum Concrete shall be designed by methods admitting of rational analysis based on established principles of mechanics. The general assumptions and principles specified for reinforced concrete in Chapter 25 shall be the basis of design of reinforced gypsum insofar as they are applicable.

(b) Standards: The Standard Specifications for Reinforced Gypsum Concrete, ANSI A59.1, is hereby adopted.

(c) Testing: The Building Official may require reasonable tests of Gypsum Concrete units or the materials of Gypsum Concrete construction to determine their quality.

2603.2 LIMITATIONS OF USE:

(a) Reinforced gypsum concrete used for roofs of Occupancies producing usually high humidities shall be constructed with the use of non-absorptive 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-absorptive formboard.

2604 CONSTRUCTION DETAILS OF REINFORCED GYPSUM CONCRETE

2604.1 POURED-IN-PLACE GYPSUM:

(a) Roof slabs of poured-in-place gypsum shall be solid and, for spans not exceeding 33 inches, shall have a minimum thickness of 2 inches not including the formboard.

(b)(1) Reinforcing fabric shall conform to the Standard for Welded Steel Wire Fabric for Concrete Reinforcement, ASTM A185, as set forth in Section 402, shall be galvanized with a zinc coating conforming to the Standard for Zinc Metal (Slab Zinc), ASTM B6, as set forth in Section 402, and shall contain a minimum weight of coating of 0.30 ounces per square foot of uncoated wire surface determined in accordance with the Standard for Tests for Weight of Coating on Zinc Coated (Galvanized) Iron or Steel Articles, ASTM A90, as set forth in Section 402.

(2) Reinforcing fabric shall have an effective cross-sectional area of not less than 0.026 square inches per foot of width of No. 12 gage wire spaced four inches on centers as principal reinforcing nor less than 0.0075 square inches per foot of width of No. 14 gage wire spaced eight inches on center as temperature reinforcing.

(3) Reinforcing fabric shall be lapped not less than 16 inches at the ends.

(4) Sides of fabric shall be butted or spaced not more than four inches.

(c) Sub-purlins shall be designed to provide a mechanical lock or key with the gypsum to resist uplift.

(d) Sub-purlins shall be rigidly secured to the primary roof framing by welding, riveting or bolting to the supporting members including end supports, and where welded, such welding shall be by rational analysis, but not less than 3/8-inch length on both sides of the sub-purlin. Sub-purlins terminating at or on masonry walls shall be securely anchored to the masonry by a continuous member. Supporting masonry running parallel to the sub-purlins shall not be used in the installation of sub-purlins on or adjacent to the masonry.

(e) Where sub-purlins are not used, resistance to uplift shall be otherwise provided of suitable design equivalent to the sub-purlins.

(f) Welding of sub-purlins to supporting members shall be done only under the supervision of a competent welding inspector as set forth in Sub-section 2805.2 and such welding inspector shall submit certification in writing to the Building Official that the welding was properly placed; or the Building Official may require that the welds not be covered or concealed until inspection and approval by the Building Official.

(g) Sub-purlins shall not be field-spliced between supports.

(h) Suspended ceilings shall not be hung from the gypsum. Such ceilings may be hung from the sub-purlins where the sub-purlins are so designed.

(i) Roof coverings shall be applied as specified in Chapter 34.

2604.2 PRECAST GYPSUM UNITS:

(a) Precast gypsum concrete units for roof construction shall be of uniform thickness, solid or hollow or may be recessed on the underside. The span of precast gypsum concrete shall not exceed six feet eight inches. For the purpose of this section any span over three feet shall be called a long span.

(b) Except as otherwise provided in Paragraph 2604.2(c), precast gypsum concrete units shall be designed by rational analysis, but not less than the following thickness:

(1) Solid units shall be not less than two inches thick, nor, if a long span, less than three inches thick.

(2) Hollow units shall be not less than three inches, nor the shell in compression less than three-fourths inch thick; if long span, the units shall be not less than five inches thick nor the shell in compression less than one and three-eighths inches thick.

(3) Recessed units shall be not less than five inches thick nor the panel less than one and three-eighths inches thick.

(c) Precast solid reinforced gypsum concrete units, not more than 15 inches wide and bound on the long edges with structural or pressed steel of approved design anchored to the units, shall be not less than two inches thick. If the length of units is not less than one and one-half times the span and the steel binding on the edges is designed to interlock with adjoining units in the manner of tongue-and-groove wooden plank and is of sufficient strength to transmit the load on one unit to adjoining units, the end joints may be staggered at random not less than two feet, and the construction may be designed as continuous.

(d) Precast gypsum concrete units for roof construction shall be reinforced, and unless the shape or marking of the unit is such so as to insure its being placed right side up, the reinforcing shall be symmetrical so that the unit can support its load either side up.

(e) Precast gypsum concrete units shall be bolted, or the edge-binding securely welded, to the supporting members. Clips or other methods where lateral movement would reduce the resistance to vertical uplift shall not be permitted.

2605 DESIGN OF INSULATING CONCRETE

2605.1 DESIGN: Insulating concrete roof deck systems shall be designed by methods admitting of rational analysis, empirical determination or shall be substantiated by approved tests.

2605.2 MATERIALS AND LIMITATIONS OF USE:

(a) Insulating concrete with galvanized formed steel sheets shall not be used over areas where highly corrosive chemicals are used or stored.

(b) Minimum average thickness of insulating concrete shall be 2 inches over the top plane of the substrate, but shall not be less than a minimum of 1-3/4 inches thick.

(c) Compressive strength shall be a minimum of 125 psi at 28 days.

(d) Galvanized coatings of formed steel sheets shall be in accordance with ASTM A525 with a minimum coating designation of G-90. Base steel shall conform to ASTM A446-72, Grade E.

(e) Minimum gauge when used with insulating concrete shall be 29 gauge _ Design thickness 0.0149 inches.

(f) Portland cement shall conform to ASTM C-150, Type I, II or III.

(g) Calcium chloride or any admixture containing chloride salts shall not be used in insulating concrete.

(h) Water shall be free from deleterious amounts of acid, alkali and organic materials.

(i) Vermiculite or Perlite shall conform to ASTM Standard C332, Group I.

2606 TESTS OF INSULATING CONCRETE

The Building Official may require tests of the insulating concrete to determine the quality in accordance with ASTM Specifications C-495 and C-513.

2607 CONSTRUCTION DETAILS

2607.1 Insulating concrete shall meet the following requirements:

(a) Insulating concrete over formed steel sheets shall be vented by slotting or perforating the sheets or by venting at side laps of the sheets.

TABLE 35-H

Height above Ground Minimum Design Pressure

(in feet)	(in Pounds per square foot) plus or minus
0 to 5	30
5 to 15	37
15 to 25	45
25 to 35	50
35 to 55	56
55 to 75	63
75 to 100	68
100 to 150	75
150 to 250	86
250 to 350	96
350 to 550	108
550 to 750	121
750 to 1000	131
over 1000	135

- (1) All heights shall be to top of opening
- (2) Section 2315 shall not apply to the above openings

3508.2 FIXED GLASS IN EXTERIOR WALLS:

(a) LIMITS OF SIZE OF GLASS:

(1) The minimum thickness of annealed float glazing materials, with four-sided support, used in exterior walls shall be determined and shall not be less than as set forth in Table 35-E. The table applies for width-to-length ratios from 1:1 to 1:5.

(2) For glazing materials other than annealed float, the design wind pressure used with Table 35-E shall first be divided by the applicable glazing material resistance factor set forth in Table 35-F.

TABLE 35-E

Minimum thickness of vertical glass as a function of area and wind pressure (based on width-to-length ratios of 1:1 to 1:5)

(3) Corrugated glass and other special glass shall be limited to spans determined by analysis and test to resist the loads set forth in Chapter 23 based on fiber stresses not exceeding 4000 psi.

(4) Glass block shall be limited as set forth in Sub-section 2704.10.

**TABLE 35-F
RESISTANCE FACTORS FOR GLAZING MATERIALS
VERTICAL GLASS**

GLASS TYPE	FACTOR
Single Glass:	
Regular (Annealed).....	1.0
Heat Strengthened.....	2.0
Fully Tempered	4.0
Wired.....	0.5
Patterned	1.0
Sandblasted	0.5
Laminated-regular plies	0.75
Laminated-heat strengthen plies	1.5
Laminated-fully tempered plies	3.0
Insulating Glass:	
Regular (Annealed)	1.8
Heat Strengthen	3.6
Fully Tempered	7.2
Laminated-regular plies	1.4
Laminated-heat strengthen plies	2.7
Laminated-fully tempered plies	5.4

(1) For laminated glass, use line in Table 35-E for total glass thickness after adjusting the loads by factor determined in Table 35-F.

(2) For laminated glass, the values are based on two plies of the same thickness and type.

(3) For insulating glass, the values are based on two panes of identical thickness and type. Use thickness for one pane.

(4) Values for patterned glass are based on the thinnest part of the pattern. Interpolation between line of Table 35-F might be necessary.

(5) Value for sandblasted glass is a minimum and depends on severity and depth of the sandblast.

(6) The resistance factors outlined herein may be utilized for sloped glazing, where symmetrical lites are to be used inside and out and the glazing will not be subjected to sustained loads. In all other cases the applicable resistance factors for sloped glazing shall be determined by way of engineering analysis or shall be based on acceptable test data.

(b) CONSTRUCTION DETAILS:

(1) Each lite of fixed glass more than 3 feet in width shall have 2 setting blocks or suspension clamps made of lead or other approved material.

(2) Fixed glass lites shall be set in non-corrosive metal frames or in frames of other non-corrosive material where substantiated by load test, except that glass not exceeding 32 square feet in area in one or two story buildings of Group G, H and I Occupancy and glass not exceeding 15 square feet in area in buildings of other Occupancies, may be set in wood members provided the adequacy and durability of such wood setting members are demonstrated to the satisfaction of the Building Official.

(3) Wood shall have been treated with an approved preservative as set forth in Paragraph 2913.2(a).

(4) Attachment shall be as set forth in Section 2309 and shall be corrosion-resistant.

(5) Glass in fixed lites shall be securely and continuously supported at the perimeter of each sheet unless the design is based on one or more unsupported edges. Supporting members such as division bars and mullions shall be designed by national analysis to support the wind pressures set forth in Chapter 23. Supporting bars shall be attached at the ends to resist the loads set forth in Section 2309.

(6) The depth of the glazing rabbet and depth of engagement in the rabbet, for fixed glass, shall be based on consideration of the dimensional reduction due to deflection and the dimensional changes due to temperature, but shall be not less than the minimum values indicated in Table 35-G.

EXCEPTION: SKYLIGHTS

Table 35-G					
Minimum Glazing Requirements					
Operative/Inoperative Windows, except Horizontal Sliding					
Glass Area	<6 S.F.	6-14 S.F.	14-32 S.F.	32-50 S.F.	>50 S.F.
1) Minimum Frame Lap	1/4"	1/4"	5/16"	3/8"	2"
2) Minimum Glass Edge ³ Clearance	1/8"	1/8"	5/16"	1/4"	1/4"
3) Continuous Glazing ³ Rabbet and Retainer	Required				
4) Resilient Setting ⁴ Material	Not Required	Required			

Sliding Doors and Horizontal Sliding Windows				
Glass Area	<14 S.F.	14-32 S.F.	32-50 S.F.	>50 S.F.
5) Minimum Glass Frame Lap	1/4"	5/16"	3/8"	2"
6) Minimum Glass Edge ³ Clearance	1/8"	3/16"	1/4"	1/4"
7) Continuous Glazing ³ Rabbet and Retainer	Required			
8) Resilient Setting Material ⁴	Not Required		Required	

(1) Table 35-G does not apply to skylights

(2) Glass edge clearance at all sides of pane shall be a minimum of 3/16" where height of glass exceeds three feet.

(3) Glass retainers such as metal, wood, or vinyl face stops, glazing beads, gaskets, glazing clips and glazing channels shall be of sufficient strength and fixation to serve this purpose.

(c) SAFEGUARDS:

(1) Where there is a drop of more than 4' on the far side of a fixed glazed panel (24" or more in width) the bottom of which is less than 30" above the near side walking surface, safeguards as set forth in Section 516 of this Code shall be provided. In other than H and I Occupancies, fixed glazed panels if less than 24" wide shall be tempered glass, but may be without safeguards.

(2) Where there is a drop of four feet or less on opposite sides of a fixed glazed panel 24 inches or more in width, safeguards shall be provided where persons might walk into or through such glazing, as follows:

(aa) Glazing which is etched, translucent or otherwise made apparent.

(bb) An opaque bulkhead not less than 18 inches higher than the upper level.

(cc) A planter with plantings not less than 18 inches higher than the upper level.

(dd) Safety glazing or a single horizontal bar of handrail strength requirements located 36 inches above the upper level.

(3) Glazed panels located adjacent to, or in doors, shall be of safety-glazing, as follows:

(aa) All glazed panels in a door through which a three-inch diameter sphere is able to pass.

(bb) In residential, H and I Occupancies, all glazing materials adjacent to door within 12 inches of the door in a closed position and below the top of the door.

(cc) In all Occupancies other than residential, any glazing material adjacent to door within 48 inches of the door in a closed position and below the top of the door.

(dd) **EXCEPTIONS:**

(1) Wired glass in fire doors.

(2) Leaded glass of area 30 square inches or less.

(3) Curved glass panels in revolving doors.

(4) Commercial refrigerated cabinet doors.

(4) A solar screen may serve as a safeguard where such screen complies with the strength requirements of a railing.

3508.3 DOORS AND OPERATIVE WINDOWS IN EXTERIOR WALLS:

(a) **DESIGN AND APPROVAL:**

(1) The design and approval of sliding doors, swinging doors, skylights and operative windows in exterior walls, including the supporting members, shall be in accordance with Chapter 23 of this Code.

(2) Garage doors, passage doors, skylights, operative and shall be tested in accordance with applicable standards as specified in sub-section 3508.3(b). Tests shall be made by an approved testing laboratory.

(3) Maximum glass sizes shall comply with Table 35-E herein.

(4) Swinging doors of glass, in exterior walls, without continuous frames shall be of fully tempered glass only, and shall be not less than one-half inch in thickness.

(5) Doors shall be designed to be readily operative without contact with the glass.

(6) Garage doors, passage doors, skylights, operative and inoperative windows, including their supporting framework, in exterior building surfaces, shall be rated for wind pressure resistance, in pounds per square foot. Said rating shall be determined in accordance with the test methods outlined in ASTM E 330-84 "Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference" or by comparative analysis as provided for in Sub-paragraph 3508.3(b)(5). The respective door, window and glazing shall then be permanently identified with its respective wind resistance rating at the point of manufacturer. This wind resistance rating is not intended to preempt any other ratings that might be required of the respective assembly, such as fire resistivity.

(7) The Architect or Professional Engineer of Record shall be required to specify the design wind pressure, determined in accordance with Chapter 23 of this Code, for all garage doors, exterior doors, skylights and operative and inoperative windows. The design wind pressure for each component of the exterior building surface, shall be incorporated into the building design drawing so as to allow the respective manufacturer to size their prefabricated assembly for the proper wind pressures.

(8) Exterior garage doors shall be designed and constructed to actively or passively lock in the closed position when closed and when subjected to a uniform lateral pressure in excess of 50 percent of the design wind pressure as prescribed in Chapter 23 of this Code over its entire face. Exterior garage door assemblies shall be deemed in compliance with this requirement upon presentation of acceptable test data or engineering analysis.

EXCEPTION: (aa) Exterior garage doors when protected by fixed, operable or portable shutters or screens, which are shown to be in conformance with Paragraph 3501.1(c) of this Code.

(9) The Architect or Professional Engineer of Record shall be required to detail, on the drawings submitted for permit, rough opening dimensions, supporting framework, method of attachment and waterproofing procedures for all garage doors, passage doors, skylights, operative and inoperative windows in exterior walls. Said framework and method of attachment shall be designed and constructed so as to sufficiently resist the design wind pressures as outlined in Chapter 23 of this Code.

EXCEPTION: When detailed engineered shop drawings and product literature, produced by the manufacturer's specialty engineer and approved by an Architect or Professional Engineer of Record, are submitted at the time of permit application, which completely identifies rough openings, supporting framework, method of attachment, and waterproofing procedures, and are prepared by and bear the signature and seal of a Professional Engineer.

(b) TESTS:

(1)(aa) Operative window and exterior sliding glass door assemblies shall be tested in accordance with AAMA/NWWDA 101/I.S.2-97.

(bb) Garage doors, passage doors and skylights shall be tested as specified in this sub-section. Such test shall be made in the order specified.

(1) EXTERIOR PASSAGE DOORS

(aa) Air Infiltration Test — ASTM E 283. (Group H and I only)

(bb) Water Resistance Test — ASTM 331 (Group H and I only)

(cc) Uniform Load Structural Test — ASTM 330

(dd) Forced Entry Resistance — ASTM F 588 or AAMA 1302.5

(ee) Impact Test for Windborne Debris — (see section 2315)

(2) EXTERIOR GARAGE AND OVERHEAD DOORS

(aa) Uniform Load Structural Test ASTM 330

(bb) Impact Test for Windborne Debris (see section 2315)

(3) SKYLIGHTS

(aa) Air Infiltration Test ASTM E 283.

(bb) Water Resistance Test ASTM 331

(cc) Uniform Load Structural Test ASTM 330

(dd) Impact Test for Windborne Debris (see section 2315)

(2) Such assemblies with permanent muntin bars shall be tested with muntin bars in place.

(3) Such assemblies shall be installed in accordance with the conditions of approval.

(4) Test load shall be one and one-half (1.5) times the design positive or negative pressure, expressed in pounds per square foot, as determined in accordance with Chapter 23 for components and cladding, of this Code

(5) Comparative analysis shall be by a Professional Engineer based on one test of the largest production unit and a second test of the production unit with the highest design pressure and provided the proposed unit complies with the following:

(aa) Shall always be compared with a tested and currently approved unit.

(bb) Varies only in width, height and/or load requirements.

(cc) Shall conform to extruded members, reinforcement and in all other ways with the tested unit.

(dd) Shall not exceed 100 percent of the concentrated load of the juncture proposed unit:

(6) Pass-through windows for serving from a single-family kitchen, where protected by a roof overhang of five feet or more, shall be excepted from the requirements of the water infiltration test.

(c) SAFEGUARDS: Operative windows shall be protected as follows:

(1) In other than H and I Occupancies, where there is a drop of more than 4' on the far side of such windows and the window opening is less than 36" above the near side walking surface; or in H and I Occupancies where there is a drop of more than 4' on the far side of such windows and the window opening is less than 30" above the near side walking surface, safeguards shall be provided to prevent the fall of persons when such windows are open, as set forth in Section 516 of this Code, except:

(aa) Where awning window vent openings are of tempered glass and restricted in operation to reject objects as required for safeguards in Paragraphs 516.2(d) and (e) of this Code.

(bb) Slats or grill work constructed to comply with the Standard OSHA-1910, set forth in Sub-section 516.1 of this Code, or other construction approved by the Building Official, may be provided in lieu of other safeguards.

(cc) Where the near side of such window is less than four inches above the floor and falling objects could present a hazard, toeboards may be required as provided in the Standard OSHA-1910 set forth in Sub-section 516.1 of this Code, or an approved alternate design.

(2) Where the drop from such windows is four feet or less, the following may be used in lieu of other safeguards:

(aa) A barrier such as a planter, fixed bench or similar construction arrangement not less than 18" higher than the upper level.

(bb) A single-family residence, a natural barrier such as shrubbery.

3508.4 INTERIOR LOCATIONS:

(a) Swinging or sliding doors of glass without a continuous frame shall be of only fully tempered glass not less than 3/8 inch in thickness.

(b) (1) The glazing in sliding and swinging doors, including shower or tub enclosures, shall be safety glazing.

(2) Glass or mirrors immediately surrounding a bathtub or shower enclosure shall be safety glazing where the glass or mirrors are less than 60" above the floor of the tub or shower.

(c) The glazing in fixed panels adjacent to paths of egress shall comply with Paragraph 3508.2(c)(3) herein.

(d) Glass shall not be solid painted or otherwise concealed where such painted glass may be mistaken for other construction materials.

(e) All mirrors exceeding 9 square feet installed on vertical walls shall be supported on the bottom and shall be securely affixed to the wall in accordance with the manufacturer's specifications.

3508.5 SAFETY GLAZING:

(a) Safety-glazing, where required, shall be as set forth in this Sub-section.

(b) Safety-glazing shall comply with the standard set forth in Paragraph 3508.1(c) for transparent and obscure safety-glazing materials and plastic glazing shall in addition comply with the specifications of Paragraph 3508.5(c).

(c) Plastics, with or without reinforcing or acrylic modifiers shall comply with Section 3505 herein and consideration of dimension reduction caused by deflection and/or dimensional instability of the materials shall be given in the determination of the depth of the glazing rabbet and engagement of the plastic in the rabbet. Plastics shall be limited to spans determined by analysis and test to resist the loads set forth in Chapter 23.

(d) Glass louvered doors need not be safety-glazed.

3508.6 SLOPED GLAZING:

(a) Sloped glazing includes any installation of glass or other transparent, translucent, or opaque glazing material installed at a slope of 15 degrees or more from the vertical plane. Glazing materials in skylights, roofs and sloped walls are included within this definition.

(b) Allowable Glazing Materials:

(1) Sloped glazing shall be any of the following materials subject to the limitations specified in 3508.5(c) and the exceptions specified in 3508.6(d):

(aa) For monolithic glazing systems, the glazing material of the single lite or layer shall be laminated glass with a minimum 30 mil polyvinyl butyryl (or equivalent) interlayer, wired glass, approved plastic material meeting the requirements of Chapter 35, heat-strengthened glass, or fully-tempered glass.

(bb) For multiple glazing systems, each lite or layer shall consist of any of the glazing materials specified in (aa) above.

(cc) See 3505 for additional requirements for plastic skylights.

(c) LIMITATIONS:

Heat-strengthened glass and fully-tempered glass when used in monolithic glazing system shall have screens installed below the glazing material, subject to exceptions in 3508.6(d) to protect building occupants from falling glass should breakage occur. The screens shall be capable of supporting the weight of the glass and shall be substantially supported below and installed within 4" of the glass. They shall be constructed of a noncombustible material not thinner than 0.0808" (12 B and S gage) diameter with a mesh not larger than 1" x 1". In a corrosive atmosphere structurally equivalent noncorrosive screening materials shall be used. Heat-strengthened glass, fully-tempered glass, and wire glass, when used in multiple layer glazing systems as the bottom glass layer over the walking surface, shall be equipped with screening meeting the requirements specified for monolithic glazing systems.

(d) EXCEPTIONS: In monolithic and multiple layer sloped glazing systems, the following exceptions apply:

(1) Fully-tempered glass may be installed without required protective screens when glazing between intervening floors at a slope of 30 degrees or less from the vertical plane if the highest point of the glass is 10' or less above the walking surface.

(2) Any glazing material, including annealed glass, may be installed without required screens if the walking surface below the glazing material is permanently protected from the risk of falling glass or if the area below the glazing material is not a walking surface.

(3) Any glazing material, including annealed glass, may be installed in the sloped glazing systems of greenhouses (structures used primarily for growing plants) without screens provided the height of the greenhouse at the ridge does not exceed 20' above grade. Frames may be of wood construction in greenhouses located outside the Fire District if the height of the sloped glazing does not exceed 20' above grade. In other cases, noncombustible frames shall be used.

(e) SLOPED GLAZING FRAMING:

In other than types III, IV and V construction, all sloped glazing and skylight frames shall be constructed of noncombustible materials. In foundries or buildings where acid fumes deleterious to metal are incidental to the use of the building, approved pressure-treated woods or other approved noncombustible material shall be permitted for sash and frames. All sloped glazing and skylights shall be designed for the roof and wind loads in Chapter 23 of this Code. All skylights set at an angle of less than 45 degrees from the horizontal plane shall be mounted at least 4" above the plane of roof on a curb construction as required for the frame. Sloped glazing may be installed in the plane of the roof where the roof pitch is greater than 45 degrees from horizontal.

3509 GLASS VENEER

Glass veneer shall be as set forth in this Section.

3509.1 DIMENSION: Glass-veneer units shall be not less than 1 1/32 inch in thickness. No unit shall be larger in area than ten square feet where 15 feet or less above the grade directly below, nor larger than six square feet where more than 15 feet above the grade directly below.

3509.2 ATTACHMENT: Every glass-veneer unit shall be attached to the backing with approved mastic cement and corrosion-resistant ties and shall be supported upon shelf angles.

(a) Where more than six feet above grade, veneer shall be supported by shelf angles; and ties shall be used in both horizontal and vertical joints.

(b) Below a point six feet above grade, glass veneer shall rest on shelf angles. Veneering shall not be supported on construction which is not an integral part of the wall, and over sidewalks shall be supported on a shelf angle not less than one-fourth inch above grade.

(c) All edges of glass veneer shall be ground.

3509.3 MASTIC:

(a) The mastic shall cover not less than one-half of the area of the unit after the unit has been set in place and shall be neither less than one-fourth inch or more than one-half inch in thickness.

(b) The mastic shall be insoluble in water and shall not lose its adhesive qualities when dry.

(c) Absorbent surfaces shall be sealed by a bonding coat before mastic is applied. The bonding coat shall be cohesive with the mastic.

(d) Glass-veneer surfaces to which mastic is applied shall be clean and uncoated.

(e) Space between edges of glass veneer shall be filled uniformly with an approved type pointing compound.

3509.4 SHELF ANGLES AND TIES:

(a) Shelf angles shall be of corrosion-resistant material capable of supporting four times the weight of the supported veneer. The shelf angles shall be spaced vertically in alternate horizontal joints, but not more than three feet apart. Shelf angles shall be secured to the wall at intervals not exceeding two feet with corrosion-resistant bolts not less than one-fourth-inch diameter. Bolts shall be set in masonry and secured by lead shields.

(b) Ties shall be of corrosion-resistant metal as manufactured especially for holding glass-veneer sheets to masonry surfaces. There shall be not less than one such approved tie for each two square feet of veneer surface.

3509.5 BACKING: Exterior glass veneer shall be applied only upon masonry, concrete or stucco.

3509.6 EXPANSION JOINTS: Glass veneer units shall be separated from each other and from adjoining materials by an expansion joint at least one-sixteenth in thickness. There shall be at least one-sixty-fourth-inch clearance between bolts and the adjacent glass.

3510 GYPSUM BOARD PRODUCTS AND ACCESSORY ITEMS

3510.1 GENERAL:

(a) Gypsum wallboard products and related items and accessories, to be used with or without the addition of plaster for partitions, walls and ceilings, shall be as set forth in this Section.

(b) Where required to be fire-resistive such assemblies shall also comply with Chapter 37.

3510.2 STANDARDS: The following Standards are adopted as set forth in Section 402:

(a) Standard Specification for the Application and Finishing of Gypsum Wallboard, ANSI A97.1.

(b) Specifications for Gypsum Wallboard, ASTM C36.

(c) Specification for General Requirements for Zinc-Coated (galvanized) Steel Sheets by the Hot-Dip Process, ASTM A525.

(d) Specification for Light-Gage Steel Studs, Runners, and Rigid Furring Channels, ASTM C645.

(e) Specifications for Joint Treatment Materials for Gypsum Wallboard Construction, ASTM C475.

3510.3 GYPSUM WALLBOARD:

(a) The gypsum wallboard shall comply with the standard set forth in Paragraph 3510.2(a) and single or multiple system combination shall be not less than one-half inch in thickness.

(b) The span between supports for gypsum wallboard shall be not more than 24 inches for 1/2-inch thick and 5/8-inch thick wallboard.

(c) Gypsum wallboard used in fire-rated assemblies shall be a type for which test ratings are available.

3510.4 WOOD STUDS AND WOOD CEILING SUPPORTS: Wood studs and wood ceiling supports shall comply with Chapter 29 herein.

3510.5 STEEL STUDS, CEILING SUPPORTS, TRACK RUNNERS:

(a) Steel studs and runners shall be of channel or "c" shape type, not less than 25 gauge (.0179 in. thick base metal) and hot dipped galvanized. (.0189 in thick after galvanized coating) Applied paint coating shall not be included in these thicknesses.

(b) The unsupported height of partitions shall comply with the loads and deflections set forth in Sub-section 2305.5 and where wallboard is suitably attached, the composite action may be accounted for in the design.

(c) Steel ceiling supports shall comply with Sub-section 3502.5 herein.

(d) Steel studs, track runners and ceiling supports shall comply with the Standard set forth in Paragraph 3510.2(c) herein and where required for fire resistance, shall conform to the materials and conditions of approval based on standard tests as set forth in Chapter 37 herein.

3510.6 ATTACHMENTS:

(a) Attachment shall be as set forth herein and for fire-rated assemblies shall also conform to the material and conditions of the assembly tested.

(b)(1) Attachment to wood supporting members shall conform to the Standard set forth in Paragraph 3510.2(a) herein.

(2) Nails and screws attaching gypsum wallboard shall, without substantially fracturing the surface paper, be driven below the surface and spotted with finishing joint compound.

(c) Attachment to metal members shall be as follows:

(1) Gypsum wallboard shall be attached to metal members by self-drilling, self-tapping sheet metal screws.

(2) The spacing of screws attaching gypsum wallboard to metal studs and runners shall be not more than 12 inches on centers.

(3) Screws for attaching gypsum wallboard to metal studs shall be not less than inches long for 2-inch wallboard or one inch long for 5/8-inch wallboard.

(4) Screws attaching gypsum wallboard shall be driven below the surface and spotted with finishing compound.

(5) Runners shall be fastened to the ceiling, contiguous walls and partitions and to the floor at intervals not exceeding 24 inches on centers. Such attachment may be by nails penetrating the base material not less than -inch or self-drilling, self-tapping sheet metal screws attaching metal to metal.

3511 SUSPENDED AND FURRED CEILINGS

3511.1 Lath and plaster ceilings shall be as set forth in this Chapter.

3511.2 Suspended and furred ceilings, other than lath and plaster, where providing fire protection shall comply with Sub-section 3705.5 of this Code.

3511.3 Suspended and furred ceilings other than lath and plaster shall be suspended and supported in conformance with the conditions of fire-tests or, if not tested, as recommended by the manufacturer or as required for structural stability.

3512 OTHER MATERIALS

3512.1 WOOD:

(a) Wood and wood-products used for wall claddings shall comply with Chapter 29 of this Code.

(b) Wood and wood-products used for wall cladding as nonstructural exterior trim, fascia and soffits on buildings of Type I, Type II and Type III Construction May be used provided such materials comply with Sub-section 1812.5 of this Code.

3512.2 ASPHALT SHINGLES: Asphalt shingles shall be applied only to solid wood sheathing and shall be tin-capped and spot-stuck, as set forth in Chapter 34 of this Code.

3512.3 ROLL SLATE OR FELT: Roll slate or felt shall be applied only to solid wood sheathing and shall be secured by nailing, as set forth in Chapter 34 of this Code.

3512.4 METAL SHINGLES: Metal shingles shall be applied only to solid wood sheathing and shall be secured as set forth in Chapter 34 of this Code.

3512.5 STEEL SIDING: Steel siding shall be designed and applied as set forth in Sub-section 2809.5 of this Code.

3512.6 ALUMINUM SIDING: Aluminum siding shall be designed and applied as set forth in Chapter 30 of this Code.

3512.7 VENEERS: Masonry veneers shall be applied as set forth in Chapter 27 of this Code.

3512.8 COMBUSTIBLE MATERIALS: Combustible materials and fire-resistive characteristics of all materials shall be regulated as otherwise required by this Code for the "Group of Occupancy" or "Type of Construction" or as "Interior Finishes" in Section 3708 of this Code.

3512.9 OTHER MATERIALS: Other materials and assemblies shall be classified by the Building Official as one described in this Code and shall comply with the requirements of loading or fire resistance herein required.

3513 STORM SHUTTERS/EXTERNAL PROTECTIVE DEVICES

3513.1 GENERAL

(a) Storm shutters/external protective devices shall have product approval, or are shown by acceptable test data or analysis to be of sufficient strength to resist full pressurization from wind loads as well as large and small missile impacts as outlined in Chapter 23 of this Code, without deforming to the point where the substrate being protected is invariably compromised.

(b) External protective devices utilized to protect openings above the first story of any building or structure must be permanently installed and closable from the inside of the building or structure unless such openings are accessible without the use of a ladder or lift, or installation of devices can be made from the interior of the building or structure.

Exception: Group I detached single-family residences, not exceeding two stories.

(c) Storm shutters must completely cover an opening in all directions.

(d) On any side of an opening, the maximum side clearance between the shutter and a wall or inset surface shall be one-quarter (1/4) inch. Any distance in excess of one-quarter (1/4) inch shall require end closure or shutter overlap, where applicable.

(e) Shutter overlap shall be a minimum of 1.5 times the side clearance between shutter and wall.

(f) End closures shall be designed to resist wind loads as specified in Chapter 23, based on rational analysis.

3514 CURTAIN WALLS

3514.1 SCOPE: This section prescribes requirements for curtain walls of buildings or structures regulated by this Code.

3514.2 APPLICATION:

(a) Curtain walls as defined in Section 401 of this Code, shall be designed and constructed in accordance with the requirements of this section.

(b) Structural glazing in curtain walls shall also comply with the requirements of Section 3515 of this Code.

3514.3 DEFINITIONS: The terms used in this section shall be defined as set forth in Section 401.

3514.4 STANDARDS: No requirements.

3514.5 DESIGN:

(a) GENERAL:

(1) All structural elements of curtain wall systems shall be reviewed and approved by, and bear the seal of, a Florida Registered Professional Engineer.

(2) Curtain wall systems, the design of which is based on support from more than two adjacent floors, shall be designed to withstand all imposed loads without exceeding allowable stresses in the event of destruction or failure of any single span within the system.

(3) Individual mullions acting as a continuous member shall transfer loads through supports from no more than three adjacent floors.

(4) When subjected to design loads, the framework shall provide adequate coverage and restraint of the glass at all perimeter edges, regardless of the location of the glass within the framework.

(b) **MATERIALS:** The materials used in any curtain wall shall comply with the applicable provisions of this Code.

3514.6 FIRE PROTECTION:

(a) Curtain wall supports, spandrel panels, anchors, and the connections at the intersection of the floor and wall shall be fire protected based on building distance separation as required by Section 1804.1(c).

(b) Irrespective of distance separation, anchors, embedded hardware, connections at the intersection of the wall and floor and other connectors used to attach the curtain wall framing system to the building frame shall be provided with fire protection from the floor below with fire resistant materials having a fire rating equivalent to that of the floor.

EXCEPTION: Connections within openings protected as set forth in (d) below.

(c) Where fire safing is used to achieve such protection it shall be installed in such a manner that it will remain in place for at least a duration of one hour.

(d) Openings between curtain wall systems and fire resistive floors shall be protected against the passage of fire and smoke in accordance with 3705.2.

3514.7 INSPECTION: Curtain wall systems for threshold buildings shall be inspected by a Special Inspector at both the point of assembly and installation in accordance with Sub-section 305.2 and 305.3.

3515 STRUCTURAL GLAZING SYSTEMS

3515.1 SCOPE: This section prescribes requirements for structural glazing systems of buildings or structures regulated by this Code.

3515.2 APPLICATION:

(a) Structural glazing, as defined in Section 401 of this Code, shall be designed and constructed in accordance with the requirements of this Section.

(b) Structural glazing systems used in curtain walls shall also comply with the requirements of Section 3514 of this Code.

3515.3 DEFINITIONS: The terms used in this section shall be defined as set forth in Section 401 of this Code.

3515.4 STANDARDS: Adhesives and sealants used in structural glazing systems shall comply with the following standards and adopted in Section 402.

- (a) ASTM C-794, Test Method for Adhesion-In-Peel of Elastomeric Joint Sealant.
- (b) ASTM C920, Specification for Elastomeric Joint Sealants.
- (c) ASTM D412, Test Methods for Rubber Properties in Tension.
- (d) ASTM D624, Test Method for Rubber Property-Tear Resistance.
- (e) ASTM D2240, Test Method for Rubber Property-Durometer Hardness.
- (f) Federal Specifications TT-S-001543A and TT-S-00230D.
- (g) ASTM E331, Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors.
- (h) ASTM E330, Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors.

3515.5 DESIGN:

(a) GENERAL:

(1) Structural glazing systems shall be reviewed and approved by, and bear the seal of, a Florida Registered Professional Engineer.

(b) MATERIALS:

(1) **IDENTIFICATION:** All materials shall be clearly identified as to manufacturer and manufacturer's product number.

(2) ADHESIVES AND SEALANTS:

(aa) Only approved silicone elastomer adhesives and sealants shall be used for fastening glass lites and other panels to curtain wall framing.

(bb) Such adhesive and sealants shall be of a polymer which is 100 percent silicone.

(cc) Adhesives and sealants shall have been tested in accordance with the standards set forth in Sub-section 3515.4.

(c) MANUFACTURER'S TESTING RECOMMENDATION AND APPROVAL:

(1) Compatibility of all components and fabrication procedures of structural glazing systems shall be tested, approved and recommended in writing by the manufacturer of the adhesive; the manufacturer on the coating, whether it is anodized, baked, or otherwise applied; and the manufacturer of the glass panel.

(2) Such testing, recommendation and approval shall address, but shall not be limited in scope to:

(aa) The compatibility of the sealant with metal, glazing materials, shims, spacers, setting blocks, backer rods, gaskets, and other materials;

(bb) Adhesion to the designated substrates; adhesion of the substrates to the base metal; and

(cc) The design and structural capability of silicone joints and cross sections.

(d) STRUCTURAL REQUIREMENTS:

(1) DESIGN OF STRUCTURAL SEALS:

(aa) The design stress of the structural silicone shall not exceed 20 psi for materials having a minimum strength of 100 psi at the weakest element in the line of stress.

(bb) Such design stress shall provide for a safety factor of not less than 5.0.

(cc) Safety factors greater than 5.0 shall be specified by the Engineer when required or recommended by the manufacturer.

(dd) The silicone structural seal shall have a maximum modulus of elasticity to allow no more than 25% movement of the joint width at 20-psi stress.

(ee) In insulating glass units, the secondary silicone seal shall be designed to withstand a minimum of one-half the design negative wind load applicable to the outboard lites.

(2) BONDING LIMITS: Structural glazing shall be limited to adhesive bonding of one side or on two opposing sides of an infill glass lite or panel.

EXCEPTION: Three or four side bonding shall be permitted only when structural glazing units are shop fabricated and shop glazed.

(3) JOBSITE REGLAZING:

(aa) Jobsite replacement reglazing shall be permitted only when performed following a procedure approved in writing by the applicable structural silicone manufacturer.

(bb) Replacement shall be performed only by individuals or firms approved or certified by the silicone manufacturer.

3515.6 FIRE PROTECTION: Structural glazing in curtain walls shall be fire protected as required by Sub-section 3514.6.

3515.7 INSPECTIONS, TESTING AND RECERTIFICATION:

(a) A minimum of 1 percent of the structurally glazed panels shall be tested for load carrying capacity and sealant adhesion in accordance with Section 2314 of this Code and ASTM E330.

(b) Structural glazed panels shall be inspected by a Special Inspector for conformance with the approved design and installation procedures in accordance with Sub-section 305.3 prior to the erection of such panels and after the seal-curing period established by the silicone manufacturer.

(c) It shall be the responsibility of the Contractor to verify the adhesion of the cured sealant periodically throughout the application to assure compliance with the manufacturer's specifications and quality of application.

(d) Structural glazing systems on threshold buildings shall be recertified by the owner in accordance with Sub-section 305.3 one year after initial inspection. Subsequently, such systems shall be recertified every five (5) years at regular intervals.

CHAPTER 36

OCCUPANCY OF PUBLIC AND RESTRICTED PROPERTY

- 3601 GENERAL**
- 3602 TEMPORARY OCCUPANCY**
- 3603 PERMANENT OCCUPANCY**
- 3604 RESTRICTED AREAS**

3601 GENERAL

The occupancy of public and restricted property shall be permitted only in conformity with the provisions of this Chapter, and the right to occupy public property shall be subject to revocation on 30-days' notice to the owner of any building accessory which in any way occupies such property. The owner shall be responsible for the maintenance of or damage caused by projections over public property.

3602 TEMPORARY OCCUPANCY

3602.1 GENERAL: No building materials, equipment, machinery, storage sheds, job offices, debris or any other temporary requirements or results of building operations or demolition shall be placed upon any streets, alleys, or sidewalks, except as provided in this Section and in Chapter 33.

3602.2 STREETS:

(a) Building materials, equipment, debris, and job offices, in connection with new construction or demolition, may be placed upon the street in front of a building in the course of construction, alteration or demolition, as provided in Paragraph 301.2(a). The maximum width of such occupied space shall not exceed one-third of the width of the street, measured between curbs, except as temporary closing of streets may be otherwise permitted.

(b) Materials, placed on streets, shall not obstruct fire hydrant, fire-alarm box, manhole or catch basin and shall be so placed, or such arrangements shall be made, that the flow of water in gutters shall not be restricted.

3602.3 SIDEWALKS: Sidewalks may be occupied for purposes in connection with construction, alterations, or demolition, provided that there shall be a temporary sidewalk, properly guarded and not less than five feet wide, constructed in the outer portion of the street area permitted for such occupancy in Paragraph 3602.2(a), and provided further that sidewalks shall be protected by sheds or fences as specified in Chapter 33.

3602.4 ALLEYS: Alleys, or any portion thereof, shall not be occupied for purposes in connection with construction, alterations or demolition; except that the use of all or a portion of any alley may be permitted for limited periods of time as provided in Paragraph 301.2(a).

3602.5 MISCELLANEOUS REQUIREMENTS: Public property such as sidewalks and pavements shall be protected from damage incident to construction work or shall be repaired or replaced as required in Section 306.

3603 PERMANENT OCCUPANCY

3603.1 SIGNS: Signs shall not be permitted to extend over public property except as specified in Chapter 42.

3603.2 AWNINGS: Awnings shall not be permitted to extend over public property except as specified in Chapter 43 and 44.

3603.3 MARQUEES: Marquees shall not be permitted to extend over public property except as follows:

- (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 a weatherhead more than ten feet above a sidewalk may project a reasonable distance.

(3) Meters and piping shall not extend over public property.

3603.6 ARCHITECTURAL ORNAMENTATIONS AND OTHER PROJECTIONS:

Architectural ornamentations and other projections not otherwise specifically regulated herein may occupy public property when complying with all of the following requirements:

(a) Such projections shall comply with all applicable zoning regulations.

(b) Such projections shall be not less than 9 feet above the grade below.

(c) Such projections shall not extend closer than 18 inches to the curb line.

(d) Such projections shall be constructed of incombustible materials or may be of fire retardant wood properly protected.

(e) Drainage of a projection of two feet or more shall be carried in downspouts under the sidewalk to the curb gutter except that where the roof of such projection is not more than 12 feet above the sidewalk nor more than four feet projection the drainage may be back to the building and off then end projection adjacent to the building but shall not be drained off the street edge thereof.

3603.7 FOUNDATIONS: Foundations of buildings may project on public property, provided such projections shall not exceed six inches into a public street nor six inches into an alley.

3603.8 EXCEPTION: Where, in this Code, reference is made to a required or minimum vertical distance above public property, such distance is measured from the sidewalk immediately below the projection. Where no such sidewalk is intended and vehicular traffic permitted adjacent to the building, the minimum vertical clearance shall be not less than 14 feet at any point.

3604 RESTRICTED AREAS

3604.1 GENERAL: Where there is conflict between the set back areas required by zoning regulations and court areas required by this code for light, ventilation, fire protection, or paths of egress, the more restrictive provision shall apply.

3604.2 COURT AREAS:

(a) **EXIT COURTS:** Court areas, for the purpose of providing paths of egress, shall be unobstructed for their required width to a height of eight feet.

(b) **LIGHT AND VENTILATION:** Court areas, for the purposes of light and ventilation, shall be unobstructed for their required width from the lowest required point to the sky; except that sills, belt courses, cornices, eaves and similar horizontal projections may extend into such required widths not to exceed 12 inches for buildings which are three stories or more in height nor more than 18 inches for buildings less than three

stories in height.

PART VIII
FIRE-RESISTIVE STANDARDS AND PROTECTION
CHAPTER 37
FIRE RESISTIVE STANDARDS

- 3701 GENERAL**
- 3702 FIRE-RESISTIVE MATERIALS**
- 3703 PROTECTION FOR STRUCTURAL MEMBERS**
- 3704 WALLS AND PARTITIONS**
- 3705 FLOORS AND ROOFS**
- 3706 FIRE-RESISTIVE ASSEMBLIES FOR PROTECTION OF OPENINGS**
- 3707 FIRE-RETARDANT ROOF COVERINGS**
- 3708 INTERIOR FINISHES**
- 3709 INSULATING MATERIALS**
- 3710 CALCULATED FIRE RESISTANCE**

3701 GENERAL

3701.1 GENERAL:

(a) Materials of construction and assemblies or combination thereof shall be classified for fire-resistive, fire-retardant or flame-spread purposes in terms of performance in authoritative tests made by a recognized laboratory in accordance with the Standards set forth herein.

(b) (1) For the purpose of determining the degree of fire resistance afforded, some materials and assemblies are listed in this Chapter and shall be assumed to have the fire resistance set forth herein.

(2) Other material and assemblies not listed herein and for which results of standard tests are available shall be given the rating based on such tests.

(3) Other materials or assemblies not listed herein and for which standard tests are not available shall be given ratings by the Building Official based on reasonable interpolation or interpretation of ratings herein set forth in Sec. 3710 Calculated Fire Resistance and/or performance in standard tests.

(4) Where no previous fire-resistive standard has been established and where the Building Official is unable to make an interpolation or interpretation of fire-resistivity, the assembly shall be submitted to the Board of Rules and Appeals for interpretation.

(5) Fire-resistance ratings of materials and assemblies may be calculated by a Registered Engineer or Architect. The following Standards shall be used to calculate this fire-resistivity:

(aa) Reinforced Concrete Fire Resistance, CRSI

(bb) Design for Fire Resistance of Precast Prestressed Concrete, PCI

(cc) Analytical Methods of Determining Fire Endurance of Concrete and Concrete Masonry Members – Model Code Approval Procedures, CMIFC

(dd) Calculated Fire Resistance for Concrete and Concrete Masonry – Florida Code Approved Procedures, FC & PA

(ee) Increasing the Fire Resistance of Concrete Masonry, TEK 80A, NCMA

(c) The designer of record shall be responsible for the design of fire resistive walls, floor/ceiling assemblies, roof/ceiling assemblies and horizontal and vertical smoke barriers. The designer of record shall show the necessary horizontal and vertical fire separations, and the hourly requirements of the fire separation and the method and type of material required to firestop penetrations of such fire separation on the floor plans and/or in the building sections. Fire-resistive assemblies and fire stopping systems, such as shown in the UL Fire Resistance Directory or Chapter 37 of this Code, shall be identified by its design number or specification as well

as by its hourly rating.

3701.2 STANDARDS: The following Standards are hereby adopted as set forth in Section 402.

(a) Standard for the Installation of Air Conditioning and Ventilating Systems (Non-residential), NFPA 90A.

(b) Standard Methods of Fire Tests of Building Construction Materials, ASTM E119, also referred to as: "Standard Fire Test."

(c) Standard Method of Fire Tests for Door Assemblies, ASTM E152.

(d) Standard for Tin-Clad Doors and Shutters, UL 10A.

(e) Standard Specification for Fire Tests of Window Assemblies, ASTM E163.

(f) Standard for Fire Doors and Windows, NFPA 80.

(g) Standard for Smoke Detectors for Fire Protective Signaling Systems, UL 168.

(h) Fire Protection Equipment List of UL Inc.

(i) Building Materials List of UL Inc.

(j) Standard Method of Test for Surface Burning Characteristics of Building Materials, ASTM E84.

(k) Method of Test for Determining Non-combustibility of Elementary Materials, ASTM E136.

(l) Design Data – Fire Resistance/Sound Control, GA, but for the fire-resistive values only of assemblies to supplement Tables 37-A, 37-B and 37-C.

(m) Factory Mutual System Approved Guide but only that portion entitled Building Materials and Construction, FMEC.

(n) Fire Resistive Index of UL, Inc.

(o) Fire-resistance ratings of materials and assemblies may be calculated by a Registered Engineer or Architect. The following Standards shall be used to calculate this fire-resistivity:

(1) Reinforced Concrete Fire-Resistive Requirements, AC1216, R-81 and/or, 1980.

(2) Design for Fire-Resistance of Precast Prestressed Concrete, PCI

(3) Analytical Methods of Determining Fire Endurance of Concrete and Concrete Masonry Members Model Code Approved Procedures, CMIFC

(4) Calculated Fire Resistance for Concrete and Concrete Masonry – Florida Code Approved Procedures, FC & PA

(5) Increasing the Fire Resistance of Concrete Masonry, TEK 80A, NCMA

(p) Warnock Hersey International Inc., 539 Benfield Road, Severna Park, MD 21146.

(q) Fire Resistance Design Manual Eleventh Edition Gypsum Association – GA 600-84

(r) Southwest Research Institute

(s) Standard method of fire tests of through penetration fire stops, A.S.T.M. E-814-83.

3701.3 DEFINITIONS:

Carbonate Aggregate Concrete – concrete made with aggregates consisting mainly of calcium or magnesium carbonate, e.g. limestone or dolomite.

Lightweight Aggregate Concrete – concrete made with aggregates of expanded clay, shale, slag, or slate or sintered fly ash, and weighing 85 to 115 pcf.

Sand-Lightweight Concrete – concrete made with a combination of expanded clay, shale, slag, or slate or sintered fly ash and natural sand. Its unit weight is generally between 105 and 120 pcf.

Siliceous Aggregate Concrete – concrete made with normal weight aggregates consisting mainly of silica or compounds other than calcium or magnesium carbonate.

3701.4 CONSTRUCTION CLASSIFICATION, RESTRAINED AND UNRESTRAINED:

I. Wall bearing

A. Single span and simply supported end spans of multiple bays ¹	
1. Open-web steel joists or steel beams supporting concrete slab, precast units, or metal decking	Unrestrained
2. Concrete slabs, precast units, or metal decking	Unrestrained
B. Interior spans of multiple bays	
1. Open-web steel joists, steel beams or metal decking supporting continuous concrete slab	Restrained
2. Open-web steel joists, steel beams, supporting precast units or metal decking	Unrestrained
3. Cast-in-place concrete slab systems	Restrained
4. Precast concrete where the potential thermal expansion is resisted by adjacent construction ²	Restrained
II. Steel Framing	
A. Steel beams welded, riveted, or bolted to the framing members	Restrained
B. All types of cast-in-place floor and roof systems (such as beam-and-slabs, flat slabs, pan joists, and waffle slabs) where the floor or roof system is secured to the framing members	Restrained
C. All types of prefabricated floor or roof systems where the structural members are secured to the framing members and the potential thermal expansion of the floor or roof system is resisted by the framing system or the adjoining floor or roof construction ²	Restrained
III. Concrete framing	
A. Beams securely fastened to the framing members	Restrained
B. All types of cast-in-place floor or roof systems (such as beam-and-slabs, flat slabs, pan joists, and waffle slabs) where the floor system is cast with the framing members	Restrained
C. Interior and exterior spans of precast systems with cast-in-place joints resulting in restraint equivalent to that which would exist in condition III A	Restrained
D. All types of prefabricated floor or roof systems where the structural members are secured to such systems and the potential thermal expansion of the floor or roof systems is resisted by the framing system or the adjoining floor or roof construction ²	Restrained
IV. Wood construction	
All types	Unrestrained

¹Floor and roof systems can be considered restrained when they are tied into walls with or without tie beams, the walls being designed and detailed to resist thermal thrust from the floor or roof system.

²For example, resistance to potential thermal expansion is considered to be achieved when:

1. Continuous structural concrete topping is used.
2. The spaces between ends of precast units or between the ends of units and the vertical face of supports is filled with concrete or mortar, or
3. The space between the ends of precast units and the vertical faces of supports or between the ends of solid or hollow-core slab units does not exceed 0.25 percent of the length for normal weight concrete members or 0.1 percent of the length for structural lightweight concrete members.

3702 FIRE-RESISTIVE MATERIALS

3702.1 GENERAL: The fire resistivity of materials of construction or assemblies shall be as set forth in this Chapter or acceptable under the provisions or Standards set forth in Section 3701.

3702.2 CONCRETE:

(a) Concrete shall be as set forth in Chapter 25 and have a 28-day strength of not less than 2500 psi.

(b) Grade A concrete is made with aggregates such as limestone, calcareous gravel, trap rock, slag, expanded clay, shale, slate or any other aggregates possessing equivalent fire-resistive properties.

(c) Grade B concrete is all concrete other than Grade A concrete and includes concrete made with aggregates containing more than 40 percent quartz, chert, or flint.

(d) Pneumatically-placed concrete without coarse aggregate shall be classified as Grade A or B concrete in accordance with the aggregate used.

3702.3 MASONRY: Masonry shall be as set forth in Chapter 27 and shall be laid in Portland cement-lime or masonry cement mortar, except gypsum tile shall, and clay tile may, be laid in gypsum mortar when not exposed to the weather. Masonry shall be bonded by breaking joints in successive courses.

3702.4 LATH:

(a) Gypsum lath shall be as set forth herein and in Chapter 35.

(b) Metal lath shall be as set forth herein and in Chapter 35.

3702.5 PLASTER:

(a) Plaster shall be as set forth herein and in Chapter 35. Thickness of plaster is measured from the face of the plaster base; except that with metal lath, it is measured from the back of the lath unless otherwise stated. The usual one-sixteenth-inch white or finish coat may be included in the required plaster thickness.

(b) Pneumatically-placed stucco shall be rated as Portland-cement plaster.

3703 PROTECTION FOR STRUCTURAL MEMBERS

3703.1 THICKNESS OF PROTECTION:

(a) Fire-resistive structural members shall have the ratings set forth in Table 37-A and as further provided in this Section or shall be rated as set forth in Sub-section 3701.1.

(b) The figures shown shall be net thickness of the protecting materials and shall not include any hollow space, back of the protection.

3703.2 UNIT-MASONRY PROTECTION: Unit masonry for the protection of girders and columns shall have metal ties embedded in each transverse joint, where joints are more than 16 inches apart, and shall be spaced not more than 16 inches in other cases. Soffit-tile protecting beam and girder flanges shall be tied to the flange. Ties shall have a cross-sectional area equal to that of No. 8-gage wire.

3703.3 REINFORCEMENT FOR CAST-IN-PLACE PROTECTION: Cast-in-place concrete protection for steel columns shall be reinforced at the edges of such members with wire ties of not less than 0.18 inch in diameter wound spirally around the columns on a pitch of not more than eight inches.

3703.4 EMBEDMENT OF PIPES: Conduits and pipes shall not be embedded in required fire protection of structural members.

3703.5 COLUMN JACKETING: Where the fire-resistive covering on columns and other exposed structural members is exposed to injury from moving vehicles, the handling of materials, or by other means, corners shall be jacketed with an adequate covering to a minimum height of six feet above the floor except, that where headroom is physically limited to seven feet six inches, such jacketing shall extend to a minimum height of two feet six inches above the floor.

3703.6 CEILING PROTECTION:

(a) (1) Where a ceiling is used as part of a fire-rated assembly to provide fire protection for floors or roofs of incombustible construction, the construction, supporting beams, girders and columns need not be individually fire protected above the ceiling.

(2) **EXCEPTION:** Where such beams, girders and columns support loads from more than one floor,

roof, or contributory area exceeding 2,000 square feet, such members shall be individually protected.

(b) (1) Such ceilings as described in 3703.6(a)(1) shall be continuous, but may have openings for incombustible pipes, and electrical outlets providing the aggregate area of such pipes, and electrical outlets shall comply with requirements of the UL listing or other approved laboratories, or if fire-rated assembly is not listed by an approved laboratory, but only by this Code, the aggregate area shall not exceed 100 square inches in each 100 square feet, and providing the spaces above such ceilings are divided into areas not exceeding 10,000 square feet. Where a mechanical smoke evacuation system is provided and such 10,000 square foot subdivisions would hamper the operation of that control system, the 10,000 square foot division may be eliminated.

(aa) Openings in ceilings for ducts and ceiling diffusers shall be protected according to Section 4806.12(c).

(2) Plenums and other ceilings shall comply with the requirements of Sub-Section 1805.3.

(c) All openings for light fixtures or other devices in ceilings where the aggregate area of all openings exceeds that set forth in Paragraph(b) above shall be protected in a manner that will provide the same rating as the ceiling and the manner of protection shall be based on the results of fire tests.

(d) The material of construction of draft stops shall be as set forth in Type of Construction.

3703.7 ATTACHED METAL MEMBERS: The edges of lugs, brackets, rivets, and bolt heads attached to structural members may extend to within one inch of the surface of the fire protection.

3703.8 REINFORCED CONCRETE: Thickness of protection for concrete reinforcement shall be measured to the outside of the reinforcement, except that stirrups and ties may project not more than one-half inch into the protection.

3703.9 STEEL STUDS AND JOISTS: Steel studs and joists are not required to have individual protection when part of an assembly which has a fire-resistive rating.

3703.10 PRESTRESSED CONCRETE MEMBERS:

(a) For members having a single tendon or more than one tendon installed with equal concrete cover measured from the nearest surface, the cover shall be not less than that set forth in Table No. 37-A.

(b) For members having multiple tendons installed with variable concrete cover, the average tendon cover shall be not less than that set forth in Table No. 37-A provided:

(1) The clearance from each tendon to the nearest exposed surface is used to determine the average cover.

(2) In no case can the clear cover for individual tendons be less than one-half of that set forth in Table No. 37-A. A minimum cover of three-fourths inch (3/4") for slabs and one inch for beams is required for any aggregate concrete.

(3) For the purpose of establishing a fire-resistive rating, tendons having a clear cover less than set forth in Table No. 37-A shall not contribute more than 50 percent of the required ultimate moment capacity of the member. For structural design purposes, however, tendons having a reduced cover are assumed to be fully effective.

3703.11 STEEL PIPE COLUMNS, OR STRUCTURAL STEEL TUBE COLUMNS:

In buildings not exceeding one (1) story in height and 10,000 square feet in area, where fire-resistive protection not exceeding one hour is required, minimum 2500 PSI concrete-filled minimum 35 KSI steel pipe columns or structural steel tube columns, will be accepted in lieu of the required one-hour rating provided the column has a wall thickness not less than 0.237 inch, with a minimum four (4) inch nominal diameter. Structural steel tube columns shall be minimum 4 x 4 inch nominal size, with a minimum wall thickness of 1/4 inch. Columns must be provided with pressure relief holes as set forth in Section 2806.

3703.12 STRUCTURAL STEEL COLUMNS:

(a) Fire protection may be omitted from the bottom flange of lintels spanning not over six feet, shelf angles, or plates that are not a part of the structural frame.

(b) Where structural steel columns required by this Code to be fire-protected are enclosed within walls or partitions, the required fire resistive protection for such steel columns shall be provided for the full vertical length of such columns.

(c) Where structural steel, minimum 2500 PSI concrete filled tube columns or steel pipe columns are enclosed within a wall or partition of one-hour fire-resistive rating which is of incombustible materials, the assembly will be accepted as one-hour fire protection for structural steel tube columns, minimum 35 KSI steel with a minimum of 4 x 4 inch nominal size and a minimum wall thickness of 1/4 inch and steel pipe columns, minimum 35 KSI with a minimum 0.237 inch wall thickness with a nominal diameter of (4) inches, columns must be provided with pressure relief holes as set forth in Section 2806.

3703.13 CONCRETE WALLS WITH GYPSUM WALLBOARD OR PLASTER FINISHES:

The fire resistance rating of cast-in-place or precast concrete walls with finishes or gypsum wallboard or plaster applied to one or both sides may be calculated in accordance with the provisions of this section.

(a) Where the finish of gypsum wallboard or plaster is applied to the non-fire-exposed side of the wall, the contribution of the finish to the total fire resistance rating shall be determined as follows: The thickness of the finish shall first be corrected by multiplying the actual thickness of the finish by the applicable factor determined from Table 37-D based on the type of aggregate in the concrete. The corrected thickness of finish shall then be added to the actual thickness or equivalent thickness of concrete and the fire resistance rating of the concrete and finish determined from Table 37-B (32-35).

(b) Where gypsum wallboard or plaster is applied to the fire-exposed side of the wall, the contribution of the finish to the total fire resistance rating shall be determined as follows: The time assigned to the finish as established by Table 37-E shall be added to the fire resistance rating determined from Table 37-B (32-35) for the concrete alone, or to the rating determined in 3703.13(a) for the concrete and finish on the non-fire-exposed side.

(c) For a wall having no finish on one side or having different types of thicknesses of finish on each side, the calculation procedures of 3703.13(a) and 3703.13(b) shall be performed twice, i.e. assume that either side of the wall may be the fire-exposed side. The fire resistance rating of the wall shall not exceed the lower of the two values calculated.

EXCEPTION: For exterior wall with more than 5 feet or horizontal separation, the fire shall be assumed to occur on the interior side only.

(d) When the finish applied to a concrete wall contributes to the fire resistance rating, the concrete alone shall provide not less than one-half the total required fire resistance rating.

(e) Finishes on concrete walls which are assumed to contribute to the total fire resistance rating of the wall shall comply with the installation requirements of 3703.14(f).

3703.14 CONCRETE MASONRY WALLS:

(a) The fire resistance rating of walls and partitions constructed of concrete masonry units shall be determined from Table 37-B (27-31). The rating shall be based on the equivalent thickness of the masonry and type of aggregate used.

(b) Where plaster or gypsum wallboard is applied to the non-fire-exposed side of wall, the contribution of the finish to the total fire resistance rating shall be determined as follows: The thickness of gypsum wallboard or plaster shall be corrected by multiplying the actual thickness of the finish by the applicable factor determined from Table 37-D. This corrected thickness of finish shall be added to the equivalent thickness of masonry and the fire resistance rating of the masonry and finish determined from Table 37-B (27-31).

(c) Where plaster or gypsum wallboard is applied to the fire-exposed side of the wall, the contribution of the total fire resistance rating shall be determined as follows: The time assigned to the finish as established by Table 37-E shall be added to the fire resistance rating determined in 3703.14(a) for the masonry alone, or in 3703.14(b) for the masonry and finish on the non-fire-exposed side.

(d) For a wall having no finish on one side or having different types of thicknesses of finish on each side, the

calculation procedures of this section shall be performed twice, i.e. assume that either side may be the fire-exposed side of the wall. The fire resistance rating of the wall shall not exceed the lower of the two values calculated.

EXCEPTION: For exterior walls with more than 5 feet of horizontal separation, the fire shall be assumed to occur on the interior side only.

(e) When the finish applied to a concrete masonry wall contributes to the fire resistance rating the masonry alone shall provide not less than one-half the total required fire resistance rating.

(f) Installation of finishes shall be as follows:

(1) Gypsum wallboard and gypsum lath applied to concrete masonry or concrete walls shall be secured to wood or steel furring members spaced not more than 16 in o.c.

(2) Gypsum wallboard shall be installed with the long dimension parallel to the furring members and shall have all joints finished.

(3) Other aspects of the installation of finishes shall comply with the applicable provisions of Chapter 35.

3703.15 JOINTS BETWEEN PRECAST CONCRETE WALL PANELS:

Joints between precast concrete wall panels which are not protected as required by this section shall be considered as openings in walls. These unprotected joints shall be included in determining the percentage of openings permitted by Part V, Types of Construction. Where such openings are not permitted or are required by this Code to be protected, the provisions of this section may be used to determine the amount of joint insulation required. Table 37-F shows thicknesses of ceramic fiber blankets to be used to protect joints between precast concrete wall panels for various panel thicknesses and for joint widths of 3/8-inch and 1-inch for fire-resistance rating of 1 hour to 4 hours. For joint widths between 3/8-inch and 1-inch, the thickness of ceramic fiber blanket may be determined by direct interpolation. Other tested and labeled materials may be used in place of ceramic fiber blankets.

3704 WALLS AND PARTITIONS

3704.1 GENERAL: Fire resistive walls and partitions shall have the ratings as set forth in Table 37-B or shall be rated as set forth in Sub-section 3701.1. Penetrations of fire resistance rated walls and partitions for electrical, telephones, plumbing, ducts, intercommunication systems or similar facilities shall not be permitted, except as follows:

(a) (1) Penetrations which are included in assemblies tested in accordance with A.S.T.M. E-119.

(2) Penetrations by noncombustible pipe and conduit when all openings around the pipe or conduit are firestopped in accordance with Sub-section 3704.5.

(3) Penetrations by pipe, conduit and cables when the penetration is protected with a system which has a fire rating equal to or greater than the assembly in which the penetration occurs, when tested in accordance with A.S.T.M. E-814 conducted with a minimum positive pressure differential of 0.03 inches of water column.

(4) Ventilating ducts shall comply with Section 4806 of this Code and need not be enclosed provided the requirements set forth in Paragraph 1807.2(d) of this Code are met to prevent the passage of fire and smoke.

3704.2 COMBUSTIBLE MEMBERS:

(a) Combustible members framed into a wall shall be protected at their ends by not less than one-half the required fire-resistive thickness of such wall.

(b) Materials, other than combustible insulation, including pipe and conduit, may be attached to or placed between the studs under the required wall claddings and, where such wall or partition is required to be of incombustible materials or have a fire-resistive rating of more than one-hour, such material shall be incombustible.

(c) Combustible pipe and conduit may penetrate a one-hour fire-rated wall or a two-hour fire-rated shaft

when such penetration is protected with a system which has a fire rating equal to or greater than the assembly in which the penetration occurs, and tested in accordance with ASTM E-814.

3704.3 FIRE STOPS – NON-COMBUSTIBLE MEMBERS: Fire stops shall be provided in all walls and partitions to cut off all concealed draft openings between the area enclosed within the wall or partition and any area above the ceiling, and to form an effectual fire barrier between stories and/or floors and between the upper story of the roof space.

EXCEPTION: Fire stops may be omitted at the top of partitions enclosing rooms with a suspended ceiling below a concrete slab, providing the area above the suspended ceiling is completely enclosed around the perimeter by partitions extending to the underside of the concrete slab, and the area is within a single tenant and not exceeding 200 square feet.

EXCEPTION: Fire stops when installed as draft stops at a ceiling line within an incombustible partition may be omitted when drywall is installed continuously from the bottom plate to the top plate on both sides of said partition.

(a) Interpolation of test results by a Registered Florida Professional Engineer on a fire stopping system, shall be acceptable with his seal and signature for 8" metal pipe or larger.

3704.4 PLUMBING, ELECTRICAL AND AIR HANDLING SYSTEM IN FIRE RATED ASSEMBLIES:

(a) In Type I and Type II construction, materials used for piping, conduit, raceways or duct systems which do not qualify as incombustible in accordance with the requirements of Part II of the definition of incombustible material contained in Section 401 shall neither:

(1) Penetrate any assembly which is required to have a fire resistance rating unless such materials and methods of penetration have been tested in accordance with this Code Section, nor

(2) Be concealed within any assembly which is required to have a fire resistance rating unless enclosed by or totally embedded within noncombustible materials or unless such materials and methods have been tested in accordance with A.S.T.M. E-119 or approved in accordance with Sub-section 3701.1 of this Code.

(b) For specific requirements relative to the use of duct and piping insulation material in plenum chambers, refer to Chapter 48 of this Code.

3704.5 FIRESTOPPING:

(a) All openings around noncombustible pipes, ducts and conduits shall be firestopped with approved noncombustible materials. Installed materials shall prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to A.S.T.M. E-119 time-temperature fire conditions and under a minimum positive pressure differential of 0.03 inches of water column for the time period equivalent to the fire resistance rating of the construction penetrated.

(b) All openings around combustible pipes, ducts, conduit and cables shall be firestopped in accordance with Section 2907 of this Code.

3705 FLOORS AND CEILINGS

3705.1 GENERAL: Fire-resistive floors or ceilings shall have the ratings set forth in Table 37-C and as further provided in this Section or as set forth in Sub-section 3701.1.

3705.2 FLOORS: Penetrations of fire resistance rated floors or floor/ceiling assemblies for electrical, telephone, plumbing, ducts, intercommunication systems, or similar facilities shall not be permitted, except by one of the following methods:

(a) (1) Pipes, and sleeves of approved materials may be installed within or through fire-resistive floor systems and through concrete slabs without enclosure provided the sealing requirements set forth in Paragraph 1807.2(c) of this Code are met to preserve the integrity of such systems and slabs.

(2) Penetrations which are included in assemblies tested in accordance with A.S.T.M. E-119.

(3) Penetrations by noncombustible pipe and conduit when all openings around the pipe or conduit are firestopped in accordance with Sub-section 3704.5.

(4) Penetrations by pipe, conduit and cables when the penetration is protected with a system which has a fire rating equal to or greater than the assembly in which the penetration occurs, when tested in accordance with A.S.T.M. E-814 conducted with a minimum positive pressure differential of 0.03 inches of water column. A temperature rating equal to one-half of the required fire resistance rating of floor shall be required for floor penetrations which are outside of a shaft enclosure.

(5) Ventilating ducts shall comply with Section 4806 of this Code and need not be enclosed provided the requirements set forth in Paragraph 1807.2(d) of this Code are met to prevent the passage of fire and smoke.

(6) Floor penetrations by pipe or conduit enclosed in shafts.

(7) Refrigerant piping see Section 4807.7(g)(5).

(b) Any openings between the edge of a floor deck and an exterior wall shall be sealed using an approved semi-rigid board formed from fire resistance material fibers, or equivalent noncombustible material designed for this purpose. The material shall remain in place, sealing the opening, for a time period at least equal to the required fire resistance rating of the floor deck.

3705.3 ROOFS: Fire-resistive roofs may have the same openings as set forth for floors and may contain other openings as otherwise set forth in this Code.

3705.4 CEILINGS:

(a) Where a ceiling of lath and plaster as approved for one-hour fire-resistive construction, as specified in this Chapter, is used below slabs or structural members not otherwise required to be protected by such a ceiling, the required thickness of slab and fire protection of structural members may be reduced one-half inch, but in no case shall the slab thickness be less than two inches.

(b) In one-hour fire-resistive construction, the ceiling may be omitted over unusable space and flooring may be omitted where unusable space occurs above.

(c) The rating of assemblies herein approved for floor assemblies will be accepted as ratings for roof construction assemblies where roofing is substituted for the finish floor of such tested assembly.

3705.5 OTHER FIRE-RESISTIVE AND SUSPENDED CEILINGS:

(a) Suspended ceiling tile or board shall (a) comply with Section 3708 or be incombustible or fire-resistive as set forth herein.

(b) Suspended ceiling tile or board providing required fire protection shall be as follows:

(1) All tiles or boards or units shall be attached to the supporting runners to resist uplift except when not required by the fire-rated assembly.

3705.6 PLUMBING, ELECTRICAL AND AIR HANDLING SYSTEMS IN FIRE RATED ASSEMBLIES:

(a) In Type I and Type II construction, materials used for piping, conduit, raceways or duct systems which do not qualify as incombustible in accordance with the requirements of Part II of the definition of incombustible material contained in Section 401 shall neither:

(1) Penetrate any assembly which is required to have a fire resistance rating unless such materials and methods of penetration have been tested in accordance with this Code Section, nor

(2) Be concealed within any assembly which is required to have a fire resistance rating unless enclosed by or totally embedded within noncombustible materials or unless such materials and methods have been tested in accordance with A.S.T.M. E-119 or approved in accordance with Sub-section 3701.1 of this Code.

(b) For specific requirements relative to the use of duct and piping insulation material in plenum chambers, refer to Chapter 48 of this Code.

3705.7 FIRESTOPPING:

(a) All openings around noncombustible pipes, ducts and conduits shall be firestopped with approved noncombustible materials. Installed materials shall prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to A.S.T.M. E-119 time-temperature fire conditions and under a minimum positive pressure differential of 0.03 inches of water column for the time period equivalent to the fire resistance rating of the construction penetrated.

(b) All openings around combustible pipes, ducts, conduit and cables shall be firestopped in accordance with Section 2907 of this Code.

(c) All spaces between masonry chimneys and floors and ceilings through which the masonry chimney may pass shall be firestopped with noncombustible material. The firestopping of space between the masonry chimneys and wood joists, beams, or headers shall be to a depth of 1" only, placed on strips of metal or metal lath laid across the spaces between combustible materials and the masonry chimney.

TABLE NO. 37-A
MINIMUM PROTECTION OF STRUCTURAL PARTS BASED ON TIME PERIODS FOR
VARIOUS INCOMBUSTIBLE INSULATING MATERIALS

Structural Parts To be Protected	Minimum Thickness of Insulating Material for Following Fire-Resistive					
	Item Number	Periods (in inches) Insulating Material Used.....	4 Hr.	3 Hr.	2 Hr.	1 Hr.
Steel Columns and all Members of Primary Trusses	1	Grade A concrete, members 6" by 6" or greater (not including sandstone, granite and siliceous gravel). ¹	2½	2	1½	1
	2	Grade A concrete, members 8" x 8" or greater (not including sandstone, granite and siliceous gravel). ¹	2	1½	1	—
	3	Grade A concrete, members 12" x 12" or greater (not including sandstone, granite and siliceous gravel). ¹	1½	1	—	—
	4	Grade B concrete and Grade A concrete excluded above, members 6" x 6" or greater. ¹	3	2	1½	1
	5	Grade B concrete and Grade A concrete excluded above, members 8" x 8" or greater. ¹	2½	2	1	—
	6	Grade B concrete and Grade A concrete excluded above, members 12" x 12" or greater. ¹	2	1	—	—
	7	Clay or shale brick with brick and mortar fill. ¹	3¼	—	—	2¼
	8	4' Hollow clay tile in two 2" layers; ½" mortar between tile and columns; ¾" metal mesh (wire diameter—.046") in horizontal joints; tile fill. ¹	4	—	—	—
	9	2" Hollow clay tile; ¾" mortar between tile and column; ¾" metal mesh (.046" wire diameter) in horizontal joints; Grade A concrete fill ¹ ; plastered with ¾" gypsum plaster.	3	—	—	—
	10	2" Hollow clay tile with outside wire ties (.08" diameter) at each course of tile or ¾" metal mesh (.046" diameter wire) in horizontal joints; Grade A concrete fill ¹ extending 1" outside column on all sides.	—	—	3	—

TABLE NO. 37-A (Continued)

Steel members, and all members of primary trusses, (cont'd.)	11	2" Hollow clay tile with outside wire ties (.08" diameter) at each course of tile with or without Grade A concrete fill; ¾" mortar between tile and column.	—	—	—	2
	12	Solid gypsum blocks with woven wire mesh ² in horizontal joints, laid with 1" mortar on flanges ¹ and plastered with ½" gypsum plaster.	2½	2½	—	—
	13	Hollow gypsum blocks with 7/8" wide No. 12 gauge metal clamps and woven wire mesh ² in horizontal joints. PL de- notes ½" gypsum plaster.	3½	3½	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	—
	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 ³	7/8
	16	Vermiculite concrete, 1:4 mix by volume over paper backed wire fabric lath wrapped directly around column with additional 2" x 2" No. 16/16 gauge wire fabric placed ¾" from outer concrete surface. Wire fabric tied with No. 18 gauge wire spaced 6" on center for inner layer and 2" on center for outer layer.	2	—	—	—
	17	Perlite or vermiculite gypsum plaster over metal lath wrapped around column and furred 1¼" from column flanges. Sheets lapped at ends and tied at 6" intervals with No. 18 gauge tie wire. Plaster pushed through to flanges.	1½	1	—	—
	18	Perlite or vermiculite gypsum plaster over self-furring metal lath wrapped directly around column, lapped 1" and tied at 6" intervals with No. 18 gauge wire.	1¾	1¾	1	—
	19	Perlite or vermiculite gypsum plaster on metal lath applied to ¾" cold-rolled channels spaced 24" apart vertically and wrapped flat-wise around column.	1½	—	—	—

TABLE NO. 37-A (Continued)

Steel members and all members of primary trusses, (cont'd.)	20	Perlite or vermiculite gypsum plaster over 2 layers of 1/2" plain2 1/2 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 2 1/2 cubic feet of aggregate for the three-hour system.	2	—	—
	21	Perlite or vermiculite gypsum plaster over one layer of 1/2 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 2 1/2 cubic feet of aggregate.	2	—	—
	22	Perlite or vermiculite gypsum plaster over 3/8" perforated — gypsum lath applied tight to column flanges and tied with doubled No. 18 gauge wire ties spaced 15" on center. For three-coat work the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2 1/2 cubic feet of aggregate for the two-hour system.	1 3/4	1 3/8	—
	23	Gypsum plaster over 3/8" perforated gypsum lath applied tight — to column flanges and tied with doubled No. 18 gauge wire ties spaced 15" on center.	2 3/8	1 3/4	7/8
	24	Multiple layers of 1/2" gypsum wallboard adhesively ⁴ secured to..... — column flanges and successive layers. Wallboard applied without horizontal joints. Corner edges of each layer staggered. Wallboard layer below outer layer secured to column with doubled No. 18 gauge wire ties spaced 15" on center. Exposed corners taped and treated.	—	2	1

TABLE NO. 37-A (Continued)

Steel members and all members of primary trusses, (cont'd.)	25	Three layers of $\frac{5}{8}$ " Type "X" gypsum wallboard. First and second layer held in place by $\frac{1}{8}$ " diameter by $1\frac{3}{8}$ " long ring shank nails with $\frac{5}{16}$ " diameter heads spaced 24" on center at corners. Middle layer also secured with metal straps at mid-height and 18" from each end, and by metal corner bead at each corner held by the metal straps. Third layer attached to corner bead with 1" long gypsum wallboard screws spaced 12" on center.	—	—	$1\frac{7}{8}$	—
	26	Three layers of $\frac{5}{8}$ " Type "X" gypsum wallboard each layer screw attached to $1\frac{5}{8}$ " 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 $1\frac{5}{8}$ " spaced 12" on center for middle layer and No. 8 by $2\frac{1}{4}$ " spaced 12" on center for outer layer.	—	$1\frac{7}{8}$	—	—
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	$1\frac{1}{2}$	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.	$2\frac{1}{2}$	2	$1\frac{1}{2}$	1
	29	Portland cement plaster on metal lath attached to $\frac{3}{4}$ " cold-rolled channels with No. 18 gauge wire ties spaced 3" to 6" on center. Plaster mixed 1:2½ by volume, cement to sand.	—	—	$1\frac{1}{2}^3$	ϕ

TABLE NO. 37-A (Continued)

Tendons in	30	Restrained ⁶	Carbonate or Siliceous	8" Beam Width ⁷	$2\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	—
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Pretensioned and Post-Tensioned Concrete Beams or Girders ^{5, 8}	31	Unrestrained	Sand-Lightweight	12" Beam Width ⁷	1 ⁷ / ₈	—	—	
				8" Beam Width ⁷	2	1 ¹ / ₂	—	
			Carbonate or Siliceous	12" Beam Width ⁷	1 ⁵ / ₈	—	—	
				8" Beam Width ⁷	— 1 ¹ / ₂	5 ⁹	—	1 ¹ / ₂
			Sand-Lightweight	12" Beam Width ⁷	3	2 ¹ / ₂	1φ	1 ¹ / ₂
				8" Beam Width ⁷	— 1 ¹ / ₂	1 ³ / ₄	³ / ₄	—
12" Beam Width ⁷	2 ¹ / ₂	2 2 ¹ / ₂	1 ⁵ / ₈	—	—			
Tendons in Pretensioned and Post-Tensioned Concrete Floor and Roof Slabs ^{8, 11}	32	Restrained	All aggregate types	—	³ / ₄	—	—	
	33	Unrestrained	Siliceous	—	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₈	
			Carbonate	—	2 ¹ / ₈	⁵ / ₈	—	
			Sand-Lightweight	—	2	1 ¹ / ₂	1	
			Lightweight	—	2 1 ³ / ₄	1 ¹ / ₂	1	
Reinforcing Steel in Beams, Girders, Joist. and Trusses-All Aggregate Types ¹⁰	34	Restrained ⁶	5" Beam Width ⁷	1 ¹ / ₄	1 ¹	³ / ₄ 1	—	
			7" Beam Width ⁷	³ / ₄	—	—	—	
	35	Unrestrained	10" Beam Width ⁷	³ / ₄	—	—	—	
			5" Beam Width ⁷	—	—	1 ¹ / ₄	³ / ₄	
			7" Beam Width ⁷	3	1 ³ / ₄	³ / ₄	—	
			10" Beam Width ⁷	1 ³ / ₄	1	³ / ₄	³ / ₄	
Reinforcing Steel in Floor and Roof Slabs ¹¹	36	Restrained	All aggregate types	—	³ / ₄	—	—	
	38	Unrestrained	Siliceous	—	1 ¹ / ₄	1	³ / ₄	
			Carbonate, Sand-LW, LW	—	³ / ₄	—	—	
Main Reinforcement in Columns	39		Siliceous	2	1 ¹ / ₂	—	—	
			Carbonate, Sand-LW	1 ¹ / ₂	—	—	—	

TABLE NO. 37-A — FOOTNOTES

1. Reentrant parts of protected members to be filled solidly.
2. Woven wire mesh consists of three-eighths-inch ($\frac{3}{8}$ ") mesh of No. 17 gauge wire.
3. Two layers of equal thickness with a three-fourths-inch ($\frac{3}{4}$ ") air space between.
4. An approved adhesive qualified under the standard in Paragraph 3701.2(2).
5. Minimum cover to nonprestressed reinforcing in prestressed concrete beams shall be determined by values shown in lines 34 and 35.
6. Tabulated values for restrained assemblies apply to beams spaced more than 4 feet on center for restrained beams spaced 4 feet or less on centers, minimum cover $\frac{3}{4}$ inch is adequate for 4 hours or less.
7. For beam widths between the tabulated values, the minimum cover thickness can be determined by direct interpolation.
8. The cover for an individual tendon is the minimum thickness of concrete between the surface of the tendon and the fire-exposed surface of the beam, except that for ungrouted ducts the assumed cover thickness is the minimum thickness of concrete between the surface of the duct and the surface of the beam. For beams in which several tendons are used, the cover is assumed to be the average of the minimum cover of the individual tendons where the minimum cover for corner tendons used in the calculation shall be reduced to one-half ($\frac{1}{2}$) of the actual value. The cover for any individual tendon must be not less than one-half ($\frac{1}{2}$) of the value given nor less than one (1) inch.
9. Not practical for eight-inch (8") wide beam, but shown for purposes of interpolation.
10. The cover for an individual reinforcing bar is the minimum thickness of concrete between the surface of the bar and the fire-exposed surface of the beam. For beams in which several bars are used, the cover is assumed to be the average of the minimum cover of the individual bars where the minimum cover for corner bars used in the calculation shall be reduced to one-half ($\frac{1}{2}$) of the actual value. The cover for any individual bar must not be less than one-half ($\frac{1}{2}$) of the value given nor less than ($\frac{3}{4}$) inch.
11. The minimum thickness of concrete cover given is to the positive moment reinforcement. Application is for solid or hollowcore one-way or two-way slabs with flat undersurfaces. For concrete not covered elsewhere in this code the procedures listed in references cited in subsection 3701.1(b)(5) shall be acceptable.

TABLE NO. 37-B
RATED FIRE-RESISTIVE PERIODS FOR VARIOUS WALLS AND PARTITIONS

Material	Minimum Finished Thickness Face-to-Face ² Item Number	Construction ¹	(in inches)			
			4 Hr.	3 Hr.	2 Hr.	1 Hr.
Brick of Clay or Shale	1	Solid units (at least 75% solid)	8	—	6 ³	4
	2	Solid units plastered each side with ⁵ / ₈ " gypsum or Portland cement plaster. Portland cement plaster mixed 1:2½ by weight, cement to sand.	—	—	4¾ ⁴	—
	3	Hollow brick units ⁵ at least 71 percent solid.	—	8	—	—
	4	Hollow brick units at least 71 percent solid, plastered each side with ⁵ / ₈ " gypsum plaster.	8¾	—	—	—
	5	Hollow (rowlock ⁶)	12	—	8	—
	6	Hollow (rowlock ⁶), plastered each side with ⁵ / ₈ " 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	8	One cell in wall thickness, units at least 50 percent plastered each side with ⁵ / ₈ " gypsum plaster.	—	—	—	4¼
(End or Side Construction)	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 ⁵ / ₈ " gypsum plaster.	—	—	7	—
	11	Two cells in wall thickness, units at least 60 percent solid. Plastered each side with ⁵ / ₈ " gypsum plaster.	—	—	5	—
Hollow Clay Tile, Load- Bearing (End or Side Construction)	12	Two cells in wall thickness, units at least 40 percent solid	—	—	—	8
	13	Two cells in wall thickness, units at least 40 percent solid. Plastered one side with ⁵ / ₈ " 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 ⁵ / ₈ " gypsum plaster.	12½	—	—	—
	19	Three cells in wall thickness, units at least 43 percent solid. Plastered one side with ⁵ / ₈ " gypsum plaster.	—	8½	—	—
	20	Two cells in wall thickness, units at least 40 percent solid. Plastered each side with ⁵ / ₈ " gypsum plaster.	—	9	—	—

TABLE NO. 37-B (Continued)

	21	Three cells in wall thickness, units at least 43 percent solid. Plastered each side with $\frac{5}{8}$ " gypsum plaster.	9	–	–	–
	22	Three cells in wall thickness, units at least 40 percent solid. Plastered each side with $\frac{5}{8}$ " gypsum plaster.	13	–	–	–
	23	Hollow cavity wall consisting of two 4" nominal clay tile wall units (at least 40 percent solid) with air space between. Plastered one side (exterior) with $\frac{3}{4}$ " Portland cement plaster and other side with $\frac{5}{8}$ " 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 $\frac{3}{8}$ " gypsum plaster.	8½	–	–	–
Concrete Masonry units ^{7,13,14}	27	Expanded slag or pumice	4¾	4	3¼	2 $\frac{5}{8}$
	28	Expanded clay or shale	5 $\frac{1}{8}$	4½	3 $\frac{5}{8}$	2 $\frac{5}{8}$
	29	Limestone, cinders or air-cooled slag	6	5	4	2¼
	30	Calcareous gravel	6¼	5 $\frac{3}{8}$	4¼	2 $\frac{7}{8}$
	31	Siliceous gravel	6¾	5¾	4½	3
Solid Concrete	32	Siliceous aggregate	7	6¼	5	3½
	33	Carbonate aggregate	6½	5¾	4½	3¼
	34	Sand-Lightweight aggregate	5½	4 $\frac{5}{8}$	3 $\frac{7}{8}$	2¾
	35	Lightweight aggregate	5¼	4½	3 $\frac{5}{8}$	2½
Hollow Gypsum Tile	36	3" tile not less than 70 percent solid.	–	–	–	–
	37	3" tile plastered one side with $\frac{5}{8}$ " gypsum plaster.	–	–	3 $\frac{5}{8}$ ⁴	–
	38	4" tile plastered one side with $\frac{1}{2}$ " gypsum plaster.	–	4½ ⁴	–	–
	39	3" tile plastered both sides with $\frac{1}{2}$ " gypsum plaster.	–	4 ⁴	–	–
	40	4" tile plastered both sides with $\frac{1}{2}$ " gypsum plaster.	5 ⁴	–	–	–
Glazed or Unglazed Nonload-bearing	41	One 2" unit cored 15 percent maximum and one 4" unit cored Facing Tile, 25 percent maximum with $\frac{3}{4}$ " mortar filled collar joint. Unit position reversed in alternate courses.	–	6 $\frac{3}{8}$	–	–
	42	One 2" unit cored 15 percent maximum and one 4" unit cored 40 percent maximum with $\frac{3}{8}$ " mortar filled collar joint. Plastered one side with $\frac{3}{4}$ " gypsum plaster. Two wythes tied together every fourth course with No. 22 gauge corrugated metal ties.	–	6¾	–	–
	43	One unit with three cells in wall thickness, cored 29 percent maximum.	–	–	6	–
	44	One 2" unit cored 22 percent maximum and one 4" unit cored 41 percent maximum with $\frac{1}{4}$ " mortar filled collar joint. Two wythes tied together every third course with No. 22 gauge corrugated metal ties.	–	–	6	–

TABLE NO. 37-B, (Continued)

	45	One 4" unit cored 25 percent maximum with ¾" gypsum plaster on one side.	-	-	4¾	-
	46	One 4" unit with two cells in wall thickness, cored 22 percent maximum.	-	-	-	4
	47	One 4" unit cored 30 percent maximum with ¾" vermiculite gypsum plaster on one side.	-	-	4½	-
	48	One 4" unit cored 39 percent maximum with ¾" gypsum plaster on one side.	-	-	-	4½
Solid Gypsum Plaster	49	¾" by No. 16 gauge vertical cold-rolled channels, 16" on center, with 2.5-pound flat metal lath applied to one face and tied with No. 18 gauge wire at 6" spacing. Gypsum plaster each side mixed 1:2 by weight, gypsum to sand aggregate.	-	-	-	2 ⁴
	50	Studless with ½" full-length plain gypsum lath and gypsum plaster each side. Plaster mixed 1:1 for scratch coat and 1:2 for brown coat, by weight, gypsum to sand aggregate.	-	-	-	2 ⁴
	51	¾" by No. 16 gauge vertical cold-rolled channels, 16" on center, with metal lath applied to one face and tied with No. 18 gauge wire at 6" spacing. Perlite or vermiculite gypsum plaster each side. For three-coat work the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2½ cubic feet of aggregate for the one-hour system.	-	-	2½ ⁴	2 ⁴
	52	Studless with ½" full-length plain gypsum lath and Perlite or vermiculite gypsum plaster each side.	-	-	2½ ⁴	2 ⁴
	53	Studless partition with ⅜" rib metal lath installed vertically, adjacent edges tied 6" on center with No. 18 gauge wire ties, gypsum plaster each side mixed 1:2 by weight, gypsum to sand aggregate	-	-	-	2 ⁴
Solid Perlite and Portland Cement	54	Perlite mixed in the ratio of 3 cubic feet to 100 pounds of Portland cement and machine applied to stud side of 1½" mesh by No. 17 gauge paper-backed woven wire lath nailed to 4" deep steel trussed wire ⁸ studs 16" on center with 1" long by No. 11 gauge by ⅞" head annular ring shank nails.	-	-	3⅛ ⁴	-
Solid Neat Wood Fibered Gypsum Plaster	55	¾" by No. 16 gauge cold-rolled channels, 12" on center, with 2.5 pound flat metal lath applied to one face and tied with No. 18 gauge wire at 6" spacing. Neat gypsum plaster applied to each side.	-	-	2 ⁴	-
Solid Gypsum Wallboard Partition	56	One full-length layer ½" Type "X" gypsum wallboard laminated to each side of 1" full-length V-edge gypsum coreboard with approved laminating compound. Vertical joints of face layer and coreboard staggered at least 3".	-	-	2 ⁴	-

TABLE NO. 37-B (Continued)

Solid Gypsum Wallboard Partition (cont'd.)	57	One full-length layer ½" gypsum wallboard laminated to each side of 1" full-length interlocking factory laminated gypsum coreboard with approved laminating compound. Vertical joints of face layer and coreboard staggered.	–	–	2 ⁴	–
Hollow (Studless) Gypsum Wallboard Partition	58	One-full length layer of 5/8" Type "X" gypsum wallboard attached to both sides of wood or metal top laminated to each side of 1" x 6" full-length gypsum coreboard ribs spaced 24" on center with approved laminating compound. Ribs centered at vertical joints of face plies and joints staggered 24" in opposing faces. Ribs may be recessed 6" from the top and bottom.	–	–	–	2¼ ⁴
	59	1" regular gypsum "V" edge full-length backing board attached to both sides of wood or metal top and bottom runners with nails or 1 5/8" drywall screws at 24" on center. Minimum width of runners 1 5/8". Face layer of ½" regular full-length gypsum wallboard laminated to outer faces of backing board with approved laminating compound.	–	–	4 ^{5/8} ⁴	–
Incombustible Studs Interior Partition with Plaster each side	60	3¼" by No. 18 gauge steel studs spaced 24" on center. 5/8" gypsum plaster on metal lath each side, mixed 1:2 by weight, gypsum to sand aggregate.	–	–	–	4¾ ⁴
	61	3 5/8" No. 16 gauge approved nailable ⁹ studs spaced 24" on center. 5/8" neat gypsum wood fibered plaster each side over 3/8" rib metal lath nailed to studs with 6d common nails, 8" on center. Nails driven 1¼" and bent over.	–	–	5 ^{5/8}	–
	62	2½" steel studs 16" on center formed with No 16 gauge angle flanges and No. 7 gauge wire diagonals. 3/8" perforated gypsum lath attached to the studs each side with No. 12 gauge wire clips at horizontal and vertical joints. ½" gypsum plaster applied each side mixed 1:2 by weight, gypsum to sand aggregate.	–	–	–	4¼ ⁴
	63	2 ½" steel studs 16" on center formed with No. 16 gauge angle flanges and No. 7 gauge wire diagonals. 3/8" perforated gypsum lath attached to the studs each side with No. 12 gauge approved steel wire clips. End joints of lath held by approved end joint clips. ¾" perlite or vermiculite gypsum plaster applied each side.	–	–	4¾ ⁴	–
	64	4" No. 18 gauge channel-shaped steel studs at 16" on center. On each side approved resilient clips pressed onto stud flange at 16" vertical spacing, ¼" pencil rods snapped into or wire-tied onto outer loop of clips, metal lath wire-tied to pencil rods at 6" intervals, 1" perlite gypsum plaster, each side.	–	7 ^{5/8} ⁴	–	–

TABLE NO. 37-B (Continued)

Wood Studs Interior Partition with Plaster Each Side	65	2" by 4" wood studs 16" on center with $\frac{5}{8}$ " gypsum plaster on metal lath. Lath attached by 4d common nails bent over or No. 14 gauge by $1\frac{1}{4}$ " by $\frac{3}{4}$ " 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.	-	-	-	$5\frac{1}{4}$
	66	2" by 4" wood studs 16" on center with metal lath and $\frac{7}{8}$ " neat wood fibered gypsum plaster each side. Lath attached by 6d common nails, 7" on center. Nails driven $1\frac{1}{4}$ " and bent over.	-	-	$5\frac{5}{8}$	-
	67	2" by 4" wood studs 16" on center with $\frac{3}{8}$ " perforated or plain gypsum lath and $\frac{1}{2}$ " gypsum plaster each side. Lath nailed with $1\frac{1}{8}$ " by No. 13 gauge by $\frac{19}{64}$ " head plasterboard blued nails, 4" on center. Plaster mixed 1:2 by weight, gypsum to sand aggregate.	-	-	-	$5\frac{3}{8}$
	68	2" by 4" wood studs 16" on center with $\frac{3}{8}$ " Type "x" gypsum lath and $\frac{1}{2}$ " gypsum plaster each side. Lath nailed with $1\frac{1}{8}$ " inch by No. 13 gauge, by $\frac{19}{64}$ " head plasterboard blued nails, 5" on center. Plaster mixed 1:2 by weight, gypsum to sand aggregate.	-	-	-	$5\frac{3}{8}$
	69	2" by 4" wood studs 16" on center with $\frac{3}{8}$ " plain gypsum lath and $\frac{1}{2}$ " neat wood-fibered gypsum plaster each side. Lath nailed with 4d common wire nails, 5" on center.	-	-	-	$5\frac{3}{8}$
	70	2" by 4" wood studs 16" on center with $\frac{3}{8}$ " perforated gypsum lath and $\frac{1}{2}$ " perlite or vermiculite gypsum plaster each side. Lath nailed with $1\frac{1}{8}$ " by No. 13 gauge by $\frac{19}{64}$ " 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.	-	-	-	$5\frac{3}{8}$
	71	2" by 4" wood studs 16" on center with $\frac{3}{8}$ " perforated gypsum lath, 1" hexagonal mesh of No. 20 gauge wire furred out $\frac{5}{16}$ " and with 1" perlite or vermiculite gypsum plaster each side. Lath nailed with $1\frac{1}{8}$ " by No. 13 gauge by $\frac{19}{64}$ " head plasterboard blued nails spaced 5" on center. Mesh attached by $1\frac{3}{4}$ " by No. 12 gauge by $\frac{3}{8}$ " head nails with $\frac{3}{8}$ " 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.	-	-	$6\frac{3}{8}$	-

TABLE NO. 37-B (Continued)

Incom- bustible Studs —Interior with Gypsum Wallboard Each Side	72	No. 25 gauge channel-shaped studs 16" ¹² on center with one full-length layer of 5/8" Type "X" gypsum wallboard applied vertically attached with 1" long No. 6 drywall screws to each side. Screws are 8" on center around the perimeter and 12" on center on the intermediate stud.	-	-	-	4 ^{7/8}
	73	No. 25 gauge channel-shaped studs 24" on center with two full-length layers of 5/8" Type "X" gypsum wallboard applied vertically each side. First layer attached with 1" long, No. 6 drywall screws, 8" on center around the perimeter and 12" on center on the intermediate stud. Second layer applied with vertical joints offset one stud space from first layer using an approved adhesive.	-	-	6 ^{1/8}	-
	74	No. 25 gauge channel-shaped studs 24" on center with two full-length layers of 1/2" Type "X" gypsum wallboard applied vertically each side. First layer attached with 1" long, No. 6 drywall screws, 8" on center around the perimeter and 12" on center on the intermediate stud. Second layer applied with vertical joints offset one stud space from first layer using 1 5/8" long, No. 6 drywall screws spaced 9" on center along vertical joints, 12" on center at intermediate studs and 24" on center along top and bottom runners.	-	-	5 ^{5/8}	-
	75	No. 16 gauge approved nailable metal studs ⁹ 16" ¹² on center with full-length 5/8" Type "X" gypsum wallboard applied vertically and nailed 7" on center with 6d cooler nails. Approved metal fastener grips used with nails at vertical butt joints along studs.	-	-	-	4 ^{7/8}
Wood Studs —Interior Partition With Gypsum Wallboard Each Side	76	2" by 4" wood studs 16" on center with two layers 3/8" regular gypsum wallboard each side, 4d cooler nails 8" on center first layer, 5d cooler nails 8" on center second layer with laminating compound between layers. Joints staggered. First layers applied full-length vertically. Second layer applied horizontally or vertically.	-	-	-	5 ^{1/8}
	77	2" by 4" wood studs 16" on center with space between filled with mineral wool batts ¹⁰ nailed to studs and full-length 1/2" regular gypsum wallboard applied vertically nailed with 5d cooler nails spaced 7" on center.	-	-	-	4 ^{5/8}

TABLE NO. 37-B (Continued)

**TABLE NO. 37-C
FOOTNOTES**

1. Staples with equivalent holding power and penetration may be used as alternate fasteners to nails for attachment to wood framing.
2. The thickness may be reduced to three inches where limestone aggregate is used.
3. Slab thickness over steel joists measured at the joists.
4. Ref. omitted 7/15/88.
5. Ref. omitted 7/15/88.
6. One inch by No. 20 gauge hexagonal wire mesh installed below lath and tied to each furring channel at joints between lath
7. No. 14 gauge wires spaced eleven and three-tenths inches on center or ten inches on center (for channel spacing of sixteen inches and twelve inches respectively) installed below lath sheets in a diagonal pattern. Wires tied to furring channels or clips at lath edges.
8. Furring channels spaced twelve inches on center.
9. Allowable working stress for bulb trees to be based upon a factor of safety of four applied to the yield point for negative bending and six and five-tenths applied to the yield point for positive bending.
10. Six-inch hollow clay tile with two-inch concrete slab above.
11. Four-inch hollow clay tile with one and one-half-inch concrete slab above.
12. Thickness measured to bottom of steel form units.
13. Five-eighths inch of vermiculite gypsum plaster plus one-half inch of approved vermiculite acoustical plastic.
14. Double wood floor may be either of the following (see also Sub-Section 3705.4 for conditions where flooring or ceiling may be omitted):
 - (a) Subfloor on one-inch nominal boarding, a layer of asbestos paper weighing not less than 14 pounds per one hundred square feet and a layer of one-inch nominal tongue and groove finish flooring; or
 - (b) Subfloor of one-inch nominal tongue and groove boarding or one-half-inch plywood with exterior glue, a layer of 0.010-inch thick rosin sized building paper and a layer of one-inch nominal tongue and groove finish flooring or five-eighths-inch interior type tongue and groove plywood finish flooring.
15. Thickness measured to top of steel deck unit.
16. See Table 37-B footnote 2 for determination of equivalent thickness.

**TABLE 3710.2-D
FLOORING OR ROOFING OVER WOOD FRAMING**

Assembly	Structural Members	Subfloor or Roof Deck	Finish Flooring or Roofing
Floor	Wood	$1\frac{5}{32}$ inch plywood or $1\frac{11}{16}$ inch T&G softwood	Hardwood or softwood flooring on building paper. Resilient flooring, parquet floor felted-synthetic-fiber floor covering, carpeting, or ceramic tile on $\frac{3}{8}$ inch thick panel-type underlayment. $\frac{1}{4}$ inch ceramic tile on $1\frac{1}{4}$ " mortar bed.
Roof	Wood	$1\frac{5}{32}$ inch plywood or $1\frac{11}{16}$ inch T&G softwood	Finish roofing material with or without insulation

(1) This table applies only to wood joist construction and is not applicable to wood truss construction.

(f) Table 3710.2-E gives the time increments that can be added to the fire resistance of wood stud walls when glass wool rockwool or slag mineral wool insulation is incorporated in the assembly.

**TABLE 3710.2-E
TIME ASSIGNED FOR ADDITIONAL PROTECTION**

Description of Additional Protection	Time, Min.
Add to the fire resistance rating of wood wall if the space between the studs is filled with 0.6 lb/sq. ft. glass-wool or 1.2 lb./sq. ft. mineral wood batts or blankets $2\frac{3}{4}$ inch or $3\frac{1}{2}$ inch thick nailed or stapled in place 12 o.c.	15

(g) Fastening of wood framed assemblies and the fastening of membranes to the wood framing members shall be done in accordance with Chapter 29 and Section 3510.2(a).

**3710.3 DESIGN OF ONE-HOUR FIRE-RESISTIVE EXPOSED WOOD MEMBERS
(6-INCH NOMINAL OR GREATER):**

(a) **GENERAL:** The design of wood columns and beams for one-hour fire-resistive construction assumes that there are four distinct structural zones of wood assumed in a member exposed to fire. The outer char zone is assumed to offer no strength or stiffness to the wood member. The second and third zones involve elevated temperature areas with a maximum thickness of approximately $1\frac{1}{2}$ to 2 inches. The outer zone has an assumed depth of about $\frac{5}{8}$ -inch with assumed residual strength and stiffness of 60 and 75 percent, respectively, or unaffected wood. The second elevated temperature zone provides residual strength and stiffness of approximately 80 and 90 percent, respectively. The fourth layer involves the core of the wood member, which remains at normal room temperature and thus is assumed to have full strength and stiffness capability.

(b) DESIGN:

(1) The fire-resistive rating, in minutes, of timber beams and columns with a minimum dimension of 6 inches is equal to:

Beams:

(a) $2.54 Zb (4-2(b/d))$ for beams which may be exposed to fire on four sides.

(b) $2.54 Zb (4-(b/d))$ for beams which may be exposed to fire on three sides.

Columns:

(c) $2.54 Zd (3-d/b)$ for columns which may be exposed to fire on four sides.

(d) $2.54 Zd (3-d/2b)$ for columns which may be exposed to fire on three sides.

Where:

b = the breadth (width) of a beam or larger side of a column before exposure to fire, inches.

d = the depth of a beam or smaller side of a column before exposure to fire, inches.

Z = load factor, based on Figure No. 1 symbols:

Ke = the effective length factor as noted in Figure No. 2

l = the unsupported length of column, inches.

(2) Formula (d) above applies only where the unexposed face represents the smaller side of the column. If a column is recessed into a wall, its full dimension shall be used for the purpose of these calculations.

(3) Allowable loads on beams and columns are determined using design values given in "Design Values for Wood Construction," a supplement to the 1982 Edition, National Design Specification for Wood Construction.

Where minimum one-hour fire endurance is required, connectors and fasteners must be protected from fire exposure by 1½ inches of wood, fire-rated gypsum board or any coating approved for a one-hour rating. Typical details for commonly used fasteners and connectors are shown in AITC Technical Note No. 7, Sept. 1984.

(4) Wood members are limited to dimensions of 6 inches nominal or greater. Glue laminated timber beams utilize standard laminating combinations except that a core lamination is removed. This tension zone is moved inward and the equivalent of an extra nominal 2-inch thick outer tension lamination is added.

CHAPTER 38

FIRE-EXTINGUISHING APPARATUS

- 3801 AUTOMATIC-SPRINKLER SYSTEMS**
- 3802 CARBON DIOXIDE FIRE EXTINGUISHING SYSTEMS**
- 3803 STANDPIPES AND HOSE STATIONS**
- 3804 WATER SUPPLY**
- 3805 FIRE DEPARTMENT CONNECTIONS**
- 3806 YARD HYDRANTS**
- 3807 PORTABLE FIRE EXTINGUISHERS**
- 3808 INSPECTIONS AND TESTS**

3801 AUTOMATIC-SPRINKLER SYSTEMS

3801.1 GENERAL:

(a) Sprinklers: For purposes of this Section only, the definition of a Story shall be that portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above, as defined in NFPA 101.

(1) In new buildings or in buildings altered to increase the area or height, and in existing buildings, as set forth in Sub-sections 104.7 and 503.1 of this Code, approved automatic-sprinkler systems shall be installed and maintained as provided in this chapter and in Chapter 51 of this Code, except that the Building Official may require or may permit a carbon dioxide fire-extinguishing system, as set forth in Section 3802 herein, or other approved automatic fire-extinguishing system, to be used in lieu of such sprinkler system.

(b) As used in this Chapter:

(1) Area shall be the allowable floor area set forth in Part III (Groups of Occupancy) of this Code for the various Types of construction.

(2) Height shall be the vertical distance from grade to the top of the main roof, exclusive of a mechanical penthouse.

(3) Grade shall be as set forth in Paragraph 5101.1(b) of this Code.

(c) Combustible goods or merchandise shall include those made of wood, plastics, cloth or rubber; those containing flammable liquids; those packed with excelsior, paper or moss; those packaged or packed in paper; cardboard or wood containers and other goods or merchandise of equivalent, or greater, combustibility.

(d) Combustible, incombustible and non-combustible shall be as defined in Section 401 of this Code.

(e) The installation of fire extinguisher or standpipes shall not reduce or nullify the requirements for automatic fire-extinguishing systems as set forth in this Chapter and in Chapter 51 of this Code.

(f) Where automatic fire-extinguishing protection is provided in other than High Hazard Occupancies, the fire-resistive requirements may be reduced by one hour in the area or portion of buildings so protected provided such buildings are not more than 50 feet in height, however, in no case shall it be less than one-hour fire rated.

(g) When six or less heads are required per building, they may be connected directly to the City water system provided that the following conditions are met:

(1) Pipe Schedule in NFPA 13 shall be used for sizing all piping in this sprinkler system. When the construction or conditions introduces unusually long runs of pipe or many angles, in risers or fire mains, an increase in pipe size over that called for in the schedules shall be required to compensate for increase friction losses.

(2) Water supply shall be not less than the demand of all sprinkler heads if activated plus 100 gallons per minute.

(3) Such fire sprinkler line shall be equipped with a metered valve, approved backflow prevention device, indicating valve, test station with pressure gauge and flow switch connected to an audible alarm.

(4) Siamese or secondary water supply shall not be required.

(5) Such fire sprinkler lines shall not be installed beneath the slab.

(6) Piping and components shall comply with NFPA 13.

(h) Alternative to 3801.1(g): When six or less heads are required per building, they may be connected to domestic water service line provided that the following conditions are met:

(1) The minimum size of the supply line shall conform to Pipe schedule in NFPA 13. When the construction or conditions introduces unusually long runs of pipe or many angles, in risers or fire mains, an increase in pipe size over that called for in the schedules shall be required to compensate for increase in friction losses.

(2) Water supply shall be not less than the demand of all sprinkler heads if activated plus 100 gallons per minute.

(3) Such fire sprinkler lines shall be connected to the water service line before the building shut-off valve, and shall be equipped with a check valve, approved indicating valve, test station with pressure gauge, flow switch connected to an audible alarm; and there shall be an automatic valve to shut off domestic water flow when sprinkler system is activated.

(4) Automatic valve in (3) shall be provided with back-up power.

(5) The sizing of the water service tap shall be the larger of either of the domestic water demand or the fire demand.

(6) Siamese or secondary water supply shall not be installed beneath the slab.

(7) Such fire sprinkler lines shall not be installed beneath the slab.

(8) Piping and components shall comply with NFPA 13.

(i) Exception to 3801.1(g) and 3801.1(h):

(1) Paint spray booths having six (6) or less sprinkler heads shall comply with the Pipe Schedule in NFPA 13 for sizing all piping and may be connected directly to a domestic water supply system.

(2) A visible indicating type shut-off valve shall be installed in an accessible exterior location before the building main water control valve.

(3) A test station with pressure gauge shall be provided at the end of the sprinkler system.

(4) Enclosed spray booths (curtain excluded) shall have audible alarms.

(5) Siamese or secondary water supply shall not be required.

(6) Such fire sprinkler lines shall not be installed beneath the slab.

(7) Piping and components shall comply with NFPA 13.

(8) When the construction or conditions introduces unusually long runs of pipe or many angles, in risers or fire mains, an increase in pipe size over that called for in the schedules shall be required to compensate for increased friction losses.

(9) Such fire sprinkler line shall be equipped with an approved backflow prevention device.

3801.2 BASEMENTS: Approved automatic-sprinkler system shall be required:

(a) In basements or underground structures occupied as bowling lanes, restaurants, or for the manufacture, sale, or storage of combustible goods or merchandise (not including garages) and exceeding 2,500 square feet in area.

(b) In basements used as workshops or for storage of combustible goods in buildings used for assembly, educational or residential occupancies where the area used for such workshops or such storage of combustible goods exceeds 2,500 square feet.

(c) In basements of buildings used for assembly, educational, or residential occupancies where the area of such basements exceeds 5,000 square feet.

3801.3 REQUIREMENTS BASED ON OCCUPANCY:

(a) **GROUP A OCCUPANCIES:** Every Group A Occupancy including areas listed in Sec. 3801.3(b) shall be protected by approved automatic sprinkler system except in specified areas within Type I and Type II construction listed below.

(1) Auditoriums with fixed seating in one story building of any height.

(2) Multipurpose educational occupancy auditoriums of less than 12,000 sq. ft. in gross area.

(3) Passenger terminals at or above grade under 50 feet in height.

(4) Gymnasiums used for no other purpose in one story building of any height.

(5) Skating rinks and swimming pools used exclusively for participant sport and no audience facilities for more than 300 occupants.

(b) **GROUP B AND C OCCUPANCIES:** Approved automatic-sprinkler systems shall be installed in the entire building of Type V (protected) construction and in the following locations in buildings of Groups B and C Occupancies having a stage:

(1) Projection rooms where nitro-cellulose film is used.

(2) All accessible spaces on the stage side of the proscenium opening, including under the stage floor, gridiron and tie and fly galleries.

(3) Dressing rooms, workshops and storerooms.

(4) On the stage side and immediately back of the proscenium curtain and not more than five feet above the proscenium arc.

(5) Projection rooms of buildings of Groups B Occupancies not having a stage and having a seating capacity of 500 or more persons.

(c) **GROUP D OCCUPANCIES:** Approved automatic-sprinkler systems shall be installed in buildings of Group D as follows:

(1) Type I and Type II buildings exceeding three stories.

(2) Type III buildings for Division 1 and Division 2 and Type III, IV and V buildings for Division 3 only where the capacity exceeds thirteen (13) residents or in facilities with four (4) or more residents deemed incapable of self-preservation.

(d) **GROUP E OCCUPANCIES:** Approved automatic-sprinkler systems shall be installed in buildings of Group E Occupancy, Divisions 1 and 2, over one story in height, or in buildings of mixed Occupancies, or in buildings one story in height exceeding 1,500 square feet in area.

(e) **GROUP F OCCUPANCIES:** Approved automatic-sprinkler systems shall be installed:

(1) In buildings or within fire divisions of Group F, Division 1, Occupancy (other than parking garages) one and two stories in height used for the storage of combustible goods or merchandise and exceeding 20,000 square feet per floor in area.

(2) In buildings or within fire divisions of Group F, Division 1, Occupancy (other than parking garages) three or more stories in height used for the storage of combustible goods or merchandise and exceeding 10,000 square feet per floor in area.

(3) In buildings of Group F, Division 1, Occupancy used for garages as follows:

(aa) In enclosed parking garages over 50 feet in height.

(bb) In open-air parking garages more than 75 feet in height.

(cc) In repair garages over one story in height, or located below another occupancy, exceeding 10,000 square feet per floor if of Type I construction, or 8,000 square feet per floor if of protected incombustible construction.

(dd) In one-story repair garages exceeding 15,000 square feet in floor area if of Type I construction, 12,000 square feet in floor area if of protected incombustible construction, or 9,000 square feet in floor area if of unprotected, incombustible construction or heavy timber, or Type III Protected construction.

(ee) In any basement-parking or repair garage located under any occupancy other than a parking or repair garage, where such basement garage exceeds 5,000 square feet in floor area.

(4) In boat storage facilities with four or more boats, regardless of square footage. When boats are stored on inside or outside multilevel racks for in and out operation, automatic sprinkler protections shall be provided for the entire building or structure and each boat in accordance with the Standard for the Installation of Sprinkler Systems, NFPA13.

(5) In buildings or Group F, Division 2, Occupancy where loose combustible fibers, chips, shavings and dust are produced or generated and such buildings are over one story in height, or:

(aa) In such buildings of mixed occupancies exceeding 8,000 square feet per floor, or

(bb) In such buildings one story in height and exceeding 15,000 square feet in floor area.

(6) In buildings of Group F, Division 2, Occupancy used for dry goods and apparel manufacturing shops as follows:

(aa) In such buildings one or two stories in height of Type II and Type III (Protected) Construction constructed with incombustible materials and exceeding 10,000 square feet per floor and,

(bb) In such buildings one or two stories in height of Type II and Type II (Protected) Construction constructed wholly or in part with combustible materials and exceeding 2,500 square feet per floor and,

(cc) In any such building of Type III (Unprotected), of Type IV, or Type V Construction of any floor area and,

(dd) In any building three or more stories in height of any floor area.

(f) **GROUP G, DIVISION 1, OCCUPANCY:** Approved automatic-sprinkler systems shall be installed:

(1) In buildings or within fire divisions of Group G, Division 1, Occupancy one story in height used for the sale or storage of combustible goods or merchandise and exceeding 15,000 square feet in floor area.

(2) In buildings or within fire divisions of Group G, Division 1, Occupancy over one-story in height used for the sale or storage of combustible goods or merchandise and exceeding 15,000 square feet per floor in area, or exceeding 30,000 square feet in gross floor the total of the floors.

(g) **GROUP H – HOTELS, MOTELS, AND TIME-SHARE UNITS:** Automatic sprinkler systems and smoke detection systems shall be installed in buildings of these categories as required by HB 1069, F.S. 509.215.

3801.4 REQUIREMENTS:

(a) Automatic-sprinkler systems shall comply with the Standard "The Installation of Sprinkler Systems," NFPA 13, as set forth in Section 402 of this Code and the provisions of Chapter 51 of this Code.

(1) Plans for automatic sprinkler systems shall bear the seal of a Florida Registered Engineer, as pursuant to F.S. 633.

(b) The alarm valve required for a standard sprinkler system shall be required only in buildings of Group A Occupancy and in basements exceeding 3,000 square feet in floor area of other occupancies.

(c) Buildings not exceeding 50 feet in height may have automatic-sprinkler systems complying with Chapter 51 of this Code and such systems may be supplied from a four inch standpipe.

(d) Sprinklers shall be installed:

(1) At the top and at alternate floors in any trash or linen chute.

(2) In every trash or linen terminal room and in every room exceeding 15 square feet of floor area connected to such trash or linen chute.

(3) In garbage or trash rooms of more than 15 square feet of floor area.

(4) In paint spray booths as provided in section 4106 of this Code.

(5) In film storage rooms storing nitro-cellulose film as provided in Section 4103 of this Code.

3801.5 SPRINKLER EXCEPTIONS AND ALTERNATIVE FIRE PROTECTION: In buildings of any occupancy with low or ordinary hazard contents, sprinkler protection required by this section may be provided in accordance with the exceptions and options outlined in this Sub-section.

(a) Areas where sprinklers may be omitted:

The following areas of buildings requiring an automatic sprinkler system need not be sprinklered:

(1) Open exterior balconies constructed of non-combustible materials.

(2) Electrical spaces such as transformer vaults, telephone equipment spaces, electric meter rooms, electric closets, electric switchgear spaces, and emergency generator spaces, need not be sprinklered pursuant to the requirements of N.F.P.A. No. 13 if such rooms or spaces are protected by an approved carbon dioxide, dry chemical, foam, Halon, water spray or other extinguishment systems designed and installed in accordance with applicable N.F.P.A. Standards. See Exception 5102.1.

(3) In any occupancy where the character of the potential fuel for a fire is such that the extinguishment or control of the fire may be more efficiently accomplished by automatic extinguishing equipment other than an automatic sprinkler system, such alternative extinguishment system may be installed in lieu of an automatic sprinkler system or portion thereof. Alternative extinguishment systems may be carbon dioxide, dry chemical, Halon 1301, water spray or any other system recognized by N.F.P.A. Standards.

Such systems shall have been approved by the authority having jurisdiction, and shall be designed and installed in accordance with applicable N.F.P.A. Standards.

3802 CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS

3802.1 GENERAL:

(a) The Building Official may require and may approve substitution for required sprinkler systems in places not commonly used by the public and, where so approved, carbon dioxide or other Underwriter's Laboratories (UL) listed fire-extinguishing systems may be provided.

(b) Piping and materials shall comply with the Standards set forth in Paragraph 4604.1(b) of this Code.

3802.2 DESIGN AND CONSTRUCTION: Carbon dioxide fire-extinguishing systems shall comply in all respects with the Standard for Carbon Dioxide Fire-Extinguishing Systems, NFPA 12, as set forth in Section 402 of this Code.

3802.3 APPLICATION: Carbon dioxide fire-extinguishing systems may be used in rooms or enclosures containing flammable liquids in closed or open containers; ovens; dryers; electrical and other special machinery, apparatus and processes involving the use of flammable liquids, vapors, or dust; fur storage areas; lumber kilns; coal bins; loose textile stock areas; grain-handling machinery and in other enclosures containing stocks through which gas may permeate and where protection by water or other means may be ineffective or undesirable, and also in vaults; library stock-rooms; organs and other places where fires may be extinguished by carbon dioxide gas with less loss than if water were used.

3803 STANDPIPES AND HOSE STATIONS

3803.1

(a) GENERAL:

(1) Standpipes required herein shall be wet standpipe systems of Class III complying with the Standard "Standpipes and Hose systems," NFPA 14, as set forth in Section 402 of this Code, except those set forth in Sub-paragraph 3803.2(a)(3) herein.

(2) Wet standpipes having a primary water supply constantly or automatically available at each hose outlet, as required in this Section, shall be provided in buildings hereafter erected; existing buildings altered to increase the area or height; and existing buildings where the occupancy is changed to an occupancy required such standpipes.

(3) Standpipes shall be required in buildings under construction as set forth in Section 3323 of this Code.

(b) A permit for the installation of a standpipe system shall be required as provided in Sub-section 4601.5 of this Code and inspections shall be as set forth in Section 3808 herein.

3803.2 STANDPIPES REQUIRED:

(a) Buildings shall be equipped with standpipes as follows:

(1) Where Buildings exceed 50 feet in height, standpipe riser shall be designed to requirements of Chapter 2 of NFPA 14 as adopted by Sec. 3803.1.

(2) All standpipes shall be Class III design, as defined in NFPA 14 as adopted in Sec. 3803.1 as minimum requirements.

(3) Stages arranged or intended for theatrical, operatic, or similar performances shall have one two and one-half inch (2-1/2") standpipe on each side and such standpipes shall be Class III.

(4) Standpipes shall not be required in one-story buildings regardless of height.

(5) Open-air parking garages provided with automatic-sprinkler systems shall not be required to be equipped with standpipes.

(b) (1) In buildings 3 stories or more, but not more than 50 feet in height and not protected by an automatic fire sprinkler system, where the primary means of egress and ingress is through an enclosed hallway, a minimum four-inch diameter standpipe with water shall be provided. The water connection to the standpipe shall be as required in Section 3804.3 (community water supply).

(2) The number of standpipe risers shall be as required in Sec. 3803.3(a).

(3) The location of standpipe risers shall be as stated in Sec. 3803.4.

(4) A connection at each floor shall be as per Sec. 3803.6(c).

(5) Automatic sprinkler systems may be connected to the standpipe riser(s).

(6) Fire Department connections shall be as required in Sections 3805.1 and 3805.3.

(7) Roof manifolds are not required on standpipe risers in buildings fifty (50) feet or less in height.

(c) In buildings three (3) stories or more, but not more than fifty (50) feet in height, where the primary means of egress and ingress is through an enclosed hallway, and is protected by an automatic fire sprinkler system, hose outlets shall be connected to a wet stand pipe or to the engineered fire sprinkler system. Wet stand pipes should be interconnected with the sprinkler system.

3803.3 NUMBER:

(a) The number of standpipe risers and hose stations shall be such that a stream of water can be brought to bear on all parts of all floors within 15 feet of a nozzle connected to not more than 100 feet of hose connected to a standpipe.

3803.4 LOCATION:

(a) Standpipes shall be so located that they are protected from mechanical and fire damage.

(b) Standpipes shall be located:

(1) Within an enclosed stairway.

(2) Within 10 feet of the floor landing of an open stairway.

(3) Valve and hose connections located within a stairway enclosure shall not be behind a swinging door.

(4) Where additional standpipes and/or hose stations are required to comply with Sub-section 3803.3 herein and additional stairways are not otherwise required by this Code, such additional standpipes and/or hose stations need not be located in or at a stairway provided the first required standpipes and/or hose stations comply with this Sub-section.

(c) In buildings divided by partitions, standpipes shall be so located that streams can be brought to bear in all portions of any room, closet, or cubicle.

3803.5 MATERIALS:

(a) Standpipes above ground, within the exterior walls of a building, shall be black-steel pipe, hot-dipped zinc-coated (galvanized) steel pipe, wrought-iron pipe, or copper pipe and, together with the fittings and connections, shall be of sufficient strength to withstand the pressure to which the system may be subjected.

(b) Pipe and fittings may be shop or field welded provided the work is done in accordance with the Standard referenced in Sub-section 2805.1 of this Code and the requirements for welders set forth in Sub-section 2805.3.

3803.6 OUTLETS:

(a) Outlets from standpipes shall be provided at each floor, including the basement, and above the roof as set forth herein.

(b) At each floor, including the basement, a 2½" Fire Department outlet and a 2½" line to a 2½" hose valve with a 2½" reducer shall be provided.

(c) The two and one-half inch Fire Department outlets shall be provided with two and one-half inch valves adapted for two and one-half inch N.S.T. Fire Department hose connections not less than five feet nor more than six feet above the floor.

(d) Where a 2½" Fire Department outlet is located within a stair enclosure, as provided in Sub-paragraph 3803.4(b)(1) herein, a 2½" line through the stair enclosure to a 2½" valve with a 2½" x 1½" reducer shall be provided.

(e) All standpipes in buildings 50 feet or more in height shall extend full size above the main roof a minimum of 30 inches and be provided with an Underwriter's approved duplex or triplex roof manifold for two and one-half inch Fire Department hose and use.

3803.7 HOSE, CABINETS AND REELS:

(a) (1) All two and one-half inch hose connections are for Fire Department use.

(2) Building owners are not required to provide two and one-half inch hose.

(3) Where two and one-half inch Fire Department outlets are located within stairway enclosures, a hose station shall be located immediately outside within 10 feet of the door to such stair enclosure.

(4) Where two and one-half inch Fire Department outlets are not located within stairway enclosures, a hose station shall be located within 10 feet of the floor landing of an open stair or as otherwise provided in Sub-paragraph 3803.4(b)(3) herein.

(b) Where 2½" Fire Department valves are installed, 1½" hoses shall be provided except as set forth in Sub-paragraph 5102.1(h) of this Code, and except in parking garages for more than four cars.

(c) (1) Such hose shall be approved for 100 pounds per square inch working pressure.

(2) Pressure reducers shall be provided where necessary to control pressure on the hose to a maximum of 100 pounds per square inch.

(3) Each hose shall be equipped with an approved, adjustable fog nozzle with the pattern: off, fog, straight stream.

(4) Each hose shall be of sufficient length to satisfy the requirements of Paragraph 3803.3(a) but not more than 100 feet in length.

(d) Hose stations, for one and one-half inch hose together with one and one-half inch valve, shall not be located within stairway enclosures.

(e) (1) An approved standard form of wall-hose reel, cabinet or rack shall be provided for the hose and shall be located to make the hose accessible at all times.

(2) The required fire-resistive rating of the wall receiving recessed cabinets shall be maintained.

(f) Hoses, nozzles, hose cabinets and one and one-half inch hose will not be required where the building is provided with a fire-suppression life-safety system as set forth in Chapter 51 of this Code.

3804 WATER SUPPLY

3804.1 FOR STANDPIPES:

(a) QUANTITY:

(1) For buildings not more than 275 feet in height, water supply shall be sufficient to provide 500 gallons per minute for the first riser and 250 gallons per minute for each additional riser to a maximum of 1,250 gallons per minute.

(2) In buildings 275 feet or more in height, water supply shall be sufficient to comply with the Standard referenced in Paragraph 3803.1(a) herein.

(b) PRESSURE:

(1) The water supply shall be sufficient to maintain 100 pounds per square inch residual pressure at the topmost standpipe outlet with flow as set forth in Sub-paragraph 3804.8(a)(1) herein.

EXCEPTION: Where permitted by A.H.J. pressure shall be permitted to be reduced but not to less than 65-P.S.I.

(2) In buildings over 275 feet in height, the pressure shall be as set forth in the Standard referenced in Sub-paragraph 3804.1(a)(2) herein.

3804.2 FOR SPRINKLER SYSTEMS AND YARD HYDRANTS:

(a) The water supply for sprinkler systems shall be as set forth in the Standard referenced in Sub-section 3801.4 herein.

(b) The water supply for yard hydrants shall be as set forth in Section 3806 herein.

(c) Supply piping and appurtenances shall be installed in accordance with National Fire Protection Association standard NFPA 24, private fire service mains and their appurtenances.

3804.3 COMMUNITY WATER SUPPLY:

(a) Standpipe systems, sprinkler systems and yard hydrants shall be connected to the community water supply where such community supply is sufficient to provide quantities and pressures required and where such community water supply is available within 150 feet from the nearest point of the building to a street water main of not less than four inches in diameter.

(b) Where a standpipe system is required, and the community water supply, as set forth in Paragraph 3804.3(a) herein, is not sufficient or is not available, a fire pump or pressure tank shall be provided.

(c) Connection to a community water supply shall be provided with a control valve located in the public street, or other public space, and an approved manufactured backflow device, accessibly located, protecting the main.

(d) Water service shall be sized to provide the required quantity of water at the required pressure.

3804.4 FIRE PUMPS:

(a) Where pumps are proposed, detailed plans shall be submitted to the Fire Inspector having jurisdiction.

(b) Fire pumps for standpipe systems shall be of sufficient capacity to provide the quantity of flow set forth in Sub-paragraph 3804.1(a)(1) or (2), as applicable, and pressures as set forth in Paragraph 3804.1(b) herein.

(c) Fire pumps for sprinkler systems shall be of sufficient capacity to provide the quantity of flow and pressures set forth in the Standard referenced in Sub-section 3801.4 herein.

(d) Where a capacity of 500 gallons per minute is required, fire pumps shall be UL Inc. listed.

(e) Fire pump controllers shall be UL Inc. listed and may be of limited service for motors of 30 HP or less.

(f) The source of water supply for a fire pump shall be a street main of not less than four inch diameter and capable of supplying the quantity of water at which the pump, or pumps, will operate; or shall be a well or cistern having not less than a one-half hour supply.

(g) Pumps shall be supplied with a separate electric service and where a standby generator is provided, or otherwise required by this Code, shall be connected through a separate automatic transfer switch to such standby generator.

(h) Fire pumps shall be automatic in operation with compatible controls.

(i) A minimum pressure on a standpipe system of 15 pounds per square inch at the roof shall be maintained by a jockey pump actuated by a pressure switch; or by connection to a suitable domestic system through an approved backflow prevention assembly.

(j) Fire pump installations shall be fitted with a full size bypass provided with approved gate and check valves.

(k) Fire pumps provided to meet the requirements of Sub-paragraph 3804.1(a)(1) herein shall have flexibly coupled drives.

3805 FIRE DEPARTMENT CONNECTIONS

3805.1

(a) STANDPIPES:

(1) One Siamese (duplex) UL and/or FM approved Fire Department connection shall be provided for each of the first two risers, and one for every two risers thereafter.

(2) Where a building is required to have more than one Siamese connection such connections shall be remotely located.

(3) All standpipes shall be interconnected at their bases.

(4) Siamese (duplex) connections shall be of the same pipe diameter as the largest standpipe connected thereto and shall be protected by an underwriter's listed check valve.

(b) **SPRINKLERS:** One Siamese (duplex) Fire Department connection of not less than four-inch diameter shall be provided for each sprinkler system.

3805.2

(a) Fire Department connection shall be two and one-half inch N.S.T hose connections not less than one foot nor more than three feet above grade Location of all Siamese connections shall be approved by the Fire Department.

(b) Piping shall not project over public property more than two inches.

3805.3 A permanent legible sign with letters at 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.

3806 YARD HYDRANTS

3806.1 GENERAL: Mobile homes and trailer parks, marine terminals, marinas, boat yards, oil storage tanks, lumber yards and exhibition parks shall have yard hydrants and hose as set forth herein.

3806.2 STANDARDS:

(a) Mobile homes and trailer parks shall have yard hydrants as provided in the Standard for Mobile Home Parks, NFPA 501-A, as set forth in Section 402 of this Code.

(b) Marine terminals shall have yard hydrants and hose as provided in the Standard Fire Protection-Operation of Marine Terminals, NFPA 307, as set forth in Section 402 of this Code.

(c) Marinas and boat yards shall have yard hydrants and hoses as provided in the Standard Fire Protection of Marinas and Boat yards, NFPA 303, as set forth in Section 402 of this Code.

3806.3 REQUIREMENTS:

(a) (1) Private boat docking facilities shall have sufficient 1½" fire hose connected to a 2½" valve with a 2½" x 1½" reducer to reach all portions of the dock facilities. Supply shall be a minimum of 2½" underground fire line and shall have a minimum capability of delivering 40 gallons of water per minute at 25 pounds per square inch pressure through a combination fog nozzle, designed and sealed by a Florida Engineer.

(2) Where such docking facilities are inaccessible to Fire Department equipment, or exceed 150 feet from Fire Department vehicular access, a 2½" Fire Department Siamese connection shall be provided. Location of Siamese shall be approved by the Fire Department.

(b) In the absence of other requirements of this section, not less than one yard hydrant and hose shall be provided for each 20,000 feet of developed area.

(c) Yard hydrants shall have not less than two, two and one-half inch connections with threads uniform with the local Fire Department hose connections and not less than 100 feet of standard two and one-half inch fire hose with approved-type nozzles.

(d) A house hose and equipment shall be provided at each hydrant unless well located portable hose reels and equipment are accepted by the authority having jurisdiction.

(e) Hose houses shall have painted thereon the words "FIRE HOSE" in legible letters not less than six inches high on all exposed sides.

(f) Location of all yard hydrants shall be approved by the Fire Department.

3807 PORTABLE FIRE EXTINGUISHERS

3807.1 WHERE REQUIRED: Portable fire extinguishers shall be installed and maintained at each floor level as specified in this section as follows:

(a) In buildings for Group A occupancy: In every projection room and one for each 2,500 square feet of floor area or within a travel distance of 75 feet for buildings exceeding 50 feet in height or 50 feet for buildings not exceeding 50 feet in height.

(b) In buildings for Groups B, C, D, and E occupancies: One to each 2,500 square feet of floor area, but not less than one to each story or within a travel distance of 75 feet for buildings exceeding 50 feet in height or 50 feet for buildings not exceeding 50 feet in height.

(c) In buildings of Groups F, G, and H occupancies: One to each 2,500 square feet of floor area, but not less than one to each path of egress or within a travel distance of 75 feet for buildings exceeding 50 feet in height or 50 feet for buildings not exceeding 50 feet in height.

EXCEPTIONS: Where gasoline is dispensed there shall be a carbon dioxide fire-extinguisher of 15 pounds capacity extinguishment rating for the first two gasoline dispensing pumps or fraction thereof; and for each additional two gasoline dispensing pumps or fraction thereof after the first two there shall be either a carbon dioxide fire-extinguisher of 15 pounds capacity extinguishment rating or a dry chemical fire extinguisher of comparable rating. Additional fire extinguishers may be required for other extra Hazard Occupancies as set forth in NFPA 10.

(d) In buildings of Groups I occupancies other than single family residences and duplexes: One for each 2,500 square feet of floor area.

(e) In buildings for Group J occupancy: As required by the inspector having jurisdiction, complying generally with the above requirements.

3807.2 DETAILED REQUIREMENT:

(a) A portable fire extinguisher shall consist of a container or containers having a capacity of not less than one unit of fire protection, as defined by the National Fire Protection Association, so arranged and equipped that pressure may be generated and the contents discharged through a hose and nozzle, or portable extinguisher of other type, approved as equal by the inspector having jurisdiction.

(b) The installation, maintenance and use of portable fire extinguishers shall comply with the Standard for Installation, Maintenance and Use of Portable Fire Extinguishers, NFPA 10, as set forth in Section 402.

(c) Portable fire extinguishers, where required, shall be mounted in corridors or other approved locations generally accessible to the occupants of the building. Where they are placed in cabinets, they shall be visible, and the doors shall be unlocked or of glass which can be broken to give access to the extinguisher in case of fire.

3808 INSPECTIONS AND TESTS

3808.1 GENERAL:

(a) All required fire-extinguishing apparatus shall be maintained in sound operative condition and where, in the expressed and written opinion of the Fire Inspector having jurisdiction, such apparatus is defective or not in compliance with the Standards set forth in this Chapter, repairs or replacement shall be made with reasonable dispatch.

(b) All fire-extinguishing apparatus required by this Code shall be inspected by the Fire Department at least once every year and tests shall be made at the discretion of the Fire Inspector having jurisdiction.

(c) Such tests shall be conducted by the Fire Department having jurisdiction and equipment satisfying such tests shall be tagged as acceptable with notation of the date of the test and the date re-testing is recommended.

(d) The cost of making all tests shall be borne by the owner.

3808.2 PRESSURE TESTS:

(a) Every system of automatic-sprinklers, standpipes or yard hydrants, and all parts thereof except linen hose, shall satisfactorily meet the pressure tests provided in the Standards referenced in Paragraphs 3801.4(a) and 3803.1(a) herein.

(b) Test for residual pressure on standpipe systems may be made at the roof outlets giving consideration to pressure reduction due to head pressure.

CHAPTER 39

CHIMNEYS, FLUES, VENTS AND FIREPLACES

- 3901 GENERAL**
- 3902 TYPE A FLUES OR VENTS**
- 3903 TYPE B FLUES OR VENTS**
- 3904 TYPE BW FLUES OR VENTS**
- 3905 SMOKEPIPES**
- 3906 FIREPLACES**

GENERAL

3901.1 GENERAL: Chimneys, flues, vents and fireplaces, and their connections, carrying products of combustion, shall conform to the requirements of this Chapter, Chapter 40 and 47.

3901.2 EQUIPMENT AND APPLIANCES: Equipment and appliances connected to chimneys, flues, vents and fireplaces shall be of approved types and shall be installed and maintained as set forth herein and in Chapters 40 and, for gas appliances, as set forth in Chapter 47.

3901.3 DEFINITIONS AND CLASSIFICATION:

APPLIANCES, HIGH HEAT, are any installations or equipment in which the temperature of the flue gases as they enter the flue is above 1500°F.

APPLIANCES, MEDIUM HEAT, are any installations or equipment in which the temperature of the flue gases as they enter the flue is between 550°F and 1500°F.

APPLIANCES, LOW HEAT, are any installations or equipment in which the temperature of the flue gases is up to 550°F.

CHIMNEYS, FLUES OR VENTS are the conduits or passageways for conveying products of combustion to the other air and shall be classified as Type A, Type B or Type C.

CONDENSATE is the liquid which separates from a gas due to a reduction in temperature.

FIREBRICK is any refractory fire-clay brick which meet the approval of the Building Official.

FIRE-CLAY FLUE LINING is flue lining made of fire clay.

FIRE COLLAR is that portion of any appliance designed for the attachment of a draft hood.

SMOKEPIPE is the pipe connecting a heat-producing appliance burning solid or liquid fuels to a flue or vent.

VENT CONNECTOR is a pipe connecting a heat-producing appliance burning gas fuel to a flue or vent.

3902 TYPE A FLUES OR VENTS

3902.1 GENERAL: Type A flues or vents shall consist of chimneys, metal smokestacks and special flues approved by the Underwriters Laboratories and the Building Official.

Type A flues or vents shall be required for: (1) solid and liquid fuel burning heating equipment, and (2) gas burning equipment which produces flue gas temperatures in excess of 500° Fahrenheit at the outlet of the appliance or the draft hood when burning gas at the input rating specified by the manufacturer of such equipment.

3902.2 CHIMNEYS:

(a) DESIGN:

(1) Chimneys shall be designed, anchored and supported as set-forth herein and as specified in Chapters 23, 25 and 27, except that fireplaces complying with Section 3906 may be used for solid fuels or liquid fuel-burning equipment where the temperature of the flue gases, as they enter the flue, does not exceed 1000° Fahrenheit.

(2) No chimney shall support any structural load other than its own weight.

(3) Chimneys shall be anchored laterally at each floor and roof line by incombustible struts, walls or beams, except that for chimneys built integrally with masonry walls of less than eight inches in thickness and bonded thereto, such walls shall be considered proper lateral support.

(4) Chimneys shall be supported on reinforced concrete footing or grade beams or on steel beams having not less than two-hour fire resistive protection.

(b) WALLS AND FLUE LINING:

(1) Masonry chimneys serving low and medium-heat appliances shall have walls of not less than eight inches of solid masonry or six inches of reinforced concrete or four inches of solid masonry and eight inches of block. Mortar used in laying up units of chimney construction shall be Portland cement mortar.

Masonry chimneys serving low and medium-heat appliances shall be lined with approved fire-clay flue lining not less than five-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. Firebricks shall be laid in fireclay.

(2) Masonry chimneys serving high heat appliances shall be built with double walls, each not less than eight inches in thickness with an air space of not less than two inches between them. The inside of the interior walls shall be firebrick not less than four inches in thickness, laid in fire-clay mortar or refractory cement.

(c) **FLUE AREA:** No flue shall be smaller in area than the flue connection on the appliance attached thereto, provided that where more than one appliance is connected to such flue the area shall be increased as set forth in Section 3903.

(d) **HEIGHT:** Metal smokestacks shall extend to a height of not less than ten feet above the elevation of any part of any building within 25 feet except that, where such smokestack serves a forced-draft appliance, such smokestack shall be not less than three feet above the roof or any part of the building within 10 feet.

(e) **CORBELING:** No chimney shall be corbeled from a wall.

(f) **SEPARATION OF CHIMNEY LINERS:** When more than one flue or vent is contained in the same chimney, masonry separation at least four-inches thick shall be provided to separate flues.

(g) **INLETS:** Every inlet any chimney shall enter the side thereof and shall be of not less than one-eighth-inch thick metal or five-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, nor over 12 inches		No. 12 gage
More than 12 inches, nor over 16 inches		No. 10 gage
More than 16 inches, nor over 24 inches		No. 8 gage
More than 24 inches, nor over 30 inches		3/16 inch
More than 30 inches, nor over 43 inches		1/4 inch

Smokestacks shall be properly riveted or welded and, unless structurally self supporting, shall be guyed to incombustible construction.

Metal smokestacks used for high heat appliances shall be lined with four-inch firebrick laid in fire-clay mortar extending from not less than two feet below to not less than 25 feet above the smokepipe entrance.

(d) HEIGHT: Metal smokestacks shall extend to a height of not less than ten feet above the elevation of any part of any building within 25 feet except that, where such smokestack serves a forced-draft appliance, such smokestack shall be not less than three feet above the roof of any part of any building within 10 feet.

(e) CLEANOUTS: Cleanout openings shall be provided at the base of every metal smokestack.

(f) EXTERIOR STACKS:

(1) Metal smokestacks, or parts thereof, erected on the exterior of a building shall have a clearance of 24 inches from combustible walls and four inches from incombustible walls, but not less than required to comply with the Standard set forth in Sub-section 4001.4.

(2) No stack shall be nearer than 24 inches in any direction from a door, window or other wall opening or from a required means of egress.

(g) INTERIOR STACKS: Metal smokestacks, or parts thereof, in a building other than a one-story building shall be enclosed above the story in which the appliance served thereby is located, in walls of incombustible construction having a fire-resistance rating of not less than two hours, with a space on all sides between the stack and the enclosing walls sufficient to render the entire stack accessible for examination and repair. The enclosing walls shall be without openings except doorways equipped with approved self-closing fire doors of Class B or better at various floor levels for inspection purposes. Where such a stack passes through a roof constructed of combustible materials, it shall be guarded by a galvanized-iron ventilating thimble extending not less than nine inches below and nine inches above such roof construction. Such thimbles shall be of a size to provide a clearance on all sides of the stack for high-heat appliances of not less than 18 inches, for medium-heat appliances not less than eight inches and for low-heat appliances not less than six inches, but not less than required to comply with the standard set forth in Sub-section 4001.4. Smokestacks shall not be carried up inside of ventilating ducts unless such ducts are constructed as required by this Section for Type A flues and provided such stacks or flues are used solely for venting the room or space in which the appliance served by the smokestack is located.

3903-3904 TYPE B OR TYPE BW FLUES OR VENTS

Type B flues and vents shall comply with the requirement set forth in NFPA 211.

3905 SMOKEPIPES

3905.1 MATERIALS: Smokepipes and vent connectors serving fixed appliances shall be of substantial metal construction, but never less than as set forth in the following table:

Thickness of Metal for Smokepipes

Diameter (Inches)	Minimum Thickness (U.S. Gage)
6-10	26
11-29	24
30-39	22
40-49	20
50-up	18

3905.2 DETAILS OF CONNECTION:

(a) No vent connection connected to any gas appliance having pilot provision for automatic or remote control shall be connected to any kitchen ventilation or any chimney flue which is used as a smoke flue for any stove, boiler, heater or other apparatus designed to burn wood, coal, oil or any fuel other than gas, unless such pilot provision is so designed that the supply of gas to the main burners in connection therewith will be automatically shut off when combustion of gas is not taking place at the pilot.

(b) Two or more smokepipes shall not be joined to a single flue or vent unless the common smokepipe and flue or vent is of sufficient size to serve all the appliances thus connected. The smokepipe of a heating appliance shall not be connected into the flue or vent of an incinerator which as the rubbish chute identical with the smoke flue.

(c) No flue or vent shall have smokepipe connections in more than one story of a building unless provision is made for effectively closing smokepipe openings with devices made of incombustible materials, whenever their use is discontinued temporarily, and completely closing such openings with masonry when discontinued permanently. Smokepipes shall be exposed to view throughout their entire length.

(d) Smokepipes serving appliances other than water heaters shall have a rise of not less than one-fourth inch to the foot.

(e) Provision for removal of condensates shall be provided. Any two inlets shall be separated vertically by not less than the diameter of the larger inlet.

(f) All gas appliances connected to a common vent shall be located in the same story of the building and in the same tenancy thereof except as otherwise provided in the Standard NFPA 54, as set forth in Section 402.

(g) The horizontal projected length of the vent connector shall not exceed 75 percent of the vertical projected length of the vent unless the appliance is equipped for forced draft.

(h) Where smokepipes or vent connectors join into a single pipe, connector or flue, they shall be joined by a Y-fitting, discharging the flow in the direction of common passage.

3905.3 CLEARANCES: Clearances between smokepipes and combustible materials above shall be 18 inches where used for medium heat appliances and 36 inches where used for high heat appliances; except that such clearances may be reduced where insulating materials are provided as set forth in the Standard for Installation of Residential Type Warm Air Heating and Air Conditioning Systems, NFPA 90B, as set forth in Section 402.

3906 FIREPLACES

3906.1 GENERAL:

(a) Fireplaces and chimneys conforming to the minimum requirements herein may be used for solid fuels or liquid-fuel-burning equipment where the temperature of the flue gases, as they enter the flue, does not exceed 1000 degrees Fahrenheit.

(b) Fireplaces and chimneys shall be so constructed and insulated that adjacent combustible materials and structural members are not heated to temperatures in excess of 175 degrees Fahrenheit.

(c) Fireplaces and chimneys shall be built of only incombustible materials.

(d) Fireplaces and chimneys shall not support concentrated loads from the surrounding structure unless such loads are considered in the design and construction.

(e) Clay tile flue liners shall conform to the Standard specification for Clay Tile Flue Linings, ASTM C315, as set forth in Section 402.

(f) Fire brick shall conform to the Standard Specification for Fireclay Brick and Silicon Carbide Brick for Incinerator Service, ASTM C64, as forth in Section 402.

3906.2 FIRE-BOX CONSTRUCTION:

(a) Where a lining of firebrick at least 2 inches thick is provided, the total thickness of firebox wall, including lining, shall be not less than 8 inches solid thickness.

(b) Steel firebox lining, at least ¼ inch thick, may be used provided a minimum of 8 inch solid masonry walls are used. Insulation of steel lining shall be in accordance with manufacturer's recommendations.

(c) Where no steel lining or firebrick 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 firebrick back up.

3906.4 SMOKE CHAMBER: The front, or inward sloping wall, of the smoke chamber shall be constructed at set forth for the walls of the firebox. Other smoke chamber walls shall be constructed as set forth for chimney walls except the 5/8-inch minimum thickness fire-clay parging or equivalent treatment may be used in lieu of fire-clay flue tile lining.

3906.5 FIREPLACE CHIMNEY CONSTRUCTION:

(a) Chimney liners shall be of 5/8 inch refractory fire-clay lining or other material that will resist temperatures of 1800 degrees Fahrenheit without softening, cracking or other deleterious effects. The lining shall extend from the throat to a point 4 inches above the enclosed masonry walls.

(b) Chimney walls where lining is used shall be 4-inch nominal solid masonry or, where building is masonry, may be 8-inch nominal hollow masonry units.

(c) Chimney walls where lining is not used shall be 8-inch nominal solid masonry.

(d) Flue linings shall be built in as the masonry is laid. All joints and spaces shall be filled with mortar, and broken or cracked flue linings shall not be used.

(e) Chimneys shall extend to a height not less than 24 inches above the highest point of the roof within a radius of 10 feet.

(f) Where the chimney is built integrally with a masonry wall the tie beam shall be continuous on one or more side of the chimney.

3906.6 CLEARANCE:

(a) Concealed combustible material shall not be within 2 inches of fireplaces, smoke chambers or chimneys which are less than 8 inches in thickness.

(b) Exposed combustible material shall not be placed within 6 inches of the fireplace opening.

(c) No such combustible material within 12 inches of the fireplace opening shall project more than one-eighth inch for each one-inch clearance for such opening.

3906.7 AREAS OF FLUES:

(a) The net cross-sectional area of the flue and the throat between the firebox and smoke chamber of a fireplace shall be not less than one-tenth of the area of the fireplace opening for chimneys 15 feet or more in height, nor less than one-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 recess for gas space heaters having a demand of more than 35,000 BTU per hour or electric space heaters having a demand of more than 10 KW per hour and/or wall recesses designed and constructed to resemble fireplaces shall be not more than 6 inches in depth, shall be labeled with a metal 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 Inc. may be used, and installation shall be in accordance with the condition of approval of UL Inc. and the Building Official.

CHAPTER 40

HEAT-PRODUCING APPARATUS

- 4001 GENERAL**
- 4002 GAS-BURNING APPLIANCES**
- 4003 ELECTRIC APPLIANCES**
- 4004 OIL-BURNING APPLIANCES**
- 4005 SOLID FUEL-BURNING APPLIANCES**
- 4006 BOILERS**
- 4007 INCINERATORS**
- 4008 SOLAR HEATERS**
- 4009 COMBUSTION ENGINES**

4001 GENERAL

4001.1 SCOPE: Heat producing appliances and apparatus, other than electrical or gas appliances, shall conform to the requirements of this Chapter. Electrical appliances shall comply with Chapter 45 herein and gas appliances shall comply with Chapter 47 herein. Flues and vents shall comply with Chapter 39 herein. The storage of flammable liquids shall comply with Chapter 41 herein.

4001.2 PERMITS:

(a) A permit shall be required to install, repair, or alter any heat-producing appliance or piping or flue or accessory thereto, except gas appliances as set forth in Chapter 47 and electric appliances as set forth in Chapter 45, except that permit shall not be required for any fully portable appliance which has no physical connection to piping or flue.

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

4001.3 OCCUPANT HAZARD: Where heat-producing apparatus is installed in locations where the occupants of the space for reasons of age or physical limitations may, in the opinion of the inspection authority, be required to be designed and installed to be inaccessible or inoperative to unauthorized persons and protective guards or screens installed to prevent physical contact with heater parts.

4001.4 CLEARANCES FOR HEAT PRODUCING APPLIANCES: Clearances for heat producing appliances shall comply with the Standards for Clearances for Heat Producing Appliances, in appropriate NFPA Standards and manufacturers recommendations.

4002 GAS-BURNING APPLIANCES

Gas burning appliances shall comply with the requirements of Chapter 47.

4003 ELECTRICAL APPLIANCES

Electric heat-producing appliances shall comply with the requirements of Chapter 45.

4004 OIL-BURNING APPLIANCES

Oil burning appliances shall comply with the Standard for the Installation of Oil Burning Equipment, NFPA 31, as set forth in Section 402.

4005 SOLID-FUEL-BURNING APPLIANCES

4005.1 Solid-fuel-burning appliances shall comply with the Standard for the Installation of Heat Producing Appliances in appropriate NFPA Standards and Manufacturers recommendations.

4005.2 Ranges and space heaters burning solid fuel shall be vented directly or by means of smokepipes to a Type A flue or vent as set forth in Chapter 39. No such connection shall be to a flue or vent to which a gas burning appliance is connected.

4006 BOILERS

4006.1 STANDARDS:

(a) The design, installation, alteration, location, operation and inspection of all boiler and pressure vessels, including boilers generating steam under pressure, shall be as set forth herein.

(b) The Boiler and Pressure Vessel Code, ASME, including all addenda thereto published prior to the adoption of this Code is hereby adopted as set forth in Section 402.

4006.2 CLASSIFICATION:

(a) A high-pressure steam boiler is any boiler generating steam or vapor at pressures over 15 pounds per square inch.

(b) A low-pressure steam boiler is any boiler generating steam or vapor at 15 pounds per square inch or less.

(c) A hot-water heating boiler operating at pressures under 160 pounds per square inch and temperatures under 250 degrees F. is classified as a low-pressure boiler.

Exception: A potable hot water heater with a Btu input of 400,000 or less, a maximum water temperature of 210 degrees Fahrenheit, a maximum operating pressure of 160 pounds per square inch gage, and having a corrosion resistant interior vessel surface shall be exempt from the requirements of a fire resistive enclosure as prescribed elsewhere in section 4006.

(d) A hot-water heating boiler operating at pressures of 160 pounds per square inch or higher and at temperatures of 250 degrees F. or higher shall be classified as a high-pressure boiler.

(e) A hot-water supply boiler having a BTU rating of more than 200,000 BTU per hour or having a capacity of 120 gallons or more or operating at a temperature of more than 200 degrees F. is classified as a low-pressure boiler.

4006.3 ENCLOSURES FOR HIGH-PRESSURE BOILERS:

(a) High-pressure boilers shall be enclosed and separated from the rest of the building by walls, floors and ceilings of not less than two-hour fire-resistive construction.

(b) There shall be no openings in such enclosure except for doors and as required for ventilation.

(c) There shall be not less than two doors remotely located and all doors to the inside of the building shall be one and one-half hour fire-resistive assembly complying with Sec. 3706 herein.

(d) Clearances for boiler appurtenances shall be a minimum of 18 inches all around the boiler. Where a manhole opening is provided in the top of boiler shell a minimum clearance to ceiling shall be 36 inches.

(e) Boilers of 3 HP or less generating steam at less than 100 psi may be installed without enclosures; shall not be placed on combustible flooring; and shall comply with the standards set forth in Paragraph 4006.1(b).

4006.4 ENCLOSURES FOR LOW-PRESSURE BOILERS:

(a) Low-pressure boilers shall be enclosed and separated from the rest of the building by walls, floors and ceilings of not less than one-hour fire-resistive construction.,

(b) There shall be no openings in such enclosure except for doors and as required for ventilation.

(c) Doors to the inside of the building shall be a one-hour-fire-resistive assembly complying with Section 3706 herein.

(d) Clearances from boiler appurtenances shall be a minimum of 18 inches all around the boiler. Where a manhole opening is provided in the top of boiler shell a minimum clearance to ceiling shall be 36 inches.

(e) Boilers of 3 HP or less generating steam at less than 100 psi may be installed without enclosures; shall not be placed on combustible flooring; and shall comply with the standards set forth in Paragraph 4006.1(b).

4006.5 DETAILED REGULATIONS:

(a) High pressure steam boilers may be blown off only to a blow-tank complying with the requirements of the pamphlet entitled, "Boiler Blow-Off Equipment," NBPVI, as set forth in Section 402.

(b) Boilers shall be connected to an approved flue or vent where required and as set forth in this Chapter.

(c) Combustion air shall be supplied or provided at the rate of eight CFM per boiler horsepower plus an additional two cubic feet per minute ventilation.

(d) Any person manufacturing or dealing in the sale of boilers or pressure vessels shall, on sale or delivery of such apparatus, notify the Building Official, giving the name and address of the purchaser.

(e) Second-hand or used boilers and pressure vessels shall be inspected by an agency approved by the Building Official before such apparatus is painted or offered for sale.

4006.6 CERTIFICATE OF INSPECTION:

(a) A Certificate of Inspection shall have been requested, issued and posted before any boiler or pressure vessel shall be placed or continued in operation.

(b) A Certificate of Inspection shall be requested from and issued after approval by the Building Official.

(c) A Certificate of Inspection shall be authorization to operate such equipment for a limited period as set forth herein.

(d) A Certificate of Inspection for a high-pressure boiler shall be for a period of not more than 6 months.

(e) A Certificate of Inspection for a low-pressure boiler shall be for a period of not more than 12 months.

(f) A Certification of Inspection may, at the discretion of the Building Official, be for a shorter period or such Certificate may be rescinded and inspection and tests be ordered at any time when in the opinion of the Building Official, a condition exists making such retesting or reinspection desirable in the interest of safety.

(g) A Certificate of Inspection shall be posted to be conspicuous to the operator and inspection of the equipment and shall state the period of approval and the maximum allowable approved operating pressures.

4007 INCINERATORS

4007.1 GENERAL:

(a) Incinerators for the reduction of refuse, garbage or other waste materials shall not be permitted where, in the opinion of the Building Official, a nuisance or fire hazard may result. Incinerators, where permitted, shall be as set forth in this section.

(b) Flue-fed or direct-fed incinerators and the accompanying chutes shall not be located within or attached to the buildings.

4007.2 SMALL DOMESTIC-TYPE:

(a) Indoor installation of small domestic-type incinerators having a grate area of not more than nine square feet, shall have been tested and approved by a recognized testing agency and shall be installed in accordance with the conditions of approval, or shall have roofs and walls of not less than eight inches of solid brick masonry or fire clay or reinforced concrete, and have not less than 36 inches clearance from protected combustibles or 48 inches from unprotected combustibles. Incinerators shall be mounted only on an incombustible floor and be connected to a Type A flue or vent.

(b) Outdoor installations of small domestic-type incinerators shall not be permitted.

4007.3 COMMERCIAL AND INDUSTRIAL TYPE:

(a)(1) Commercial and industrial incinerators shall comply with recognized Standards.

(2) Refuse chutes shall not feed directly to the combustion chamber but shall discharge into a room or

bin enclosed and separated from the incinerator room by not less than two-hour fire-resistive construction.

(3) The opening through which material is transferred from such room or bin to the incinerator room shall be equipped with a fire-assembly having a Class A label.

(b) Refuse chutes shall comply with Section 1807.

(c) Commercial or industrial-type incinerators shall have a combustion chamber lined with not less than three and one-half inches of firebrick laid in fireclay mortar, including the space below the grate in downdraft incinerators, and shall have walls and roof of not less than eight inches of brick masonry laid in Portland-Cement mortar or reinforced concrete where having a grate area of not more than nine square feet, and 12 inches where having a grate area of more than nine square feet. Firebrick lining may be included in the required wall and roof thickness. The flue shall be constructed as set forth for chimneys, Chapter 39, and shall be covered with a corrosion-resistant spark arrester having a mesh not exceeding three-fourth inch and an area not less than twice the flue area.

4008 SOLAR ENERGY

4008.1 GENERAL:

(a) **DESIGN:** All solar collectors, tanks, piping, insulation, duct work, materials and devices shall conform to the requirements of this Chapter and Chapter 46 herein.

(1) Electrical wiring apparatus and equipment used in a solar system shall comply with Chapter 45 herein.

(2) All supporting structural members, components, and parts of a solar system subjected to live winds and dead loads shall comply with Chapter 23 herein.

(b) **UNLAWFUL CONNECTIONS:** No installation of solar piping or part thereof shall be made in such a manner that it will be possible for polluted or contaminated water, gases, fluids or other substances to enter any portion of the potable water system from any pipe, tank, receptacle, or other equipment by reason of back siphonage or suction.

(c) VALVES & VENTS:

(1) Water supplied solar piping systems shall have control valves capable of isolating the system from the potable water system.

(2) Shutoff valves shall be located to isolate heat generating or transfer equipment and pressure storage tanks. Such heat generating or transfer equipment and pressure storage tanks shall be provided with an approved, listed, adequately sized pressure relief valve capable of operating at the working pressure of the pipe or 150 psi, whichever is lesser.

(3) All required shutoff and control valves shall be readily accessible.

(4) Automatic air release vents shall be installed at all high points of the solar system, unless not required by design.

(d) **STORAGE TANKS:** Hot water storage tanks located in concealed or attic space shall be provided with an approved drain pan as required in Chapter 46.

(e) **PERMITS:** A solar permit shall be required to install, repair, or alter any solar system or piping or accessory thereto. Replacement of any component part which does not alter its original approval and complies with other applicable requirements of this section shall not require a permit.

(f) **PLANS REQUIRED:** Two sets of plans, specifications, calculations and/or test reports verifying the structural adequacy shall be prepared by a professional architect or engineer, registered in the State of Florida, except in I Occupancy, and shall be submitted with the application for permit.

(g) PROTECTION OF PIPING:

(1) All piping in connection with a solar system shall be so installed that the piping or connections will not be subject to undue strains or stresses and adequate provisions shall be made for expansion and contraction.

(2) Piping subject to undue corrosion or mechanical damage shall be protected in an approved manner.

(3) All piping and equipment shall be adequately supported in accordance with provisions of Chapters 46 and 48.

(h) WATERPROOFING OF OPENINGS:

(1) Joints around pipes, ducts, bolts or other appurtenances which penetrate the roof or exterior wall shall be made water-tight by the use of pitch pans, lead, copper, galvanized steel or other approved flashing material.

(2) Voids around piping, ducts and other appurtenances passing through walls, ceilings and floors shall be appropriately sealed.

4008.2 TESTING:

(a) PIPING SYSTEM:

(1) Upon completion of the installation of the solar system and the entire piping system, it shall be tested and proved tight under a water, fluid, or air pressure test of not less than two times the maximum working pressure under which it is to be used, and if not marked, a minimum of 160 psi.

(2) Equipment not capable of withstanding the above pressures shall be isolated in order to test the piping system.

(b) STORAGE TANKS: Pressure type tanks shall comply with paragraph 4614.18(c) herein.

(c) SOLAR COLLECTORS:

(1) Solar collectors installed in Broward County must be certified as meeting Florida Solar Energy Center standards.

(2) Solar collectors shall also be tested in vacuum chamber in accordance with ASTM E-330 for wind loads complying with Chapter 23 herein.

(3) Solar collectors shall not contain plastic pipes except in Swimming Pool Collectors.

(d) CONTROLS AND DEVICES: All controls and devices shall comply with established nationally recognized standards, shall carry labeling of an approved listing agency or laboratory and shall be of such design and construction as to be suitable for installation.

4008.3 INSULATION: All piping, tanks, ducts and equipment shall be insulated in accordance with the provisions of Chapters 48 and 52.

4008.4 INSTALLATION: Solar panels installed at ground level shall be at least six inches above the ground. Panels which are not an integral part of the roofing system shall comply with Chapter 34.

4008.5 LOCATION:

(a) Collectors constructed of combustible materials shall not be located on or adjacent to construction required to be of non-combustible materials.

(b) Collectors and equipment shall be accessible for maintenance and repair.

4008.6 OTHER SYSTEMS:

(a) Other systems installed in conjunction with solar systems for the purpose of comfort cooling or heating shall comply with applicable sections of this Code.

(b) Solar heating systems, or parts thereof, used in swimming pools, spas or other similar facilities, having a maximum working pressure of 40 psi shall comply with the requirements of Chapter 50 herein.

4009 COMBUSTION ENGINES

4009.1 The installation and operation of stationary combustion engines and gas turbines or within 15 feet of a building shall be as set forth herein.

4009.2 The Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, NFPA

37, is hereby adopted, as set forth in Section 402.

4009.3 When engine installations totaling more than 2000 horsepower are located inside structures which are frequented by the public, such engines shall be in rooms having walls, floors and ceilings of three hour fire-resistive construction. Openings in the engine room that open into the other sections of the structure shall be provided with automatic firedoors. Installations on roofs are not required to comply with this Subsection if the roof is of Type I Construction. Rooms housing such engines shall have provisions for venting a full explosion with minimum structural damage.

4009.4 An integral engine-driven unit for compressing a flammable gas or pumping a flammable liquid shall be located in a room of fire-resistive construction or by being placed in a separate structure and such engines shall also comply with the standard set forth in this Section.

4009.5

(a) Exhaust pipes shall terminate outside the structure at a point where the hot gases or sparks will discharge harmlessly and not be directed against combustible materials or structures, or into atmosphere containing flammable gases, vapors or combustible dusts. Exhaust pipes shall not terminate under loading platforms or structures, or near ventilation air inlets.

(b) Exhaust pipes shall be installed with clearances as set forth in Sub-section 4001.4 and guarded, where necessary, to prevent personnel burns.

a. A chemical that has a median lethal dose (LD50) or more than 50 milligrams per kilogram but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

b. A chemical that has a median lethal dose (LD-50) or more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

c. A chemical that a median lethal concentration (LC50) in air more than 200 parts per million but not more than 2,000 parts liter but not more than 20 milligrams per liter of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

Highly Toxic: A chemical falling within any one of the following categories:

a. A chemical that has a median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighting between 2000 and 300 grams each.

b. A chemical that has a median lethal dose (LD50) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

c. A chemical that has median lethal concentration (LC50) in air of 200 parts per million by volume or less of gas or vapor, or two by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

4108.4 Determination of Hazardous Materials:

The property owners and design professionals shall be responsible for providing Material Safety Data Sheets for all chemicals to be utilized and/or stored. The design professional shall specify all chemicals and processes on plans for review by the building department. The Building Official, after consulting with the appropriate fire official, shall determine the group occupancy and type of construction based on the hazard of materials to be utilized and/or stored in accordance with this section and other provisions of this Code.

4108.5 Fire Protection:

Automatic extinguishing systems shall be provided according to the provisions of Chapter 38 and 52 herein. The Fire Department shall be responsible for approving the compatibility of auto-extinguishing systems with hazardous materials in accordance with the appropriate NFPA standards.

4108.6 Ventilation:

Mechanical ventilation shall be provided in accordance with the provisions of Chapter 48 to remove or sufficiently reduce vapors and fumes from hazardous materials within areas of use and/or storage, but in no case shall there be less than one complete change of air every ten minutes. A manual switch for mechanical ventilators systems shall be subject to the approval of the Chief Mechanical Inspector.

4108.7 Hazardous Liquids:

Approved impervious secondary containment shall be required for all tanks, piping and appurtenances for utilization and/or storage of hazards liquids in excess of 55 gallons. Dilution and drainage systems shall be installed with the approval of the Chief Plumbing Inspector, in accordance with the provisions of Section 4605 herein, for hazardous materials storage and/or use over 55 gallons.

4108.8 Separation of Hazardous Materials:

Separation or isolation of hazardous materials from other storage areas and occupancies shall be provided through fire resistive construction of not less than one hour. Such required fire separations shall be approved by the Chief Structural Inspector.

4108.9 Monitoring and Detection:

Bathtubs	A112.19.1H-1979	None	WW-P-541/3a-1971	None
Bathtubs Units, Gel-Coated, Glass Fiber Reinforced Polyester Resin	Z124.1-1987	None	WW-P541/3a-1971	None
Drinking Fountains	A112.11.1-1973	None	WW-P-541/6a-1971	None
Fittings, Plumbing Fixtures, Finished and Rough Brass	A112.18.1M1-1989	None	WW-P541 ALL-1971	None
Floor Drains	A112.21.1-1991	None	None	None
Hand-Held Showers, Performance Requirement	None	None	None	ASSE 1014-79
Individual Control Valves, Anti-Scald Type	None	None	None	ASSE 1016-79
Lavatories	None	None	WW-P-541/4a-1971	None
Lavatory, Cultured Marble	Z-124.3-1986	None	None	None
Plumbing Fixtures, General Specification	None	None	WW-P-541/Gen-1971	None
Plumbing Fixtures, Enamelled Cast Iron	A112.19.1-1973	None	WW-P-541/3A 5A-1971	None
Plumbing Fixtures, Stainless Steel	A112.19.3-1976	None	WW-P541/5A-1971	None
Plumbing Fixtures, Vitreous China	A112.19.2-1973	None	WW-P-541/1A,2A, 4A, 6A-1971	None
Plumbing Fixtures, Enamelled Steel	A112.19.4-1977	None	None	None
Polyvinyl Chloride (PVC) Plastic Flexible Concealed Water--Containment Membrane	None	ASTM D4551	None	None
Shower Baths and Heads and Water Control Valves	None	None	WW-P-541/7B-1974	None
Shower receptor, Shower Enclosures and Non-Metallic Bathtubs Prefabricated	Z124.1-1987 Z124.2-1987	None	None	None
Rubber Gaskets for Cast Iron Soil-Pipe and Fittings	None	C564-82	None	None
Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings	A21.11-1990	None	None	AWWA C111-90

Rubber Gaskets Molded or Extruded, for Concrete Non-Pressure Sewer Pipe	None	C443-79	HH-G-o160b-1968	None
Rubber Rings for Asbestos Cement Pipe	18.7-1971	D1869-83	None	None
Rubber Gaskets, Sheet	17.2-1971	D1330-70	None	None
Pipe Joining Materials and Gaskets, and Supports				
Sealing Compound, Pre-formed Plastic, for Expansion Joints and Pipe Joints	None	None	SS-S-210(1965)	None
Sealing Compound, Sewer, Bituminous Two-Component, Mineral-Filled, Cold Applied	None	None	SS-S-168(2)1962	None
Pipe Hangers and Supports	None	None	WW-H-171d-1970	None
Plumbing Appliances and Appurtenances				
Dishwashing Machines Commercial	None	None	OOO-431c(2)-1970	UL 921-1978 ASSE 1006
Dishwashing Machines, Household	None	None	None	UL 749-1978
Drinking Water Coolers, Self-Contained Mechanically Refrigerated	None	None	None	ARI-1010-1020-84 UL 399-1978
Food Waste Disposal Units, Household	None	None	QQ-G-001513-1968 ASSE 1008	None
Home Laundry Equipment	None	None	None	UL560-1978 ASSE 1007
Water Heaters, Automatic Storage Type	Z21.10.1a-1978	None	None	None
Water Heaters, Circulating Tank	Z21.103a-1978	None	None	None
Polyvinyl Chloride (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	K65.56-1971	D2665-91B	L-P320a-1966	NSF-14
Type PSM PVC Sewer Pipe and Fittings	None	D3034-89	None	None
Styrene-Rubber Plastic Drain Pipe and Fittings	None	D2852-89	None	None
Solvent Cement for Styrene Rubber Plastic Pipe and Fittings	None	D3122-89	None	None
Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)	None	D2241-89	None	NSF 14

Thermoplastic Accessible and Replaceable Plastic tube and Tubular Fittings	None	F409-81	None	NSF 14
Polybutylene (PB) Plastic Pipe and Tubing for Cold Water Service Pipe (SDR)	None	D2662-89	None	NSF 14
Tubing	None	D2666-89	None	NSF 14
Pipe (SDR-00)	None	D3000-89	None	NSF 14
Recommended Practice for making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Plastic Pipe and Fittings	None	D2855-83	None	None
Pipe Joining Materials and Gaskets, and Supports				
Caulking, Lead Wool and Lead Pig	None	None	QQ-C40(2)1970	None
Compression Joints for Vitrified Clay Bell and Spigot Pipe	A106.6-1977	C425-91	None	None
Plastic Elastomeric Joints	None	D3139-77 D31281	None	None
Fixture Setting Compound	None	None	TT-P-1536(1968) Revision of HHC 536a-1954	None
Hubless Stainless Steel Couplings	None	None	None	CISPI 307-78
Non-Metallic Gaskets for Pipe Flanges	B1621-1978	None	None	None
Neoprene Rubber Gaskets for Hub and Spigot Cast Iron Soil Pipe and Fittings	None	C564-88	None	CISPI HSN-76
Polyethylene (PE) Plastic Pipe, (SDR-PR)	B72.1-1975	D2239-89	L-P315c-2-1975	NSF 14
Butt Fusion Polyethylene (PE) Plastic Pipe Fittings, Schedule 40	K65.160-1971	D3261-90	None	NSF 14
Butt Fusion Polyethylene (PE) Plastic Pipe Fittings, Schedule 80	K65.159-1971	D3261-90	None	NSF 14
Plastic Insert Fittings for Polyethylene Plastic Pipe	None	D2609-90A	L-F001546-1968	NSF 14
Polybutylene (PB) Plastic Hot and Cold Water Distribution Systems	None	D3309-83	None	NSF 14

Type PSP PVC Sewer Pipe and Fittings	None	D3033-83	None	NSF 14
Polyethylene (PE) Plastic Tubing	None	D2737-89	None	NSF 14
Chlorinated Polyvinyl Chloride (CPVC) Plastic Hot-Water Distribution Systems	None	D2486-92	None	NSF 14
Chlorinated Polyvinyl Chloride (CPVC) Solvent Cement	None	P493	None	None
Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120	B72.7-1971	D1785-91	L-P1036A-1974	NSF 14
Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40	None	D2466-90A	None	NSF 14
Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80	None	D2467-92	None	NSF 14
Solvent Cement for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings	B72.16-1971	D2564-91	None	NSF 14
Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80	K65-166-1971	D2464-90	None	NSF 14
Bell-End Polyvinyl Chloride (PVC) Pipe	B72.20-1971	D2672-92	None	NSF 14
Clay Pipe, Perforated, Standard and Extra Strength	A106.8-1978	C700-91	SS-P-361E	None
Concrete Drain Tile	None	C412-90	None	None
Concrete Low Head Pressure Pipe Reinforced	None	C361-92	None	None
Concrete Pipe Perforated	None	C444-90	None	None
Concrete Pipe (Sewer, Storm Drain and Culvert) Non-reinforced	None	C14-92	SS-P371e-1968	None
Concrete Pipe, Pressure Reinforced Concrete, Pre-Tensioned Reinforcement (Steel Cylinder Type)	None	None	SS-P—381A-(2)-1972	AWWA C30387
Concrete Pipe (Culvert, Storm Drain and Sewer) Reinforced	None	C76-90	SS-P-375d-1970	None
Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedule 40 and 80	B72.5-1971	D1527-89	None	None

Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR and Class T)	B72.3-1975	D2282-89	None	NSF 14
Socket-Type Acrylonitrile-Butadiene Styrene (ABS) Plastic Pipe, Fittings, Schedule 40	K65.164-1971	D2468-90	None	NSF 14
Socket-Type Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Fittings, Schedule 80	K65.163-1971	D2469-76	None	NSF 14
Threaded Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 80	K65.165-1971	D2465-79	None	NSF 14
Acrylonitrile-Butadiene-Styrene (ABS) Plastic Drain, Waste, and Vent Pipe and Fittings, Schedule 40	B72.18-1971	D2661-91	L-P332D-1973	NSF 14
Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and fittings	B72.23-1971	D2235-89	None	NSF 14
Polyethylene (PE) Plastic Pipe, Schedule 40	B72.8-1971	D2104-89A	None	NSF 14
Polyethylene (PE) Plastic Pipe, Schedule 40 and 80 Based on Outside Diameter	B72.23-1971	D2447-89	None	NSF 14
Coating Pipe, Epoxy, Fusion Bond	None	None	None	AWWA-C213-85
Coating Pipe, Thermoplastic Resin or Thermosetting, Epoxy	None	None	L-CO53OB-1970	None
Copper , Sheet and Strip for Building Construction	None	B370-83	None	None
Clay Pipe, Installation	A106.2-1977	C12-82	None	None
Clay Pipe, Testing	A106.5-1978	C301-78c	None	None
Drain, Roof	A112.21.2-1971	None	None	None
Interceptors, Grease	None	None	None	PDI G 101
Drain, Floor	A112.21.1-1968R1974	None	None	None
Lead Sheet, Grade A	None	None	QQ-L-201f(2)-1970	None
Relief Valves, Automatic	Z21.11-1979	None	None	None

Reducing Valves, Water Pressure for Domestic Water Supply System	A112.26.2-1975	None	None	ASSE 1003S
Solder, Soft	None	None	QQ-S-571d-1963	None
Tape Pipe Coating, Pressure Sensitive Polyethylene	None	None	L-T-0075(1)-1966	None
Thermoplastic Pressure Piping Underground Installation	None	D2774-83	None	None
Trap Seal Primer Valves	None	None	None	ASSE 1018-7
Valve, Backwater	A112.14.1-1975	None	None	None
Valve, Drain, Water Heater	None	None	None	ASSE 1005
Water Closet, Flush Tank, Ball Cocks	None	None	None	ASSE 1002-7
Air Admittance Valves	None	None	None	ASSE 1051-96
Single Fixture and Branch-Type Devices	None	None	None	NSF 14-96
*NOTE: The Standards set forth in this table are intended to supplement, not supersede, the requirements otherwise set forth in this Chapter. Only those procedures of the Standards stated as being mandatory by the Code shall be mandatory, and recommendations, suppositions or preferences so stated as Standards shall not be construed to be mandatory.				

4605 DRAINAGE SYSTEM AND DISPOSAL

4605.1 GENERAL REQUIREMENTS:

(a) Sewage and liquid waste shall be treated and disposed of as hereinafter provided. Septic tanks, sewage treatment systems, soakage pits, drainage wells, and/or other drainage work on or from premises or building sites shall be constructed, installed and maintained as herein provided.

(b) It shall be unlawful for any person to cause, suffer, or permit the disposal of sewage, human excrement and/or liquid waste in any place or manner except through and by means of an approved plumbing and drainage disposal system installed and maintained in accordance with the provisions of this Code. (See Section 4615 for septic tank requirements.)

(c) In areas where no public sewer is provided or where a connection to the public sewer is not permitted by the Engineering Department, or where no sewer connection through an easement is available, plumbing and drainage of all properties shall be connected to a private disposal system constructed in compliance with the provisions hereinafter set forth. (NOTE: Some public sewers are surcharged or over-loaded. In some instances, therefore, the Engineering Department may prohibit the disposal of additional waste to these sewers. Liquid wastes shall then be disposed of by means of an approved soakage pit, drainage well, or other approved means.

(d) No septic tank, drainfield pipe, soakage pit, drainage well or water supply well or other drainage work shall be installed or discharged on any public property outside the property lines of the premises or structure

served without first securing a written approval to do so from the Engineering Department and the Plumbing Official. Approval may be limited to certain specific conditions.

(e) ENCROACHMENT ON PRIVATE PROPERTY — EASEMENT REQUIRED: No sewer, septic tank, drainfield pipe, soakage pit, drainage well, water supply well or other drainage work shall be located or installed or discharged on any privately owned property outside the property lines of the premises or structures served except as specifically permitted herein. Permission for such installation may be granted upon presentation to the Plumbing Official of a properly executed easement which has been recorded with the Clerk of the Circuit Court. Such easement which has been executed and recorded as aforesaid must be filed with the Plumbing Official before a permit for such work may be approved. The common ownership of the property for which such permit is approved and the property encumbered by such easement shall not waive any of the above requirements.

(f) SEWER EASEMENT: At the option of the owner of a property which does not abut a public sewer but where a sewer connection can be secured through an adjoining lot or property whether of the same ownership or not, a connection to the public sewer may be made through such adjoining lot or property by virtue of a properly executed and recorded easement under such conditions as the Plumbing Official and Engineering Department shall permit, and as set forth in paragraphs 4605.1(d) and 4605.1(e).

(g) PLANS AND SPECIFICATIONS AND INFORMATION REQUIRED: Complete and detailed specifications, plans and other information shall be provided as required in this Code from the person designing the work and/or by the owner of the premises desiring to dispose of liquid waste or sewage before a permit is approved and construction work of any nature is commenced.

(h) LOCATION OF HOUSE DRAIN: House drains installed in connection with new construction where waste disposal is to a septic tank shall comply with Paragraph 4615.

4605.2 REGULATIONS GOVERNING THE DISCHARGE OF LIQUID 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 overload or surcharge or cause the public sewer system to overflow or back up into private property or flood public thoroughfares or private property.

(b) APPROVAL AND PERMITS REQUIRED BEFORE COMMENCING WORK No work shall be commenced before the approval of the Engineering Department is secured in writing upon plans submitted or before a building and plumbing permit is issued. The Engineering Department shall not give approval for the discharge of liquid waste to a public sewer except in accordance with the following terms and restrictions:

(c) PROHIBITED DISCHARGES TO SEWERS: Storm or rainwater or other liquid waste shall not discharge into a sanitary sewer, nor shall sewage discharge into a public storm sewer, except as herein provided for.

(d) SEWER CONNECTIONS REQUIRED AND LIMITED: Connection for the disposal of sewage and liquid waste shall be made to a public sewer when and where such connection can be made without 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, benzene, naphtha, steam, acid, oil, grease, sand, glass or any other deleterious substances to enter or discharge into a plumbing system or a public sewer system.

(f) Where a container for food, garbage and liquid waste is required, it shall be set on a 6" raised slab 12" larger on all sides of the container. The drain shall be 4" with a required grate with a free area of at least 16 square inches. (This section shall not apply to "H" and "I" Occupancies.)

4605.3 SEWAGE AND LIQUID WASTE DISPOSAL WHERE A PUBLIC SEWER IS AVAILABLE:

(a) Sewage and liquid waste shall discharge into public sewer if such sewer is available and abutting the property except as herein provided. Rainwater only may discharge to street gutters (not over sidewalks) if permitted by the Plumbing Official and Engineering Department.

(b) **LIQUID WASTE DISPOSAL WHERE A PUBLIC SEWER IS AVAILABLE:** Liquid waste may discharge into a public sewer only upon approval of the Engineering Department. Such approval shall accompany request for plumbing plan approval and the permit therefore shall be obtained from the Plumbing Official. If not permitted to discharge into a public sewer, liquid waste may discharge to soakage pits or drainage wells; however, the responsibility for satisfactory operation shall rest upon the owner, and permits shall be issued conditionally with the owner (not the contractor or other person) assuming full responsibility for the maintenance and operation.

NOTE: Some types of liquid wastes cannot be successfully disposed of via pits or wells. Pits and wells receiving liquid wastes from establishments such as automobile wash floors, refrigerators, laundries, milk bottling plants, bars and food processing plants generally result in unsanitary conditions and public nuisance, and therefore must be abated by legal action. Soakage pits and drainage wells for rainwater or other clear water wastes have operated successfully in the majority of installations.

(c) **INTERCEPTING TANKS REQUIRED:** Until such time as the proposed public sewer and sewage treatment system is completed, a septic tank and drainfield shall be installed as required.

4605.4 CONDITIONAL RETENTION AND TIME DISCHARGE TO PUBLIC SEWERS:

(a) Where the Engineering Department determines a public sewer to be overloaded and/or surcharged at times of peak usage, said Department is hereby empowered and authorized to issue a conditional permit for the discharge of sewage or liquid waste to the public sewer system, provided that the owner and designer shall comply with all conditions and requirements set forth in said conditional permit and/or contained in this Code and before a sewer permit is issued, Conditional permits shall provide:

(1) That a retention tank of suitable and acceptable size be provided, designed to hold and retain all of the sewage and liquid waste at times when the public sewer is over-loaded and surcharged and to discharge the contents of said tank at such time as the Engineering Department may require and specify.

(2) That such tank be provided with an automatic time control device designed to limit and regulate the flow from the tank to the public sewer at a time when and in such quantity as within the capacity of the public sewer to care for same.

(3) That the premises be open to inspection at such time and place as the Engineering Department and Plumbing Official may specify, and that the installation be maintained in good and proper working condition.

(4) That upon a violation of any of the provisions herein contained the conditional permit shall be revoked and the sewer connections be removed and plugged by a licensed Master Plumber.

(5) That should such connection not be removed upon proper notice, the Engineering Department be and is hereby authorized to cause a disconnection and assess the cost of same to the owner and/or management of the property.

(6) Any permit issued for connection to a public sewer under any of the conditions set forth in any of the foregoing sections, shall be issued and accepted conditionally.

(b) Such conditional permit shall be issued in writing by the Plumbing Official, and the acceptance of the terms and conditions of issuance shall be indicated thereon by the signature of the person to whom such permit is granted. It is expressly provided however, that in the event of change of ownership and/or occupancy of the property and/or premises for which such permit has been granted then such permit shall become void and of no effect, unless renewed by the Plumbing Official. Upon the change of ownership and/or occupancy the person to

whom a conditional permit is granted shall forthwith surrender such conditional permit to the Plumbing Official for regranting and/or cancellation. (See Table 46-F.)

(c) The volume of liquid waste permitted to discharge into the public sewer system shall be limited to a zone and a lot area bases of 7,500 square feet for a limited volume of liquid waste or sewage as permitted by the Engineering Department.

4605.5 SEWAGE AND LIQUID WASTE DISPOSAL WHERE A PUBLIC SEWER IS NOT AVAILABLE:

(a) Where a public sewer is not available, sewage, all waste from plumbing fixtures, except liquid waste of a non-fecal character, shall discharge into a septic tank or other acceptable method of sewage disposal as hereinafter provided. Liquid wastes of a non-fecal character shall discharge into an approved soakage pit, drainpipe field or bed or drainage well for that purpose only and/or shall be disposed of by a form of treatment acceptable to the Plumbing Official.

(b) Where a permit to connect to a public sewer is refused, or where no public sewer is available, the factors in Table 46-E shall govern and apply in the disposal of liquid wastes from establishments as herein set forth or similar establishments.

(c) **DILUTION TANK REQUIRED FOR CORROSIVE WASTES:** No corrosive waste which has a pH of less than 5.0 shall discharge into any plumbing pipe or any house drain or a house sewer of standard material and construction without first discharging into a neutralizing tank or basin. Every neutralizing tank or basin used for this purpose shall be constructed of earthenware or glass or other non-corrosive material and shall be provided with a standing waste and overflow or other approved means to ensure neutralization. A chamber shall be provided to retain a sufficient quantity of lime or other approved neutralizing material which shall be removed as often as may be necessary to render such neutralization effective. Such neutralizing tank or basin shall be provided with a controlled supply of water or neutralizing medium to make its contents non-injurious to an ordinary plumbing system or to the public sewer system. All pipes and fitting to neutralizing tanks and to a point of approved neutralization in a plumbing system, including the connecting fitting in a main drain or sewer, shall be duriron or equal.

TABLE 46-E

Type of Liquid Waste	Type of Establishment	Method of Disposal
(a) Liquid wastes containing appreciable amounts of grease, oil, solids or other material in suspension or liquid wastes of like character from establishments such as:	Auto Wash Floors	To separate disposal systems for such waste only.
	Bakeries	
	Bottling Plants	
	Candy Manufacturing Plants	
	Dry Cleaning Plants	
	Restaurants or places preparing or serving food	
	Laundries	
	Milk Plants	
(b) Liquid wastes which ordinarily do not contain appreciable amounts of oil, grease, solids or other materials in suspension from establishments as:1	Food Processing Plants	May be discharged to disposal system combined for liquid waste set out in paragraph (b)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

(1) Rainwater to separate disposal system.

(d) INDEPENDENT SYSTEMS: The septic tank and drainage system of each building shall be separate and independent of any other building except that where buildings are built on a single lot or building site of single ownership and it is apparent that the lot cannot be subdivided and result in dual ownership, one septic tank and drainage system may be installed.

(e) LIMITS FOR DISCHARGE OF LIQUID WASTE INTO SEPTIC TANKS AND DRAINAGE PIPES: Liquid waste shall not discharge into an existing septic tank or drainpipe thereof when such septic tanks and drainpipe constitute the minimum requirement of this Code for the disposal of sewage.

(f) DISCHARGE OF SEWAGE OR LIQUID WASTE INTO NATURAL OR ARTIFICIAL BODIES OF WATER: The discharge of any sewage or liquid waste (as herein defined) whether treated or untreated into any body of water natural or artificial is hereby prohibited except as expressly permitted by the Florida Department of Environmental Regulation.

TABLE 46-F
CONDITIONAL PERMIT FOR DISCHARGE OF LIQUID WASTE OR
SEWAGE TO A PUBLIC SEWER SYSTEM

I _____ do hereby certify that I am the legal owner, representative of the owner, lessee, of the _____ located at Lot _____ Block _____ Subdivision _____ In making application for, and accepting a permit for the discharge of sewage and/or liquid waste _____

_____ at the above described premises, it is understood by the undersigned that such permit is a **CONDITIONAL PERMIT** and is issued conditionally and is accepted by the undersigned upon the following condition, viz; that the _____

_____ will be maintained by the undersigned in such manner as to exclude from the public sewer system all milk products, cloth, steam, water over 125 degrees F., vapor, sand, silt, dirt, mud, or other solids, and all greases, oil, gasoline and/or inflammable fluids.

It is further understood and agreed that should this connection be improperly maintained to such an extent as to interfere with the operation of the public sewer, or should the sewer become overloaded, then in that event the undersigned will have the public sewer connection disconnected by a licensed Master Plumber and seal the connection to the public sewer upon a twenty-four hour notice so to do served by the Plumbing Official.

Any change of the legal ownership, representative of the owner, or lessee will invalidate this agreement unless renewed on the part of such new legal owner, representative of the owner or lessee.

Signed _____

Address _____

STATE OF FLORIDA

SS

COUNTY OF

Before me the undersigned authority, personally appeared _____ to me well known, and who being first duly sworn upon oath deposes and says that he is the owner, representative of the owner, lessee, of the above described premises and that he has carefully read the foregoing and that he did sign the same and that all the facts therein by him stated are true.

Read, sworn to and subscribed before me

Signed _____

Notary Public

My commission expires

(g) GARBAGE CONTRIBUTED TO SEWERS FROM DOMESTIC AND COMMERCIAL FOOD GRINDERS: Garbage contributed from domestic and commercial food grinders shall not enter a sewer which conveys same to a sewer treatment plant unless approved by the proper administrative authority.

4605.6 FIXTURE UNITS: VALUES FOR FIXTURES:

(a) Fixture values as given in Table 46-I designate the relative load weight of different kinds of fixtures which shall be employed in estimating the total load carried by a soil or waste pipe and shall be used in connection with the Table of sizes for soil, waste, and drain pipes for which the permissible load is given in terms of fixture units.

**Table 46-I
FIXTURE UNITS PER FIXTURE**

	Fixture Unit Value	Minimum Trap Size
Bathtub (with or without overhead shower)	2	1 1/2
Bidet.....	1	1 1/2
Dental unit or cuspidor	1	1 1/4
Dental lavatory.....	1	1 1/4
Drinking fountain.....	1/2	1 1/4
Dishwasher domestic	2	1 1/2
Floor drains	3	3 or 4
Lavatory Small P.O.....	1	1 1/4
Lavatory Large P.O.....	2	1 1/2
Lavatory, barber, beauty parlor.....	2	1 1/2
Lavatory, surgeon's	2	1 1/2
Laundry tray (1 or 2 compartments).....	2	1 1/2
Shower stall, domestic	2	2
Shower (group) per head.....	3	2

SINKS

Combination sink-and-tray	3 Nominal	1-1/2
Combination sink-and-tray with food disposal unit	3 See 4613.10(b)	1 1/2
Kitchen sink, domestic	2	1 1/2
Kitchen sink, domestic with food waste grinder and/or dishwasher	2 See 4613.10(b)	1 1/2
Surgeon's sink	3	1 1/2
Flushing rim sink (with valve).....	8	3
Service sinks, combination trap standard	3	2 or 3
Service sink (P Trap) ordinary	2	2
Pot, scullery, etc., sink	4	2
Wash sink, (circular or multiple), each set of faucets.....	1	1 1/2
Urinal, pedestal	8 Nominal	3
Urinal, wall	4	2
Urinal stall.....	4	3
Water closet, tank operated.....	4 Nominal	3
Water closet, valve operated.....	8 Nominal	3
Automatic dish washer (domestic)	2	1 1/2
Automatic clothes washer.....	4	2

(b) VALUES FOR CONTINUOUS FLOW: For a continuous or semicontinuous flow into a drainage system, two fixture units shall be allowed for each gpm of flow.

(c) Fixtures not listed in Table 46-I shall be determined in accordance with Table 46-J.

Table 46-J

Fixture Drain or Trap Size	Fixture-Unit Value
1 1/4 inches and smaller.....	1
1 1/2 inches	2
2 inches	3
3 inches	5
4 inches	6

4605.7 DETERMINATION OF SIZES FOR THE DRAINAGE SYSTEM:

(a) **MAXIMUM FIXTURE-UNIT LOAD:** The maximum of fixtures units that may be connected to a given size vertical soil or waste stack is given in Table 46-H.

(b) Sizes and grade of horizontal drainage piping:

(1) Horizontal drainage piping shall be installed at a slope of not less than 1/16 inch per foot.

(2) The size of building drains, building sewers and horizontal branches shall be determined by the fixture units and slopes in accordance with Table 46-G.

(3) Any portion of the sanitary drainage system installed underground shall be not less than 2-inch diameter.

**TABLE 46-G
BUILDING DRAINS, SEWERS AND HORIZONTAL BRANCHES**

Diameter Pipe in Inches.....	Maximum Number of Fixture Units that may be Connected to any Portion of the Building Drain or the Building Sewer		
	Fall per Foot		
	1/16 Inch	1/8 Inch	1/4 Inch
1 1/4	1	1	1
1 1/2	2	4	6
2.....	4	10	21
3(1).....	22	28	36
4(2).....	60	180	216
5.....	150	390	480
6.....	360	700	840
8.....	1,400	1,600	1,920
10.....	2,500	2,900	3,500
12.....	3,900	4,600	5,600
15.....	7,000	8,300	10,000

(1) Not over two fixtures having integral traps requiring three or four inch waste connection.

(2) Size of building sewers shall be a minimum of 4 inches, with the exception that, if connected to a septic tank and if the developed length measured along the pipe and fittings from the exterior of the building wall to the septic tank does not exceed 10 feet, the building sewer may be sized the same as the building drain.

(c) On remodeling and additions to residential buildings where soil and vent lines are 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
SIZE AND PERMITTED LENGTH OF SOIL AND WASTE STACKS**

Maximum Diameter of Pipe in Inches	Total Number of Fixture Units	Permitted Length In Feet	Units at One Story or Branch Interval
1 1/4	1	45	1
1 1/2	8	60	6
2	24	80	12
3	72	150	36
4	500	225	120
5	1,100	300	200
6	1,900	400	350
8	3,600	600	600

(1) An automatic clothes washer shall be considered a pump discharge fixture. It shall be installed on a minimum 2-inch stack with a 2-inch arm and a 2-inch trap with a minimum drop of 24 inches to the crown weir of its trap.

(2) No kitchen sink or other sinks receiving greasy wastes shall be installed in a waste stack less than 2" in diameter except as set forth in Sec. 4613.10(b). No automatic clothes washer shall discharge into a wet vent 2" or less in diameter.

(3) No pumped discharge fixtures shall be installed on a cross less than 3" stack diameter. Domestic dishwashing machines and food grinders shall not be considered as pump discharge fixtures.

4605.8 RESTRICTIONS: No water closet shall discharge into a stack less than three inches in diameter. Not more than two water closets shall discharge into a three-inch stack at the same point. Not more than four water closets shall discharge into a three-inch stack at the same level. All horizontal soil and waste sections shall be governed by Table 46-G.

(a) **MINIMUM SIZE OF SOIL AND WASTE STACKS:**No soil or waste stack shall be smaller than the largest horizontal branch connected thereto except that a 3 x 4 one quarter bend connected to a water closet outlet shall not be considered as a reduction in pipe size.

(b) **FUTURE FIXTURES:** When provision for the future installation of fixtures, those provided for shall be considered in determining the required sizes of drainpipes. Construction to provide for such future installation shall be terminated with an accessible plugged fitting or fittings.

4605.9 SUMPS AND EJECTORS — DRAINAGE BELOW STREET LEVEL:

(a) **SUMPS, SEWAGE AND LIQUID WASTE EJECTORS:**Sewage and liquid waste from any plumbing fixture or appliance installed where the floor level at the fixtures is below the crown of the street shall discharge into a sump or receiving tank by gravity and be lifted and discharged into the building sewer or drain by ejectors. The sump or receiving tank shall be sized to retain a 30-minute peak flow. Pump discharge pipes shall be provided with a check located on the pump side of a gate valve located as close to the pump as possible.

(b) **MINIMUM NUMBER EJECTORS REQUIRED:**Single ejector for one or two family buildings. Duplex ejectors for all other buildings for sumps collecting sewage. (See definition of sewage.) One ejector permitted for liquid waste provided such a single ejector is not located in a place where failure to operate will flood a place where food or drink is store or prepared.

(c) Pumps, when connected to the drainage systems, shall connect to the building sewer or shall connect to a wye fitting in the building drain a minimum of 10 feet from the base of any soil stack, waste stack or fixture drain.

4605.10 SUMP CONSTRUCTION: Sump basins or receivers shall be of waterproof concrete adequately reinforced with steel rods or of cast iron or vitrified clay. If of vitrified clay pipe the bottom shall rest on a concrete base extending at least six inches laterally from the pipe. All basins and receivers shall be watertight.

4605.11 SUMP VENTS:

(a) Plumbing fixtures discharging into a sump shall be vented.

(b) All sumps receiving the discharge from plumbing fixtures shall be vented as follows:

(1) No less than a three inch vent for sumps receiving body waste from plumbing fixtures.

(2) For clear water liquid waste, separate sump vent optional, no cover required.

(3) Vents from pneumatic ejectors or similar equipment shall be carried separately.

(c) Such sump and fixture vents may be connected to the plumbing system discharging into a public sewer or septic tank or extended independently to above the roof.

(d) All sumps shall be provided with a metal cover. (Exception — See (2) or 4605.11(b).) Sumps receiving sewage or liquid waste shall be provided with a gas and air-tight metal cover securely fastened in place and provided with an air and gas tight manhole for access for repairs.

4605.12 MOTORS AND COMPRESSORS FOR EJECTORS:

(a) All motors, air compressors, and air tanks shall be located where they are open for inspection and repair at all times. The air tanks shall be so proportioned as to be of equal cubic capacity to the ejectors connected therewith, in which there shall be maintained an air pressure of not less than two pounds per square inch for each foot of height the sewage is to be raised.

(b) **CONNECTIONS:** No direct connection of a steam exhaust blowoff, or drip pipe shall be made with the building drainage system. Wastewater when discharged into the building drainage system shall be at a temperature not higher than 140 degrees F. When higher temperature exists, proper cooling method shall be provided.

(c) **SUBSOIL DRAINS:** Where subsoil drains are placed under the cellar or basement floor or are used to surround the outer walls of a building, they shall be made of open-jointed or horizontally split or perforated clay tile, not less than four inches in diameter. When the building is subject to backwater, the subsoil drain shall be protected by an accessibly located backwater valve. Subsoil drains may discharge into a properly trapped area drain or sump. Such sumps do not require vents.

(d) **BUILDING SUBDRAINS:** Building subdrains located below the public sewer level shall discharge into a sump or receiving tank the contents of which shall be automatically lifted and discharged into the drainage system as required for building sumps.

4605.13 PRIVATE SEWER SYSTEMS:

(a) Private sewers shall be designed in accordance with Section 4615 and a minimum peak load factor of 2.5 shall be applied. Sizes, minimum slope, construction of manholes and materials shall be in accordance with Section 301.2.

(b) A manhole shall be installed:

(1) Not greater than 300 feet apart and at the end of each private sewer.

(2) At every change of grade, size or alignment.

(3) At the connection with a building sewer only where such building sewer is larger than the private sewer and

(4) At the connection with a public sewer.

(c) Drainage drawings, specifications and calculations shall be prepared by and bear the impressed seal of a Professional Engineer and shall be in accordance with good engineering practice. Upon completion of the private sewer, the design engineer shall submit as-built drawings to the Plumbing Official with a letter stating that the work has been accepted as complying with the South Florida Building Code.

4606 INDIRECT WASTE PIPING AND SPECIAL WASTES

4606.1 INDIRECT WASTE PIPING:

(a) **GENERAL:** Wastes from the following shall discharge, to the building drainage system, through an indirect waste pipe serving the individual fixtures, devices, appliances or apparatus.

(b) FOOD HANDLING: Establishments engaged in the storage, preparation, selling, serving, processing, or otherwise handling of food shall have the waste piping from all preparation sinks, dishwashers, ice machines, refrigerators, ice boxes, bar sinks, cooling of refrigerating coils, laundry washers, extractors, steam tables, egg boilers, coffee urns or similar equipment discharge indirectly into a floor drain or as otherwise provided in this Code.

(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 materials 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 Official. Air/Conditioning condensate drains shall be as set forth in Subsection 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.

(g) STRAINERS AND BASKETS: Every indirect waste receptor which could receive solids ½ inch or larger in diameter shall be equipped with a basket or other device which shall prevent passage of such solids into the drainage system. The basket or device shall be removable for cleaning purposes.

(h) SPLASHING: All plumbing receptors receiving the discharge of indirect waste pipes shall be of such shape and capacity as to prevent splashing or flooding. No plumbing fixture which is used for domestic or culinary purposes shall be used to receive the discharge of an indirect waste pipe.

(i) The maximum length of the indirect waste to vent shall not exceed 25 feet.

(j) The condensate or waste from an air conditioning unit shall be classified as a plumbing fixture only if connected to the plumbing sanitary system.

4606.2 MATERIAL AND SIZE:

(a) (1) Indirect waste when installed above the floor, shall be a minimum of three-quarters inch diameter, but not less than the size of the fixture or appliance outlets and shall be cast-iron, galvanized, lead, brass, copper or plastic pipe with drainage fittings.

(2) Indirect waste below a floor shall be a minimum of 2 inches with drainage fittings.

(3) Indirect waste pipes carrying the discharge of more than one fixture unit shall be sized in accordance with Table 46-I and 46-G.

(b) (1) Drip pipes from walk-in refrigerator floors or store-room floors where perishable food is stored shall be installed as indirect wastes and such drip pipes shall discharge into an approved fixture.

(2) Such drip piping shall be equipped with a flap check as close as possible to the drain outlet.

(3) Such floors shall be two inches above overflow point or receiving fixture.

(c) Any fixture or appliance installed where perishable food or drink is stored, and which is equipped with a drain, shall be independently and indirectly connected to an approved fixture or receptacle with overflow level below the bottom of such fixture or appliance.

(d)(1) Walk-in cooler floors, where perishable food is stored, shall be a minimum of 2 inches above the surrounding floor. If a ramp is provided on the interior, it shall be so designed to meet industry standards.

(2) For the purpose of this section a walk-in cooler shall be defined as a prefabricated or built-on-site cooler, which has a maximum area of one thousand square feet.

4606.3 CLEAR WATER WASTES: Water lifts, expansion tanks, cooling jackets, sprinkler systems, drip and overflow pans, or similar devices which waste clear water only, shall discharge into the building drainage system through an indirect waste.

4606.4 CONDENSERS AND SUMPS: No live steam pipe shall connect directly to any part of a drainage or plumbing system.

4606.5 DRINKING FOUNTAINS: Drinking fountains may be installed with indirect wastes only for the purpose of resealing required traps of floor drains installed to receive other clear wastes.

4606.6 SPECIAL WASTES:

(a) Acid and chemical indirect waste pipes and fittings shall be of materials unaffected by the discharge of such wastes.

(b) Liquid wastes having a pH of less than 5 or more than 10 shall be properly neutralized and diluted before being discharged into any soil or waste pipe or any building drain or sewer.

(c) **NEUTRALIZING DEVICE:** In no case shall corrosive liquids, spent acids, or other harmful chemicals which might destroy or injure a drain, sewer, soil or waste pipe and fittings or which might create noxious or toxic fumes, discharge into the plumbing systems without being thoroughly diluted or neutralized by passing through a properly constructed and acceptable dilution or neutralizing device. Such device shall be automatically provided with a sufficient intake of diluting water or neutralizing medium, so as to make its contents noninjurious before being discharged into the soil or sewage system.

4606.7 AIR CONDITIONING CONDENSATE DRAINS:

(a) Condensate drains shall be a minimum of ¾ inch diameter for one unit or any number of connected units totaling not over 10 tons of refrigeration capacity.

(b) Air conditioning condensate drains shall be a minimum of 1¼ inch diameter for one unit or any number of connected units totaling over 10 tons of refrigeration capacity.

(c) Connections to the unit drain pans may be either flexible connections or rigid piping and shall be provided with a minimum two-inch trap seal. Flexible connections used to form a trap shall not exceed 18 inches in length. On units larger than 3 tons, a minimum three-inch trap seal and a union installed on the pan side of trap shall be provided.

(d) Condensate drainage systems serving more than one air handler shall be vented.

(1) Risers for condensate drainage collection systems may terminate a minimum of 12 inches above the topmost drain pan and have a perforated cap. Termination of vents shall be accessible and vents shall not terminate in a return plenum or supply plenum.

(e) Air conditioning condensate drains for units with not more than 5 tons capacity may discharge upon a pervious area. Units with not more than ten tons capacity may discharge to a 10-inch diameter by 24-inch long pipe without cover, filled with ¾-inch crushed rock.

(f) (1) Air conditioning condensate drains for units regardless of tonnage may discharge to a drainage well, storm sewers, adequate soakage pit, drainfield or the building drainage systems except where such discharge is specifically prohibited by the Administrative Authority.

(2) Connections to storm or building drains shall be by indirect connections.

(3) Condensate drains will be independent of a storm drain system within a building.

(g) The materials to be used in condensate drains for air-conditioning equipment shall comply with the minimum Standards set forth in Table 46-C.

(h) Installation of PVC pipe under concrete floor slabs on fill shall be as follows:

(1) The top of the pipe shall be a minimum of 2 inches below the bottom of the slab.

(2) All piping under slab areas shall be installed after fill and compaction is completed. All pipe shall be laid on a firm base for its entire length and backfilled with 2 inches of sand.

4607 JOINTS AND CONNECTIONS

4607.1 TIGHTNESS: Joints and connections in the plumbing system shall be gas-tight and water-tight for the pressure required by test, or use, with the exceptions of those portions of perforated or open-joint piping which are installed for the purpose of collecting and conveying underground or seepage water.

4607.2 TYPES OF JOINTS:

(a) CAST IRON PIPE JOINTS:

(1) CAULKED JOINTS: Caulked joints for cast-iron bell-and-spigot soil pipe shall be firmly packed with oakum or hemp and filled with molten lead not less than one inch deep and shall extend up to not less than one eighth inch below rim of hub. No paint, varnish, or other coatings shall be permitted on the jointing material until after the joint has been tested and approved.

(2) HUBLESS JOINTS: Joints for hubless cast iron soil pipe and fittings and all parts of the clamp assembly used in joining a hubless cast iron sanitary system for soil, waste, vent and house or building sewer lines shall comply with the mechanical and dimensional requirements of the Cast Iron Soil Pipe Institute's Standard 310-95.

(3) COMPRESSION-TYPE GASKET JOINTS: Neoprene rubber gaskets for hub and spigot cast-iron soil pipe and fittings shall conform to the Standard specification for Rubber Gaskets for Cast-Iron Soil Pipe and Fittings, ASTM C564, and the Standard Neoprene Rubber Gaskets for Hub and Spigot Cast-Iron Soil Pipe and Fittings, CISPI HSN, as set forth in Section 402.

(b) PLASTIC PIPE JOINTS:

(1) Plastic pipe and fittings shall be solvent-welded using procedures recommended by the manufacturer and/or Plastic Pipe Institute.

(2) Solvent cement shall be manufactured under the specifications set forth in the Standard for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings, ASTM D2235, or Solvent Cement for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings, ASTM D2564, as set forth in Section 402, and further bearing the seal of approval of the National Sanitation Foundation (NSF herein).

(3) No Schedule 40 pipe shall be threaded on the job site.

(4) All such transitions shall be with approved adapter fittings.

(5) Connections between plastic pipe and other materials shall be through approved adapter fittings only.

(6) The co-mingling of ABS and PVC plastic pipe or fittings with solvent weld joints shall not be permitted.

(c) THREADED JOINTS — SCREWED JOINTS:

(1) Threaded joints shall conform to the Standards, ANSI B2.1, or GAS GGG-P-351a, as set forth in Section 402.

(2) All burrs shall be removed.

(3) Pipe ends shall be reamed or filed out to the size of bore and all chips removed.

(4) Pipe-joint cement and paint shall be used only on male threads.

(d) WIPED JOINTS: Joints in lead pipe or fittings, or between lead pipe or fittings and brass or copper pipe, ferrules, solder nipples, or traps, shall be full wiped joints. Wiped joints shall have an exposed surface on each side of a joint not less than $\frac{3}{4}$ inch and at least as thick as the material being jointed. Wall or floor flange lead-wiped joints shall be made by using a lead ring or flange placed behind the joints at wall or floor. Joints between lead pipe and cast-iron steel, or wrought iron shall be made by means of a caulking ferrule, soldering nipple, or bushing. Minimum lengths of lead from wiped joint to fixture connection shall be four inches.

(e) SOLDERED OR SWEAT TYPE JOINTS: Soldered or sweat type joints for tubing shall be made with approved fittings. Surfaces to be soldered shall be cleaned bright. The joints shall be properly fluxed and made with approved solder in accordance with 4604.1(c) and Table 46-C. Screwed joints from copper to cast iron or steel pipe shall be made by the use of approved adapters. Caulk joints between DWV copper and cast iron pipe shall be made with the use of an approved caulking adapter.

(f) HOT-POURED JOINTS: Hot-poured compound for concrete sewer pipe shall not be water absorbent and when poured against a dry surface shall have a bond of not less than 100 psi. All surfaces of the joint shall be cleaned and dried before pouring. If wet surfaces are unavoidable, a suitable primer shall be applied. Compound shall not soften sufficiently to destroy the effectiveness of the joint when subjected to a temperature of 160 degrees F. nor be soluble in any of the waste carried by the drainage system. Approximately 25 percent of the joint space at the base of the socket shall be filled with jute or hemp. A pouring collar, rope or other device

shall be used to hold the hot compound during pouring. Each joint shall be poured in one operation until the joint is filled. Joints shall not be tested until one hour after pouring.

(g) COMPRESSION-TYPE JOINTS FOR NON-METALLIC PIPE: Neoprene rubber gaskets for vitrified-clay bell-and-spigot pipe shall conform to the Standard Specification for Compression Joints for Vitrified Clay Bell and Spigot Pipe, ASTM C425, as set forth in Section 402.

(h) BRAZED JOINTS: Brazed joints shall be made in accordance with the provisions of Section 6 of the Code for Power Piping, ANSI B31.1 and the National Fuel Gas Code, ANSI Z223.1, as set forth in Section 402 of this Code.

(i) CEMENT MORTAR JOINTS: Cement joints shall be used only when specifically permitted in other chapters of this Code or when approved by the Plumbing Official, as sufficient to accomplish the purpose of this Code. A layer of jute or hemp shall be inserted into the base of the joint space and rammed to prevent mortar from entering the interior of the pipe. Jute or hemp shall be dipped into a slurry suspension of Portland cement in water prior to insertion into bell. Not more than 25 percent of the joint space shall be used for jute or hemp. The remaining space shall be filled in one continuous operation with a thoroughly mixed mortar composed of one part cement and two parts sand, with only sufficient water to make the mixture workable by hand. After one-half hour of setting, the joint shall be rammed around entire periphery with a blunt tool to force the partially stiffened mortar into the joint and to repair any cracks formed during the initial setting period. Pipe interior shall be swabbed to remove any material that might have fallen into the interior. Additional mortar of the same composition shall then be troweled so as to form a 45-degree taper with the barrel of the pipe.

(j) BURNED LEAD JOINTS: Burned (welded) lead joints shall be lapped and the lead shall be fused together to form a uniform weld at least as thick as the lead being joined.

4607.3 SPECIAL JOINTS:

(a) COPPER TUBING TO SCREWED PIPE JOINTS: Joints from copper tubing to threaded pipe or threaded connection shall be made by the use of brass or copper converter fittings. The joint between the copper pipe and the fittings shall be properly soldered, and the connection between the threaded pipe and the fitting shall be made with a standard pipe size screw joint. See Paragraph 4607.2(d).

(b) WELDING OR BRAZING: Brazing or welding shall be performed in accordance with requirements of recognized published standards of practice.

(c) SLIP JOINTS: In drainage systems, slip joints may be used only on the inlet side of the trap or in the trap seal. In water piping, only one slip joint connection shall be allowed on each exposed supply to a fixture.

(d) EXPANSION JOINTS: Mechanical type expansion joints permitting adjustment shall be accessible for replacement.

(e) GROUND JOINT BRASS CONNECTIONS: Ground joint brass connections which allow adjustments of tubing but provide a rigid joint when made up shall not be considered as slip joints.

4607.4 UNIONS (SCREWED):

(a) DRAINAGE SYSTEM: Unions may be used in the trap seal and on the inlet side of the trap. Unions shall have metal-to-metal seats.

(b) WATER SUPPLY SYSTEM: Unions in the water-supply system shall be metal-to-metal with ground seats.

4607.5 PROHIBITED JOINTS AND CONNECTIONS IN DRAINAGE SYSTEMS:

(a) Any fitting or connection which has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area, that offers an obstruction to flow through the drain, is prohibited.

(b) EXCEPTIONS: Floor or urinal strainers may be caulked. A directional fitting may be used to connect a domestic food-waste disposal unit in a two-compartment sink as set forth in Paragraph 4613.10(b).

(c) The drilling and tapping of drains, sewers, soil leaders, waste or vent pipes and the use of saddle hubs and bends is prohibited.

4607.6 INCREASERS AND REDUCERS: Where different sizes of pipes, or pipes and fittings are to be connected, the proper size increasers or reducers or reducing fittings shall be used between the two sizes.

4608 TRAPS AND CLEANOUTS

4608.1 TRAPS:

(a) FIXTURE TRAPS:

(1) Plumbing fixtures, excepting those having integral traps, shall be separately trapped by a waterseal trap. (See Section 4606 indirect wastes.)

(2) The vertical drop of a pipe serving a floor-connected integral trap fixture shall not exceed twenty-four inches.

(3) Floor drains requiring a vertical drop greater than twenty-four (24) 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 twenty-four (24) inches measured vertically from the bottom of the fixture to the top of trap seal.

(5) No offsets shall be permitted for the purpose of avoiding the requirements of Table 46-K.

(b) **HORIZONTAL DISTANCE OF FIXTURE TRAP FROM VENT:** The horizontal distance of a fixture trap to a vent shall not exceed that set forth in Table 46-K. The distance shall be measured along the center of the fixture branch from the crown weir of the trap to the vent opening except for fixtures with integral traps in which case the horizontal distance shall be measured from the vent to the downstream edge of the vertical section of the fixture outlet branch.

**TABLE 46-K
HORIZONTAL DISTANCE OF FIXTURE TRAP FROM VENT OPENING**

Size of Fixture Branch	Size of Trap	Fall per foot	Distance from Trap
1 1/4"	1 1/4"	1/4"	5'
1 1/2"	1 1/2"	1/4"	5'
2"	1 1/2" or 2"	1/4"	8'
3"	3"	1/4"	8'
Floor connected fixtures with integral traps			5'
Floor drains and interceptors			15'
Island or loop vents			15'

The number of quarter bends in a fixture arm shall not exceed two, not counting the fixture tee entering the stack.

(c) **TRAPS PROTECTED:** Every fixture trap shall be protected against siphonage and back pressure; and air circulation shall be assured by means of a soil vent, waste vent, stack vent, a common vent, loop, circuit or wet vent. No crown vent shall be installed.

(d) **RELATION TO FIXTURE DRAINS:** No trap outlet shall be larger than the fixture branch to which it is connected.

(e) **TYPE OF TRAPS:** Fixture traps shall be self-cleaning, except interceptor traps.

(f) TRAPS PROHIBITED:

(1) No form of trap which depends for its seal upon the action of moveable parts shall be used.

(2) No bell trap, 3/4 S trap, drum trap, pot trap, running trap, or bottle trap shall be used.

(g) **TRAP SEAL:** Each fixture trap shall have a water seal of not less than two inches and not more than four inches, except when deeper seals are required for interceptors.

(h) **TRAP CLEANOUTS:** Trap cleanouts are prohibited on all concealed traps.

(i) **TRAP LEVEL AND PROTECTION:** All traps shall be set level in relation to their water seals and protected from siphonage.

(j) TRAP MATERIAL:

(1) Traps in covered and concealed places shall be of cast iron, cast brass, copper, or may be a solvent weld plastic trap.

(2) All exposed traps 2" and smaller except tubs, showers, and washing machines shall be of the swivel type with two collars. EXCEPTION: Unless provided with cleanout in trap.

(3) Accessible traps, except integral traps, including tail pieces, trap arms, overflow and trap assembly, shall be of cast iron, cast brass, 20 gage brass, copper, or may be plastic.

4608.2 CLEANOUTS:

(a) REQUIRED: A cleanout shall be required at the base of each soil and waste stack excluding interior rainwater leaders.

(1) Every building drain and branch drain and building sewer shall have an accessible cleanout every 75 feet.

(2) Required cleanouts shall be located in a basement or flush with finish floor or outside of building and brought to finish grade or in a vertical stack not more than five feet above finish floor.

(3) No cleanout will be required in the base of a stack rising vertically from a horizontal building drain provided the building drain cleanout is upstream from the vertical stack connection.

(4) All cleanouts shall be accessibly located and have 18 inches clearance to permit upstream and/or downstream rodding.

(5) Wall cleanouts shall be flush with or protrude beyond finished walls or made accessible through an access door or panel.

(6) Floor cleanouts shall be flush with finished floor and equipped with flush type plugs.

(7) In lieu of a cleanout at the base of a stack or in the vertical section of the stack, the cleanout may be extended from the upstream side of the stack base to the finished floor level, or to the outside of the building and brought to finish grade level, or the outside of the building into a pit or box with cover brought to finish grade.

(8) The base of a stack shall be deemed to mean the lowest point of any vertical soil or waste stack inclusive of horizontal sections in such vertical stacks.

(9) Cleanouts shall be the same nominal size as the pipe into which they are installed up to six inches and not less than six inches for larger pipe.

(10) A cleanout shall be required on the horizontal discharge from all interceptors to provide upstream and/or downstream rodding.

(11) A cleanout fitting shall be provided in the horizontal arm section of grease interceptors within a building.

(12) Test fittings shall be placed at property line with suitable cleanout fittings. Such cleanout need not be brought to grade unless required by the Public Works Department of the municipality having jurisdiction.

(13) Cleanouts installed in vehicular traffic paved areas shall be protected from breakage by use of cleanout box with metal lid (valve box).

(14) A full size cleanout shall be required in or at the base of all stacks receiving the waste from a kitchen sink or washing machine.

(15) Each building drain shall be provided with a cleanout near the junction of the building drain and building sewer, and shall be sized the same size as the building sewer.

4608.3 EXCEPTIONS: In single family residential unattached homes:

(a) A full size cleanout shall be required in or at the base of all stacks receiving the waste from a kitchen sink or washing machine. Such cleanouts shall be accessible from the outside of the building if the stack is in an outside wall.

(b) Minimum vent size to be 2 inches in "I" Occupancy when such vent penetrates the roof.

(c) Stack offsets, if necessary, may be made with 45-degree elbows. (If 90-degree elbows are used, a cleanout must be at the base of the stack.)

(d) All cleanouts shall be brought to, or above, grade except as provided in Section 4608.2(a)(12).

(e) Interior vents stacks for powder or bathrooms not adjacent to outside walls shall not require cleanouts.

(f) Bath and toilet rooms with an exterior wall shall have a cleanout in the extended waste line, stack, or installed as per Section 4608.2(a)(7), cleanout to be 2" minimum.

4609 HANGERS AND SUPPORTS

4609.1 STRAINS AND STRESSES:

(a) Piping in a plumbing system shall be installed without undue strain and stresses and provisions shall be made for expansion, contraction and structural settlement.

(b) All suspended soil, waste, and vent piping shall be supported, hung, or suspended with "clevis type" metal hangers, and a minimum of 3/8" metal rods or other approved hangers and rods. Perforated metal strap, wire and similar materials shall not be used in lieu of an approved hanger. All underground installations to have said hangers coated with a mastic paint and installed in accordance with the requirements of Section 4609. On all above the slab installations where it is necessary to support, hang, or suspend soil waste and vent piping, "clevis type" or other approved metal type hangers shall be required with steel rods. All structures on piling with structural floor slab shall have slab hangers for piping support; slabs supported on fill shall not have hangers.

4609.2 VERTICAL PIPING:

(a) **ATTACHMENT:** Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.

(b) **CAST-IRON SOIL PIPE:** Cast Iron soil pipe shall be supported at the base and at each story level at intervals not exceeding 15 feet.

(c) **SCREWED PIPE COLD:** Screwed pipe I.P.S. shall be supported at not less than every other story height with maximum 30-foot intervals.

(d) **SCREWED PIPE HOT:** Screwed pipe (I.P.S.) shall be properly supported to provide for expansion.

(e) **COPPER TUBING:** Cold copper tubing shall be supported at each story.

(f) **COPPER TUBING:** Hot copper tubing shall be properly supported to provide for expansion.

(g) **PLASTIC PIPE:** Plastic piping shall be supported at each story for piping 2 inches and larger and not more than mid-story intervals for piping 1-1/2 inches or under.

4609.3 HORIZONTAL PIPING:

(a) **SUPPORTS:** Horizontal piping shall be supported at sufficiently close intervals to keep it in alignment and prevent sagging.

(b) **CAST-IRON SOIL PIPE:** Cast-iron soil pipe shall be supported at not more than five-foot intervals; except that pipe exceeding five feet in length, may be supported at not more than ten-foot intervals. Supports shall be placed within eighteen inches of the hub or joint. Hubless or compression gasket joints must be supported at least at every other joint except that when the developed length between supports exceeds four feet, they shall be provided at each joint. Supports shall be placed on or immediately adjacent to the coupling. Suspended lines shall be suitably braced to prevent horizontal movement.

(c) **SCREWED PIPE:** Screwed pipe (I.P.S.) shall be supported at approximately 10-foot intervals.

(d) **COPPER TUBING:** Copper tubing shall be supported at approximately 8-foot intervals.

(e) **IN GROUND:** Piping in the ground shall be laid on a firm bed for the entire length, except where support is otherwise provided which is adequate in the judgement of the Plumbing Official.

(f) **PLASTIC PIPE:**

(1) DWV Plastic Pipe shall be supported at intervals of not more than four (4) feet.

(2) Water distribution and process pipe shall be installed according to manufacturer's recommendations.

4609.4 HANGERS AND ANCHORS:

(a) **MATERIAL:** Hangers and anchors shall be metal of sufficient strength or other approved materials to support the pipe and contents in proper alignment and to prevent rattling.

(b) **ATTACHMENT:** Hangers and anchors shall be securely attached to the building construction.

4609.5 BASES OF STACKS:

(a) **SUPPORTS:** Bases of cast-iron soil stack shall be supported on masonry construction, metal brackets attached to the building construction, or by other methods approved by the Plumbing Official.

(b) **PIPING MATERIAL:** Other piping materials shall be so anchored as to take the load off the stack at the base.

4610 VENTS AND VENTING SYSTEMS

4610.1 VENT TERMINALS:

(a) Extensions of vent pipes through a roof shall be terminated at least six inches above the finished roofing excluding base flashing, but not less than 4" above the invert of the emergency overflow.

(b) Vent stacks on the exterior walls of a structure with parapet walls shall extend six inches above same. Vent extensions above the roof shall not exceed ten feet and be securely fastened to prevent wind damage. Where roofs are used for sun decks, solariums or similar purposes, all vents shall extend not less than seven feet above the deck.

(c) **FLAG POLING:** Vent terminals shall not be used for the purpose of flag poling, TV aerials, or similar purposes.

(d) ROOF TERMINAL:

(1) The roof terminal of any vent pipe if within 10 feet of any door, window or exhaust opening shall extend not less than three feet above such door, window or exhaust opening.

(2) The vent terminal of a sanitary system of a building shall not be located less than 10 feet developed distance from any mechanical air intake opening.

EXCEPTION: Vent to exhaust separations as stated above shall not apply if all three of the following conditions exist:

1. The vent opening is not within three feet (3') of the roof terminal of any exhaust.
2. The vent system serves only a single family residential use, (i.e. Condominium, Apartment Building, Townhouse, Duplex or Single-Family Residence.)
3. The roof terminal of the vent pipes and exhaust openings are through a sloped roof (2-1/2 in 12 or greater.)

4610.2 VENT GRADES AND CONNECTIONS:

(a) **GRADE:** All vent and branch-vent pipes shall be so graded and connected as to drain dry.

(b) **VERTICAL RISE:** Where dry vent pipes connect to a horizontal soil or waste pipe, the vent shall be taken off above the center line of the soil pipe, and the vent pipe shall rise vertically, or at an angle not more than 45 degrees from the vertical to a point at least six inches above the flood level rim of the fixture it is venting before offsetting horizontally or before connecting to the branch vent. **EXCEPTION:** Island vent and air admittance valve vent terminals.

(c) **HEIGHT ABOVE FIXTURES:** A connection between a vent pipe and vent stack or stack-vent shall be made at least six inches above the floor-level rim of the highest fixture served by the vent.

4610.3 VENTS: Where fixtures are located directly adjacent to one another and connect to a vertical stack at the same level, the fixture trap may be served by a common vent.

4610.4 WET VENTING:

(a) Horizontal wet vents shall not exceed 15 feet and shall receive discharge from fixture branches only. (See Paragraph 4610.4(c).)

(b) Vertical wet vents connecting to a horizontal wet vent shall not exceed six feet and shall receive discharge from fixture branches only. (EXCEPTION: See Combination Waste and Vent Sub-section 4610.10.)

(c) The minimum size and the maximum capacity of wet vents shall be as follows:

(1) **2" VENT:** Six-fixture units other than urinals, pressure fixtures, kitchen sinks, service sinks, or medical type sinks with plaster trap, except as set forth in Sec. 4613.10(b).

(2) **3" VENT:** 16-fixture units. No water closets or other fixtures having an opening greater than 3 inches.

(3) **4" VENT:** 32-fixture units. No water closets or other fixtures having an opening greater than 4 inches.

(d) Two water closets on a horizontal section may be vented by a wet or dry vent taken off between the two water closets, providing the vent intersection is within five feet horizontal developed length from each water closet vertical outlet, and all fixtures are on same story level.

(e) Wet vents shall not be reduced in size.

4610.5 CIRCUIT OR LOOP VENT:

(a) **GENERAL:**

(1) A series of adjacent fixtures may be installed on a horizontal drain.

(2) A vent shall be installed vertically within five feet downstream from the first fixture branches, and another vent installed vertically between the last two water-supplied fixture branches connected to the horizontal drain section provided all fixtures are located in the same or adjacent toilet rooms at the same level.

(3) Branch drains not exceeding 15 feet in length and receiving the discharge of fixtures, other than water closets and pedestal urinals located in the same or adjacent toilet rooms may connect to the horizontal section of a loop or circuit vent.

(4) A branch may be taken off the upstream side of a battery provided the horizontal section remains full size to the highest fixture branch and not to exceed 15 feet in length.

(5) Fixtures other than water closets, having a fixture unit rating of four or less and a maximum 2 inch discharge line may connect to the vertical vent portion of a circuit or loop vent systems.

(b) **SIZE OF CIRCUIT OR LOOP VENT:** The pipe of the dry vent section of a circuit or loop vent may have a diameter of one pipe size less than the diameter of the pipe of the horizontal soil or waste drain it serves.

TABLE 46-L

Size of Pipe	Number of Traps	Size of Dry Vent Pipe
2"	Six 1¼" traps or four 1½" traps other than sink traps. No urinal traps allowed	1-1/2 "
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 or vent piping.	3"

4610.6 CABANA SHOWERS: Multiple cabana showers may be installed on a circuit or loop vented branch and not limited as to distance from fixture branches, provided that all cabana shower drains, where appreciable quantity of sand washing into the shower drain is a possibility, shall waste through an approved sand interceptor before entering the sewer, drainage or disposal system.

4610.7 FIXTURES WASHED BY WATER CLOSETS: Fixture branches installed downstream from a water closet in a circuit or loop vent group shall be minimum three (3) inches.

4610.8 MAIN VENTS TO CONNECT AT BASE:

(a) All main vents or vent stacks shall connect full size at their base to the main soil or waste stack, at or below the lowest fixture branch of such waste stack. Such base shall be washed by a fixture or group of fixtures. The diameter of the vent pipe shall not exceed the diameter of the soil or waste stack to which it connects.

(b) **SIZE ON INDIVIDUAL VENTS:** The diameter of an individual vent shall be not less than 1¼ inches not less than one-half the diameter of the drain to which it is connected. No vent for a water closet shall be less than two inches in diameter. (See Sub-section 4612 for interceptor vents.)

(c) **SIZE OF VENT PIPING:** The nominal size of vent piping shall be determined from its developed length and the total of fixture units connected thereto as provided in Table 46-M.

4610.9 SOIL WASTE AND VENT STACKS:

(a) For each building having a single building sewer receiving the discharge of a water closet there shall be at least one minimum size vent stack, extending above the building roof no less than three or four inches in diameter or of a larger diameter as set out in Table 46-M.

(1) Main vent stack size for buildings having multiple building sewers. Buildings having more than one building sewer, each building sewer receiving the discharge of a water closet shall have at least one minimum size vent stack, no less than three or four inches in diameter or of a larger diameter extending above the building roof as set out in Table 46-M.

(2) Vent stacks for accessory buildings. For accessory buildings on a lot or building site connected by a common building sewer, the minimum size for a vent stack shall be as provided for in Table 46-M. If a water closet is installed in accessory building the minimum size vent shall be two inches.

**TABLE 46-M
SIZE AND LENGTH OF VENT PIPING**

Diameter of Soil or Waste Stack	Maximum Fixture Units	Size and Maximum Length of Vent (Feet)							
		1¼	1½	2	3	4	5	6	8
1 ¼	1	70							
1 ½	4	70	190						
1 ½	6	50	175						
2	8	50	150	400					
2	12	45	75	300					
2	24	20	50	200					
3	12	—	30	100	1200				
3	36	—	—	50	800				
3	72	—	—	40	400				
4	100	—	—	35	300	1200			
4	200	—	—	30	240	900			
4	500	—	—	20	100	450			
5	200	—	—	—	80	450	1300		
5	500	—	—	—	70	300	1000		
5	1100	—	—	—	45	180	600		
6	350	—	—	—	50	200	600	1300	
6	620	—	—	—	30	150	400	1100	
6	960	—	—	—	25	100	300	1100	
6	1900	—	—	—	15	80	250	700	
8	600	—	—	—	—	80	200	500	1300
8	1400	—	—	—	—	50	100	400	1200
8	2200	—	—	—	—	40	80	350	1100
8	3600	—	—	—	—	30	60	250	800

(b) All soil, waste and vent stacks serving fixtures for more than one floor shall extend full size above the roof, or shall be connected to a vent stack of the same diameter or larger. In buildings three or more stories in height, vents through the roof shall equal or exceed the free square inch area of the building drain at the point of collection.

4610.10 COMBINATION WASTE AND VENT:

(a) Fixture branches other than water closets or fixtures requiring a flushometer valve on the water supply with a waste opening not greater than two inches (other than floor drains) shall be permitted and may be installed on a combined waste and vent stack as follows: Such branches will be allowed to discharge into a waste stack extended undiminished in size through the roof according to the following table provided that the waste stack portion is vertical throughout, and that no kitchen sinks be placed on a two-inch combined waste and vent stack. The stack vent portion of a combination waste and vent shall be installed in accordance with sections 4610.2 and 4610.9(b).

Table 46-N

Diameter of Stack	Fixture Units On Stack	Maximum Length
2 inch (No kitchen sinks)	4.....	30 feet
3 inch.....	16.....	50 feet
4 inch.....	32.....	100 feet
5 inch.....	50.....	200 feet
6 inch.....	80.....	300 feet

(b) For drinking fountains and fountain cuspidors, the fixture units may be increased ten times and the permitted length increased two times above those specified.

(c) **(1) ISLAND VENT:** Island venting shall be permitted only when installation by through the roof method is not possible.

(2) The branch of an island vent shall not exceed 15 feet from a vented line.

(3) The minimum size of an island vent shall be three inches except for the fixture arms which shall be a minimum of one and one-half inches and the loop vent which shall be a minimum of two inches.

(4) Both the dry and wet riser shall have full size clean-outs. The wet riser clean-out to be located below the fixture arm(s).

(5) The dry side of the island vent shall connect vertically to the horizontal drain.

4610.11 RELIEF VENTS-STACKS OF MORE THAN 10 BRANCH INTERVALS:

Soil and waste stacks in buildings having more than ten branch intervals shall be provided a relief vent at each tenth interval installed, beginning with the top floor. The size of the relief vent shall be equal to the size of the vent stack to which it connects. The lower end of each relief vent shall connect to the soil or waste stack through a wye below the horizontal branch serving the floor and the upper end shall connect to the vent stack through a wye not less than 3 feet above the floor.

4610.12 AIR ADMITTANCE VALVES

(a) Air admittance valves shall conform to ASSE 1051 and NSF 14.

(1) Air admittance valves shall be permitted to be installed in lieu of branch, common, individual, loop or circuit and/or wet vent terminals. The air admittance valve shall be permitted as an alternate which replaces the extension of such a vent to a soil or waste vent, or outdoors to the open air.

2) There shall be at least one vent stack which extends outdoors to the air in accordance with Subsection 4610.9 for each building sewer.

(b) The air admittance valve shall be installed a minimum of 4 inches above the fixture branch that it vents.

1) The air admittance valve shall be located within the maximum developed length permitted for the vent.

2) The air admittance valve shall be installed a minimum of 6 inches above insulation materials.

(3) All air admittance valves shall be accessible for inspection and/or replacement.

(4) The valve shall be located within a ventilated space that allows air to enter the valve.

(c) Air admittance valves shall be installed after the DWV test requirements, prescribed in Section 4601.6 have been performed.

(d) The air admittance valve shall be rated for the size of the vent to which it is connected.

(e) The air admittance valve shall only vent fixtures that are located on the same story level and connect to a horizontal branch drain. The horizontal branch drain shall conform to (1) or (2) below.

(1) LOCATION OF BRANCH The horizontal branch drain shall connect to the drainage stack or building drain a maximum of four branch intervals from the top of the stack.

(2) RELIEF VENT: The horizontal branch drain shall be provided with a relief vent, which shall connect to a vent stack or stack vent, or extend outdoors to the open air. The relief vent shall connect to the hori-

zontal branch drain between the stack or building drain and the most downstream fixture drain connected to the horizontal branch.

- (f) Air admittance valves shall not be installed as a component in Special Waste Systems.
- (g) Air admittance valves shall not be used as relief vents or to vent sewage ejectors or sumps.
- (h) Air admittance valves shall not be located within spaces used as supply or return air plenums.

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) Into a drainage well, if approved by the Broward County Department of Natural Resource Protection.
 - (2) Upon pervious ground (see Sub-paragraph 4611.7).
 - (3) Into a soakage pit (see Sub-section 4611.6).
 - (4) To a street gutter only if first approved by the Engineering Department.
 - (5) To a storm sewer or a storm sewer catch basin where permitted by the Engineering Department.

4611.2 ROOF DRAINAGE:

(a) Storm sewers, drains, gutters and leaders for conveying rainwater from a roof shall be of not less size than set forth in Table 46-O.

TABLE 46-O

Nominal Building Pipe Size (Inches)	Maximum Roof Area (Square Feet)			Gutters	Leaders
	Storm Sewers and Drains				
	1/8" per foot Slope	1/4" per foot Slope	1/2" per foot Slope		
1-1/2	127	190	222		222
2	270	380	460		460
3	745	1,080	1,270	635	1,270
4	1,560	2,210	3,080	2,810	3,080
5	2,810	4,000	5,620	3,080	5,620
6	4,450	6,290	8,880	4,440	8,880
8	9,460	13,760	18,950	9,975	18,950
10	18,100	25,600	36,400	18,200	36,400
12	30,000	42,000	60,000		60,000
14	38,500	54,700	76,000		76,000
15	55,400	78,400	109,000		
18	91,000	129,000	182,000		
21	138,000	197,000	276,000		
24	195,800	279,000	390,000		
27	271,000	386,000	545,000		
30	362,000	510,000	715,000		

For required sizes of ground surface drainage, see Paragraph 4611.4(h).

(b) The roof area to be taken in the sizing of storm sewers, drains, gutters and leaders is the horizontal projection, except that, where a building wall extends above the roof or court in such manner as to drain into the area considered, then one-third of the area of the vertical wall shall be added to the horizontal projection.

(c) Rainwater leaders and drains shall not reduce in cross-sectional area in the direction of flow.

(d) The sizes of rain leaders are based on diameter of circular rain leaders, and gutters based on semi-circular sheet metal gutters with the top dimension given. Other shapes may be used if equivalent area capacity is provided.

(e) Where secondary emergency roof drainage systems, as set forth in Section 1806.4, are required, they shall be piped to a point of discharge separate from the primary system. Discharge shall be above grade in a normally observable location.

4611.3 ROOF DRAIN STRAINERS: Where roof surfaces drain through the roof, as to the inside leader, a strainer shall be provided and such strainer shall extend not less than four inches above the surface of the roof immediately adjacent to the roof drain, furthermore, such strainer shall have an available inlet area, of not less than two and one-half times the area of the conductor or leader to which the drain is connected, with the exception that roof drain strainers for use on sun decks, parking decks, and similar 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 of leader to which the drain is connected.

4611.4 DETAILED REGULATIONS:

(a) Leader pipes shall not be used as soil, waste or vent pipes; nor shall any soil waste or vent pipes be used as leaders. Air-conditioning equipment shall not discharge or overflow upon any roof where rainwater leaders discharge into any surface or curb gutter at grade except by specific approval of the Plumbing Official.

(b) Impervious areas shall be graded to drain to a collection basin or to a pervious area as set forth in Sub-section 4611.7.

(c) Rainwater pipes shall not discharge over sidewalks.

(d) Liquid waste, except rainwater, shall not be discharged into rainwater pipes which terminate at a street or sidewalk or above the ground surface.

(e) (1) The disposal of rainwater shall be based on 0.0417 cubic feet of rainwater during any five minute period for each square foot of impervious area drained.

(2) The disposal of rainwater shall be through underground structures into pervious ground.

(3) The Plumbing Official may require percolation tests to be made to determine the percolation rate.

(4) Where the percolation rate at the bottom of the proposed drainage structure is found by test to be longer than one minute per inch of fall, the soakage volume herein set forth shall not apply and a design to store the volume of five minutes of rain and disposal of dispersement within one hour shall be provided.

(5) Soakage pits, when used as part of the drainage structure, shall be sized to provide a minimum of 0.0417 cubic foot volume, from water table to the bottom of the soakage pit lid, for each square foot of impervious area drained thereto, except as otherwise set forth herein.

(6) The cubic content of ballast filled structures shall be taken at not more than 50 percent of the ballast volume.

(f) (1) Pipe to carry rainwater only, where located under a sidewalk and discharging into a street gutter, shall be cast iron or Schedule 40 PVC. Where such pipe cannot be installed by reason of the depth of the curb being less than the pipe diameter plus the necessary concrete cover over such a pipe, a 14-inch gauge (5/64 in.) galvanized sheet metal flume box, or equivalent cross-sectional area may be substituted for the pipe.

(2) The following table shall be used to compute such cross-sectional area:

I.D. of Pipe (inches)	Area in Inches
2	3.141
3	7.068
4	12.566
5	19.635
6	28.269
8	50.265
10	78.54
12	113.09
14	153.93

(3) A concrete cover not less than two inches thick, reinforced with a 6 inch x 6 inch No. 10 gauge road mesh wire shall be required over a pipe of flume box under a public sidewalk. The bottom and sides of a flume box through which asbestos cement pipe pass shall be of poured concrete at least four inches thick and the concrete shall be of not less strength 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 Official. Permits and inspection for work outside the property line shall be secured from the Engineering Department.

(g) Public sidewalks and driveways of concrete which are cut, tunneled or channeled to necessitate repair may be repaired by replacing the concrete in only full sized blocks between scored or construction joints.

(h) The minimum size for sloping rainwater drains and storm sewers for surface drainage (not including pipes or building drains for roof drainage) shall be not less than the following size based on the horizontal projections of the surface area drained.

MINIMUM PIPE SIZES AND SLOPES FOR GROUND SURFACE

STORM SEWERS

Maximum Ground Surface Area for Various Slopes

Diameter of Pipe in Inches	1/8" per foot slope	1/4" per foot slope	1/2" per foot slope
3.....	1,360	1,590	1,930
4.....	2,470	2,930	3,600
5.....	4,270	5,020	6,030
6.....	7,110	8,360	11,400
8.....	15,900	18,400	22,600
10.....	30,200	34,300	42,300
12.....	49,800	57,000	68,600
15.....	87,800	107,000	130,000
18.....	150,000	167,500	210,000
21.....	226,000	268,000	326,000
24.....	326,000	377,000	453,000
27.....	453,000	510,000	630,000
30.....	586,000	670,000	837,000

Where ground surface storm sewers are connected to the building storm sewer, the size of the combined storm sewer shall be as set forth in Table 46-O.

(i) Rainwater drainage openings which discharge sewer or other gases and which are within 25 feet of adjacent building openings, interior courts or air shafts, windows, ventilating openings, air intake equipment, or where roof is used by human beings for sun bathing or other purposes, shall be protected from discharging such gases by installation of accessibly located back water valves or automatic self sealing traps. Back water valves shall be so constructed as to remain in a closed position when not discharging liquids.

(j) Rain or storm water drains shall be installed to drain dry.

(k) Soakage pits shall have the distance separation from property lines as set forth for septic tanks in Paragraph 4612.2(n).

4611.5 PROTECTION FROM MOSQUITOS:

(a) A film of oil or other equally effective substance shall be maintained on the surface of all liquids of any exposed basin, trap, tank, or receptacle not in regular use.

(b) A flap or flapper valve shall be placed on each soakage pit pipe inlet connection from rainwater surface catch basin and such flap or flapper shall be suitable to prevent the passage of mosquitos and vermin. (See Sub-section 4611.6.) The flap check shall be hung so as to completely close the pipe inlet when not in use.

EXCEPTION: In areas where inlet pipe from catch basin to soakage pit terminates below the water table, mosquito flaps may be omitted.

(c) Emergency inverted overflow fittings of the same size as the leader pipe up to and including four inch shall be provided at the base of the rainwater leaders discharging directly into soakage pits. Such fittings shall discharge at points which, in the opinion of the Plumbing Official, are the least possible to become a nuisance to the public, to occupants of a premises, or to neighboring property. Should the overflow from such a fitting become a nuisance, it shall be sealed and some other acceptable method of disposal be provided. For leaders five inches and over, the emergency overflow shall be a minimum of four inches. All overflow openings shall be screened to prevent entrance of mosquitoes.

4611.6 SOAKAGE PIT LIDS:

(a) Soakage pit lids shall be designed to support the anticipated loadings not less than that of a 10-ton truck. Not less than the following minimum slab thicknesses and reinforcement areas shall be permitted.

TRENCH SPAN	SLAB THICKNESS	REINFORCEMENT					
		#3	#4	#5	#6	#7	#8
2'	5" Bottom Bars	6"	12"	12"	12"	12"	12"
3'	6" Bottom Bars	3"	7"	10"	12"	12"	12"
4'	7" Bottom Bars	No	6"	7"	10"	12"	12"
5'	7" Bottom Bars	No	No	5"	7"	10"	12"
6'	8" Bottom Bars	No	No	No	6"	8"	10"

(b) Reinforcing across trench is to be placed 3/4-inch up from bottom of slab. Temperature reinforcing lengthwise in the lid shall be No. 4 bars 9 inch o.c.

(c) Support of slab lid shall be on block walls or on rock trench walls.

(d) If slab lid is supported on block walls, such walls shall be supported on an eight-inch deep by ten-inch wide footing. Vertical support shall be provided about every 15 feet by reinforcing two adjacent block cells with #5 vertical bars and filling such reinforced cells with concrete. For precast concrete lid, an eight-inch wide by 12-inch deep beam with four #5 bars shall be placed over the block walls under the lid.

(e) Support may be on rock trench walls, provided the rock is solid and free from honeycombing. A footing, 10 inches deep (including slab thickness) by sixteen inches wide with two No. 5 bars, shall be provided. Trench width shall be computed from the center of such footing for the table given above.

(f) Any reasonable combination of these methods may be used. Under unusual conditions on filled soil where the entire pit will rest on such fill, a design by a Registered Engineer with plans to be approved by the Building Official shall be required.

(g) When the block wall bearing is used it is necessary that a properly designed cantilever, 18 inches in width, be constructed to retard or prevent back wash. Such cantilever shall be of the same thickness as the slab and the principal slab reinforcing shall be alternately bent bars.

(h) Concrete block shall be laid in mortar with the block cell vertical and with the vertical block intersection having one-fourth inch gap without mortar. Not less than one-foot width of 3/4-inch washed rock shall be placed as backfill around the outside of the soakage pit walls.

(i) Plumbing inspection shall be required and requested when blocks are in place and sewer is connected to soakage pit, and before top form is placed over soakage pit.

(j) No concrete shall be poured until steel is tied and in place and approved by the Building Official.

4611.7 DISPOSAL TO PERVIOUS GROUND:

(a) Rainwater may be disposed to uncovered, pervious areas where not otherwise disposed of as set forth above.

(b) Sufficient effective uncovered pervious areas for rainwater seepage shall be provided on each building site on a minimum ratio of one square foot of effective pervious area for each ten square feet of impervious area.

(c) For the purposes of this Code pervious area shall be deemed to mean ground unpacked by traffic or uncoated by any material.

(d) Where there is reason to believe the ground is of low porosity, the Plumbing Official may require that the owner submit the results of a percolation test to support his request for disposal thereto.

4612 INTERCEPTORS AND SEPARATORS

4612.1 GENERAL REQUIREMENTS:

(a) INTERCEPTORS REQUIRED: Interceptors (including grease, oil and sand interceptors), shall be provided where required herein for the interception and separation from liquid waste materials such as grease, flammable wastes, sand, plaster, ground glass and all other ingredients or liquids considered harmful to the building drainage system, the public sewer or sewage-treatment plant or processes. The terms interceptor and separator may be used interchangeably and may be prefaced by a term indicating the material separated or the location or use.

(b) APPROVAL:

(1) Interceptors shall not be installed unless approved by the Plumbing Official.

(2) The size, type and location of each interceptor together with drawings including all pertinent information, shall be submitted to the administrative authority for approval before installation.

(3) Grease interceptors shall not be approved unless of a type having been tested by a recognized laboratory and found to conform to all applicable requirements of this Code.

(c) SEPARATION: A mixture of light and heavy solids or liquids and solids having various specific gravities may be treated and then separated in an interceptor, in accordance with Paragraph 4612.1(b). Wastes not requiring treatment or separation shall not be discharged into or through an interceptor.

(d) INTERCEPTOR EFFICIENCY: Interceptors shall be rated and approved for their efficiency in accordance with accepted practice.

(e) ACCESSIBILITY: Interceptors shall be so installed as to provide ready accessibility to the cover and contents and means of servicing and maintaining the interceptor in working and operating condition.

(f) MAINTENANCE: Interceptors shall be maintained in efficient operating condition by periodic removal of accumulated contents.

(g) VENTING INTERCEPTORS: Interceptors shall be so designed and installed that they shall not become air bound if closed covers are used.

(h) DISTANCE SEPARATION: Interceptors and separators shall have the distance separation from buildings, other facilities and property lines as set forth in Section 4612.2(n).

4612.2 COMMERCIAL GREASE INTERCEPTORS:

(a) A grease interceptor may be omitted for single-family residences, but shall be installed in the waste line leading from sinks, drains or other fixtures in the following establishments; restaurants, kitchens, cafeterias, processing plants, food preparation areas and other establishments where grease can be introduced into the drainage system in quantities that can affect line stoppage or hinder sewage disposal.

(b) Commercial grease interceptors shall be installed as required by the Broward County Public Health Unit. When disposal is to a public sewer system, grease interceptors shall be governed by this section.

(c) A two-way clean-out tee, brought to grade, shall be installed entering and leaving each grease interceptor, and protected as called for in Section 4608.2(a)(13).

(d) All grease traps and drainfields, where required, shall be designed in accordance with the established criteria and approved by the Environmental Engineering section of the Broward County Public Health Unit.

Minimum size of grease interceptors where disposal is to sanitary sewer system shall be:

Up to 50 persons or 2,600 gallons per day..... 750 gallon tank

51 to 100 persons or 4,900 gallons per day.....1,200 gallon tank

101 to 150 persons or 7,200 gallons per day.....1,600 gallon tank

Above 150 persons or 7,200 gallons per day, multiple series tanks shall be used at the aforementioned ratios, but in all cases tanks in series shall be of the same size.

(e) Grease interceptors shall be rectangular in shape with inside length between two and three times the inside width, or shall be of a shape approved by the Florida Department of Environmental Regulation.

(f) Grease interceptors shall be constructed of concrete, either precast or poured-in-place or other approved material. All concrete used in the construction of grease interceptors shall have a strength of not less than 3,000 psi in 28 days. If a test is required by the Chief Plumbing Inspector, the tank need only be filled to the invert of the outlet pipe at the time of inspection. Metal, block, bricks or sectional tanks of any description are not permitted. The interior wall of grease interceptors shall be finished smooth and impervious. Voids, pits, or protuberances on or in the inside walls of grease interceptors are prohibited. The Plumbing Official may require that plans for proposed grease interceptor bear a statement by a registered professional engineer or architect as to the character of the soil and the sufficiency of the support for the tank.

(g) Precast concrete grease interceptors shall have a minimum wall and bottom thickness of 4" and for tanks exceeding 1,200 gallon capacity the minimum concrete cover over the reinforcing shall be not less than 1½". Tops shall have a minimum thickness of 4", and be reinforced with No. 3 bars set on 6" centers across the carrying span and 12" on centers for temperature reinforcement. Precast tanks shall be sufficiently reinforced to resist cracking during handling or installation with a minimum reinforcement of 6 x 6 ten-ten wire mesh or equivalent area. Precast grease interceptors shall not be located where vehicular traffic or other overburden loads are anticipated unless a design by a professional engineer and construction is provided to support the anticipated loads bearing on the tank. Where support is provided without bearing on the tank, bearing shall be on the soil independent from the grease interceptor and reinforced as set forth in Sub-section 4611.6.

(h) Cast-in-place grease interceptor shall have a minimum wall, floor and lid thickness sufficient to provide 3" of concrete cover between the reinforcing and any ground-contact surface and 1½" of concrete cover between the reinforcing and any formed wall surface but not less than 4".

(i) Cast-in-place grease interceptors subject to overburden loads not in excess of 2' of fill and not subject to vehicular loads shall be as follows:

(1) Walls and floors shall be reinforced with No. 4 bars, 6" on centers each way with continuity around corners.

(2) Bars shall have the cover set forth in (h) above.

(3) Lids spanning not more than 4'6" shall be reinforced with No. 4 bars 6" on centers short way and No. 3 bars 6" on centers long way and such bars shall be located ¾" from bottom of slab.

(j) Cast-in-place grease interceptors subject to overburden loads in excess of the loads set forth in paragraph (i) above shall be designed to support the anticipated load but not less than that of a ten-ton truck and shall have concrete lids of the thickness and reinforcing as set forth in paragraph 4611.6(a) and (b). Traffic lids for cast-in-place grease interceptors subject to loads other than those herein described shall, when deemed necessary in the opinion of the Building Official, be designed by a registered professional Engineer.

(k) Ventilation of grease interceptors and drainpipes shall be provided through grease interceptor inlet and outlet tee thence through the plumbing system and in no other manner.

(l) The grease interceptor outlet tee shall be terra cotta, or concrete with a wall thickness of at least 1", and a cross-section area not less than the building sewer in connection therewith and not more than two times greater. Outlet tee may be cast iron or PVC.

(m) A manhole located directly above the inlet connection and the outlet tee and having a least dimension of 22" shall be provided at all grease interceptors. Such manholes shall be brought to grade and have cast iron ring and cover.

(n) Grease interceptors shall not be located under any building or within 5' thereof, within 10' of water supply pipe lines, within 5' of property lines other than public streets.

(o) Unless otherwise approved by the Building Official, by reason of special design, excavations shall not be made within the angle of pressure as transferred from the base of an existing structure to the sides for an excavation on a 45 degree angle.

(p) Grease and contents from grease interceptors shall not be deposited in any canal, reservoir, bay or water, nor upon the top of the ground nor buried under the ground and shall be disposed of only by a method approved by the Florida Department of Environmental Regulation.

(q) Outlet tees shall extend to within 8" of the bottom of the tanks and the inlet invert shall discharge a minimum of 2½-inch above the liquid level line.

(r) Abandoned grease and septic tanks shall be pumped out, a hole broken in the bottom, and filled with clean sand or other suitable material.

4612.3 GASOLINE, OIL AND SAND INTERCEPTORS:

(a) **REQUIRED:** An approved gasoline, oil and sand interceptor shall be provided in the following places:

(1) Public storage garages where floor drainage is to be provided.

(2) Where motor vehicles are washed, floor drains shall be provided, private individuals excluded.

(3) Any place where motor vehicles are repaired and floor drainage is provided.

(4) Shops, manufacturing and assembly plants where parts are washed to remove oil and/or greasy substances or anything deleterious to any public sewer.

(5) Where oil, gasoline or other volatile liquid becomes a nuisance.

EXCEPTION: Where sewers (Public Operated Treatment Works) licensed by Office of Natural Resource Protection are not available, the floor drain shall discharge to a holding tank approved by ONRP and shall be vented as per Sec. 4612.3(d)(5). Tank shall be on exterior of building as per Sec. 4612.2(n). Waste to be disposed as per ONRP regulations.

(b) **FLOOR DRAINS:** Floor drains shall be of a bucket type with minimum 4-inch diameter outlet.

(c) **MINIMUM DIMENSION:** Oil interceptors shall have a minimum depth of not less than 2 feet below the invert of the discharge drain and a minimum capacity of 18 cubic feet per 20 gallon flow per minute.

(d) PIPE CONNECTIONS:

(1) The minimum inlet, outlet and vent pipes shall be 4 inches except as otherwise set forth herein.

(2) The 4-inch outlet shall be taken off the outer wall at the bottom of the interceptor basin at a 45 degree angle in such manner as to provide a trap seal of approximately 24 inches.

(3) The invert of the 4-inch drain inlet to the interceptor basin shall be located not less than one inch above the water line.

(4) The interceptor local vent for the interceptor basin shall be taken off vertically not more than 6 inches below the cover.

(5) Approved commercial interceptors may be used.

(6) The local vent for the interceptor basin shall be a minimum size of 3 inches.

(7) When service sinks, drinking fountains or novelty boxes are installed in or adjacent to wash areas, the interceptor local vent may be installed on the drain line for the purpose of receiving the wastes from such fixtures.

(8) A cleanout shall be required on the horizontal discharge to provide downstream rodding only.

(e) **STRUCTURAL DESIGN:** Interceptors shall be structurally adequate to support the loads superimposed thereon dependent on their location. A 5/8-inch thick removable metal cover may be used under vehicular traffic loads where the interceptor area does not exceed 9 square feet. A 3/8-inch thick removable metal cover may be used where vehicle traffic loads are not possible and the interceptor area does not exceed 9 square feet. For larger areas or greater load capacities or at the option of the designer, concrete lids may be used but cast iron manholes brought to grade must be provided. All covers must be accessible and brought to grade.

4612.4 LAUNDRY INTERCEPTORS: Commercial laundries shall be equipped with an interceptor having a non-removable ½-inch mesh screen metal basket or similar device that will prevent strings, rags, buttons or other materials detrimental to the collection and treatment system from passing into the drainage system. Such

1/2-inch screen metal basket or similar device shall be designed to be easily cleaned without completely removing such basket or device.

4612.5 BOTTLING ESTABLISHMENT INTERCEPTORS: Bottling plants shall discharge their process wastes into an interceptor designed to provide the separation of broken glass or other solids, before discharging liquid wastes into the drainage system. (See Paragraph 4606.6(b).)

4612.6 SLAUGHTER HOUSE INTERCEPTORS: Slaughtering rooms and dressing rooms shall be provided with floor drains equipped with metal screen type baskets piped to separators which shall prevent the discharge into the drainage system of feathers, entrails or other materials likely to clog the drainage system. Metal screen type baskets shall prevent passage into the drainage system of solids exceeding one-half inch.

4612.7 ABANDONED GREASE INTERCEPTORS: When a grease interceptor is abandoned or discontinued, the contents shall be completely pumped out, the bottom broken to permit drainage, and the interceptor filled with clean sand or other suitable material. The contents of grease interceptors shall be disposed of in accordance with the authority having jurisdiction.

4613 PLUMBING FIXTURES

4613.1 GENERAL REQUIREMENTS:

(a) (1) Plumbing fixtures shall be constructed with approved materials, shall have smooth impervious surfaces, shall be free from defects and concealed fouling surfaces, and, except as permitted elsewhere in this Code, shall conform in quality and design with one of the Standards in Table 46-C.

(2) Fixtures constructed of pervious material and equipped with a waste outlet to retain water, shall not be installed.

(b) **REQUIREMENTS FOR THE PHYSICALLY HANDICAPPED:** See Sec. 515.

(c) **WATER CONSERVATION STANDARDS:** Every plumbing fixture installed in new construction regulated by this Code shall comply with the water conservation standards set forth in this section.

EXCEPTION: Showerheads manufactured for use in safety spray installations, penalware and specialty hospital fixtures shall be exempt from the requirements of this section.

(1) **TESTING AND LABELING:** All plumbing fixtures subject to compliance with this section shall be tested by the manufacturer for compliance with the water conservation standards specified herein and fixtures meeting these standards shall bear a label certifying compliance. All testing shall be performed by independent testing laboratories acceptable to the authority having jurisdiction.

(2) **WATER CLOSETS, URINALS AND ASSOCIATED FLUSHING MECHANISMS:** The maximum water flow of water closets, urinals and associated flushing mechanisms shall not exceed the values specified in Table 46-R when tested in accordance with ANSI A112.19.2M (1990).

(3) **SHOWERHEADS AND SINK OR LAVATORY FAUCETS:** The maximum water flow of showerheads and sink or lavatory faucets shall not exceed the values set forth in Table 46-R when tested in accordance with ANSI A112.18.1M (1989). In addition, the flow control valve or device which restricts the flow of water in such fixtures shall not be capable of being removed without special tools.

4613.2 OVERFLOWS:

(a) **DESIGN:** When any fixture is provided with an overflow, the waste shall be so arranged that the standing water in the fixture cannot rise in the overflow when the stopper is closed or remain in the overflow when the fixture is empty.

(b) **CONNECTION:** The overflow pipe from a fixture shall be connected on the house or inlet side of the fixture trap, and it shall be unlawful to connect such overflows with any other part of the drainage system.

4613.3 INSTALLATION:

(a) **FIXTURE CLEARANCE:**

(1) Plumbing fixtures shall be installed and spaced in a manner to permit easy access for cleaning and for the intended use, and shall be set with the following minimum clearances:

(2) Closet bowls and the roughing-in of bends shall be spaced a minimum of 15 inches from the center of the bowl to any finished wall or shower compartment wall (curb): A minimum of 15 inches from the center line of the closet tank to the edge of a lavatory, vanity lavatory counter-top, or any other infringement: A minimum of 15 inches from the center of the water closet and/or bidet to the outside wall or edge of a shower curb/bathtub, and in battery installations a minimum of 30 inches center to center of bowls plus the total thickness of partitions:

(aa) There shall be a minimum clearance of twenty-one (21) inches from the front of the bowl to any finished or stall compartment wall, door, or other fixture.

(bb) In Buildings classed as Group H or I occupancy, any room containing a water closet shall have a minimum width of three feet and a minimum area of fifteen (15) square feet.

(3) Pedestal, stall and wall hung urinals shall be spaced a minimum of fifteen (15) inches from the center of the urinal to any finished or stall compartment wall, and in battery installations a minimum of thirty (30) inches center-to-center of the urinals, plus the total thickness of the partition.

(aa) There shall be a minimum clearance of eighteen (18) inches from the front of pedestal urinals and twenty-one (21) inches from the front of a stall or wall-hung urinal to any finished or stall compartment wall, door, or other fixture.

(4) Lavatories shall be spaced a minimum of four inches from any finished or stall compartment wall, a minimum of two inches from a tub and, in battery installations, a minimum of four inches between lavatories.

(aa) There shall be a minimum clearance of twenty-one (21) inches in front of any lavatory and any finished or stall compartment wall, door or other fixture.

(5) Shower receptors and compartments shall have a minimum clearance of twenty-four (24) inches in front of opening to any finished or stall compartment wall, door or other fixture.

(b) **PIPES FROM FIXTURES:** Where practical, all pipes from fixtures shall be run to the nearest wall.

(c) **GROUTING OR SEALING:** Where fixture surfaces come in contact with wall or floor, the point of contact shall be grouted with suitable material to provide a watertight seal.

(d) **SECURING FIXTURES:** Floor-outlet fixtures shall be rigidly secured to floor flange by brass bolts and/or screws.

(e) **WALL HUNG FIXTURES:** Wall-hung fixtures shall be rigidly supported by concealed approved floor mounted carriers securely bolted to the floor or to suitable backing.

(f) **SETTING:** Fixtures shall be set level and in proper alignment with reference to adjacent walls. See Paragraph 4613.3(a).

NOTE: See Appendix A-2 for graphic reference.

4613.4 PROHIBITED FIXTURES AND CONNECTIONS:

(a) **WATER CLOSETS:** Pan, valve, plunger, offset, washout, washdown bowls, latrine, frostproof, and other water closets having an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge, shall be prohibited. Any water closet which might permit siphonage of the contents of the bowl back into the tank shall be prohibited.

(b) **URINALS:** Trough urinals are not permitted. Urinals which have an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge shall be prohibited. Urinals with integral strainers shall be prohibited. Pedestal urinals are not permitted in school installations.

4613.5 WATER CLOSETS:

(a) PUBLIC USE: Water closet bowls, except within the residence or apartment of a single family, shall be of an elongated type and equipped with open front seats.

(b) FLUSHING DEVICE: Water-closet tanks shall have a flushing capacity sufficient to properly flush the water-closet bowls with which they are connected.

(c) FLOAT VALVES: Float valves in flush tanks shall close tight and provide water to properly refill the trap seal in the fixture.

(d) FLUSHING TANKS: Flushing tanks shall be equipped with an approved ball-cock. The ball-cock shall be installed with critical level of the vacuum breaker at least one inch above the full opening of the overflow pipe. In cases where the ball-cock has no hush tube, the bottom of the water supply inlet shall be installed one inch above the full opening of the overflow pipe.

(e) CLOSE-COUPLED TANKS: The flush-valve seat in close-coupled water-closet combinations shall be one inch or more above the rim of the bowl.

(f) AUTOMATIC FLUSH VALVE: Flushometer shall be so installed that they will be readily accessible for repairing. When the valve is operated, it shall complete the cycle of operation automatically, opening fully and closing positively under the service pressure. At each operation the valve shall deliver water in sufficient volume and at a rate that will thoroughly flush the fixture and refill the fixture trap. Means shall be provided for regulating flush-valve flow. Not more than one fixture shall be served by a single flush valve, except as approved by the Plumbing Official.

4613.6 URINALS: Tanks, or plumbing devices, flushing more than one urinal shall be automatic in operation and of sufficient capacity to provide the necessary volume to flush and properly cleanse all urinals simultaneously. All stall urinals shall be equipped with beehive strainers.

4613.7 LAVATORIES: Lavatories shall have waste outlets not less than one-and-one-fourth inches in diameter. Wastes may have open strainers or may be provided with stoppers.

(a) LEAD: (See Table 46-C.) Sheet lead shall be as follows:

For safe pans, not less than 4 pounds psf.

(b) COPPER: Sheet copper shall be not less than the following:

Safe pans — 12 ounces per square foot.

4613.8 SHOWER RECEPTORS AND COMPARTMENTS:

(a)(1) SHOWER: All shower compartments, except freestanding, pre-fabricated shower compartments, shall have approved pans of lead, copper or other approved material and shall turn up on all sides at least two inches above the finished curb level or 3 ½ inches above the rough curb level.

(aa) See Section 4613.7(a).

(bb) See Section 4613.7(b).

(2) A separate shower pan may be omitted for shower compartments built integrally with a concrete slab on the first floor level where the construction provides a concrete curb having a height on the enclosed sides at least one inch higher than the entrance curb finish height so that the water level may not rise to the height of any surrounding wood plates or studs.

(3) A separate shower pan may be omitted for shower compartments where the finished shower drain is depressed a minimum of 4" below the surrounding finish floor on the first floor level and where the shower recess is poured integrally with the main floor adjoining.

(4) Lead and copper shower pans shall be protected against the corrosive effects of concrete or mortar by a coating of asphaltum paint inside and outside before being placed in position.

(5) Pans shall be securely fastened to the trap stubs at the invert of the weep holes, to provide a water-tight joint between the pan and the trap.

(6) Shower receptacle waste outlets on all showers shall be not less than two inches and shall have removable strainers.

(7) Before the completed pan is placed in the space provided for the stall shower, a 30-pound asphalt saturated felt or a 1-inch thick layer of sand shall be placed under the pan for protection against rough surfaces or projecting nails.

(8) Strainers for 2-inch stubs shall have a minimum three and one-half-square inches of free area including the removable plate.

(9) All strainers and pans shall be installed and ready for inspection at time of tub and/or waterpipe inspection.

(10) Free standing prefabricated shower stalls or receptors shall require individual approval.

(b) **DIMENSIONS:** Shower compartments shall be not less than 1,020 square inches in free standing floor area (minimum 30 inches). The minimum required area and dimensions shall be measured at a height equal to the top of the threshold and at a point tangent to its center line.

(c) **PUBLIC OR INSTITUTION SHOWERS:** Floors of public shower rooms shall be drained in such a manner that no waste water will pass over areas occupied by other bathers.

(d) **WALLS:** Walls of smooth, non-corrosive and non-absorbent water-proof materials shall be provided at showers to a height of 6 feet above the floor for shower compartments and stalls not having a tub and to a height of 4 feet above the rim of the tub where a shower is provided in a tub.

(e) **JOINTS:** Built-in tubs with overhead showers shall have waterproof joints between the tub and the wall.

(f) See Section 4614.17(h).

4613.9 SINKS:

(a) **WASTE OUTLETS:** Sinks shall be provided with waste outlets not less than one and one-half inches in diameter. Waste outlets may have open strainers or may be provided with stoppers.

(b) **FOOD GRINDERS:** Where commercial food-waste grinders are installed, the waste from those units shall discharge directly into the building drainage system and not through a grease interceptor. Installation to public sewers shall not be allowed until such time as sewers are adequate.

4613.10 FOOD GRINDERS — WHERE PERMITTED:

(a) **FOOD GRINDERS:** Sinks on which a food grinder is installed shall have a waste opening not less than three and one-half inches in diameter.

(b) **FOOD-WASTE — DISPOSAL CONNECTIONS:** A domestic food-waste-disposal unit in a two-compartment sink on a minimum two-inch line shall waste through a two inch by one and one-half-inch double tapped vertical sanitary tee (Hi-Lo) fitting. The tappings shall be no more than 6 inches apart on the vertical, and each compartment shall be separately trapped and separately wasted to the stack or vented branch. In existing sink installations where the second waste opening is not available a domestic food grinder may be installed on a two-compartment sink and waste through a single 1½-inch trap provided an approved directional tee or wye is used.

(c) **GREASE INTERCEPTORS:** No food-waste grinder shall be connected through a grease interceptor.

(d) **COMMERCIAL-TYPE GRINDERS:** Commercial-type food grinders shall be provided with a waste line equal in size to the discharge opening of the machine, but not less than a two-inch waste line. Each waste shall be trapped and vented as provided in other Sections of this Code.

4613.11 DRINKING FOUNTAINS:

(a) **DESIGN AND CONSTRUCTION:** Drinking fountains shall conform to the Standards for Self-Contained Mechanically Refrigerated Drinking-Water Coolers, ANSI A112.11.1, or the Standard Specifications for Drinking Fountains, ANSI Z4.2, as set forth in Section 402.

(b) PROTECTION OF WATER SUPPLY:Stream projectors shall be so assembled as to provide an orifice elevation as specified by ANSI Standard Air Gaps in Plumbing Systems. Drinking fountains equipped with water heating devices shall be equipped with pressure and temperature valves in accordance with Sub-section 4614.18 and Table 46-C herein.

4613.12 FLOOR DRAINS AND BACK WATER VALVES:

(a) PROHIBITED LOCATION:

(1) Floor drains serving indirect waste pipes serving food or drink storage rooms shall not be installed in any toilet room nor in any inaccessible or unventilated space such as a closet or store room.

(2) No floor drain or other plumbing fixture shall be installed in a room containing air handling machinery when that room is used as a plenum for the movement of air. Equipment drains shall be conveyed through an indirect waste to a floor drain located outside such room or other approved point of disposal.

(3) Drinking fountains shall not be used to reseal floor drain traps located in toilet rooms.

(4) Floor drains located in toilet rooms shall not receive indirect waste from any fixture, appliance or appurtenances.

(b) FLOOR DRAIN TRAPS: Floor drain shall connect into a trap so constructed that it can be readily cleaned and of a size to serve efficiently the purpose for which it is intended. The floor drain inlet shall be so located that it is at all times in full view. When subject to backflow or back pressure, such drains shall be equipped with an approved back-water valve. One or more floor drains may be connected to the same fixture branch without a revent provided that all traps are within 15 feet measured horizontally from the vented sewer line.

(c) WATER TRAP SUPPLIES: Every trap which is directly connected to the drainage system, shall be provided with a permanent water seal, fed from an approved source of water, or by means of an approved automatic priming device designed and installed for that purpose, except where in the opinion of the Plumbing Official such water seal is not necessary for safety or sanitation.

(d) FLOOR DRAINS: Floor drains sized three inches and larger may be installed within 15 feet, measured horizontally, from a vented sewer line without a revent; provided that no floor drain shall connect to a soil line within five feet of the base of a soil stack serving more than six water closets or equivalent fixture units. All public toilet rooms shall be required to have floor drains. In public coin-operated laundries and in the central washing facilities of apartment buildings, except in one and two family dwellings, the rooms containing the laundry machines shall be provided with adequate floor drains located to readily drain the entire floor area.

(e) FLOOR DRAINS SHALL BE PROVIDED WITH TRAPS AND STRAINERS: Approved bucket type drains shall be provided for filling stations, garages, garbage areas, chicken and fish cleaning areas, bottling plants, food processing plants and other floor areas where solids could find entry into a drainage system.

(f) FLOOR DRAINS CONSIDERED FIXTURES:A floor drain shall be considered a plumbing fixture.

(g) BACKWATER VALVES:

(1) Backwater valves shall be so constructed as to ensure a mechanical seal against backflow.

(2) Backwater valves, when fully opened, shall have a capacity not less than that of the pipes in which they are installed.

(3) Backwater valves shall be so installed as to provide ready accessibility to their working parts.

4613.13 DISHWASHING MACHINES:

(a) Domestic dishwashing machines shall comply with the requirements set forth in Sub-section 4614.4.

(b) Gravity discharge dishwashing machines installed on ground floor shall have an emergency overflow not less than one-inch diameter connected to the machine tailpiece and terminating outside of building wall above grade.

(c) Wastes from dishwasher with pump discharges shall rise to a height equal to the height of the underside dishwasher top and may connect to tailpiece of sink by means of a "Y" connection. If a food-disposal unit is provided, the domestic dishwasher shall connect to the inlet side of the food-disposal unit.

4613.14 MULTIPLE WASH SINKS:

(a) **CIRCULAR TYPE:** Each 18 inches of wash sink circumference (circular type) shall be equivalent to one lavatory.

(b) **STRAIGHT-LINE TYPE:** Multiple wash sinks of the straight-line type shall have hot and cold combination spouts not closer than 18 inches from adjacent similar spouts and each spout shall be considered the equivalent of one lavatory.

4613.15 GARBAGE-CAN WASHERS:

(a) **DISCHARGE:** Garbage-can washers shall not discharge through a trap serving any other device or fixture.

(b) **BASKETS:** The receptacle receiving the wash from garbage cans shall be provided with a bucket type strainer or similar device to prevent the discharge of solids into the building drainage system.

(c) **CONNECTIONS:** Water supply connections shall conform to Sub-section 4614.4.

4613.16 LAUNDRY TRAYS: Each compartment of a laundry tray shall be provided with a waste outlet not less than one and one-half inches in diameter and with a stopper.

4613.17 BATHTUBS: Bathtubs shall be provided with waste outlets not less than one and one-half inches in diameter.

(a) **WHIRLPOOL BATHTUBS:**

(1) **Access** — An access panel of sufficient size shall be installed to provide access to the pump for repair and replacement.

(2) **Pump** — When not factory assembled to the tub assembly, the circulation pump shall be accessibly located above the crown weir of the trap. The pump drain line shall be properly graded to assure minimum water retention in the volute after fixture use.

(3) **Operation** — Leak testing and pump operation shall be performed in accordance with manufacturer's recommendations.

(4) **Whirlpool Bathtubs Appliances** — Whirlpool bathtub appliances shall comply with ANSI/ASME A112.19.7.

(5) **Suction Fittings** — Suction fittings for use in whirlpool bathtubs shall comply with ANSI/ASME A112.19.8.

4613.18 SPECIAL FIXTURES AND SPECIALTIES:

(a) **WATER AND DRAIN CONNECTIONS:** Baptistries, ornamental pools, aquaria, ornamental fountain basins, developing tanks or sinks and similar constructions when provided with water supplies shall be protected from back-siphonage as required in Section 4620.

(b) **APPROVAL:** Specialties requiring water and waste connections shall be submitted to the Plumbing Official for approval before installation.

(c) **WATER USED FOR PROCESSING:** Water used for cooling of equipment or similar purposes shall not be to the potable-water distributing system. When permitted, the waste water shall be discharged through an indirect waste pipe or air gap to the drainage system or other approved point of disposal.

4613.19 MINIMUM FIXTURE REQUIREMENTS:

(a) **GENERAL:** (See Footnote No. 12 which applies to all fixture requirements.)

(1) Wherever installation of plumbing fixtures is required or provided the minimum number of each type of fixture installed shall be as set forth in this Sub-section based on the use or occupancy proposed and based on the number of persons, as set forth in Sub-section 4603.22, except as may be otherwise specifically provided.

(2) Where facilities are provided for 1 to 9 persons, one water closet and one lavatory for use of both sexes will be accepted in accordance with Footnote 12 and shall be classified as semiprivate facility. Impermeable wainscoating and floor drain will not be required under this condition.

(3) See Paragraph (m) for Footnotes referenced.

(b) **PLACES OF EMPLOYMENT:** Minimum fixture requirements for places of employment such as factories, office buildings, stores and similar establishments shall be as follows and these minimum fixture requirements shall be applicable to any occupancy or use except as may be otherwise specifically set forth hereafter:

MALES				FEMALES		
No. of Males	Water Closets	Urinals	Lavatories	No. of Females	Water Closets	Lavatories
1-9	per (a) (2) above			1-9	per (a) (2) above	
10-25	1	1	2	10-25	1	2
26-60	2	1	2	26-50	2	2
61-100	3	2	2	51-75	3	3
101-140	4	2	3	76-100	4	3
141-180	5	3	3	101-125	5	3
181-220	6	3	4	126-150	6	4
				151-175	7	4
				176-225	8	5
				176-225	8	5
Where the number exceeds two hundred-twenty (220) there shall be provided one (1) water closet or one (1) urinal and one (1) lavatory for each additional forty (40) male employees.				Where the number exceeds two hundred and twenty-five (225) there shall be provided one (1) water closet and one (1) lavatory for each additional fifty (50) female employees.		
Urinals: See Footnote 2.						

(1) For service sink requirements see Footnote No. 8.

(2) For Drinking Fountain requirements see Footnote Nos. 5 and 7.

(3) Shower shall be provided for each 15 persons subject to excess heat or to contamination infection or irritating material.

(4) Each store or warehouse shall have a minimum of one lavatory or sink and 1-1/2 inch fixture branch connected to a three or four inch waste stack.

(5) Arcades and shopping malls containing stores which are 1000 square feet or less in area may be serviced by centrally located toilet facilities that are accessible to the entrances of said stores within a 300 foot travel distance.

(6) Group G Division I Occupancy buildings or portions thereof shall have its minimum fixture requirements determined by using an occupant count of 200 square feet per person of the net sales area.

(7) Kiosk of less than 400 square feet in area, and other isolated minor uses, shall be exempt from requiring bathroom facilities, if a letter is submitted by a tenant within a 300 feet travel distance to the Plumbing Official permitting the use of its plumbing facilities, or public toilets are available within a 300 foot travel distance. (See Footnotes 3, 4, 6, 9, 11 and 12.)

(c) **PUBLIC ASSEMBLY:** Minimum fixture requirements for places of public assembly such as theatres, churches, arenas, stadiums, lodge halls and similar assembly of Group A and Group B Occupancy shall be as follows:

MALES				FEMALES		
No. of Males	Water Closets	Urinals	Lavatories	No. of Females	Water Closets	Lavatories
1-100	1	1	2	1-74	2	2
101-250	2	1	2	75-250	5	3
251-360	2	2	2	251-360	6	3
361-470	2	3	2	361-470	8	4
471-580	3	3	2	471-580	9	4
581-700	3	4	3	581-700	11	5
701-820	3	5	3	701-820	12	6
821-975	4	5	4	821-975	14	7
976-1150	4	6	4	976-1150	15	7
1151-1325	4	7	4	1151-1325	17	8
1326-1490	5	7	5	1326-1490	18	9
1491-1675	5	8	5	1491-1675	20	10
1676-1875	5	9	5	1676-1875	21	10
1876-2075	6	9	6	1876-2075	23	11
2076-2250	6	10	6	2076-2250	24	12
2251-2475	6	11	6	2251-2475	26	13
2476-2700	6	12	7	2476-2700	27	13
Above 2700 add 1 water closet and 1 lavatory and 1 urinal for each additional 500 males.				Above 2700 add three water closets for each additional 500 females and one lavatory for each additional 500 females.		
Urinals: See Footnote 2.						

(1) Drinking fountains shall be provided at a ratio of 1 for each 200 persons up to 800 total number of persons, over 800 to be considered a special problem and design is to be submitted for approval.

(2) The occupancy control of drive-in theatres shall be based on 3 persons per parking space. (See Footnote 11.)

Exception: This Table does not apply to establishments licensed under Chapter 509 Florida Statutes (public lodging and food service) unless the establishment provides meeting or banquet rooms which accommodate more than 150 persons and the establishment has at least the same number of water closets for women as the combined total of water closets and urinals for men.

(d) **PLACES SERVING FOOD AND/OR DRINK:** Minimum fixture requirements where food and/or drink are served and consumed on the premises such as restaurants, bowling alleys, liquor bars, barbecue stands, drive-in stands, cafeterias, counter service, private clubs and similar eating and drinking establishments shall be as follows:

FIXTURE REQUIREMENTS FOR ESTABLISHMENTS SERVING FOOD AND/OR DRINK

MALES				FEMALES		
No. of Males	Water Closets	Urinals	Lavatories	No. of Females	Water Closets	Lavatories

1-9	per (d) (4) below			1-9	per (d) (4) below	
10-40	1	1	2	10-40	2	2
41-90	2	1	2	41-90	3	2
91-150	2	2	2	91-150	4	2
151-225	3	2	2	151-225	5	2
226-300	3	3	3	226-300	6	3
301-400	4	3	3	301-400	7	3
Where the number exceeds four hundred (400) there shall be provided one (1) water closet or one (1) urinal and one (1)lavatory for each one-hundred twenty-five (125) males				Where the number exceeds four hundred (400) there shall be provided one (1) water closet and one (1) lavatory for each one-hundred twenty-five (125) females.		
Urinals: See Footnote #2						

Note: Establishments licensed under Chapter 509, Florida Statutes, (public lodging and food service) that provide meeting or banquet rooms which accommodate more than 150 persons must meet the 3-to-2 ratio requirements as stated in Florida Statute 553.141, Potty Parity.

(1) See Footnote No. 9 for bar space.

(2) Curb service to be based on a minimum of one person per 100 square feet of parking area.

(3) Public food service establishments that offer only a take-out service will not be required to provide guest toilets and will be required to provide only one employee's toilet under the following conditions:

(aa) The number of employees present at one time does not exceed nine.

(bb) The establishment does not allow consumption of food on the licensed premises or provide equipment such as tables, chairs, benches, counters, etc., as a convenience for patrons to consume food on the licensed premises.

(See Footnote 11.)

(4) Where facilities are provided for 1 to 9 persons, one water closet and one lavatory for use of both sexes will be accepted in accordance with Footnote 12. Impermeable wainscoating and floor drain will be required.

(e) **SCHOOLS:** Minimum fixture requirements for schools and similar Group C Occupancies shall be as follows:

KINDERGARTEN THROUGH 2nd GRADE					
MALES			Drinking Fountains	FEMALES	
Water Closets	Urinals	Lavatories		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
3 rd GRADE THROUGH 6 th GRADE					
1 per 75 males	1 per 30 males	1 for each 50 males minimum of one. (28" rim)	1 per 75 pupils and a minimum of 1 per floor and a minimum of 1 accessible to the playground area (26" height)	1 per 35 females	1 per 50 females
7 th GRADE THROUGH 12 th GRADE					
1 per 75 males	1 per 30 males	1 per 50 males, minimum of 1 per floor and a minimum of one accessible to the playground area. (30" rim height)	1 per 75 pupils and a minimum of 1 per floor and a minimum of 1 accessible to the playground area (36" height)	1 per 45 females	1 per 50 females

(1) There shall be one water closet, one lavatory and one drinking fountain in each room except where common toilet rooms are provided. (See Footnote 11.)

(2) Showers shall be provided wherever there is a gymnasium at a rate of one for each 5 boys and one for each 4 girls, based on the maximum number that can use the facilities. (The number of each sex to be provided for, may be calculated on the number of classrooms multiplied by 2.5 or the known total number of pupil boys and girls divided by 12.)

I) EXAMPLE: School has 16 classrooms.

$16 \times 2.5 = 40$ 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.

(3) Toilets shall be accessible from the playground as well as from the inside of the building.

(f) DAY NURSERIES: Minimum fixture requirements for day nurseries shall be as follows:

Total No. of Children	Water Closets	Lavatories	Bathtubs or Showers	Drinking Fountains
Day Care:				
1-10	1	1	1	1 for each 50. Minimum of 2; 1 inside building and one on playground.
11-15	1	2	1	
16-30	2	3	1	
31-50	3	4	1	
above 50	1 per 30	1 per 30	1	
Night Care:				
1-8	1	1	1	
9-18	2	2	2	
19-30	3	3	3	
31-50	4	4	3	
above 50	1 per 30	1 per 30	3	

(1) Toilets shall be accessible from the playground as well as from inside building.

(g) PLACES OF DETENTION: Minimum fixture requirements for places of detention and similar Group D, Division I Occupancies shall be as follows:

(1) Fixture requirements in places of detention are special requirements and plans for proposed installation shall be submitted to the Plumbing Official for approval. (See Footnote 11.)

(h) HOSPITALS: Minimum fixture requirements for hospitals and similar Group D, Division 2 Occupancies shall be as follows:

MALES					FEMALES			
No. of Males	Water Closets	Urinals	Lavatories	Bed Pan Washers	No. of Females	Water Closets	Lavatories	Bed Pan Washers
1-25	1	1	1	1	1-20	1	1	1
26-40	2	1	2	1	21-40	2	2	1
41-55	2	2	2	2	41-60	3	3	2
56-70	3	2	3	2	61-90	4	4	2
71-85	3	3	3	3	91-130	5	5	3
86-100	4	4	4	4	131-170	6	6	3
101-130	4	4	4	4	171-210	7	7	4
above 130	1 per 60	1 per 60	1 per 60	1 per 60	above 210	1 per 40	1 per 40	1 per 40

(1) Other requirements, such as sterilizers, slop sinks, special fixtures, etc., shall be special problems, and shall be submitted to the Plumbing Official for approval. (See Footnote 11.)

(2) See schedule for "Places for Employment" for employees facilities.

(i) **FILLING STATIONS:** Minimum fixture requirements for filling stations shall be as follows:

MALES		FEMALES	
Water Closets	Lavatories	Water Closets	Lavatories
1	1	1	1

(1) Grease and oil interceptors shall be provided as set forth in Sub-section 4612.3 herein and such interceptors shall have a basket-type floor drain and a trap.

(See Footnote 11.)

(j) **RESIDENCES:** Minimum fixture requirements for single family residences, duplexes, and apartments shall be as follows:

(1) One water closet per dwelling unit.

(2) One lavatory per dwelling unit.

(3) One tub or shower per dwelling unit.

(4) One kitchen sink per dwelling unit.

(5) One laundry tub or washing machine outlet per dwelling unit.

(See Footnotes No. 1 and 12.)

(k) ROOMING AND BOARDING HOUSES: Minimum fixtures requirements for rooming and boarding houses shall be as follows:

MALES					FEMALES		
No. of Males	Water Closets	Urinals	Lavatories	Tub or Shower	No. of Females	Water Closets	Lavatories
1-11	2	1	2	1	1-11	1	2
12-18	2	1	2	2	12-18	2	2
19-26	3	1	3	3	19-26	3	3
27-33	4	1	4	4	27-33	4	4
34-41	5	1	5	5	34-41	5	5
42-48	5	2	6	6	42-48	6	6
49-56	6	2	7	7	49-56	7	7
57-63	7	2	8	8	57-63	8	8
64-71	7	3	9	9	64-71	9	9
72-78	8	3	10	10	72-78	10	10
79-86	9	3	11	11	79-86	11	11
87-93	10	3	12	12	87-93	12	12
94-101	10	4	13	13	94-101	13	13

(1) Over five males a urinal is required.

(2) The above schedule applies for each floor. (See Footnote No. 11.)

(3) Both hot and cold water shall be supplied to showers, tubs and lavatories.

(4) Where accommodations exceed 15 persons per floor a service sink is required on each floor.

(l) DORMITORIES: Minimum fixture requirements for dormitories shall be as follows:

MALES				FEMALES	
Water Closets	Urinals	Lavatories	Drinking Fountains	Water Closets	Lavatories
1 for the first 10 Males. Over 10, 1 for each additional 25 males.	1 for each 25 males, up to 150 males. Over 150 males add 1 for each 50 additional males.	2 for each 12 males up to 75 males Over 75, 1 for each 20 males. Additional separate dental lavatories should be provided in communal toilet rooms at 1 for each 20 males.	1 per each 75 persons and a minimum of one per floor and a minimum 2 per dormitory.	1 for each first 8 females. Over 8, one for each additional 20 females. See Footnote 11.	2 for each 12 females up to 75 females. Over 75, one for each additional 15 females. Additional separate dental lavatories should be provided in communal toilet rooms at 1 for each 20 females.

(1) Bath or shower requirements same as for lavatories.

(2) For service sink requirements see Footnote No. 8.

(m) FOOTNOTES: Footnotes to the preceding Paragraphs:

FOOTNOTES

Footnote No. 1

At least one laundry tub or the rough supply and drainage for a clothes washing machine shall be provided for single family and duplex buildings. For apartment houses, such tub or clothes washing machines for the first five apartments and one such tub or clothes washing machine for each additional 15 apartments shall be required. Such laundry tub or clothes washing machines shall be available to all residents of the building and shall be within a travel distance of not more than 400 feet from an entrance to such building.

Footnote No. 2

Female urinals may be substituted for water closets up to one-half of the required number of water closets.

Footnote No. 3

Wash-up sinks may be substituted for lavatories where type of employment would warrant.

Footnote No. 4

For factories the above requirements are minimum and may be adjusted upward depending upon the provisions of work periods, and type of operation, when it is considered that these minimum requirements will not provide adequate facilities.

Footnote No. 5

One drinking fountain shall be provided accessibly within 50 feet of all operational processes and at least 1 drinking fountain for each 75 persons.

Footnote No. 6

Toilet facilities shall be provided on each floor for each sex using that floor and shall be located to be readily accessible except that in a building where the two lower levels, such as a first floor and mezzanine or the first floor and second floor where there is no mezzanine, are occupied by a single tenant and the toilet facilities are not for public use. The combined total toilet facilities required for these two levels may be located on either the first or second level. Total facilities accessible only through private offices shall be considered in addition to the above minimum requirements and the personnel occupying such offices may be 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. 7

One drinking fountain shall be provided if there are over 10 employees and 1 drinking fountain for each 75 employees. Such drinking fountains shall be conveniently located and accessible to the offices served. Not to be located in any toilet room or vestibule to a toilet room. **EXCEPTION:** Bottled water may be substituted for the installation of drinking fountain(s) provided drinking fountain(s) rough-in(s) is installed.

Footnote No. 8

Where there are 10 offices or rooms or more, and 25 employees or persons, a service sink shall be provided on each floor.

Footnote No. 9

Seating capacity shall be determined as follows: Restaurants and eat and drink establishments where no alcoholic beverages are served, 30" of counter space and/or 15 square feet of dining room area shall be equal to 1 person. Where alcoholic beverages of any kind are served, 18" of counter or bar space and/or 15 square feet of serving area shall equal 1 person. All toilet rooms shall be of easy and convenient access to both patrons and employees, with and under the responsible direction of the management of the premises served; and shall be not over 100 feet along the line of travel from the nearest exit to the dining room, bar or food service area. Where such dining room, bar or food service area is incidental to another Occupancy, the limiting travel distance set forth herein may be varied where adequate directional signs from the food or drink service area to

the toilets are provided, and the toilets are of sufficient and adequate number and are conveniently located to serve the food and drink service area plus the remainder of the floor area. Such exceptional travel distance, however, shall not exceed 300 feet.

Footnote No. 10

Passenger terminals, such as railroad, bus or airline terminals are not included in this classification. Such establishments are special problems and shall be submitted to the Plumbing Official for approval.

Footnote No. 11

Hotels, places of public assembly, public toilet rooms, places of employment, stores, hospitals, convalescent homes, schools, dormitories, day nurseries, rooming houses, filling stations, places of detention, community toilets and all locations that may be classed as other than private residential or private apartments shall have water closet bowls of an elongated type and equipped with open-front seats.

Footnote No. 12

All calculations shall be on the basis of equal numbers of males and females where sanitary facilities are required for both sexes.

4613.20 TRASH CHUTES, LINEN CHUTES AND TRASH ROOMS:

(a) Sprinkler heads shall be required as set forth in Sub-section 3801.1 and water supply shall be as set forth in Section 4614 except that, where no other automatic sprinklers are required or provided in the building, such sprinklers may be connected to the domestic supply.

(b) A one-half inch hose bib with syphon breaker shall be provided in or near each trash room or garbage room supplied by a chute.

(c) A floor drain shall be provided in each linen room supplied by a chute and/or in which sprinklers are provided.

(d) A floor drain shall be provided in every trash or garbage room exceeding 15 square feet in area where such room is used for collection or compacting and in every trash, garbage or linen room served by a fire sprinkler.

(e) All garbage or trash chutes shall be supplied with a flushing ring.

4614 WATER SUPPLY AND DISTRIBUTION

4614.1 QUALITY OF WATER SUPPLY:

(a) **PUBLIC WATER SERVICE REQUIRED:** All premises intended for human habitation or occupancy, including but not limited to establishments to be used for household, domestic, food processing, food handling, restaurant, dairy or bottling purposes, public buildings and places of assembly or other establishments, where a water supply is or may be used for human consumption, shall be supplied from the approved public water mains, where such mains are available. Where a water supply is not available from approved public water mains such premises shall be supplied with potable water (as herein defined) from a privately-owned well or other source which has been properly approved by the authorities having jurisdiction.

(b) **APPROVAL:** No water supply of a non-potable nature shall be used for commercial or industrial purposes unless such use and the source of supply has first been approved by the Florida Department of Health and Rehabilitation Service, Division of Health and Plumbing Official and/or other authority having jurisdiction.

(c) **ACCEPTABLE SOURCES:** Where a public supply of potable water is not available, the requirements of the Florida Department of Health and Rehabilitation Services, Division of Health shall be satisfied.

4614.2 WATER SUPPLY MANDATORY: Every building in which plumbing fixtures are installed and are for human occupancy or habitation shall be provided with an ample supply of pure and wholesome water.

4614.3 PROTECTION OF POTABLE WATER SUPPLY: See Section 4620.

4614.4 VACUUM BREAKERS AND AIR GAPS: See Section 4620.

4614.5 WATER SERVICE PIPE:

(a) The underground water service pipe and building sewer shall be not less than 5 feet apart horizontally and shall be separated by undisturbed compacted earth. The water-service pipe may be placed in the same trench with the building sewer provided the following conditions are satisfied:

(1) The water-service pipe and all other pipe or conduit, shall be placed on a solid shelf excavated at one side of the common trench, above the sanitary sewer line, with a minimum of twelve inches between pipes or conduits.

(2) The number of joints in the service pipe shall be kept to a minimum.

(3) The materials and joints of sewer and water-service pipe shall be installed in such manner and shall possess the necessary strength and durability to prevent the escape of solids, liquids, and gases, therefrom, under all known adverse conditions such as corrosion, strains due to temperature changes, settlement, vibrations and superimposed loads.

(b) **STOP-AND-WASTE VALVE COMBINATION:** Combination stop-and-waste valves and cocks shall not be installed in an underground service pipe.

(c) **PRIVATE WATER SUPPLY:** No private water supply shall be interconnected with any public water supply.

4614.6 WATER PUMPING AND STORAGE EQUIPMENT:

(a) **PUMPS AND OTHER APPLIANCES:** Water pumps, tanks, filters, water softeners, water vending machines, home water purifiers, and all other appliances and devices shall be protected against contamination.

(1) All water softeners, water vending machines, home water purifiers and all other appliances and devices shall bear the NSF Seal of Approval.

(2) All water softeners shall comply with NSF Standard 44.

(3) All water vending machines, home water purifiers and all other appliances and devices shall comply with one of the following NSF Standards: 42, 53 or 58.

(b) **WATER-SUPPLY TANKS:** Potable-water-supply tanks shall be properly covered and screened to prevent the entrance of foreign material or insects into the water supply. Soil or drainage lines shall not pass directly over such tanks.

(c) **CLEANING, PAINTING, REPAIRING WATER TANKS:** A potable-water-supply tank used for domestic purposes shall not be lined, painted, or repaired with any material which will affect either the taste or the potability of the water supply when the tank is returned in service. Tanks shall be disconnected from the system during such operations, to prevent any foreign fluid or substance from entering the distribution piping.

4614.7 WATER-SUPPLY HOUSE TANKS:

(a) **WHEN REQUIRED:** When the water pressure from the community mains during flow is insufficient to supply all fixtures freely and continuously, the rate of supply shall be supplemented by a gravity house tank or booster system.

(b) **SURGE TANKS:** In any structure that requires an auxiliary pump to supplement the available water supply, such pump shall be supplied from a surge tank to be supplied with water from public or private main through a float valve. Upon acceptance by both the local water company and the administrative authority, the requirement for a surge tank may be waived where controlled pumps are provided.

(c) **AUXILIARY PRESSURE: SUPPLEMENTARY TANK:**

(1) If the residual pressure in the system is below the minimum allowable at the highest water outlet when the flow in the system is at peak demand, an automatically controlled pressure tank or gravity tank shall be installed, of sufficient capacity to supply sections of the building installation which are too high to be supplied directly from the public water mains.

(2) Low Pressure Cut-Off: When a booster pump is used on an auxiliary pressure system and the possibility exists that a pressure of five pounds per square inch or less may occur on the suction side of the pump, a low pressure cut-off shall be installed on the booster pump to prevent the creation of negative pressure on the suction side of the water system.

(3) Similar arrangements may be provided with the approval of the Plumbing Official.

(d) **SUPPORT:** All water-supply tanks shall be supported in accordance with the Building Code or other regulations which apply.

(e) **OVERFLOW FOR WATER-SUPPLY TANKS:** Overflow pipes for gravity tanks shall discharge to an approved point of disposal. Rainwater gutters discharging into a street gutter are not considered approved points of disposal. Adequate overflow pipes properly screened against the entrance of insects and vermin shall be provided.

(f) **HOUSE TANK SUPPLY:** The water-supply inlet within the house tank shall be at an elevation not less than is required for an air gap in an open tank with overflow, but in no case shall the elevation be less than four inches above the overflow. If a drop pipe is added to the ball cock or filling device an air inlet shall be inserted in the drop pipe at least two inches above the overflow.

(g) **DRAINS:** Water-supply tanks shall be provided with valved drain lines located at their lowest point and discharged as an indirect waste or as required for overflow pipes in Paragraph 4614.7(e).

(h) **SIZE OF OVERFLOW:** Overflow drain openings for water supply tanks shall be not less than twelve square inches of free opening.

(i) **PRESSURE TANKS:** Pressure tanks used for supplying water to the domestic water distribution system, combined supply to fire standpipes and domestic water systems, or to supply standpipes for fire equipment only, shall be equipped with an accessible water and pressure gauge.

4614.8 WATER DISTRIBUTION PIPE, TUBING AND FITTINGS:

(a) (1) Materials for water distributing pipes and tubing shall be brass, copper, cast iron water pipe, polybutylene, galvanized steel (cold water only), or approved plastic with appropriate fittings.

(2) All steel pipe and fittings shall be hot dipped galvanized (zinc coating) and shall meet the requirements of ASTM Standards A53 or A120. All steel piping shall be marked continuously along the barrel with the name of the manufacturer, place of origin, ASTM Standard and Schedule of pipe.

(3) Copper pipe and tubing below ground shall be Type K or Type L.

(4) Copper pipe and tubing above ground may be Type K, Type L or Type M.

(5) Plastic pipe and fittings may be used for water only in accordance with Table 46-C.

(b) (1) Pipes conveying fire and domestic water shall not be installed underneath concrete slab on the ground in any location inside the building walls.

(2) The looping of copper annealed-soft tubing and approved plastic water piping beneath the ground floor slab will be permitted in single story buildings or multi-story single family residences and the pipe shall be encased in plastic pipe sleeves, its total length to include the turn to above the slab.

EXCEPTION: In multi-story buildings, domestic water pipes of copper or polybutylene may be installed below the ground floor slab providing the water pipe does not exceed 1-1/2" diameter and is encased in a sleeve of PVC sized 2" larger than the water pipe encased, having an angle no greater than one 45 degree fitting and not exceeding 40 feet of its developed length, with the encased water distribution pipe removable for replacement.

(3) Fittings shall not be permitted below the ground floor slab.

(4) The minimum wall thickness of the plastic sleeve shall be 1/32-inch.

(5) Such piping and fittings may be installed in concrete trenches with removable covers.

(c) (1) Water service and distribution pipe shall be electrically isolated from all other pipe, conduit, soil pipe, building steel and steel reinforcing except where electric ground is otherwise required by this Code, and shall also be separated from such metallic members and from any other materials of construction where damage by friction, heat and abrasion may be anticipated.

(2) Where dissimilar metals are used in the piping system which are not considered compatible on the electromotive scale, insulating dielectric fittings between the two dissimilar metals shall be provided. Copper adapters or heater tees with brass nipples may be used as connectors to hot water heaters or like equipment (without using the insulating dielectric fittings required in this section).

(d) (1) Domestic cold water piping placed above a roof or within 10 inches below a roof shall be suitably insulated with approved materials.

(2) Hot and cold water piping, underground or within partitions, shall be separated and not physically connected.

4614.9 PLASTIC PIPE AND FITTINGS PRESSURE RATED FOR WATER SERVICE PIPE:

(a) In Table 46-C these numbers are listed under "Materials" column which represent the ASTM designation numbers assigned to these materials by the joint ASTM-NSF-PPI committee to assist in quick, easy identification of the materials. The numbers appear as a part of the marking on the pipe and/or tubing. These and no others are approved.

(b) (1) All plastic pipe and fittings approved in Table 46-C shall be properly marked as specified by their respective standards.

(2) All material shall be installed as recommended by the manufacturer and/or the Plastic Pipe Institute.

(3) No materials shall be co-mingled within the same system except which are specifically approved in writing by the respective Standards.

(4) All water service piping shall have a minimum working pressure of 160 pounds per square inch, with permanent identification markings. (Schedule 40.)

(5) All plastic water service piping shall have a minimum cover of 12 inches of backfill. PVC water service piping may continue and turn vertically to the service valve for a height not greater than 4 feet.

(c) No existing metallic water service piping used for electrical grounding shall be replaced with non-metallic pipe or tubing until other grounding means are provided which are satisfactory to the proper administering authority having jurisdiction.

4614.10 ALLOWANCE FOR CHARACTER OF WATER:

(a) **SELECTION OF MATERIALS:** When selecting the material and size for water-supplying pipe, tubing, or fittings, due consideration shall be given the action of the water on the interior and of the soil, fill or other material on the exterior of the pipe. No material that would produce toxic conditions in a potable-water-supply system shall be used for piping, tubing or fittings.

(b) **Used Piping:** No piping material that has been used for other than a potable-water-supply system shall be reused in the potable-water-supply system.

4614.11 WATER SUPPLY CONTROL:

(a) Each building shall have a separate main water control valve, independent of the meter valve. Each apartment or store in a building shall have separate independent control valve or valves located close to the distribution main and individual fixture control valves controlling all the fixtures in such apartment or store. Main control valves shall be located at or near the foundation line outside the building above the ground or in a separate approved box with cover.

(b) Supply lines taken from pressure or gravity tanks shall be valved at or near the tank. Tanks in connection with a domestic water system shall have a drain cock installed on the discharge side of the valve.

(c) All single fixtures and groups of fixtures in hotels, office buildings, hospitals, clinics, places of public assembly, manufacturing plants and warehouses shall have separate fixture control valves and a single control valve for each group of fixtures in a single or adjacent room. Each water storage tank shall have an individual control valve and draw off valve.

(d) A shut-off valve, minimum size three-quarter-inch, shall be provided in the cold water branch line, accessible and adjacent to each water-storage tank of each water heater.

(e) Sillcocks for all Group "H" occupancies of more than two units served by a single water service shall be separately and individually valved or otherwise arranged to shut off the supply to the sillcocks without interrupting water supply to the resident units. All store or commercial hose bibbs shall be valved.

(f) Any device, fixture or appliance using potable water shall be connected at a point in the water system so as not to be dependent upon any other fixture supply valve for water supply. Such device or appliance shall be independently valved. Clamp-on type valve shall be prohibited.

(g) (1) **LINE VALVES:** Valves in the water-supply distribution system, including hot water heaters and group shut-off valves, except those immediately controlling one fixtures supply, when fully opened shall have a cross-sectional area of the smallest orifice of opening through which the water flows at least equal to 100 percent of the cross-sectional area of the nominal size of the pipe in which the valve is installed. Valves shall be rated for 125 psi minimum.

(2) All valves in the water-supply distribution system shall be accessible for service and maintenance.

4614.12 WATER SUPPLY DISTRIBUTION:

(a) **WATER-SERVICE PIPE:** The water-service pipe from the street main to the water-distribution system for the building shall be of sufficient size to furnish an adequate flow of water to meet the requirements of the building at peak demand, and in no case shall be less than three-quarters-inch nominal diameter. If flushometers or other devices requiring a high rate of water flow are used, the water-service pipe shall be designed to supply this flow.

(b) **DEMAND LOAD:** The demand load in the building water-supply shall be based on the number and kind of fixtures installed and the probable simultaneous use of these fixtures.

**TABLE 46-Q
MINIMUM WATER PIPE SIZE**

No. of Fixture Units Flush Tank Water Closet		Diameter of Water Pipe	Recommended Meter size	Approx. Pressure Loss, Meter and 100' of Pipe	No. of Fixture Units Flush Valve Water Closet	
Copper	Galva-	Inches	Inches	PSI	Copper	Galvanized
18	—	3/4	5/8	30	—	—
—	15	3/4	5/8	30	—	—
19-55	—	1	1	30	—	—
—	16-36	1	1	30	—	—
—	—	1	1	30	9	—
56-85	—	1 1/4	1	30	—	—
—	37-67	1 1/4	1	30	—	—
—	—	1 1/4	1	30	10-20	—
—	—	1 1/4	1	30	—	14
86-225	—	1 1/2	1 1/2	30	—	—
—	68-175	1 1/2	1 1/2	30	—	—
—	—	1 1/2	1 1/2	30	21-77	—
—	—	1 1/2	1 1/2	30	—	15-52
226-350	—	2	1 1/2	30	—	—
—	176-290	2	1 1/2	30	—	—
—	—	2	1 1/2	30	78-175	—
—	—	2	1 1/2	30	—	53-122
351-550	—	2	2	30	—	—
—	291-450	2	2	30	—	—
—	—	2	2	30	176-315	—
—	—	2	2	30	—	123-227
551-640	—	2 1/2	2	30	—	—
—	451-580	2 1/2	2	30	—	—
—	—	2 1/2	2	30	316-392	—
—	—	2 1/2	2	30	—	228-343
641-1340	—	3	3	22	—	—
—	581-1125	3	3	22	—	—
—	—	3	3	22	393-940	—
—	—	3	3	22	—	344-785

1. **NOTE:** This table is applicable to only the most favorable conditions, where water main pressure does not fall below 50 psi at any time.

2. In general for 3- or 4-story buildings, or where main pressure falls below 50 psi, the next larger size group should be used.

3. Minimum water service shall be 3/4" to the control valve.

4. All secondary or submeters, backflow assemblies shall be at least equal to the nominal size of the water line in which the devices are installed.

5. *One-half inch water piping distribution may be used to service not more than 2 fixtures from a 3/4" water service (reference Section 4614.13).

4614.13 PROCEDURE IN SIZING THE WATER DISTRIBUTION SYSTEM OF A BUILDING:

(a) The sizing of the water distribution system shall conform to good engineering practices.

(b) Methods used to determine the pipe sizes shall be approved by the Plumbing Official and shall be in accordance with the Standards set forth in Section 402 or in the following Tables:

TABLE 46-R1

SIZE OF FIXTURE SUPPLY: The minimum size of a fixture-supply pipe from the riser or main to the wall opening shall be as follows:

Type of Fixture or Device	Pipe Size (Inches)
Bath tubs	1/2
Bidet.....	1/2
Combination sink and tray	1/2
Drinking fountain.....	3/8
Dishwasher (Domestic).....	1/2
Hot water heaters	3/4
Ice Maker	1/2
Kitchen sink, residential	1/2
Kitchen sink, commercial (over one compartment).....	1/2
Lavatory	1/2
Laundry tray, 1, 2 or 3, compartments.....	1/2
Shower (single head)	1/2 Minimum
Sinks (service, slop).....	1/2
Sinks flushing rim.....	1
Urinal (flush tanks)	1/2
Urinal (direct flush valve).....	3/4
Water closet (flush tank type).....	1/2
Water closet (flush valve type)	1
Hose bibbs.....	1/2

TABLE 46-R2
WATER CONSUMPTION IN PLUMBING FIXTURES

Fittings Fixture	Maximum Flow Rate or Volume	
	Residential Use	Commercial & Public Use
Water Closets		
One-Piece	1.6 gpf*	
Two-Piece	1.6 gpf*	1.6 gpf*
Handicap with Flushometer		1.6 gpf*
Flushometer Valve		
(floor mount)		1.6 gpf*
Flushometer Valve (wall mount)		1.6 gpf*
Urinal		
Standard		1.0 gpf*
Handicap		1.6 gpf*
Faucets		
Sink	2.5 gpm**	2.0 gpm**
Lavatory	2.0 gpm**	0.25 gpc or 0.5 gpm**
Showerheads	2.5 gpm**	2.5 gpm**

Notes:

* Tolerances shall be as specified in either ANSI A112.19.2 (1990) or A112.19.19.6 as applicable.

** The values given are based on a test pressure of 60 psig (flowing) in accordance with ANSI/ASME A112.18.1.

Abbreviations: gpm = gallons per minute; gpf = gallons per flush; gpc = gallons per cycle.

A group of not more than two fixtures shall be connected to a half-inch, cold water supply. Hose bibbs shall not be considered a plumbing fixture.

4614.14 MINIMUM PRESSURE: Minimum fairly constant, service pressure, at the point of outlet discharge shall be not less than 8 psi for all fixtures except for direct flush valves, for which it shall be not less than 15 psi, and except where special equipment is used requiring higher pressure. In determining the minimum pressure, allowance shall be made for the pressure drop due to friction loss in the piping system during maximum demand periods as well as head, meter, and other losses in the system.

4614.15 HAZARD AND NOISE: Water pipe installations shall be adequately protected from water hammer by use of air chambers or other approval devices. Air chambers shall be installed in such manner that will permit draining without disconnecting fixture supply. Air chambers or shock absorbers shall be installed and air chambers shall be not less in volume than a 12-inch length of pipe one size larger than the pipe it serves.

4614.16 HOT-WATER DISTRIBUTION: The sizing of the hot-water distribution piping shall conform to good engineering practice.

4614.17 SAFETY DEVICES:

(a) PRESSURE-RELIEF VALVE: Pressure-relief valves shall be installed for all equipment used for heating or storage of hot water. The rate of discharge of such valve shall limit the pressure rise for any given heat input within ten percent of the pressure at which the valve is set to open.

(b) TEMPERATURE RELIEF VALVES: Temperature relief valves shall be installed for equipment used for the heating or storage of domestic hot water. Each temperature relief valve shall be of the reseating type and be rated as to its BTU capacity. In all cases the BTU rating of the temperature relief valve shall be greater than the BTU input rating of the appliance. (See Table 46-S).

(c) **APPROVALS:** Combination pressure and temperature relief valves and separate pressure and temperature relief valves, which have been tested and approved by, or meet the specification requirements of the American Gas Association, A.S.M.E., or other recognized approval authorities, shall be considered acceptable.

(d) **RELIEF-VALVE LOCATION:**

(1) Combination pressure and temperature valves, or temperature relief valves, shall be installed so that the temperature sensing element is immersed in the hottest water within the top six inches of the tank.

(2) There shall be no check-valve or shut-off valve between a relief-valve and the heater or tank for which it is installed.

(3) Pressure-relief valves may be located adjacent to the equipment they serve.

(e) **RELIEF OUTLET WASTES:**

(1) The outlet of a pressure, temperature, or other relief valve shall not be connected to the drainage system as a direct waste.

(2) The valve discharge outlet pipe shall not be smaller than the valve to which it is connected.

(3) The outlet pipe shall not be trapped and shall be installed to drain dry away from the valve to the riser.

(f) **DRIPS — LOCATION FOR BUILDINGS:** Each temperature and pressure relief valve or combination thereof shall be provided with a drip pipe connected to the valve discharge outlet. Drip pipes shall discharge as follows:

(1) For hot water storage tanks placed above the roof: as in (2) and (3) or upon the roof.

(2) In cases where a building covers an entire lot: to any suitable plumbing fixture or floor drain terminating above the floor level except a water closet, urinal, bidet, bath or shower.

(3) In all other buildings except those described in the foregoing; to an observable point outside a building. The terminus of all drip pipes shall be without a thread. Where terminated outside a building: pointing down to within six inches of ground level.

(g) **RELIEF VALVE DISCHARGE PIPING:** Relief valve discharge pipe shall be sized for capacity, length, and connection size of the valve to be installed and shall not be smaller than the valve outlet connection. The size of the manifold pipe shall be determined by the cumulative BTU total of the appliances served thereby and shall be sized as follows:

Up to.....	127,000 BTU.....	1/2 inch I.D.
Above.....	127,000 to 340,000 BTU	3/4 inch I.D.
Above.....	340,000 to 600,000 BTU	1 inch I.D.
Above.....	600,000 BTU shall discharge independently	

This table shall apply to single or manifold pipe and the length of the piping shall be considered. Reducers shall be with smooth transition and without abrupt shoulders.

(h) **SHOWER TEMPERATURE CONTROL DEVICES:**

(1) The temperature of mixed water to multiple (gang) showers shall be controlled by a master thermostatic mixing valve, or such showers may be individually controlled by an anti-scald valve of the pressure balancing or thermostatic mixing type.

(2) All Showers and bath and shower combinations shall be protected with a control valve of the pressure balance, the thermostatic mixing or the combination pressure balance/thermostatic type. Handle position stops shall be adjusted in accordance with manufacturer's instructions at time of installation to a maximum mixed water outlet temperature of 120 degrees Fahrenheit.

4614.18 STORAGE TANKS:

(a) (1) APPLICABLE REQUIREMENTS: All storage tanks for domestic hot water shall meet the applicable A.S.M.E. and listed requirements of Table 46-C.

(2) Hot water storage tanks shall also be installed with heat traps as per State of Florida Energy Code.

(b) MARKING: Any tank hereafter installed for the storage of domestic hot water shall have clearly and indelibly stamped in the metal of the tank, or marked upon a plate welded thereto, or otherwise permanently affixed, the maximum allowable working pressure and the hydrostatic test pressure which the tank is designed to withstand, and the year of manufacture. Such marking shall be placed in an accessible position so inspection and reinspection shall be readily accomplished.

(c) MINIMUM PRESSURES: The minimum hydrostatic test pressure shall be 300 lbs. per square inch and the working pressure shall be not more than 42-1/2 percent of the indicated hydrostatic test pressure.

(d) DRAIN COCK: All storage tanks shall be equipped with an adequate accessible drain cock.

(e) (1) WATER HEATER DRAIN PANS: All water heaters installed above the ground floor space or in attics or ceiling areas shall be installed in an approved drain pan with minimum 2" high sides.

(2) A two-inch minimum clearance shall be provided between the drain pan sides and the heater, or a design approved by the Chief Plumbing Official. The drain pan shall be equipped with a 3/4" minimum size drain line connected to bottom of pan so that no more than 1/4" of water will stand in the pan, and the drain shall be visible in the heater pan.

(3) Drain lines for heater safe pans shall not receive condensate, waste, or drainage from any other device, equipment, or fixture.

(4) On multiple connections, each pan drain shall run a minimum of 6" down before entering the main riser.

(5) Drain size for multiple connections shall be as follows:

(aa) 2 to 3 drain pans shall waste into a 1" pipe.

(bb) 4 to 10 drain pans shall waste into a minimum 1-1/4" pipe.

(cc) Over 10 drain pans shall waste into a minimum 1-1/2" inch pipe.

(6) P & T relief lines and safe pan units shall not use common riser.

(7) Drain lines shall be installed as per Sec. 4614.17(f).

4615 SEPTIC TANKS AND DRAINFIELDS

4615.1 SEPTIC TANKS AND DRAINFIELDS: All septic tanks and drainfields shall be designed in accordance with the requirements of and approved by the Broward County Health Department, Florida Department of Health and Rehabilitative Services.

4616 SUPPLY AND DISPOSAL WELLS

4616.1 POTABLE WATER SUPPLY WELLS:

(a) All premises intended for human habitation or occupancy shall be provided with a supply of pure and wholesome water.

(b) (1) Well casing shall be continuous of new pipe and shall terminate not less than 30 feet below grade in a suitable aquifer.

(2) Pipe 6 inches or less in diameter shall be galvanized or approved PVC.

(3) Well shall be developed and free of all loose sand and stone.

(c) Draw down shall not be excessive.

(d) A tee, of the same size as the casing, shall be installed on the top of the well to allow for proper inspection, introduction of disinfecting agents, and for measurements of depth and static water level.

(e) A soft seat valve of 200 pounds water test, either spring-loaded or flapper type, shall be installed as close to the well as is practicable. Check valves shall be all brass up to and including two-inch size and for three inches or over may be brass or iron body.

(f) The suction line shall be of a size to furnish water in sufficient volume and adequate pressure.

(g) The suction line from the well to the pump shall not be less than one-inch size, shall pitch toward the well and shall contain no loops or high points. Suction pipe 40 feet or more in length shall be increased to the next pipe size.

(h) A union or slip coupling shall be installed in the suction line just before the pump.

(i) Piping from well pump to hydropneumatic tank or other approved water system pressurizing device shall not be smaller than the discharge outlet size of the pump.

(j) A gate valve, with handle removed, shall be installed in the piping between the pump and tank, where the tank is more than 42-gallon size. All tank installations shall be provided with a minimum $\frac{3}{4}$ -inch valve on the discharge side of such tank.

(k) A hydropneumatic tank or other approved water system pressurizing device shall be of a size to prevent excessive cycling of the pump by providing a draw-down of six gallons of water while maintaining an operating range of 20 to 40 pounds per square inch water pressure.

(1) For a hydropneumatic tank the minimum size for each single-family residence shall be 42-gallon capacity.

(2) When the yield or storage capacity of a well is limited, or if additional storage is necessary, hydropneumatic tanks of larger storage capacity may be required.

(l) A pressure switch and air volume control or other approved means of providing a balance of air and water throughout the water supply system shall be adjustable to correspond to the minimum and maximum operating pressures.

(m) The pump and tank system shall be subject to such tests as will effectively disclose all leaks and defects.

(n) The pump and water pressurizing system shall be installed with regard to space as to be reasonably accessible for repair.

(o) Wells shall be so located as to be free of danger of contamination from unsafe water supply and shall be at least 75 feet from a septic tank, drain field, soakage pit or discharge well and of sufficient depth to provide pure and wholesome water.

(p) Before a new potable water supply well, or one which has been repaired, is placed in use, it shall be disinfected in accordance with the method approved by the Division of Health having jurisdiction and shall be pumped clear of the disinfecting agent after disinfection has been completed.

(q) A water supply well for domestic purposes shall terminate not less than 30 feet below grade unless a lesser depth is specifically approved by the Division of Health.

(r) The type and capacity of the pump, equipment, suction and pressure lines and tank shall be not less than specified in Table 46-X.

(s) No well shall be located within any building or under the roof or projection of any building or structure, unless specifically approved by the Plumbing Official.

(t) (1) A concrete pad, 18 inches in diameter, a minimum of four inches thick, shall be poured around the well casing of both driven and drilled wells.

(2) Such pad shall be placed on grade and poured with 4-inch by 4-inch wire mesh and the surface shall slope outwardly. The well casing shall extend above the pad to permit disinfection.

(3) Rotary drilled wells shall be provided with a casing as set forth in Section 4616.1(b) and the annular space between the bored hole and the casing shall be filled with a neat cement grout.

4616.2 WORKING CODE: Any person, firm or corporation submitting application to the Plumbing Official for a plumbing permit for a well installation shall have approval from the Florida Department of Health and Rehabilitation Services, Division of Health, showing that all requirements of the Florida Department of Health and Rehabilitation Services, Division of Health, have been met. Plumbing permits shall be required before work is started and the permit card shall be displayed on the job at all times.

4616.3 WATER SUPPLY WELLS FOR IRRIGATION AND PRIVATE SWIMMING POOLS: Water supply wells for irrigation purposes and for private swimming pools shall be as set forth in Section 4616.1(a), (b), (c), (d), (e), (r), (s) and (t), and shall be so located as to be free of danger of contamination from unsafe water supply and shall be at least 75 feet from a septic tank, drain field, soakage pit, or discharge well and of sufficient depth to provide pure and wholesome water.

4616.4 CLOSED WELL SYSTEMS:

(a) Location of air-conditioning supply wells shall be as distant as practicable or as necessary from disposal wells to minimize cross-circulation.

(b) Air conditioning supply wells shall be located not less than 25 feet horizontally from a septic tank, drain field or soakage pit.

TABLE 46-X
(Predominately for Flush Tanks)
TANK AND PUMP SIZE REQUIREMENTS

Fixture Units	Supply Required G.P.H.	Diameter of Suction	Diameter Pressure Pipe	Diameter Service Pipe	Size of Tanks	HP	Families	Stores	Well Size
23	720	1	3/4	3/4	42	1/2	1	-	1-1/2
30	900	1-1/4	1	1	82	3/4	1	-	2
40	200	1-1/4	1	1	120	3/4	1	-	2
11	720	1	3/4	3/4	42	1/2	-	1	1-1/2
24	900	1-1/4	1	3/4	82	3/4	2	2	2
37	1300	1-1/2	1-1/4	1	120	3/4	3	3	2
45	1500	1-1/2	1-1/4	1	220	1	4	4	2
53	1650	2	1-1/4	1-1/4	220	1	5	5	2
62	1860	2	1-1/4	1-1/4	220	1-1/2	6	6	2
71	2130	2	1-1/2	1-1/4	315	1-1/2	7	7	2-1/2
80	2400	2	2	1-1/2	315	2	8	8	2-1/2
89	2600	2	2	1-1/2	525	2	9	9	2-1/2
98	2700	2	2	1-1/2	525	3	10	10	3

EXCEPTIONS: Variance from the above table may be permitted provided that the detailed plans and calculations are submitted to the Plumbing Official for approval. Such calculations shall be based on table 46-Q and B.M.S. 66 National Bureau of Standards Publication.

4616.5 DISPOSAL AND DISCHARGE WELLS:

(a) (1) A discharge well shall be drilled to an aquifer yielding water having chloride content of not less than 1,500 PPM.

(2) A discharge well for a public swimming pool shall, if such stratum is not available, be deeper than any supply well in the area.

(3) A discharge well for an area drain, rain water, or roof water disposal shall be preceded by a settling tank of approved design.

(b) Disposal wells shall be approved by the Florida Department of Health and Rehabilitation Services, Division of Health, before a permit is issued.

4617 FIRE-EXTINGUISHING APPARATUS

4617.1 Standpipes, yard hydrants and other fire-extinguishing apparatus shall be as set forth in Chapter 38.

4617.2 A permit for a standpipe system shall be required as set forth in Sub-section 4601.5 and inspection shall be as set forth in Sub-section 4601.6.

4617.3 In trash and linen chutes, sprinklers shall be provided as set forth in Sub-Section 3801.4 of this Code and an accessible approved indicating-type valve shall be provided to control the supply to each riser.

4618 SWIMMING POOLS

Swimming pools shall be installed and maintained as set forth in Chapter 50.

4619 TRAILER COACHES AND TRAILER PARKS

4619.1 GENERAL:

(a) The design and installation of toilets and other plumbing facilities within trailer parks for the accommodation, use and parking of independent and dependent trailer coaches, shall be as set forth herein.

(b) Trailers shall not be used for living purposes unless parked at a site approved for that class of trailer.

(c) The owner of a trailer and the owner, operator or lessee of the trailer park shall be responsible for the sanitation of the trailer and the sanitation in connection with such trailer shall be as set forth herein.

4619.2 DEFINITIONS:

BRANCH SERVICE LINE: That portion of the water distributing system extended from the park service main to a trailer site and includes connections, devices and appurtenances.

DEPENDENT TRAILER COACH: Any trailer coach that has a toilet and a bathtub or shower, or any trailer coach which does not provide a plumbing system suitable for connection to the park sewerage system.

INDEPENDENT TRAILER COACH: Any trailer coach that has a toilet and a bathtub or shower. This term shall include mobile homes and trailers which are properly in accordance with provisions of Chapter VIII, Florida State Sanitary Code.

PARK SANITARY DRAINAGE SYSTEM: The entire system of drainage piping used to convey sewerage or other wastes from the trailer drain connection to the trailer site trap to a public sewer or private sewage disposal system.

PARK WATER MAIN: That portion of the water distributing system which extends from the street main, water meter, or other source of supply to the branch service lines.

SERVICE CONNECTION: That portion of the water distributing system which extends from the termination of the park branch service line to the inlet fitting at the trailer.

TRAILER: The term TRAILER shall include a mobile home, travel trailer, truck coach and/or recreation vehicle where such vehicle is used as a dwelling or sleeping place.

TRAILER COACH: Any vehicle used, or so constructed as to permit its being used, as a conveyance upon the public streets and highways, and constructed in such a manner as will permit occupancy thereof as a dwelling or sleeping place for one or more persons.

TRAILER DRAIN CONNECTION OR HOSE CONNECTION: The removable extension, part of which shall be flexible, connecting the trailer coach outlet to the park sewer inlet.

WATER DISTRIBUTING SYSTEM: All of the water supply piping within a trailer park extending from the main public supply, or other source of supply to, but not including the trailer service system, and shall include branch service lines, fixtures, devices and appurtenances.

TRAILER CAMP: This term shall be used in accordance with the definition contained in Section 513.01, Florida Statutes, the terms trailer park and mobile home park as hereinafter used shall be considered synonymous with trailer camp.

TRAILER COACH SPACE: A plot of ground within a trailer park designated for the accommodation of one trailer coach.

REFUSE: All solid waste except body wastes, including garbage, rubbish and ashes.

4619.3 TRAILER PARKS:

(a) TRAILER SITES:

(1) Trailer sites for independent trailers shall provide a gas and watertight connection for sewage disposal which shall be connected into an underground sewage collection system as set forth in this section and chapter.

(2) Trailer sites for dependent trailers shall provide public toilet and bath facilities within 200 feet, and as set forth herein.

(3) Where trailer sites are intended and approved for both independent trailers and dependent trailers, such sites shall provide the facilities for both.

(b) SANITARY FACILITIES REQUIRED FOR DEPENDENT TRAILERS:The minimum number of fixtures provided shall be as follows:

Women:	1 water closet for each 15 women	Men:	1 water closet for each 20 men
	1 lavatory for each 20 women		1 lavatory for each 20 men
	1 shower bath for each 20 women		1 shower bath for each 20 men
			1 urinal for each 25 men

For completely sewerer trailer parks, the toilet facilities shall be as follows:

Women:	1 water closet	Men:	1 water closet
	1 lavator		1 lavatory
	1 shower		1 urinal
			1 shower

for each 100 trailers or fraction thereof.

(c) REQUIRED LAUNDRY FACILITIES: For each 25 trailer coach spaces there shall be provided one hot and cold water supply and one drainage outlet. A 2-compartment laundry tray shall be provided for each wringer-type washing machine installed and a minimum of one 2-compartment laundry tray shall be provided where automatic washers are used.

(d) In determining the number of persons, the occupant content of each trailer shall be taken as three persons.

4619.4 PERMIT REQUIRED:

(a) It shall be unlawful to construct, enlarge, alter, repair, move, remove or demolish any trailer park plumbing facility without first having filed application and obtained a plumbing permit therefor from the Building Official except that no permit will be necessary for the repair of leaks, unstopping of sewers or waste pipes, repairing faucets or valves or cleaning of septic tank. Plans and specifications shall be submitted with the application for new facilities or major alterations to existing facilities and such plans and specifications shall be in detail and shall clearly describe the following:

(1) A plan of the park, drawn to scale, indicating the spaces, areas, site or portion of the park for the parking of trailers and designating thereon whether such site is for a dependent or independent trailer or both.

(2) Detailed description, specification and location of the park sewerage and drainage system.

(3) Detailed description, specifications and location of water supply lines and source of water or details of water treatment plant, if independent source is used.

(b) Plans submitted with application for permit shall require approval of the Plumbing Official and/or Florida Department of Health and Rehabilitation Services, Division of Health.

(c) Plumbing required herein shall comply with all applicable plumbing and health ordinances and regulations.

4619.5 MATERIALS:

(a) All plumbing materials, fixtures and appliances shall comply with the standards set forth in Table 46-C.

(b) All piping material in the park drainage system shall comply with the materials set forth in Sub-section 4604.3 and shall be of not less diameter than set forth in Table 46-Y.

TABLE 46-Y

Size of Soil Pipe (inches) (Based upon Slope of 1/8" per foot)	Maximum Number of Trailers Individually Vented System	Maximum Number Trailers Loop or Circuit Vented
3	2	0
4	20	12
5	42	25
6	80	55
8	175	166
10	325	270

4619.6 DRAINAGE INSTALLATION:

(a) Each trailer shall be considered as 9 fixture units in determining discharge requirements in design of sewage disposal systems.

(b) Branch lines or sewer laterals to individual trailer sites shall be not less than 3 inches in diameter and capped while not in use.

(1) For properly trapped and vented trailers such laterals shall terminate with a sweep into which shall be caulked one 3-inch sanitary tee terminating 4 to 6 inches above grade with a cleanout caulked in the top.

(2) For trailers not properly trapped and vented each sewer lateral shall terminate with a 3-inch P-trap into which shall be caulked a 3-inch sanitary tee the center line of the branch terminating 4 to 6 inches above grade with a cleanout caulked in the top. Such branch line shall not extend more than 15 feet measured horizontally, from a vented sewer without a re-vent. No trap shall be more than 24 inches below grade.

Note: A vented sewer shall be deemed to mean that it shall be loop or circuit vented and shall be in accordance with Table 46-Y.

(c) All vent pipes shall be located at least ten feet from an adjoining property line and shall extend at least ten feet above ground level. All vent pipes shall be strapped and supported by at least the equivalent of 4 inch by 4 inch post securely anchored in the ground. Supports shall be of rot and deterioration resistant material.

(d) To provide the shortest possible trailer drain connection between the trailer outlet and sewer inlet, all sewer laterals shall terminate at least 12 inches outside of the left wheel and within the rear third of the trailer coach.

(e) Cleanouts shall be not less in size than the line they serve, but in no event need they be larger than 6 inches. A cleanout shall be provided at the upper terminal of each park drainage system, and at intervals of not more than 75 feet in straight runs. Cleanouts shall also be located at any point in the line where a deviation occurs in excess of 45 degrees from a straight line. Cleanouts shall be accessible and brought to grade.

(f) Drain connections shall slope continuously downward and form no traps. All pipe joints and connections shall be installed and maintained gas and watertight.

(g) No sewage, wastewater, or any other effluent shall be allowed to be deposited on the surface of the ground.

4619.7 WATER DISTRIBUTING SYSTEM:

(a) Every trailer site shall be provided with an individual branch service line delivering safe, pure, and potable water. The outlet of the branch service line shall terminate on the same side of the site as the trailer sewer lateral.

(b) Each trailer park water distributing system shall be so designed and maintained as to provide a pressure of not less than 20 psi at each trailer site under normal operating conditions.

(c) The water distributing system shall be designed as otherwise set forth in this Chapter. The quantity of water required to be supplied to each trailer site shall be as required for nine-fixture units. The minimum size pipe in the water distributing system shall be not less than three-quarter inch diameter.

(d) When a trailer coach is physically connected to the park distributing system, a separate service shut-off valve and an approved manufactured backflow preventer shall be installed on the branch service line, at or near, the service connection to each trailer. (See Section 4620.)

(e) The service connection shall be not less than ½-inch diameter. Approved flexible tubing is permitted. Fittings at either end shall be of a quick disconnecting type not requiring any special tools or knowledge to install or remove. Water supply lines to each trailer site shall have the point of connection with the individual trailer in either a horizontal or downward position.

4619.8 CONNECTIONS TO SERVICE FACILITIES: Trailer drain connections shall be of approved semi-rigid and non-collapsible hose having smooth interior surfaces and not less than three-inch inside diameter. Drain connections shall be equipped with a standard quick disconnect screw or clamp-type fitting, not less in size than the trailer outlet. Drain connections shall be gas tight and no greater in length than necessary to make the connection between the trailer coach outlet and the sewer inlet on the site.

4619.9 MAINTENANCE: All required devices or safeguards shall be maintained in good working order. The owner, operator, or lessee of the trailer park or his designated agent shall be responsible for their maintenance.

4619.10 INSPECTION:

(a) The Plumbing Official shall periodically inspect the trailer and trailer park sanitary facilities for compliance with the provisions of this section. A decal or other device indicating approval for the trailer sanitary facilities and connection of each trailer to the park water and sewage system shall be placed on the trailer adjacent to the sanitary connection.

(b) The requirements of this section shall apply to existing trailer and trailer park water and sewage facilities as provided for in Paragraph 4601.1(d).

(c) Permits shall be secured in accordance with Sub-section 4601.5 for the installation, alteration and repair of any trailer park plumbing facilities.

4620 CROSS CONNECTION, BACKFLOW AND BACK-SIPHONAGE

4620.1 GENERAL:

(a) It is the intent of this section to recognize that there are varying degrees of hazard to potable water within the water main and water supply systems, and it is the intent to apply the principle that the degree of protection should be commensurate with the degree of hazard.

4620.2 PURPOSE:

(a) To protect the water supply within the premise or private property against actual or potential backflow by requiring such air gaps, vacuum breakers, backflow preventers, and other special devices as required by this section in order to provide protection from the danger created by cross connections.

(b) To establish a cross connection management and backflow prevention program.

4620.3 CONTROL:

(a) Cross connection management and backflow prevention requires cooperation between water purveyors, public health officials, the Plumbing Officials and the consumer.

(b) The responsibilities and duties of each shall be as set forth in this section and other applicable regulations.

4620.4 RESPONSIBILITIES:

(a) **ENFORCEMENT:** The Plumbing Official shall enforce the provisions of this Code so as to ensure the potability of the consumer's water supply, from the point of entrance of the public water supply to the extremities of the consumer's water system. The Plumbing Official shall have primary enforcing responsibility of new and existing installations, alterations and repairs to the consumers water systems.

(b) **WATER PURVEYOR:** The Water Purveyor is primarily responsible for the prevention of contamination and pollution of the public water mains as per Florida Administrative Code 17-555. Such responsibility begins at the point of origin of the public water supply and includes adequate treatment facilities and water mains, and ends at the point of delivery to the consumer's water system. (See definitions, Sec. 4602.) The Water Purveyor has secondary supervisory responsibility to the Plumbing Official for new and existing installations, alterations and repairs to the consumers water systems.

(c) **CONSUMER:** The Consumer has the prime responsibility of preventing contaminants and pollutants from entering his/her water system, and from entering the public water main or water source from his/her water system. The Consumer shall protect his/her water system against actual or potential cross connections, to prevent backflow, as required by this Code and other applicable regulations. He shall assure that all protective devices are tested and maintained in the working condition required. He shall assure the necessary plumbing permits are obtained for new water supply system installations, and for alterations or repairs to existing systems, as required by this Code.

(d) **BACKFLOW PREVENTION DEVICE TECHNICIAN:** When employed by the consumer or the water purveyor to inspect, test, repair, overhaul or maintain backflow prevention devices, the technician shall make certified reports of such work to the Consumer, Plumbing Official, and Water Purveyor. Such reports shall include the name of the premises, service address, location of the device on the premises, type of work performed, type of device, size of device, manufacturer, model number, serial number, line pressure at time of test and include the list of replacement parts if used, such report shall be filled out on a standard backflow device test report form if one is not provided.

4620.5 DUTIES AND INSPECTIONS:

(a) The Plumbing Official, the Health Officer, the Water Purveyor, or their authorized representative shall have the right to enter any building, structure or premises to conduct a survey for purposes of detecting prohibited cross connections.

(b) Nothing herein shall relieve the Consumer of the responsibility for conducting, or causing to be conducted, periodic surveys of water use practices on his premises to determine whether there are actual or potential cross connections in the Consumer's water system through which contaminants or pollutants could flow back into a public water supply or the Consumer's potable water system.

(c) It shall be the duty of the Plumbing Official to cause inspections to be made of all properties containing potable water systems where backflow through a possible cross connection is deemed possible. The frequency of inspections and re-inspections based on potential health hazards involved shall be as established by this section. On request, the Consumer shall furnish to the inspection agency any pertinent information regarding the water system on such property.

(d) These regulations shall be uniform, taking into account the varying degrees of hazards for various premises, and shall properly utilize airgaps of preventive principles, devices, tests, maintenance and repair, as contained in ASSE 1001, ASSE 1011, ASSE 1012, ASSE 1013, ASSE 1015, ASSE 1020, ASSE 1024, ASSE 1025 and ASSE 1035 or as contained in AWWA C506. Other devices may be approved by the Board.

(e) The Plumbing Official shall notify the Consumer of the preventive actions required. The Consumer has the right of appeal.

(f) Water service shall be discontinued after notice to the Consumer if a violation of this section exists on the premises and such other precautionary measures shall be taken as are deemed necessary to eliminate any danger to the potable water supply. Water service shall not be restored until the danger has been eliminated in compliance with the provisions of this Section.

4620.6 TYPE OF PROTECTION REQUIRED:

(a) **ISOLATION:** Every water outlet or connection to any device, fixture, equipment or situation shall be protected with the minimum required air gap whenever possible.

(1) Where it is not possible to provide a minimum required air gap, the potable water supply system shall be protected with the following minimum approved device.

(aa) Low inlet to receptacles under non-continuous pressure — Atmospheric vacuum breaker.

(bb) Low inlet to receptacles under continuous pressure — Pressure vacuum breaker.

(cc) Outlets with hose threads, under non-continuous pressure — Atmospheric vacuum breaker, permanent non-removable type. Except for automatic clothes washing machines.

(dd) Lawn sprinkler system under non-continuous pressure — Atmospheric vacuum breaker.

(ee) Lawn sprinkler systems under continuous pressure — Pressure vacuum breaker.

(ff) Systems subject to back pressure with a pollutant hazard — Double check valve assembly.

(gg) Systems subject to back pressure with a contaminant hazard — Reduced pressure backflow preventer.

(hh) Where hot and cold water valves are connected to supply tempered water to another valve for use in fixtures or where cross flow may occur, check valves or combined valve and check devices shall be provided.

4620.7 INSTALLATION OF BACKFLOW PREVENTERS:

(a) **GENERAL:** All devices shall be accessible. They shall not be installed with any actual or potential unprotected bypass. Any bypass installed shall be protected with the same minimum approved device as the main.

(b) **Atmospheric Vacuum Breaker:** Atmospheric vacuum breakers shall be installed with the critical level at least six inches above the flood level rim or highest point of discharge. Such devices shall be installed on the discharge side of the last control valve to the fixture and no shut off valve or faucet shall be installed downstream of the device. Flush valve vacuum breakers shall be installed a minimum of six inches above the fixture flood level rim.

(c) **Pressure Type Vacuum Breakers:** Pressure type vacuum breakers shall be installed at least twelve inches above the flood level rim.

(d) **Double check and Reduced Pressure Devices:** Such devices shall be installed at least twelve inches above the floor or exterior grade.

(e) The shutoff valves used as an integral component of Approved Backflow Prevention Assemblies shall be of the resilient seat type as defined by AWWA #C509-87 Standard.

4620.8 INSPECTIONS, TESTS AND MAINTENANCE:

All inspections, tests and maintenance shall be performed by a certified backflow prevention device technician. Such work shall require a plumbing permit and include the requirements as set forth under Section 4620.4(d), other than public water main system. Such work shall be at the expense of the consumer.

(a) ISOLATION INSPECTIONS:

(1) **Purpose:** The degree of hazard shall be determined by such inspections. Should any device or plumbing changes be required, such work shall be completed within ten working days and a follow up inspection shall

be made within ten working days thereafter. The Plumbing Official shall be notified at the time of inspection if the degree of hazard poses an imminent health hazard and the proper relative action shall be taken.

(2) Frequency: An isolation inspection shall be performed annually or more if needed, on all potable water systems.

(3) EXCEPTIONS:

(aa) Isolation inspections on buildings of group occupancy having single family or duplex family uses may be performed by the owner. If the owner chooses to employ someone to perform this inspection that individual shall be a certified backflow prevention device technician.

(bb) Isolation inspection on new work, under construction, shall be performed by the Plumbing Official and passed before a Certificate of Occupancy is issued.

(4) Proposed Construction:

(aa) All plans for new construction shall be reviewed by the Plumbing Official to determine the type of protection required, in accordance with this Section.

(b) TESTING OF BACKFLOW PREVENTERS: All devices shall be tested upon initial installation and annually or more if needed.

(1) Visual "Tests" for non-testable devices shall be made at the time of isolation inspection and subject to the requirements of this Section.

(c) MAINTENANCE OF BACKFLOW PREVENTERS:

(1) Any device that fails a visual or operational test shall be replaced or repaired within 10 working days and re-tested with ten days thereafter.

(2) The Plumbing Official shall be notified at the time of test if a device fails and said device is protecting an imminent health hazard.

(3) Devices that are replaced shall be replaced with a device that conforms with this Section.

(4) Devices that are repaired:

(aa) Only original manufacturer's parts are to be used.

(bb) Assembly design shall not be changed.

CHAPTER 47

GAS

- 4701 GENERAL**
- 4702 STANDARDS**
- 4703 PERMITS**
- 4704 INSPECTION**

4701 GENERAL

4701.1 SCOPE: The design, installation, tests and operation of appliances, apparatus, accessory devices and systems using manufactured gas, natural gas, bottle gas or liquefied petroleum gas (L. P.) or mixtures thereof for heat, light and power and the transportation storage, handling, selling, offering for sale or installing of equipment using such gases shall be as set forth herein.

4701.2 OTHER APPLICABLE REGULATIONS: Persons, firms, or corporations engaged in the transporting, storing, handling, selling, offering for sale or installing equipment using liquefied petroleum gas shall comply with Chapter 527, 1969 Florida Statutes and 1970 amendment to Sub-section (1) of Section 527.02.

4701.3 ELECTRICAL CONNECTIONS: All electrical connections and wiring shall comply with Chapter 45 herein. Gas piping shall not be used for electrical ground.

4701.4 OCCUPANT HAZARD: Where heat-producing apparatus is installed in locations where the occupants of the space for reasons of age or physical limitations may, in the opinion of the inspection authority, be required to be protected by additional safeguards, controls and devices shall be designed and installed, to be inaccessible or inoperative to unauthorized persons and protective guards or screens installed to prevent physical contact with heated parts.

4701.5 PORTABLE APPLIANCES: Only appliances which are fully portable in nature shall be connected with gas hose. Gas hose shall not be used or substituted for required tubing and appliance connectors of flexible metal tubing and fittings. Appliances equipped with a control valve or valves which permit complete shut off of the gas supply shall not be connected with gas hose. This requirement does not apply to hand torches, gas irons and similar equipment. Where a gas-hose connection is made, a gas shut-off valve shall always be provided within convenient reaching distance of the operator, on rigid supply piping where the hose is attached; and any valve on the inlet of the appliance shall be removed. Gas hose shall be of adequate capacity, gas tight, and so designed as to permit the secure attachment to the appliance of a threaded connection or a metal clamp, and no rubber slip connections shall be permitted. Under no circumstances shall gas hose be concealed from view or used in a concealed location. Where gas hose is used, it shall be of the minimum practical length, and shall not extend from one room to another or pass through any walls, partitions, ceiling or floors.

4701.6 GAS PIPING IN MULTI-FAMILY RESIDENTIAL AND COMMERCIAL BUILDINGS:

(a) In multi-family residential buildings and commercial buildings all gas piping shall be rigid pipe as described in National Fire Protection Association Standard No. 54, Section 2.6.1 (a) except the following:

(1) Appliance connectors not exceeding six feet in length and located in the same room with the appliance may be semi-rigid tubing as described in National Fire Protection Association Standard No. 54, Section 2.6.1 (b).

(2) Semi-rigid tubing as described in National Fire Protection Association Standard No. 54, Section 2.6.1 (b) may be used to connect individual valves or meters to supply lines where such tubing is provided protection from physical damage.

4701.7 SHUT-OFF VALVES:

(a) In multi-family residential units and commercial buildings control valves for branch lines to each unit occupancy shall be provided and protected from physical damage.

(b) Each valve shall be legibly marked by the owner so that the unit which it serves can be readily identified.

(c) When service is discontinued or interrupted the following safety precautions shall be taken:

(1) Where meters are provided, the gas shut-off valve shall be locked in the closed position by the serving gas supplier or the supply line shall be plugged or capped or the meter plugged or capped gas-tight at the discharge outlet.

(2) Where control valves only are provided, they shall be locked in the closed position by the owner or the line shall be plugged or capped gas-tight on the discharge side of the valve.

(3) The valve controlling the discontinued service line shall be labeled with a durable plastic or metal tag bearing the legend.

"Out-of-Service. Do Not Disturb or Change the Condition of this Valve Under Penalty of Law"

The tag shall be attached to the valve with a non-removable connector.

(d) (1) Every gas appliance connected to a gas line shall have an accessible manual shut-off valve installed upstream of the union or connector and within six feet of the appliance it serves.

(2) When the appliance is disconnected the gas line shall be plugged or capped gas-tight on the discharge side of the valve.

(e) Liquefied petroleum gas systems shall be provided with emergency shut-off valving at the tank.

(f) Emergency shut-off valves for individual units and individual buildings as required by National Fire Protection Association Standard No. 54, Section 2.11.2 (a) and (b) shall be provided and protected from physical damage.

4702 STANDARDS

The following Standards are hereby adopted, as set forth in Section 402:

4702.1 Standard for the Installation of Gas Appliances and Gas Pipe, NFPA 54.

4702.2 Standard for the Storage and Handling of Liquefied Petroleum Gases, NFPA 58.

4702.3 National Fuel Gas Code, ANSI Z223.1-1988.

4703 PERMITS

4703.1 It shall be unlawful to commence work on any gas appliances, apparatus, accessory devices or systems or perform any work covered by this Chapter without first having filed application and obtained a permit therefore and paid the required fee, except that no permit will be necessary for the repair of leaks in an appliance and in the appliance connection. It is the responsibility of the owner to see that such permit is obtained and that all work on or within his property related to gas facilities shall be performed by qualified workers as defined and regulated by applicable licensing ordinances. The word "work" shall mean to include connections to and disconnections from any gas system and opening or closing valves which are a part of the gas system. Violations of the requirements of this Sub-section shall be deemed tampering as prohibited by applicable ordinances.

4703.2 Application for gas permit will be accepted only 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 date to show the nature, character and location of the proposed work.

4704 INSPECTION

4704.1 Upon the presentation of proper credentials, the duly authorized inspector may enter at any reasonable

time, any building, structure or premises for the purpose of inspection to prevent violation of this Code.

4704.2 The inspector is hereby empowered to disconnect or cause to have disconnected any gas burning appliance which does not meet the requirements of this code or which is installed in violation of the Standards prescribed in this Code. Where the inspector finds a hazardous condition warranting such action he may, in writing, direct the person, firm or corporation supplying the gas to disconnect the service from the source of supply and service shall not be restored until the hazard shall have been eliminated and the inspector has approved the resumption of service.

CHAPTER 48

MECHANICAL SYSTEMS

4801	GENERAL ADMINISTRATIVE
4802	DEFINITIONS
4803	MECHANICAL VENTILATION
4804	AIR CONDITIONING AND REFRIGERATION
4805	EQUIPMENT
4806	DUCTS
4807	PIPING
4808	WEATHERPROOFING AND INSULATION
4809	MAINTENANCE

4801 GENERAL ADMINISTRATIVE

4801.1 TITLE, PURPOSE AND SCOPE:

(a) **TITLE:** This Chapter shall be known as "The South Florida Mechanical Code for Broward County" and may be cited as such or as the "Mechanical Code".

(b) **PURPOSE:** The purpose of this Chapter is to provide certain minimum standards, regulations and requirements for safe and adequate design, methods of construction and uses of materials, mechanical apparatus and equipment to secure the expressed intent for reasons of public health, welfare and safety.

(c) **SCOPE:**

(1) The provisions of this Chapter shall apply to the installation of mechanical systems, including alterations, repairs, replacement, equipment, appliances, fixtures, fittings and/or appurtenances thereto, including ventilating, heating, cooling, air conditioning and refrigeration systems, medical gasses, and other energy-related systems.

(2) All portions of buildings customarily occupied by human beings shall be provided with ventilation by openings to the exterior as set forth in Part III — "Requirements Based on Occupancy," or by mechanical ventilation.

(3) It is not the intent of this Code to require air conditioning in any specific building. However, when required and purchased by the owner, all air conditioning and refrigeration systems and equipment shall be as herein set forth and existing installations not conforming with the requirements of this Chapter shall be made to comply, when relocated, or when altered or repaired, the cost of which exceeds 25 percent of the value of the existing installations.

4801.2 MECHANICAL INSPECTION DEPARTMENT:

(a) **MECHANICAL INSPECTORS:** The Mechanical Inspection Department will consist of a Chief Mechanical Inspector, a Mechanical Plans Examiner, and one or more Mechanical Inspectors. The Chief Mechanical Inspector may hold any of all of these positions. The Chief Mechanical Inspector, construed to mean the Chief or Head of the Division or Department of Mechanical Inspectors shall have the sole authority to interpret the South Florida Mechanical Code in his jurisdiction.

EXCEPTION: Except as allowed in Section 203.

(b) **CERTIFICATION:** Personnel of the Mechanical Inspection Department shall be certified in accordance with Sections 201.5 and 201.6 of this Code.

(c) **RIGHT OF ENTRY:** Upon presentation of proper credentials, the Mechanical Inspector may enter, at any reasonable time, any building, structure or premises for the purpose of inspection or to prevent violations of this Mechanical Code.

(d) STOP-WORK ORDERS: Whenever any mechanical work is being done contrary to the provisions of this Mechanical Code or is being improperly installed or may create a structural or health hazard or nuisance, the mechanical inspector may order such work stopped or may order the violation corrected within a reasonable period of time, by notice in writing served on the person or persons engaged in the doing or causing of such work to be done; and such persons shall immediately stop such work until arrangements in compliance with this Mechanical Code and satisfactory to the Mechanical Inspector have been made, at which time he may order the work to proceed.

(e) CONCEALED WORK: The Mechanical Inspector may order portions of a building or structure to be exposed for inspection when, in his opinion, there is good reason to believe that the mechanical systems or equipment, or parts thereof, concealed therein are in an unsafe or dangerous condition, or that there is willful or negligent concealment of a violation of this Mechanical Code.

(f) OCCUPANCY: Whenever any building or portion thereof is being used or occupied contrary to the provisions of this Mechanical Code, the Chief Mechanical Inspector shall report such violation to the Building Official and the Building Official shall order such use or occupancy discontinued and the building or portion thereof vacated as set forth in Sub-section (d) above.

4801.3 PERMITS:

(a) PERMITS REQUIRED: A permit, as set forth in Chapter 3, shall be required for the installation, alteration, or major repair of any air conditioning, refrigeration or other mechanical system. A permit shall not be required for repairs that do not change the location, size, or capacity of a compressor, coil, or duct.

(b) APPLICATIONS: Application for a mechanical permit will be accepted from only qualified persons or firms. Qualifications of persons or firms shall be in accordance with separate ordinance providing for qualification and certification of contractors.

(c) PLANS: Application for a mechanical permit shall be accompanied by sufficient description to clearly define the proposed work. All mechanical construction work shall be detailed on two sets of plans to a convenient scale, and specifications. The information to be illustrated on mechanical plans shall include, but shall not be limited to, the following information: All fire protection assemblies and devices associated with the mechanical system(s), a complete duct layout with specified materials, duct sizes, cfm air volumes at each duct outlet, diffuser sizes, routing and location of ducts, thermal resistance ratings for ducts, equipment manufacturer, equipment model numbers, equipment locations, equipment efficiency ratings, equipment support details, equipment accessibility, equipment capacity in tonnage and/or horsepower, all piping materials and sizes, piping locations and terminations, piping insulation materials and thickness, details for exterior ventilation devices, product specifications, and product listings. The mechanical plans shall comply with the requirements of Chapter 49 and other standards as indicated in section 4801.6.

When the proposed work is for the installation or major alteration of an air conditioning system of one ton or more capacity or is constructed to two or more separately occupied areas, application for a mechanical permit shall be accompanied by mechanical plans describing the proposed work.

When the proposed work serves an occupant content of 100 or more persons, or has a value of \$50,000 or more or when the mechanical system(s) with a per system capacity of more than 15 tons or for any structure greater than 5,000 square feet in area designed for public assembly, the plans shall be prepared by and bear the impress seal of a professional engineer, registered in the State of Florida.

Applications for permits for installation of medical gas systems shall be accompanied by sufficient drawings to clearly define the work. When the estimated cost of medical gas, oxygen, steam, vacuum, toxic air filtration or Halon systems exceed \$5,000 the plans shall be prepared by and bear the impress seal of a professional engineer, registered in the State of Florida, who is competent in this field of expertise.

(d) PRECONTRACT EXAMINATION OF PLANS: Preliminary plans may be submitted by the designer to the Chief Mechanical Inspector before a contract for the proposed work is entered into by the owner. It is the duty of the Chief Mechanical Inspector to cooperate with owners, designers and contractors to provide precon-

tract examination of plans and specifications, to insure the sufficiency and Mechanical Code compliance of such plans before final contracts for construction are made. Application for mechanical permit may not be required for such examination.

(e) EXAMINATION OF PLANS: The Chief Mechanical Inspector or Mechanical Plans Examiner shall examine all plans and applications for permits. If the application or plans do not conform to the requirement of all pertinent laws or regulations, the Chief Mechanical Inspector shall reject such application in writing, stating the reasons therefore. Plans which are rejected, as stated herein above, shall be returned for correction. Penciled notations on mechanically reproduced plans may be accepted for only minor corrections. If the application, plans and specifications, upon examination, are found to comply with the requirements of the Mechanical Code, the plans shall be signed and marked as approved.

4801.4 PERMIT FEES: Permit fees shall be in accordance with Sections 303.1, 303.2 and 303.3 of this Code.

4801.5 INSPECTION:

(a) SCHEDULE: The Chief Mechanical Inspector may, at the time the permit is issued, determine the mandatory inspection schedule based upon the complexity of the system. However, the schedule shall be no less than:

- (1) Before insulation or otherwise concealing any portion of the system.
- (2) Final Inspection.

(b) INSPECTIONS: Mechanical Inspections by Certified Mechanical Inspectors shall be required on all systems. Window air conditioning units in Group I Occupancy may be inspected by other certified Inspectors designated by the Building Official.

(c) Inspections shall be made according to the approved plans, specifications, the South Florida Building Code and its adopted standards.

4801.6 STANDARDS:

(a) STANDARDS ADOPTED: The following standards are hereby adopted, as set forth in Section 402:

- (1) Safety Code for Mechanical Refrigeration ANSI/ASHRAE 15
- (2) Power PipingANSI B 31.1
- (3) Storage and Handling of Liquefied Petroleum Gases NFPA 58
- (4) Installation of Air Conditioning and Ventilating Systems..... NFPA 90 A
- (5) Installation of Blower and Exhaust Systems for Dust, Stock and Vapor
Removal and Conveyance..... NFPA 91
- (6) Removal of Smoke and Grease-laden Vapors from Commercial Cooking
Equipment NFPA 96
- (7) Smoke and Heat Venting Guide..... NFPA 204
- (8) Water Cooling Towers NFPA 214
- (9) Standard for the Prevention of Dust Explosions in Wood Working and
Wood Manufacturing Plants NFPA 664
- (10) Standards for Natural and Mechanical Ventilation.....ASHRAE 62
- (11) Chimneys, Fireplaces, Vent and Solid Fuel Burning Appliances NFPA 211
- (12) Flammable and Combustible Liquids Code NFPA 30

(b) AUTHORITY HAVING JURISDICTION: In NFPA pamphlets where interpretive powers are vested in the inspection authority, it shall be construed to mean the board of Rules and Appeals as set forth in Section 203.

(c) APPLICATION: NFPA pamphlet 90A applies to all Occupancies other than Group I and NFPA pamphlet 90B shall apply to only Group I Occupancies.

(d) STANDARDS OF GOOD PRACTICE:The published "Standards" of the National Fire Protection Association and the handbooks published by the American Society of Heating Refrigerating and Air conditioning Engineers shall be accepted as standards of good practice.

4801.7 DISTRIBUTION OF APPROVED DRAWINGS:

(a) QUANTITY: Two complete sets of drawings shall be submitted with the application for permit.

(b) DISTRIBUTION: The Building Official shall retain one set of the approved plans and the other set shall be kept at the building site, open to inspection of the Building Official at all reasonable times. The Building Official may stop the work if such plans are not available at the building site.

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

4801.8 ALTERNATE MATERIALS AND TYPES OF CONSTRUCTION: The provisions of this Mechanical Code are not intended to prevent the use of types of construction or materials or methods of design as an alternate to the standards herein set forth, but such alternates may be offered for approval, and their construction shall be set forth in this Sub-section.

(a) STANDARDS: The types of construction or methods of design referred to in this Mechanical Code shall be considered as Standards of Quality. New types of construction or materials or methods of design shall be at least equal to these standards for the corresponding use intended.

(b) APPLICATION: Any person desiring to use types of construction or materials or methods of design not specifically mentioned in this Mechanical Code shall file with the Chief Mechanical Inspector authentic proof in support of claims that may be made regarding the sufficiency, and request approval and permission for use. The Chief Mechanical Inspector shall approve such alternates if it is clear that the Standards of the Mechanical Code are at least equaled. If, in the opinion of the Chief Mechanical Inspector, the Standards of the Mechanical Code will not be satisfied by the requested alternate, he shall refuse approval.

(c) APPEAL: Any person, whose request for alternate types of construction, materials or methods of design has been refused by the Chief Mechanical Inspector, or any person in whose considered opinion an action by the Chief Mechanical Inspector in approving or disapproving construction under this Mechanical Code does not satisfy the Standards of this Code for reasons of safety or quality, may appeal to the Board of Rules and Appeals by written request to the Secretary of the Board and such written request shall be transmitted to the Board at once.

(d) REPEATED TESTS: The Chief Mechanical Inspector may require tests of equipment, method, device, or appurtenance to be repeated if, at any time, there is reason to believe that an approval method, device, equipment, or appurtenance no longer conforms to the characteristics on which its approval was based.

4801.9 WORKMANSHIP: All mechanical work shall be done in a workmanlike manner and in compliance with the provisions of this Mechanical Code.

4801.10 WIND REQUIREMENTS: All mechanical work shall be anchored to comply with Section 2309.

4802 DEFINITIONS

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

Wherein a definition set forth in this Chapter varies from a definition set forth in Chapter 4 herein, the definition set forth as follows shall be applicable to only this Chapter 48:

ACCESSIBLE: (See Section 401).

FLEXIBLE DUCT CONNECTOR: A flexible portion of a duct system, one end of which is attached to a rigid branch or main duct, the other end of which is attached to an air terminal device.

PLENUM: A compartment or enclosed space to which one or more ducts may be connected or that shall receive air for the purpose of collection, disbursement or treatment.

4803 MECHANICAL VENTILATION

4803.1 GENERAL:

(a) MECHANICAL VENTILATION: Mechanical ventilation shall be forced ventilation supplying outside air or air conditioning as set forth in this Chapter.

(b) VENTILATION REQUIRED: Required forced ventilation supplying outside air shall be in operation where the building or portion thereof is occupied by human beings, and each room or space shall be separately considered, except that closets and similar minor spaces connected to the properly ventilated room need not be individually ventilated.

(c) EXCEPTIONS: The Chief Mechanical Inspector may waive or vary the requirements for forced ventilation and the supply of outside air or the exhaust of noxious, hazardous, or otherwise objectionable fumes or vapors, subject to the consideration of hazards, arrangements of building components and equipment, and of special equipment for specific conditions of use.

4803.2 REQUIRED VENTILATION:

(a) VENTILATION REQUIREMENTS: Subject to the consideration of and as allowed in the standards of good practice as set forth in Sub-section 4801.6, except as follows:

(1) (AA) ASHRAE 62 shall apply to all indoor or enclosed spaces that people may occupy, except where other applicable standards and requirements dictate larger amounts of ventilation.

(bb) Where the velocity at the intake exceeds 10 feet per second, the intake shall be placed not less than 8 feet above the floor directly beneath.

(2) (aa) In all buildings used for storage or handling of automobile operating under their own power and in all buildings where flammable liquids are used or stored, exhaust ventilation shall be provided to produce one complete change of air every 10 minutes, with the exception of single family garages.

(bb) Such exhaust ventilation shall be taken from a point at or near the floor.

(3) In buildings or portions thereof used for dry cleaning plants, there shall be a complete change of air every 3 minutes.

(4) (aa) All toilet rooms not having an outside operable window sized as required by other sections of this Code shall be provided with a mechanical exhaust system to produce one complete change of air every 3 minutes, except that where the ventilating air has been conditioned there shall be a complete change of air every 7.5 minutes.

(bb) For the purposes of this paragraph the term "toilet rooms" shall be construed to also mean bathrooms, shower rooms, service sink rooms and janitors' closets.

(cc) In public toilet rooms ventilation shall be by an approved mechanical exhaust system discharging outside the building.

(dd) Mechanical exhaust under this section shall be an independent system and shall not be recirculated.

(5) In below-grade vaults and equipment rooms, unless continuous ventilation is provided, there shall be a complete change of air every 3 minutes during periods of human occupancy.

(6) (aa) In paint spray areas and lay-up areas of fiberglass boat manufacturing places and similar hazardous locations, there shall be a complete change of air every minute.

(bb) The area to be considered in calculating the ventilation required shall be defined as a minimum of 20 feet in all horizontal directions from the work and 14 feet in a vertical direction.

(7) Fans and duct systems required to comply with 4801.6(a)(9) - (NFPA-664) shall have the fan located beyond the air cleaning equipment to handle only cleaned air.

(b) EXHAUST DISCHARGE: Ducts from kitchen range hoods, bathroom exhausts and dryers, where duct connections are provided, shall discharge to the outside of the building. All clothes dryers that are vented types shall be vented to the exterior of the building. All exhaust air ducts other than bathroom shall be sealed to the roof jacks, wall caps or any device that accepts duct work. See Section 4806.3(n).

(c) DESIGN BASIS: Where minimum mechanical facilities are based on numbers of persons, the number of persons shall be taken as that reasonably anticipated and the number of persons anticipated shall be shown on plans for the proposed work.

(d) (1) DUCT TERMINATION: All extensions of ventilation openings through a flat roof shall be terminated not less than 8" above the roof surface.

(2) All terminations will comply with Section 4610.1(d)(1) and (2).

EXCEPTION: Exhaust openings do not have to comply with Section 4610.1(d)(1) if all three of the following conditions apply:

1. The exhaust opening is not within three feet of the roof terminal of any vent pipe.
2. The exhaust system serves only a single family residential use. (i.e., Condominium, Apartment Building, Townhouse, Duplex or Single Family Residence.)
3. The roof terminal of the vent pipes and exhaust openings are through a sloped roof (2½ in 12 or greater).

(3) All extensions of ventilation openings through a sloped roof (2½ in 12 or greater) shall be terminated not less than four (4) inches above the roof's finished roof surface.

4804 AIR CONDITIONING AND REFRIGERATION

4804.1 WINDOW TYPE AIR CONDITIONING UNITS: All individual air conditioning units installed in walls or windows shall be securely anchored to the walls by approved methods. Units installed over public property, paths of egress or more than 10 feet above grade shall be secured to the structure by bolts or screws to resist horizontal wind loads. Such units cantilevering more than 8" on the exterior of a building shall be supported by steel angle brackets secured by bolting. Bolts to masonry shall be set in lead shields or similarly rot-resistant fastenings.

4804.2 FIRE-RESISTIVE RATINGS:

(a) Where walls and ceilings are required by this Code to be fire-resistive, the ducts and other appurtenances of an air conditioning or ventilating system shall comply with Section 3703.6, other applicable Sections of this Code, and the Standards set forth herein.

(b) Such wall and ceiling assemblies shall be constructed in accordance with the conditions of the approved fire test made with such assemblies.

(c) Fiberglass and flexible Class I air duct may be used where a one-hour fire-resistive roof/ceiling or floor/ceiling assembly is required if all duct openings are protected with Type BZZU ceiling air diffusers or Type CABS ceiling dampers, as used in the UL Fire Resistive Directory.

(d) The architect shall be responsible for the design of fire resistive walls, floor/ceiling assemblies, roof/ceiling assemblies and horizontal and vertical smoke barriers. The architect shall show the necessary horizontal and vertical fire separations and the hourly requirements of the fire separation on the floor plans and in the building sections. Fire-resistive assemblies, such as shown in the UL Fire Resistance Directory or Table 37 of this Code, shall be identified by its design number or specification as well as by its hourly rating.

(e) The engineer or system designer shall show on the plans openings and duct penetrations of required fire-resistive walls, partitions, ceilings and smoke barriers. The engineer or system designer shall show on the mechanical plans the location and mounting details of all automatic fire doors, fire dampers, ceiling radiation dampers and other fire protection means incorporated in the HVAC system.

4804.3 SIGNS REQUIRED:

(a) Each refrigerating system shall be provided with legible and securely attached permanent sign indicating thereon the name and addresses of the manufacturer and installer, the kind and total number of pounds of refrigerant required in the system for normal operations, and the refrigerant leak field test pressure applied.

(b) It shall be the duty of the person in charge of the premises on which a refrigerating system containing more than 50 pounds of refrigerant is installed, to maintain a conspicuously posted card as near as practicable to the refrigerant compressor giving directions for the operation of the system, including precautions to be observed in case of a breakdown or leak as follows:

(1) Instruction for shutting down the systems in case of emergency.

(2) The name, address and day and night telephone numbers for obtaining service.

(3) The name, address and telephone number of the Building Official and instructions to notify said Building Official immediately in case of emergency.

(c) Where multiple installations exist in a single location, both the electrical disconnect and corresponding heating, ventilation and air conditioning equipment shall be labeled to identify the apartment, office, bathroom or area they serve.

4804.4 OUTSIDE AIR SUPPLY:

(a) All air conditioned or mechanically refrigerated spaces normally occupied by persons shall be provided with outside air at a rate of not less than that prescribed in ASHRAE 62.

(1) **EXCEPTION:** Outside air shall not be required where a unit or units serve a single-family residence of Group I Occupancy.

(2) **EXCEPTION:** Outside air shall not be required for single-family units of Group H Occupancy where such single-family unit is served by a closed system for that unit only and the unit has not less than two exterior walls, and two of the exterior walls have openings complying with Section 1305.1(a)(1).

(b) The point of air intake shall be a minimum of 10 feet developed distance from any vent terminal of a sanitary plumbing system or any exhaust system.

(c) Outside air supply ducts shall be constructed of metal, and installed according to SMACNA/HVAC "Duct Construction Standards - Metal and Flexible".

4804.5 COOLING TOWERS:

(a) The recommendations in the Standards for Water Cooling Towers, NFPA 214, as set forth in Section 402, shall be used as a guide to the fire protection of water cooling towers.

(b) Cooling towers of combustible construction shall be protected with automatic sprinkler devices as set forth in N.F.P.A. 214.

4804.6: WALK-IN COOLERS AND FREEZERS

Walk-in Coolers and Freezers shall comply with the provisions of Sections 3505.3(b)(2), 4606.2 and 4801.6(a)(1) within the South Florida Building Code.

4805 EQUIPMENT

4805.1 GENERAL:

(a) Air conditioning, heating and mechanical systems shall be designed and equipment selected in accordance with good engineering practice and the principles and standards set forth in Section 4801.6.

(b) The design of and selection of equipment and materials for air conditioning and heating systems shall be in compliance with the energy conservation provisions set forth in Chapter 49.

(c) All roof-mounted equipment shall meet the requirements of Section 3409.1 and 3401.7(e).

(d) Conversion of old refrigerant to new refrigerant shall require a permit, and such conversions shall comply with all requirements of ASHRAE 15. Plans shall accompany the application for permit, and such plans shall be prepared, signed, dated and sealed by a Professional Engineer where such proposed work meets or exceeds that provided for in 4801.3(c) of this Code.

(1) The following three UL Standards for Safety for the field conversion of refrigeration and air conditioning equipment shall apply to all equipment that was previously UL Listed:

(aa) UL 2170 - Construction and Operation Requirements for Field Conversion/Retrofit of Products to Change to an Alternate Refrigerant.

(bb) UL 2171-Insulating Material and Refrigerant Compatibility Requirements for Field Conversion/Retrofit of Products to Change to an Alternate Refrigerant.

(cc) UL 2172 - Refrigerant Field Conversion/Retrofit Safety Requirements - Procedures and Guidelines.

4805.2 USED OR SECOND-HAND EQUIPMENT: It shall be unlawful to purchase, sell, or install used equipment or material for mechanical installations unless it complies with the minimum standards set forth in this Code.

4805.3 USE OF EQUIPMENT: All new and used equipment and material shall be installed and utilized in accordance with the manufacturer's recommendations.

4805.4 MIX-MATCHING OF EQUIPMENT:

(a) **NEW INSTALLATIONS:**

(1) In installations of unitary equipment, nothing shall be added to or deleted from the equipment which will invalidate the UL label.

(2) When there is mix-matching of equipment, it shall be the responsibility of the designer of the system that the equipment will function without damage to the components and will meet the quantities stated in the permit application.

(b) **REPLACEMENT EQUIPMENT:**

(1) When a component of an existing system is replaced and there has been no problem with the system other than the component being replaced, it shall be replaced with a piece of equipment as near as possible in design and capacity to the piece of equipment being replaced. When a question arises about capacity, Item (2) of "New Installations" shall prevail.

4805.5 INSTALLATION:

(a) Piping, insulation, devices, appurtenances, or equipment shall not be located in a manner to interfere with the normal operation of windows, doors, or other exit openings.

(b) Piping, insulation, devices, appurtenances, or equipment shall not be located in a manner to interfere with the normal operation or maintenance of other mechanical equipment or electrical equipment.

(c) Equipment, devices, appurtenances and incidental piping shall be so placed and installed that adequate room and space is available for proper operation, inspection, service, repair and replacement.

(d) Every attic installation in new construction in which mechanical equipment is installed shall be accessible by an opening and passageway as large as the largest piece of the equipment and in no case less than 22x36 inches continuous from the opening to the equipment and its controls. The opening to the passageway shall be located not more than 20 ft. from the equipment measured along the centerline of such passageway. Every passageway shall be unobstructed and shall have solid continuous flooring not less than 24 inches wide from the

entrance opening to the equipment. On the control side and other sides where access is necessary for servicing the equipment a level working platform extending a minimum of 30 inches from the edge of the equipment with a 36 inch high clear working space shall be provided. Top or bottom service equipment shall have a full clearance above or below the unit for component removal.

(1) All attic installations shall comply with Chapter 49, (State of Florida Model Energy Efficiency Code for Building Construction).

(e) Grade level equipment shall be installed on an approved preformed base, a structural frame, or a concrete base extending at least 2 inches larger than the equipment on all sides, except when anchoring is to be on the outside of the equipment, the slab shall be 4 (four) inches larger than the equipment and extending not less than 2 inches above adjoining ground.

4805.6 PROTECTION: All mechanical equipment subject to damage by any type of vehicle shall be protected as follows:

(a) The mechanical equipment shall be installed a minimum of five (5) feet from any driveway, street, alley, parking space, loading and unloading areas for vehicles, fire lanes and dumpster containers.

(b) If the five (5) feet clearance cannot be achieved then posts shall be provided at the corner and at a maximum spacing of three feet on center therefrom until such ten (10) foot clearance on that side is provided for.

(1) The center of all posts shall be placed a minimum of 2'-0" from such mechanical equipment of any appurtenances therefrom.

(2) All posts shall be of either the removable barrier type or the fixed barrier type.

(3) All posts shall be of 4" nominal diameter schedule 40 hot dipped galvanized steel pipe conforming to A.S.T.M. A120-79. All pipe shall be filled solid with 3,000 p.s.i. concrete at 28 days and the end of such post shall be crowned 2" minimum. All posts shall be painted with a safety yellow paint.

(4) All posts for removable barriers shall be a minimum length of 5'-0" with a minimum of 3'-6" extending above the adjacent finished grade. For all posts at removable barriers provide a nominal 5" diameter by 3'-4" schedule 40 hot dipped galvanized steel pipe sleeve conforming to A.S.T.M. A120-79 set 4" above the adjacent finished grade to the top of the pipe sleeve. Provide a ¾" diameter by 8" long galvanized steel bolt with a nut at 1'-6" above the bottom of and through the sleeve. Provide a minimum 1'-4" by 1'-4" by 2'-0" deep concrete pod of 3,000 psi concrete at 28 days at each pipe sleeve at a maximum of 3" below the finished grade. Slope the concrete at the area 3" wide by 3" high around the pipe sleeve perimeter so as to shed the water from the pipe sleeve. All fill and/or soil below the concrete pod shall be well compacted.

(5) All posts for fixed barriers shall be a minimum length of 6'-6" with a minimum of 3'-6" extended above the adjacent finished grade. All posts at fixed barriers shall have a concrete pod 1'-4" by 1'-4" by 1'-0" deep minimum of 3,000 psi at 28 days concrete at a maximum of 3" below the finished grade. Slope the concrete area at the area 3" wide by 3" high around the fixed pipe so as to shed water from the fixed pipe. All fill and/or soil below the concrete pod shall be well compacted.

(6) Removable barriers shall be mandatory where it is necessary that the mechanical equipment be accessible or readily accessible for the purpose of maintenance, repairs and/or replacement.

(c) Alternate methods complying with 4801.8 may be used.

4806 DUCTS AND SYSTEMS

4806.1 GENERAL:

(a) This section applies to duct systems for the movement of air or materials in air conditioning, heating, ventilating, exhaust, or conveying systems. All ducts and ductwork shall conform to the standards outlined herein.

(b)(1) No corridor, stair enclosure, passageway, or path of egress in a building, any part of which is normally used for sleeping purposes, shall be used for the supply, return, or exhaust air system serving adjoining areas other than toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces opening directly on the corridor, nor shall any air conditioning or refrigeration equipment be installed therein. Buildings constructed and supervised under the Department of Health and Rehabilitative Services need not comply with this Sub-paragraph.

(2) In Group H Occupancies, the provisions of this paragraph shall not prohibit the use of corridors as a source of make-up air through normal leakage around doors.

(3) In Group I Occupancies, the provisions of this paragraph shall not prohibit the use of corridors or stairs as a path of return air to an air handling unit. In individual tenancy occupying more than one floor, the use of stairs as path of return air to an air handling unit shall not be prohibited.

(4) Air conditioning and air handling installations in Group I Occupancies shall be located and ducted in such manner as to prevent possible carbon monoxide emission in enclosed garages from entering other areas of the building.

(c) No attic, basement, or concealed space in a building shall be used as an integral part of a duct system unless such spaces conform to all the requirements for ducts, except where in compliance with NFPA 90A Section 2-3.10.

(d) The use of polyvinyl chloride or CPVC shall be prohibited from being used in plenums including machinery rooms that used for plenums, except for CPVC piping used for fire sprinkler systems.

#1 EXCEPTION: Low voltage wiring will be permitted in a plenum in Group G Occupancy with open floor area in excess of 20,000 square feet, providing the quantity of low voltage wiring does not exceed ½ percent of the volume of the concealed ceiling space; providing that a smoke detection system is installed in accordance with NFPA 72E, and in accordance with the listing of the detection devices; that the smoke detection system will sound a general alarm and will indicate at the main annunciator panel when device has been triggered and/or alarmed; and that a heat detection device limits the temperature in the ceiling plenum to 125° Fahrenheit. The smoke and heat detection devices shall shut down the air moving equipment.

#2 EXCEPTION: Liquidtight flexible metal conduit coated with PVC shall be allowed under raised floors in computer rooms used for data processing equipment when the raised floor is in compliance with Sec. 2-2 of NFPA 75; the air conditioning system is in compliance with Sec. 7-1 of NFPA 75 "STANDARD for the PROTECTION of ELECTRONIC COMPUTER/DATA PROCESSING EQUIPMENT; and the wiring and ventilation under the raised floor are in compliance with Article 645 of NFPA 70 "NATIONAL ELECTRIC CODE."

(e) For the purpose of this section, attached garages of H or I Occupancy shall be considered J Occupancy.

(f) Closets for air handling units in the residential portions of H and I Occupancies are not considered return air plenums and are to be used solely for the installation of the air handling unit and or water heater.

4806.2 DESIGN: Design of duct systems shall be in accordance with accepted engineering practice. Duct systems designed in accordance with ASHRAE, "Handbook and Product Directory" or American Conference of Governmental and Industrial Hygienists, "Industrial Ventilation, a Manual of Recommended Practice" are prima facie evidence of accepted engineering practice.

4806.3 CONSTRUCTION:

(a) Ducts shall be constructed of metal, or other incombustible materials, installed, supported and reinforced, to provide structural strength and durability at least equal to the requirements set forth in the SMACNA/HVAC "Duct Construction Standards - Metal and Flexible, 1985 Edition," SMACNA "Fibrous Glass Duct Construction Standards," or NAIMA "Fibrous Glass Duct Construction Standards", NAIMA "Fibrous Glass Duct Construction with 1½" Duct Board," NAIMA Fibrous Glass Residential Duct Construction Standard," and ASHRAE Handbooks listed in Table 4-A. Ducts shall not be constructed of Gypsum Board.

EXCEPTIONS:

- (1) Return air ducts in air conditioning systems required to comply with NFPA 90B.
- (2) Ceilings used as return air plenums.
- (3) Walls and ceilings of Mechanical Equipment Rooms used as return air plenums.

(b) Materials for fabrication of air duct systems shall meet the listing requirements of Underwriter Laboratories Standard UL-181, "Factory Made Air Duct Materials and Air Duct Connectors".

(c) All ducts shall be constructed of materials and construction quality as set forth in its class as outline in UL-181.

For the purpose of these requirements, materials are classified as follows:

Class 0 – Air-duct materials and connectors having a fire hazard classification of zero.

Class 1 – Air-duct materials and connectors having a flame-spread rating of not over 25 without evidence of continued progressive combustion and a smoke-developed rating of not over 50.

Class 2 – Air-duct materials and connectors having a flame-spread of not over 50 without evidence of a continued progressive combustion and a smoke-developed rating of not over 50 for the inside surface and not over 100 for the outside surface.

(1) Ducts in Group I Occupancies shall be minimum of Class 2 air-duct material.

(2) Ducts in Group H and Commercial occupancies shall be minimum Class 1 air duct material but shall not exceed 250 degrees F. Temperature. Maximum pressure and velocity for duct material shall be as per U.L. 181.

(3) Industrial or medium and high pressure commercial duct systems shall be minimum of Class 0 air-duct material when duct temperatures exceed 250 degrees F.

(d) Ducts shall be tight throughout in accordance with SMACNA standards with no openings except those essential to the required functioning of the system.

(e) Fibrous glass ductwork shall not be used outdoors or under the following conditions:

- (1) In or under concrete foundation slabs.
- (2) When air temperature exceeds 250 degrees F.
- (3) Kitchen or fume exhausts or to convey solids or corrosive gasses.
- (4) Above the recommended velocities or pressures.
- (5) Immediately adjacent to heating coils operating above 250 degrees F.
- (6) For vertical risers serving more than two stories.
- (7) In mechanical equipment rooms without adequate protection against possible damage.

(f) Fibrous glass ductwork or duct coverings shall not extend through walls or floors required to be fire-stopped; they shall be interrupted at fire dampers and fire doors. Metal sleeves for fire dampers should extend minimum 3 inches past each side of the wall to facilitate attachment of duct sections.

(g) Electric resistance heaters located in fibrous glass duct systems shall be installed in a sleeve of galvanized sheet metal having a minimum thickness of 18 gage and extending 6 inches beyond each side of the heater.

(h) Closure systems utilizing pressure sensitive tapes shall conform to UL181A-P-Underwriters Laboratories closure systems for use with air ducts and connectors.

(i) All rigid and flexible glass duct shall bear a factory applied UL-181 label indicating the class with which it complies.

(j) Ducts embedded in or under concrete slabs shall be of sufficient structural strength and shall be covered on all sides with not less than 4 inches of concrete. Exhaust ducts constructed with PVC schedule 40 pipe, below the slab, shall be installed according to the manufacturer's specifications and may omit the 4 inch concrete encasement where permitted by manufacturer's specifications.

(1) Ducts shall not pass through a structural element unless the element is designed for passage.

(2) All ducts shall be sloped to an accessible plenum for drainage of condensate.

(3) Ducts shall be properly sealed and secured prior to pouring the concrete encasement.

(k) Ducts shall not be installed in such a manner as to impair the effectiveness of the fireproofing around steel or iron of structural members.

(i) Each joint of round metal duct shall be secured against disarrangement with not less than three sheet metal screws except that in buildings of Group I Occupancy where approved tape is used to seal and secure the joints, such sheet metal screw will not be required.

(m) Each joint in flexible duct shall be installed in accordance with UL approval.

(n) All clothes dryer vents shall be constructed of a minimum 26 gauge metal pipe and having a smooth interior surface, or other approved metal materials and installed and utilized in accordance with manufacturers recommendations. When specific dryers are not being installed the minimum size of the exhaust duct shall be 4 inches I.D. The maximum length shall not exceed 25 feet from dryer location to wall, roof cap or engineered exhaust system. There shall be a deduction of 2½ feet for each 45-degree bend and 5 feet for each 90-degree bend.

4806.4 SUPPORTS:

(a) Ducts shall be suitably protected when placed in locations where they may be subject to damage or rupture.

(b) Hangers or brackets for supporting ducts shall be of flat metal, angle iron, or other approved materials, adequately spaced to securely support, or hang the ductwork.

(c) "Hangers, saddles and other supports for flexible ducts shall meet the duct manufacturer's recommendations and shall not be less than 26 gauge, one and one half (1½) inches wide metal strap or #12 gauge wire with 26 gauge one and one half (1½) inch wide saddle minimum, and capable of carrying a minimum of one and one half times the installed weight of the duct and of sufficient width to prevent restriction of the internal duct diameter.

4806.5 FLEXIBLE DUCT CONNECTORS: Flexible duct connectors which do not pass through floors of buildings need not conform to the requirements for ducts if they conform to the following provisions:

(a) Connectors not exceeding 8 inches in diameter shall conform to the requirements for Class 2 connectors when tested in accordance with UL-181.

(b) Connectors exceeding 8 inches in diameter shall conform to the requirements for Class 1 connectors when tested in accordance with UL-181.

(c) Connectors shall not be used as main ducts and each connector from a main duct to an air terminal shall not exceed 14 feet in length.

(d) Connectors shall not pass through any wall, partition, or enclosure of a vertical shaft which is required to have a fire resistance rating of two hours or more.

(e) Connectors shall be installed as straight as possible with no deformation which reduces the cross sectional area.

(f) Connectors used in concealed spaces consisting in part of combustible materials shall also pass the 15-minute flame penetration test for Class 2 air ducts as described in Section 7 of UL-181.

(g) Cylindrical sheet metal collars shall be provided as all junctions with flexible connectors.

4806.6 FLEXIBLE DUCTS: Flexible ducts shall be installed in accordance with the UL restrictions of length and duct class and shall be installed according to SMACNA/HVAC "Duct Construction Standards – Metal and Flexible, 1985 Edition," or other approved engineered methods.

4806.7 VIBRATION ISOLATION CONNECTORS: Vibration connectors in duct systems shall be made of woven material or approved flame proofed fabric or shall consist of sleeve joints with packing or other approved non-combustible materials. Vibration isolation connectors shall not exceed 10 inches in length.

4806.8 SMOKE DAMPERS AND AIR DUCT SMOKE DETECTORS:

(a) Smoke Damper – A leakage rated damper intended for use in heating, ventilating and air conditioning (HVAC) systems. Smoke dampers are intended to restrict the spread of smoke in HVAC systems that are designed to be automatically shut down in the event of a fire or to control the movement of smoke within a building when the HVAC system is operational in engineered smoke control systems.

(1) Smoke dampers shall be classified and labeled in accordance with UL 555S, Standard for Safety-Leakage Rated Dampers For Use in Smoke Control Systems.

(2) Smoke dampers shall be installed where required by 4801.6(a)(4) (NFPA 90A), NFPA 101 and other adopted standards of this Code.

(3) Smoke dampers shall be installed according to the approved manufacturer's detailed directions.

(4) Suitable access doors with tightly fitted covers shall be provided to make them accessible for inspection and maintenance.

(b) Air Duct Smoke Detector. A device used to detect the presence of smoke in the air-stream of ductwork sections of the HVAC air handling system. Air Duct Smoke Detectors are for the primary purpose of controlling blowers and smoke dampers of air conditioning and ventilating systems to prevent distribution of smoke and gaseous products.

(1) Air Duct Smoke Detectors shall be listed, maintained, tested and installed according to the manufacturer's recommendations, NFPA 72 "National Fire Alarm Code," and NFPA 90A.

(aa) Initial testing and installation of Duct Smoke Detectors shall be responsibility of the Mechanical Department.

(bb) Required duct smoke detectors upon activation, when not connected to an approved protective signaling system, shall cause a supervisory visual signal; (no strobe light devices) and an audible signal in a normally occupied area. Audible signal devices sound level shall be a minimum of 45 dBA and a maximum of 80 dBA at ten (10) feet.

(cc) Smoke detector trouble conditions shall be indicated visually or audibly in a normally occupied area and shall be identified as air duct detector trouble.

(2) Air Duct Smoke Detectors shall be installed in all new and replacement air handling units, air conditioning units, package units and fans where required by NFPA 90A and NFPA 101 and meet all requirements of NFPA standards.

(aa) Air Duct Smoke Detectors are designed to be used in air handling systems having a certain range of air velocities. The detector installed shall be listed for the duct air velocities of the designed system.

(bb) Each system designer shall specify on the plans the type of smoke detector to be installed.

(3) Suitable access doors with tightly fitted covers shall be provided to make the detectors accessible for inspection and maintenance.

4806.9 FIRE DOORS: Ducts shall not pass through firewalls unless unavoidable. When ducts or the outlets from or inlets to them pass through fire walls, they shall be provided with automatic fire doors approved for the protection of openings in fire walls (Class A openings on both sides of the walls) through which they pass.

4806.10 FIRE DAMPERS:

(a) Approved fire dampers shall have the following performance characteristics:

(1) They shall provide a practical barrier to passage of air when in the closed position.

(2) They shall remain in the closed position under fire conditions.

(3) They shall be constructed, listed and labeled in accordance with UL 555.

(AA) Fire dampers installed in systems that continue to operate when smoke or heat from a fire is detected, shall be labeled for use in dynamic systems as required by UL 555.

(bb) Fire dampers installed in systems that shut down when smoke or heat from a fire is detected shall be labeled for use in static or dynamic systems as required by UL 555.

(4) They shall be so installed as to stay in place at the protected opening even though the duct is disrupted during a fire, such as by the use of a substantial sleeve or frame secured by perimeter angles on both sides of the opening. Fire dampers shall be installed in accordance with the conditions of their approval and the manufacturer's instructions.

(5) Suitable access doors with tightly fitted covers shall be provided to make them accessible for inspection and maintenance.

(6) They shall have either a 1 or 3 hour standard fire protection rating in accordance with UL 555 for fire dampers.

(7) Fire dampers provided in branch ducts used solely for exhaust of air to the outside shall be installed in such a way that they will not interfere with the flow of air in the main duct.

(b) Fire dampers shall be installed under the following conditions:

(1) Ducts passing through fire resistive walls or partitions requiring a fire rating of one or more hours.

(2) Ducts penetrations of required fire rated shafts.

(3) Fresh air intakes near or below ground, combustible roof level, or in the vicinity of combustible buildings or hazardous facilities, shall be protected with approved fire dampers at the outside wall line.

(4) Approved fire dampers shall be provided in all air transfer openings in partitions required to have a fire resistance rating.

(c) **EXCEPTIONS:** Fire dampers are not required in the following:

(1) Ducts having a cross sectional area less than twenty (20) square inches.

(2) Where horizontal branch ducts connect to multi-story vertical ducts in which the airflow is upward and sub-ducts at least 22 inches in length are carried up inside the riser from each inlet.

(3) In I-Occupancy, attic fan installations where installed in a fire-rated ceiling or roof assembly, a firestat shall be installed to shut off the fan and a fusible link to close the ceiling opening.

(4) Fire dampers are not required in Group I Occupancy except in the supply and return duct openings through required one-hour fire-resistive construction between an attached garage and the residence. In lieu of the required fire dampers at existing Group I Occupancy construction, a smoke detector may be provided wired to shut off the fan. These duct smoke detectors shall be located in the supply duct.

4806.11 FIRE DOORS AND FIRE DAMPERS CLOSING MECHANISM: Fire doors and fire dampers shall be arranged to close automatically and remain tightly closed upon the operation of a fusible link or other approved heat actuated device located where readily affected by an abnormal rise of temperature in the duct or wall opening. Fusible links shall have a temperature rating approximately 50°F (28°C) above the maximum temperature that would normally be encountered with the system in operation or shut down, but not less than 160°F (71°C).

EXCEPTION: When fire dampers are installed as part of an engineered smoke control system, fusible links shall have a temperature rating approximately 50°F (28°C) above the operation temperature for which the smoke control system is designed but not to exceed 285°F (141°C).

4806.12 CEILING RADIATION DAMPERS: A specialized form of a heat stop installed in the air distribution portion of a fire-rated floor/ceiling or roof/ceiling assembly: the sole purpose of which is to help maintain the fire endurance rating of the assembly. Ceiling radiation dampers shall be tested in accordance with UL 555C-Standard for Safety-Ceiling Dampers-First Edition or Canadian UL Standard CAN 4-S112.2-M84 which is Standard Method of Fire Test of Ceiling Firestop Trap Assemblies.

(a) Ceilings radiation dampers are classified into three different types as listed in the UL Fire Resistance Directory – January 1987:

(1) Ceiling Air Diffuser (BZZU) – a diffuser or grill with factory installed material which serves as a heat transmission barrier under fire conditions.

(2) Ceiling Damper (CABS) – a damper designed to function as a heat barrier in air duct outlets or air handling openings penetrating fire resistive membrane ceilings.

(3) Air Terminal Unit (BZGU) – a plenum slot diffuser with factory installed protection material which acts as a heat transmission barrier.

(b) All ceiling radiation dampers shall be installed and utilized in accordance with the manufacturers installation instructions as approved by UL. When manufacturers recommendations require a thermal blanket, such blanket shall be marked "Accessory Thermal Blanket" designated by type of damper, model number and damper size.

(c) Ceiling radiation dampers shall be installed under the following conditions:

(1) Openings or ducts penetrating the fire resistive ceiling membrane which is a required part of a fire rated floor/ceiling or roof/ceiling assembly according to their listing in:

(aa) UL "Fire Resistance Directory:

(bb) Gypsum Association "Fire Resistance Design Manual"

(cc) Other assemblies tested by an approved testing laboratory by recognized standards.

(dd) **EXCEPTION:** Openings in ceilings having a cross sectional area less than twenty (20) square inches in each 100 square feet.

4806.13 REMOVAL OF SMOKE AND GREASE-LADEN VAPORS FROM COMMERCIAL COOKING EQUIPMENT:

(a)(1) The design, installation and use of exhaust components including hoods, grease removal devices, exhaust ducts, dampers, air moving devices, auxiliary equipment and fire extinguishing equipment for the exhaust system and cooking equipment used therewith in commercial, industrial, institutional and similar cooking applications shall comply with the Standards set forth in Section 4801.6 except as set forth herein.

EXCEPTION: The requirements of 4806.13 need not comply with 4801.6(a)(6) for new construction if all of the following criteria are met and installation complies with 4806.14.

(aa) One residential four burner range.

(bb) Two fire extinguishers (Location and type to be determined by fire department).

(cc) One story recreation building or clubhouse associated with a rental or condominium apartment project of Group H or I Occupancy. Or Group H apartments or condominium complying with the requirements of Chapter 51.

(dd) Kitchen area a maximum of 80 square feet.

(ee) Adjoining dining room with a maximum of 750 square feet and a maximum 50 person occupancy.

(2) The requirements of this Sub-section shall not apply to hoods and ducts to carry off heat only from kitchen units such as dishwashers, coffee urns, water heaters and similar kitchen equipment where smoke or grease-laden vapors are not anticipated.

(3) Cooking equipment used in process producing smoke or grease-laden vapors shall be equipped with an exhaust system having a hood or canopy, a duct system, grease removal equipment and fire extinguishing equipment as set forth herein.

(b) LOCATION:

(1) Such hoods shall not be raised more than 7 feet from the floor.

(2) The length and width of kitchen hoods shall extend a minimum of 6 inches beyond the appliance over which they are installed.

EXCEPTION: Six-inch extension is not required when the appliance is adjacent to a wall.

(3) Range hoods shall be not less than two feet high to provide a reservoir to confine momentary bursts of smoke and steam until the exhaust system can evacuate the hood.

(4) Range hoods shall be located as low as possible to increase their effectiveness.

(5) Exhaust connections to range hoods shall be made at the top and/or back of the hoods.

(c) GAS APPLIANCE VENTS: Vents of gas-burning cooking appliances other than ovens shall extend through or beyond the grease screen or filter and shall be further regulated as set forth in Chapter 47.

(d) HOOD DESIGN:

(1) Hoods over kitchen cooking equipment shall be constructed of and be supported by steel not lighter than No. 18 Manufacturers Standard Gage, stainless steel not lighter than No. 20 Manufacturers Standard Gage or of other approved material of equivalent strength, fire, and corrosion resistance.

(2) Hoods shall have continuous external liquid tight welded joints.

(3) Hoods shall be installed to provide 18 inches clearance from all unprotected combustible material.

(4) Range or grease filters or equally effective grease traps shall be installed in all commercial use installations and shall be of non-combustible construction, proportioned not to decrease the air velocity in the duct below the limit set forth in Section 4806.13(e)(8).

(5) The average air velocity across the face of any hood in the exhaust system shall be not less than 100 feet per minute unless the hood is constructed and tested in accordance with UL 710 and certified by a national recognized testing agency.

(e) DUCTS:

(1) Ducts shall comply with the Standard set forth in Section 4801.6(a)(6) and shall also comply with Appendix A of the referenced Standard applicable to clearance required to unprotected combustible construction.

(2) Ducts shall lead as directly as possible to outside.

(3) The ducts shall constitute an independent system in no manner connected with any other ventilating system.

(4) Hand-holes, for inspection and cleaning purposes, equipped with tight-fitting sliding or swinging doors and latches, shall be provided in horizontal sections of exhaust ducts. Such openings should be at the side of the horizontal run in order to prevent dripping of residue. Spacing of such openings shall not exceed 20 feet.

(5) Vertical risers located outside of buildings shall be adequately supported by the exterior walls. Risers located inside of buildings shall be enclosed in a shaft of fire-resistive material, as set forth in Part V herein, extending continuously through the roof.

(6) At the base of each vertical riser, a residue trap shall be provided with provisions for cleanout.

(7) Exhaust ducts shall not pass through 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.

(8) Duct systems shall create a conveying air velocity in the exhaust system of not less than 1500 feet per minute and not more than 2200 feet per minute.

4806.14 SHELVING, HOODS AND VENTILATING DUCTS FOR DOMESTIC RANGES:

(a) Range hoods, where installed, shall be vented to the outside of the building with an incombustible duct.

(b) Range hoods and ducts shall have tightly-fitted joints and be metal of not less thickness than 26 U.S. Standard Gauge.

(c) Ductless range hoods may be installed.

(d) Ducts from residential kitchen range-hoods or ventilating systems shall comply with the Standard set forth in Section 4801.6(a)(5).

(e) The requirements set forth in this Sub-section shall apply to only such ranges as are within a single residential unit.

4806.15 EXHAUST SYSTEMS FOR FLAMMABLE VAPORS: Exhaust systems for flammable vapors shall comply with the Standard set forth in Section 4801.6(a)(5).

4807 PIPING

4807.1 GENERAL:

(a) **GENERAL:** All steel and wrought iron pipe shall be at least standard weight pipe or tubing of equivalent working pressure and tensile strength. Pipe or tubing shall be reamed after cutting to not less than full internal dimensions.

(b) PIPE SUPPORTS:

(1) Piping shall be installed without undue strain and stresses and provisions shall be made for expansion, contraction and structural settlement.

(2) All suspended piping shall be supported with "clevis type" or other approved metal hangers with steel rods. Perforated metal strap, wire and similar materials shall not be used.

(3) Hangers, supports, rods and anchors shall be metal of sufficient strength to support the pipe, contents and pipe covering in proper alignment and to prevent rattling.

(4) Hangers and anchors shall be securely attached to the building construction.

(5) Vertical, copper, steel and plastic piping shall be supported at every other story height.

(6) Horizontal steel pipe shall be supported with maximum support spacing as set forth in Table 48-A.

TABLE 48-A

Nominal Pipe Size (Inches)	Maximum Span (Feet)	Minimum Rod Diameter (Inches)
1/2	5	1/4
3/4	6	3/8
1	7	3/8
1 1/2	9	3/8
2	10	3/8
3	12	1/2
3 1/2	13	1/2
4	14	5/8
5	16	5/8
6	17	3/4

8.....	19.....	7/8
10.....	22.....	7/8
12.....	23.....	7/8

(7) Horizontal copper pipe shall be supported with maximum support spacing as set forth in Table 48-B.

TABLE 48-B

Nominal Pipe Size (Inches)	Maximum Span (Feet)	Minimum Rod Diameter (Inches)
1/2.....	5.....	1/4
3/4.....	5.....	3/8
1.....	6.....	3/8
1 1/4.....	7.....	3/8
1 1/2.....	8.....	3/8
2.....	8.....	3/8
3.....	10.....	1/2
4.....	12.....	1/2

(8) Horizontal SDR and SCH 40 plastic pipe shall be supported with maximum support spacing as set forth in Table 48-C.

TABLE 48-C

Nominal Pipe Size (Inches)	Maximum Span (Feet)	Minimum Rod Diameter (Inches)
1/2.....	3.5.....	1/4
3/4.....	3.5.....	1/4
1.....	4.0.....	1/4
1 1/2.....	4.5.....	3/8
2.....	4.5.....	3/8
3.....	5.5.....	3/8
4.....	6.26.....	3/8
5.....	6.50.....	1/2
6.....	6.75.....	1/2
8.....	7.5.....	5/8
10.....	7.75.....	5/8
12.....	8.0.....	3/4

(9) Horizontal SCH 80 plastic pipe shall be supported with maximum support spacing as set forth in Table 48-D.

TABLE 48-D

Nominal Pipe Size (Inches)	Maximum Span (Feet)	Minimum Rod Diameter (Inches)
1/2.....	3.5.....	1/4
3/4.....	4.0.....	1/4
1.....	4.5.....	1/4
1 1/2.....	5.0.....	3/8
2.....	5.0.....	3/8
3.....	6.0.....	3/8
4.....	7.5.....	1/2
5.....	8.0.....	1/2
6.....	8.5.....	5/8
8.....	9.0.....	5/8
10.....	9.5.....	3/4
12.....	10.0.....	3/4

(c) PIPING THROUGH WALLS, FLOORS, ETC: Piping passing through walls, ceilings, floors, in or under concrete slabs, beams, or any portion of the building structure shall be free to expand and contract and shall not be embedded in plastic, concrete or masonry. Such piping shall be provided with sleeves or thimbles when passing through concrete or masonry walls, ceilings, floors or beams, and such sleeves or thimbles shall be at least three-eighths (3/8) inch larger than the outside diameter of the pipe plus the insulation. Openings through wooden floors, ceilings, walls and beams shall be at least three-eighths (3/8) inch larger than the outside diameter of the pipe or the pipe plus insulation. No piping shall be installed in a concrete slab or in the ground under a slab. See Exception 4807.7(b).

EXCEPTION: In industrial and public utility facilities it shall be acceptable for specified piping to be located in the ground below a slab in buildings of E, F or J Occupancy when the installation plans bear the seal of a Florida Registered Professional Engineer.

(d) WELDING: Where welding is used as a means of connection of branches to mains, provisions shall be made for the expansion of the pipe at this point so that undue stresses or strains shall not be placed on the welds or piping.

(e) COLD WATER SUPPLY TO HOT WATERTANK: The cold water supply to a hot water tank shall be discharged within 3 inches of the bottom of the tank either by direct connection at this point or by means of a pipe or tube inside the tank. There shall be installed on the cold water line close to the tank a hand shut-off valve and a back flow preventer in accordance with Section 4620.

(f) PIPE, FITTINGS, VALVES AND FLANGES:

(1) All threads on pipe, fittings, valves, flanges and similar appurtenances shall conform to American Standard for Pipe Threads, ANSI B2.1 and shall be made up with an approved thread compound or lubricant.

(2) Required gaskets shall be made of material approved for the pressure and temperature to which they are to be subjected. Rubber shall not be used where pressure exceeds 15 psig steam and 125 psig water or on temperature greater than 250 degrees F.

(3) Flanges, screw type, cast iron or steel, or of the forged integral type may be used up to their working pressure and temperature ratings. All companion flanges shall have matching facing and drilling.

(4) All pipe fittings and valves shall be of the type designed for the pressures and temperatures of the installation.

4807.2 CONDENSATE DRAIN PIPING AND INDUSTRIAL WASTES:

(a) Special consideration shall be given to the disposal of waste and over-flow water, and means of disposal shall be subject to approval of the Plumbing Official. Condensate drain piping and industrial wastes shall be in accordance with Sections 4603.10, 4606.7 and 4611.4. A condensate pump may be used as an alternate method of condensate removal if the condensate pump is properly sized and installed according to manufacturer's recommendations, and the condensate pump shall be equipped with a factory installed micro switch/float switch wired to shut down the air conditioner in case of condensate pump failure.

(b) When indoor air conditioning equipment is installed in concealed attic or ceiling spaces or crawl space, an auxiliary drain pan shall be required; and shall be a minimum of 1 inch deep and 1 inch larger than the unit in width and length on all sides and shall be constructed of not less than No. 24 gauge galvanized sheet metal. All indoor air conditioning equipment with an auxiliary drain pan underneath shall have a separate condensate drain line terminating over a shower, tub, sink, lavatory, or any other interior or exterior locations where the condensate flow would be noticed, but not do damage; a float switch or an approved listed switching device to control overflow may be used in auxiliary drain pans in lieu of an auxiliary drain line and shall be wired to shut down the air conditioning system when the switch opens. When such auxiliary drain pan is used with a float switch or an approved listed switching device, such auxiliary drain pan shall be provided with a means of draining for servicing purposes.

EXCEPTION: A shallow fan coil unit containing a built-in auxiliary drain connection can be installed within a furred down ceiling without an auxiliary drain pan. The connection for the auxiliary drain line shall terminate below the ceiling at a point where the water from it would be noticed and will not cause any structural damage, if it is not possible to terminate over a shower, tub, sink, lavatory or any other exterior locations where the condensate flow would be noticed, but not do damage.

(c) All condensate piping except auxiliary pan condensate lines shall be adequately insulated where damage to property or equipment may result from sweating or where the condensate piping is installed in attic or crawl space.

4807.3 CHILLED WATER PIPING: All chilled water piping and fittings shall be of wrought iron, steel, copper, brass or polyvinyl chloride plastic (PVC) Schedule 40 Type I normal impact, polyvinyl chloride plastic (PVC) Schedule 80 Type I normal impact, pressure rated cement asbestos epoxy lined pipe or Type 3003-0 aluminum tubing.

(1) IDENTIFICATION: All piping and fittings shall be marked to indicate type, weight or pressure as applicable.

(2) All plastic pipe shall be installed and supported in accordance with the manufacturer's recommendations and/or the Plastic Pipe Institute in such a manner as to give protection from physical damage to the piping and shall not be used as a connection material to heating devices, nor other equipment where temperature and/or vibration could affect the piping.

4807.4 CONDENSER WATER PIPING:

(a) Condenser water piping shall be of the same quality and installed in the same manner as required in Section 4807.3 of this Code.

NOTE: Sizes larger than 6" should be governed by manufacturer's recommendations.

(b) BLEED-OFF: All cooling tower bleed-off lines shall be extended to a sanitary sewer drain or storm sewer drain. Such drain shall not in any case be allowed to drain into yards, streets or alleys, or on the roof of a building.

(c) INSTALLATION: Cooling towers shall be provided with a direct connection to a water supply through an individual float control valve. The control valve shall terminate not less than three inches above the highest possible water level in the cooling tower pan. A convenient means shall be provided, either a gate valve or a capped nipple, for draining or flushing the tower.

4807.5 MAKE-UP WATER PIPING:

(a) From an approved back-flow preventer installed as required by Section 4620 of this Code, to the inlet on a boiler, chiller, or other water-using device covered by this Code, the piping shall be as herein before specified for chilled water piping, except on boilers operating above 250 degrees F. or 100 PSIG pressure, the make-up water line shall be black iron or wrought iron pipe conforming to Schedule 80 of American Standard on Wrought-Steel and Wrought-Iron Pipe ANSI B.36.10 and extra-heavy iron or steel fittings.

(b) Protection of portable water supply shall be in accordance with Section 4620 of this Code.

4807.6 FUEL PIPING: All gas fuel piping shall be in accordance with Chapter 47 of this Code. All fuel oil piping shall be wrought iron, steel, or copper. Piping shall be joined by threading, welding, or brazing.

4807.7 REFRIGERANT PIPING:

(a) All refrigerant piping and equipment shall be sized, installed, tested, and placed in operation in accordance with the "American National Standard for Mechanical Refrigerating Equipment." ANSI B31.5 and ASHRAE STANDARD – Safety Code for Mechanical Refrigeration" ANSI/ASHRAE 15.

(b) The looping of copper tubing beneath the ground floor slab will be permitted in single-story buildings or multi-story single family residences, but the suction line shall be insulated and the liquid line shall be enclosed in a plastic sleeve or insulated the total length to include the turn to above the slab. Concealed or non-removable joints shall not be permitted below the ground floor slab.

EXCEPTION: In multi-story buildings, refrigerant piping of copper may be installed below the ground floor slab providing the pipe does not exceed one and five eighths (1 5/8) inch OD and is encased in a sleeve of PVC Schedule 40 sized 2" larger than the pipe and insulation encased, having an angle no greater than 45 degrees, with no joints permitted below the ground floor slab, and with the encased refrigerant piping removable for replacement. Sleeved underground refrigerant lines shall be dry, sealed and watertight with approved materials and methods at all times after the sleeving is installed.

(1) Sleeved underground refrigerant lines shall be dry, sealed and watertight with approved materials and methods at all times after the sleeving is installed.

(c) SPECIFIED MINIMUM REQUIREMENTS FOR REFRIGERANT PIPE AND TUBING:

(1) No less than Schedule 80 wall thickness carbon steel or wrought iron pipe shall be used for Group 2 and Group 3 refrigerant liquid lines for sizes 1 inches and smaller. No less than Schedule 40 wall thickness car-

bon steel or wrought iron pipe shall be used for Group 1 refrigerant liquid lines 6 inches and smaller, Group 2 and Group 3 refrigerant liquid lines sizes 2 inches through 6 inches, and Group 1, Group 2, and Group 3 refrigerant vapor lines 6 inches and smaller. Butt-welded carbon steel and butt-welded wrought iron pipe shall not be used for refrigerant liquid lines. Cast iron pipe shall not be used for Group 1, Group 2, or Group 3 refrigerant lines.

(2) Standard iron pipe size copper and red brass (not less than 80 percent copper) pipe may be used and shall conform to "Standard for Seamless Copper Pipe," ANSI H26.1, and "Standard for Seamless Red Brass Pipe," ANSI H27.1.

(3) Water tube size hard copper tubing used for refrigerant piping erected on the premises shall conform to "Standard for Seamless Copper Water Tube," ANSI H23.1, for dimensions and specifications, except that copper tubing with outside diameter of 1/4 inch and 3/8 inch shall have a minimum nominal wall thickness of not less than 0.030 inch and 0.034 inch respectively.

(4) Soft annealed copper tubing used for refrigerant piping erected on the premises shall not be used in sizes larger than one and five eighths (1 5/8) inch standard size (1.625 outside diameter). Mechanical joints shall not be used on soft annealed copper tubing on sizes larger than 7/8 inch standards size (0.875 outside diameter).

(5) Copper tubing joints used in refrigerating systems containing Group 2 or Group 3 refrigerants shall be brazed. Soldered joints shall not be used in such refrigerating systems.

(6) Type 3003-0 aluminum tubing with high pressure fittings may be used with all refrigerants except methyl chloride, and those others known to attack aluminum.

(d) JOINTS AND REFRIGERANT CONTAINING PARTS IN AIR DUCTS: Joints and all refrigerant containing parts of a refrigerating system located in an air duct of an air conditioning system carrying conditioned air to and from humanly occupied space shall be constructed to withstand, without leakage, a temperature of 700 degrees F.

(e) EXPOSURE OF REFRIGERANT PIPE JOINTS: Refrigerant pipe joints erected on the premises shall be exposed for visual inspection prior to being covered or enclosed.

(f) STOP VALVES:

(1) GENERAL REQUIREMENTS: All systems containing more than 6 pounds of a Group 2 or 3 refrigerant, other than systems utilizing non-positive displacement compressors, shall have stop valves installed as follows:

(aa) Each inlet of each compressor, compressor unit, or condensing unit;

(bb) Each discharge outlet of each compressor, compressor unit, or condensing unit, and each liquid receiver.

(2) SYSTEMS CONTAINING 100 POUNDS OR MORE OF REFRIGERANT: All systems containing 100 pounds or more of a refrigerant, other than systems utilizing non-positive displacement compressors, should have stop valves in addition to those in paragraph (1), on each inlet of each liquid receiver except that none shall be required on the inlet of a receiver in a condensing unit nor on the inlet of a receiver which is an integral part of the condenser.

(3) Stop valves used with soft annealed copper tubing or hard drawn copper tubing 7/8 inch standard size (0.875 outside diameter) or smaller shall be securely mounted, independent of tubing fastenings or supports.

(4) Stop valves shall be suitably labeled if their purpose is not obvious. Numbers may be used to label the valves provided a key to the numbers is located near the valves.

(g) LOCATION OF REFRIGERANT PIPING:

(1) Refrigerant piping crossing an open space which affords passageway in any building shall be not less than 7½ feet above the floor unless against the ceiling of such space and chemically isolated from lime bearing structural member.

(2) Free passageway shall not be obstructed by refrigerant piping. Refrigerant piping shall not be placed in any elevator, dumbwaiter, or other shaft containing a moving object, or in any shaft which has openings to living quarters or to main exit hallways. Refrigerant piping shall not be placed in public hallways, lobbies, or stairways, except that such refrigerant piping may pass across a public hallway if there are no joints in the section in the public hallway, and provided nonferrous tubing of 1 inch nominal diameter (1-1/8-inch outside diameter) and shall be contained in a rigid metal pipe.

(3) Where piping passes through concrete or masonry walls, ceilings, floors or beams, such piping shall be provided with sleeves or thimbles which shall be at least 3/8" larger than the outside diameter of the piping plus the insulation. All voids between piping and casing shall be adequately enclosed with an approved material.

(4) When the length below ground of exterior refrigerant piping exceeds two feet, piping shall be buried minimum 12 inches below grade.

(5) Openings not exceeding 20 square inches in cross-sectional area per 100 square feet for refrigerant piping may be installed through fire-resistive floor systems and through concrete slabs without having to comply with enclosure requirements of Sec. 1807.2 if such lines are carried in an approved rigid and tight continuous fire resistive pipe duct or shaft having no openings into floors not served by the refrigerating system. The pipe duct or shaft shall be vented to the outside.

(h) REFRIGERANTS:

(1) Refrigerants and refrigerant blends shall be classified and designated according to ASHRAE 34 - Number Designation and Safety Classification of Refrigerants.

4807.8 MEDICAL GAS PIPING: All medical gas piping shall be installed in accordance with the requirements of NFPA 99.

4807.9 STEAM AND HOT WATER PIPING:

(a) All steam and hot water piping shall be at least Schedule 40 pipe. Brass or copper pipe, copper or steel tubing and CPVC plastic piping can be used in hot water installations if the system is designed to operate within the pressure and temperature ratings of the material.

(b) **BRANCH MAIN STRESS:** Where the main steam supply or hot water supply piping or the main return piping of a system is divided into two (2) or more branch mains or returns, such branches from the main piping shall be taken off with tees and elbows or "Y" branch fittings, installed and connected so that there are no undue stresses or strains from pipe fittings or threads at the point or points of junction of the piping. Bull head tee connections where the two branch connections are taken from the run of the tee are prohibited in steam piping.

4807.10 TESTS AND INSPECTIONS: Work shall not be concealed prior to inspection and tests. All pipe of all piping systems except cast iron and plastic as approved in this Code, shall be tested with nitrogen, compressed air or other inert gas (not oxygen) or hydrostatically at a minimum of 1½ times the operating pressure. Approved plastic piping shall be tested at 1½ times the operating pressure of the system.

4808 WEATHERPROOFING AND INSULATION

4808.1 WEATHERPROOFING:

(a) All ducts installed outside buildings and exposed to the elements shall be weatherproofed.

(b) All ducts installed outside buildings shall be galvanized coated metal, stainless steel, aluminum or copper.

(c) Metal ducts externally insulated shall have this insulation protected with a covering of weatherproof membrane, mastic coating or approved product.

4808.2 INSULATION:

(a) All equipment, ducts and piping of mechanical systems shall be insulated to conserve energy, prevent condensation, and prevent injury from burns.

(b) All sheet metal outside air ducts passing through conditioned spaces shall be insulated.

(c) Cooling ducts in any unconditioned area shall be insulated and provided with a vapor barrier to prevent condensation.

(d) Ductwork insulation may be applied to the exterior surface of the duct or may be applied as an interior liner to the duct.

(1) When interior liner insulation is used, the maximum recommended duct velocity is not to exceed the insulation manufacturer's recommendation.

(2) Lining and adhesives for ducts shall have a flame-spread rating not over 25 without evidence of continued progressive combustion and with a smoke-developed rating not higher than 50.

(3) Tests shall be in accordance with ASTM C-411-61 (Hot Surface Performance of High Temperature Thermal Insulation) at a minimum test temperature of 250 degrees F.

(4) Linings shall be interrupted at the area of operation of a fire damper or fire door.

(5) Linings shall be interrupted for a minimum of 6 inches downstream in the vicinity of heat sources in a system involving electric resistance. Linings shall be interrupted for a minimum of 18 inches upstream and 30 inches downstream in the vicinity of heat sources for fuel burning heaters.

(6) Where lining is interrupted, insulation shall be applied externally to the duct, with sufficient lap to prevent condensation.

(e) Duct, equipment and pipe covering shall be thermal insulation of an approved type installed in accordance with manufacturer's instructions.

(f) Duct, equipment and pipe covering in spaces used as plenums or part of a duct system shall have a flame-spread rating of not over 25 and SDR of 50.

(g) All ducts, equipment and piping which operate at temperatures in excess of 120 degrees F. shall have sufficient thermal insulation to limit the exposed surface temperature to 120 degrees F. (vapor barrier not required).

4809 MAINTENANCE

4809.1 Mechanical apparatus, equipment and installations as are required or regulated in this Mechanical Code, now existing or hereinafter installed, shall be maintained by the user in a safe condition and all devices and safeguards maintained in good working order.

4809.2 Mechanical apparatus, equipment and installations shall be maintained by the user in a clean condition, free from accumulations of oily dirt, waste, and other debris.

4809.3 No alterations or additions shall be made which will reduce or obstruct the accessibility or space provided for maintenance of mechanical apparatus, equipment or installations.

4809.4 Upon the presentation of proper credentials, the duly authorized inspector may enter at any reasonable time, any building, structure, or premises for the purpose of inspections to prevent violation of this Code.

4809.5 The inspector shall cause to be discontinued the operation of any mechanical apparatus, equipment or system which does not meet the requirements of this Code or which is installed and operated in violation of the standards prescribed in this Code.

CHAPTER 49
SOUTH FLORIDA BUILDING CODE

State of Florida
Model Energy Efficiency Code
for Building Construction

As of April 1, 1986

the State Energy Code will be a part of the Broward County Edition of the South Florida Building Code, but by reference only and will remain Chapter 49. The Board of Rules and Appeals will not issue future revisions to the State Energy Code – they will have to be obtained from:

Florida Department of Community Affairs
Codes and Standards Section
2571 Executive Center Circle, East
Tallahassee, FL 32301 Phone: (904) 487-1824

**PART XIV
SPECIAL SUBJECTS
CHAPTER 50
SWIMMING POOLS AND SPAS**

- 5001 GENERAL**
- 5002 DESIGN**
- 5003 CONSTRUCTION DETAILS**
- 5004 WATER SUPPLY AND DISPOSAL**
- 5005 EQUIPMENT**
- 5006 INSPECTION**

5001 GENERAL

5001.1 All Public and Residential swimming pools and spas shall comply with the requirements herein.

5001.2 STANDARDS: The following Standards are hereby adopted as set forth in Section 402 of this Code:

For the purpose of this chapter, the word pool(s) or spa(s) shall be synonymous with each other.

(a) AMERICAN NATIONAL STANDARDS INSTITUTE:

- (1) **ANSI/NSPI-1**Standard for Public Pools
- (2) **ANSI/NSPI-2**Standard for Public Spas
- (3) **ANSI/NSPI-3**Standard for Permanently Installed Residential Spas
- (4) **ANSI/NSPI-4**Standard for Aboveground/Onground Residential Swimming Pools
- (5) **ANSI/NSPI-5**Standard for Residential Inground Swimming Pools
- (6) **ANSI/NSPI-6**Standard for Residential Portable Spas
- (7) **ANSI/ASME A112.19.8m**Suction Fittings For Use In Swimming Pools, Wading Pools, Spas, Hot Tubs and Whirlpool Bathtub Appliances.
- (8) **ANSI/ASME Z21.56**Gas Fired Pool Heaters

(b) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

- (1) **ASTM D1785**Standard Specifications for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.

(c) NATIONAL FIRE PROTECTION ASSOCIATION (NFPA):

- (1) **NFPA 70**The National Electrical Code (NEC)—Specifically Article 680
- (2) **NFPA 54**National Fuel Gas Code
- (3) **NFPA 58**Standards for the Storage and Handling of Liquefied Petroleum

(d) NATIONAL SANITATION FOUNDATION (NSF)

- (1) **Appropriate Standards**
- (2) **NSF-50** Circulation System Components and Related Materials for Swimming Pools, Spas/Hot tubs.

(e) SOUTH FLORIDA BUILDING CODE, BROWARD COUNTY EDITION

(f) STATE OF FLORIDA:

(1) Department of Health and Rehabilitative Services

(aa) Florida Administrative Code Chapter 10D-5... “Swimming Pools and Bathing Places” shall be complied with for Public Swimming Pools and Public Spas.

(g) UNDERWRITERS LABORATORIES INC. (UL):

(1) UL Electrical Appliance and Utilization Equipment Directory.

(2) UL Electrical Construction Materials Directory.

(3) UL General Information for Electrical Construction, Hazardous Locations, and Electric Heating and Air Conditioning Equipment Directory.

(4) UL Marking Guide — Swimming Pool Equipment, Spas, Fountains and Hydromassage Bathtubs.

(5) UL 559 — Heat Pumps

(6) UL 1081 — Swimming Pool Pumps, Filters and Chlorinators

(7) UL 1261 — Electric Water Heaters for Pools and Tubs

(h) U.S. DEPARTMENT OF LABOR

(1) Occupational Safety and Health Administration (OSHA)

(aa) Code of Federal Regulations (CFR) OSHA Standards

OSHA Title 29 CFR Standard Number 1910...Subpart S...Electrical

OSHA Title 29 CFR Standard Number 1926...Subpart K...Electrical

5001.3 DEFINITIONS: For the purpose of this Chapter, certain terms are defined as follows:

(Refer to ANSI/NSPI-1 through ANSI/NSPI-6 (NSPI Glossary of Industry Terms), and NEC Article 680 (Definitions) as applicable. Which ever is more stringent shall be used.)

(a) THERAPEUTIC POOL/HYDROTHERAPY SPA: Any pool or spa that complies with the following minimum criteria:

(1) On Ground Pool.

(2) The maximum depth shall not exceed three feet.

(3) The maximum volume shall not exceed 800 gallons, U.S.

(4) A Listed or Labeled Manufactured unit shall be preplumbed and prewired for plug-in installations.

(b) VERTICAL: Not more than one foot horizontally for each five (5) feet vertically from a plumb line.

5001.4 CONSTRUCTION: Other sections of this Code, specifically Part VI, Engineering and Construction Regulations, shall also apply to all pools and spas.

5001.5 ELECTRICAL:

(a) APPLICATION OF ELECTRICAL: Shall comply with Chapter 45 and Standards as set forth in Section 4503 and Subsection 5001.2 of this Code.

(b) Swimming Pool Lighting Fixtures: Underwater wet niche and no-niche lighting fixtures shall be of the type for use with 15 volts or less. (Reference Subsection 4512.3 of this Code)

5002 DESIGN

5002.1 MINIMUM REQUIREMENTS: Every swimming pool or spa design shall admit to rational analysis according to accepted engineering principles.

5002.2 PROFESSIONAL DESIGN:

(a) Plans shall be prepared by and bear the impress seal of a Registered Professional Engineer for the following:

(1) A public pool or spa as defined by the Florida Department of Health and Rehabilitation Services, division of Health.

(2) Any pool or spa requiring special consideration due to unstable soil or unusual ground water conditions.

(3) Plans for swimming pools or spas other than set forth in Sub-paragraphs (1) and (2) above shall be prepared by and bear the impress seal of a Registered Professional Engineer or a Registered Architect.

(b) Therapeutic pools/Hydrotherapy spas, as set forth in Paragraph 5001.3(a), shall be exempt from professional design requirements except when not placed on grade-supported slabs (floors).

5002.4 HYDROSTATIC UPLIFT:

(a) All pools or spas shall be designed to resist hydrostatic uplift forces on the bottom and lateral earth and water forces on the walls.

(b) Design criteria shall be taken when the pool or spa is empty and the ground is at existing ground water table at the site.

(c) A hydrostatic relief valve or other device capable of preventing the pool or spa water from being pumped to a level lower than the surrounding ground water may be considered in the design, but such devices shall not be credited for more than two feet of the difference of head between the pool or spa bottom and the existing ground water table.

(d) The design of the bottom slab for hydrostatic pressure and pool or spa walls for lateral pressure of adjacent soil with ground water at existing ground water table may be based on an increase of 33 1/3 percent of the allowable stresses set forth in this Code for the material used.

(e) Dewatering shall consist of a minimum 1½-inch threaded fitting and plug in the bottom of the main drain of the pool or spa. If additional construction dewatering line(s) are used, it shall consist of a minimum 1½-inch Schedule 40 PVC pipe, clearly marked and labeled, terminating within twenty-five (25) feet measured horizontally from the pool or spa wall in a non-hazardous, accessible location.

5002.5 MINIMUM EQUIPMENT:

(a) Swimming Pools or Spas Drains

(1) Main drain outlet(s) in pools or spas shall be provided at the lowest point measured from water line of each pool or spa for complete water circulation except for Fiberglass Pools or Spas and On-Ground Pools or Spas as set forth in Subsection 5001.3.

(2) A grate or plate with an open unobstructed area of at least four times the area of the pipe to which it discharges shall be placed over the main outlet and securely fastened in a manner requiring tools for removal.

(3) Suction outlet(s) in swimming pools or spas shall provide a means for preventing entrapment by one of the following:

(aa) Anti-vortex type drain plate.

(bb) Dual main drain outlets.

(cc) Installation of an atmospheric break.

(dd) Pump suction main drain anti-entrapment valve.

(ee) Other approved methods.

Note: Constructed therapy pools/spas four (4) feet or less in depth shall provide a means for preventing entrapment by two of the above listed methods:

(4) Fiberglass pool and Spa main suction outlets shall draw from the lower 20 percent of the pool or spa for complete water circulation.

(5) The recirculation inlets shall be sized and spaced to produce uniform circulation of the incoming water throughout the pool. There shall be at least two inlets for the initial three hundred fifty (350) square feet of pool water surface or fraction thereof. For each additional two hundred (200) square feet or fraction thereof of the pool surface area, one inlet shall be added.

(b) A 12 inch diameter vacuum fitting or surface skimmer fitting shall connect to a minimum two (2) inch suction line on all pools, and be located not less than six (6) inches or more than eighteen (18) inches below the

water line of the pool, in an accessible position. Vacuum fittings located on the pool wall shall be equipped with a self-closing safety cover requiring tool(s) for removal.

(c) The water velocity in the pool piping shall not exceed ten (10) feet (3.048 m) per second for pressure piping and eight (8) feet (2.4384 meter) per second for suction piping, unless summary calculations are provided to show that greater flow is possible with the pump and piping provided. In copper pipe, the velocity shall not exceed eight (8) feet (2.4384 meter) per second for suction and pressure piping. Pool piping shall be sized to permit the rated flows for filtering and cleaning without exceeding the maximum head of the pump.

(d) A separate valve or multiport valve shall be installed on each main drain line, skimmer and vacuum line (if provided) and shall be located in an accessible place outside the walls of the pools.

(e) The turnover rate for all residential spas and hot tubs shall be a minimum of once every sixty (60) minutes of operation.

(f) The turnover rate for all residential pools shall be a minimum of once every twelve (12) hours of operation.

(g) Piping and Valves: The system shall be designed with necessary valve(s) and piping to permit filtering to pool, vacuum to waste, back washing individual filters to waste, isolation of individual filter and complete drainage of system. Overall layout shall permit necessary maintenance, operation and inspection.

(h) A filter as set forth in Section 5005.1 shall be provided.

5002.6 DIMENSIONAL DESIGN: Minimum dimensions for pools or spas shall comply with the Standards set forth in Section 5001.2.

5003 CONSTRUCTION DETAILS

5003.1 GENERAL:

(a) Reinforced concrete shall comply with Chapters 23, 24, and 25 and shall be Portland cement concrete having a 28-day compressive strength of not less than 2500 psi.

(b) Reinforced concrete shall have not less reinforcing in both directions than the minimum set forth in the Standard in Sub-paragraph 2502.1 for temperature reinforcing.

(c) Reinforcing bars shall have not less than three (3) inches of concrete cover when placed in contact with earth and not less than two (2) inches from any formed or troweled surface.

(d) Surrounding areas, decks and/or walkways when provided shall be constructed so as not to drain into the pool and in accordance with Section 5002.1.

5003.2 UNIT MASONRY WALLS: Unit masonry walls of swimming pools shall be designed and constructed as engineered unit masonry as set forth in Chapters 23, 24, and 27.

5003.3 PNEUMATICALLY PLACED CONCRETE: Pneumatically placed concrete shall be as set forth in Sub-paragraph 5003.1 and 5003.2 except that walls shall have a minimum thickness of six (6) inches at the bottom and five (5) 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/Code Administrator.

(b) Concrete placed by hand against the natural earth or forms on one side only, shall comply with Chapters 23, 24 and 25 shall be of Portland cement concrete having a 28-day compressive strength of not less than 3000

psi. Floors shall have a minimum thickness of six (6) inches and walls shall have a minimum thickness of eight (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 or spa 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 TO PIPING: A plumbing permit shall be required for pool, spa or hot tub piping. actual connection to potable water supply and sanitary sewers shall be in accordance with the technical requirements of Chapter 46 of this Code.

5004.2 WATER SUPPLY: Water supply shall comply with NSPI Standards Article 10, Appendix A and the following:

(a) Where water wells are used as a source of water, the color shall not exceed 100, and the iron content shall not exceed 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.

(b) To eliminate a cross connection, an atmospheric break or other approved device 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 means of disposing of backwash water and a method of emptying the pool, spa or hot tub shall be provided by one of the following methods:

(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.

(b) By disposal to a soakage pit or drainage pit, having a volume as set forth by the designer of record using rational analysis.

(c) By disposal to an open waterway, bay or ocean where permitted by the Authority Having Jurisdiction.

(d) Where sufficient pervious area exists remote from water supply wells, disposal systems, soakage pits, septic tanks, drain fields and non-tidal bodies of water; such pervious area may be used for the disposal of pool, spa or hot tub water under the following conditions:

(1) Surface grading is such to confine any ponding to remain within the property lines or swale adjacent to property and such ponding or standing water shall persist for not more than one hour after discharge.

(2) A minimum distance of fifty feet (50'-0") inches is maintained between this pervious area, any supply well, and twenty-five (25'-0") minimum distance to any disposal works.

(3) The pervious area for pools only, shall be in accordance with the designer of record using rational analysis.

(e) By disposal to a drain field, sized the designer of record using rational analysis.

Note: Backwash water from pressure diatomite filters, piped to permit backwash to waste, shall be deployed to a separation tank or settling basin before final disposal by the above listed methods:

Exception: In any filter system not employing pressure backwash, the contents of the filter tank may be emptied onto the ground surface where the capacity of the filter tank does not exceed thirty (30) gallons.

5004.4 MAINTENANCE OR SERVICE: The drainage of pools shall be to a storm sewer or to any open body of water, if available within three hundred (300) feet of property. Where storm sewers or an open body of water

are not available within three hundred (300) feet of the property, disposal to the swale adjacent to the property shall be permitted during the maintenance and service of the pool.

5005 EQUIPMENT

5005.1 FILTRATION EQUIPMENT:

(a) Filtration equipment for public pools shall be in accordance with the Standards set forth in Subsection 5001.2.

(b) Filtration equipment for residential pools shall be in accordance with the Standards set forth in Subsection 5001.2 and the provisions set forth herein.

(c) PRESSURE SAND AND ANTHRACITE FILTERS:

(1) Filtration Rate: Filter capacities on recirculation systems utilizing sand and gravel or anthracite filters, either gravity or pressure, shall be based on a maximum filtration rate of three (3) gallons per square foot per minute.

(2) Backwash: Facilities shall be provided for backwashing the filters at a rate of not less than fifteen (15) gallons per minute per square foot of filter area. A minimum backwash rate of twelve (12) gallons per minute per square foot will be permitted on anthracite filters.

(3) Filter media: The filtering materials shall consist of at least twenty-four (24) inches depth of screened sharp filter sand or crushed quarts with an effective size of 0.4 mm to 0.5 mm and a uniformity coefficient of 1.5 to 2.0. This filter media shall be supported by at least twelve (12) inches of graded gravel to distribute water effectively and uniformly during filtration and backwashing. A reduction in depth or an elimination of gravel may be permitted where equivalent performance and service are demonstrated. If anthracite is used as a filter media in lieu of sand, the effective size shall be 0.6 mm to 0.7 mm with a uniformity coefficient of 1.5 to 2.0.

(4) Freeboard: There shall be a sufficient freeboard above the surface of the filter media to the overflow troughs or pipes of rapid filters to permit 50 percent expansion of the media during the backwash cycle.

(5) Appurtenances: Each filter tank over twenty-four inches (24") in diameter shall be equipped with a standard eleven inch by fifteen inch (11" x 15") manhole and cover. The filter system shall be equipped with influent and effluent pressure gauges, across each filter, backwash sight glass, and air bleed device.

(6) Inlet baffle: An inlet baffle or diverter shall be provided on each filter tank to distribute the incoming water evenly over the sand bed.

(7) Underdrain: The filter underdrain system shall be of corrosion-resistant durable material so designed and constructed to collect water during filtration and to distribute water evenly during backwashing.

(8) Pump: The pump shall be designed to handle the required recirculation flow against a total dynamic head of a minimum of sixty (60) feet and also furnish the required backwash flow against at least forty (40) feet of total dynamic head.

(9) Piping and Valves: The filtering system shall be designed with necessary valves and piping to permit filtering to pool, vacuum to waste, backwashing individual filters to waste, isolation of individual filter and complete drainage of the system. Overall layout shall permit necessary maintenance, operation and inspection.

(10) Steel Tanks: Steel filter tanks shall be of welded sheet steel construction and shall be hydrostatically tested to a minimum pressure of fifty (50) psi.

(11) Other materials: Tanks constructed of materials other than steel must comply with all requirements of this section, and may be used subject to submission of rational engineering data and approval by the Building Official/Code Administrator. They must be tested as required in (10) above.

(12) Approval: All filters approved for use under this section must also bear the seal of approval or indicate to the satisfaction of the Building Official/Code Administrator that it complies with the appropriate standards of the National Sanitation Foundation.

(d) HI-RATE SAND FILTERS:

(1) Hi-rate sand filters: These filters shall be of an approved design and type filter in which the total sand bed is used as a filter, and not the top surface alone. They shall be of a type listed by N.S.F. and they shall be capable of at least the same water clarity as the approved sand filters.

(2) Pressure hi-rate sand filters shall have a maximum filtration and backwash rate not to exceed twenty (20) gpm per square foot of filter area.

(3) Filtering materials shall consist of suitable grades of screened sharp silica sand with effective size of particles of sand from .4 to .5 mm and a uniformity coefficient of 1.5 to 2.0.

(4) They shall be sufficient freeboard above the surface of the sand and below the overflow troughs or pipes of the filter to permit a thirty percent (30%) expansion of the sand during backwash cycles and to prevent loss of sand during these cycles.

(5) A pressure gauge shall be installed to indicate when the filter is dirty and requires cleaning.

(6) A sight glass shall be installed on the backwash line to indicate clarity of the effluent water.

(7) A suitable opening shall be provided on all tanks for complete access and service.

(8) An indirect underdrain shall be provided to prevent loss of sand and re-entry of sand into the pool and evenly distribute the backwash water.

(9) An inlet baffle or device shall be provided on each filter tank to distribute the incoming water evenly over the sand bed.

(10) The filtering piping shall be so designed that there will be a provision for vacuuming to waste, vacuuming while filtering, pressure backwash, and the normal filtration cycle.

(11) The pump for this system shall be capable of full design flow at a design head of at least sixty (60) feet Total Dynamic Head.

(12) Filters shall be designed and installed so as to permit easy access for normal maintenance and any repairs or replacements required.

(13) Air Relief: Each pressure filter tank shall be designed and constructed to remove the air from the tank by an approved method or device.

(14) Steel Tanks: Steel filter tanks shall be of welded sheet steel construction and shall be hydrostatically tested to minimum pressure of fifty (50) psi.

(15) Other Materials: Tanks constructed of materials other than steel must comply with all requirements of this section and may be used subject to submission of rational engineering data and approval by the Building Official/Code Administrator. They must be tested as required in (14) above.

(16) Approval: All filters approved for use under this section must also bear the NSF seal of approval or indicate to the satisfaction of the Building Official/Code Administrator that it complies with the appropriate standards of the National Sanitation Foundation (NSF).

(e) DIATOMACEOUS EARTH FILTERS:

(1) Filter rate: Filter capacities on recirculation systems utilizing diatomaceous earth filters, either vacuum or pressure shall be based on a maximum filtration rate of two (2) gallons per square foot per minute.

(2) Filter tanks and septa: The filter and all component parts shall be of such material, design and construction to withstand normal continuous use without significant deformation, deterioration, corrosion or wear which would adversely affect filter operation. The filter area shall be determined on the basis of effective filtering surfaces with no allowance given for areas of impaired filtration, such as broad supports, folds or portions.

(3) Precoat: Provision shall be made to introduce the diatomaceous earth into the filter in such a way as to evenly precoat the filter septum or element(s) at the beginning of the filter cycle.

(4) Backwash: There shall be provision made on pressure filters for removing the cake by either reverse-flow backwash or simple disassembly. Vacuum filters shall be washed in place.

(5) Disassembly: Filters shall be so designed and installed so as to allow adequate room and permit ready disassembly and removal of filter elements.

(6) Inlet Baffle: An inlet baffle shall be required to distribute the incoming water evenly and protect against the erosion of the filter cake. Other devices may also be used.

(7) Pumps: On pressure diatomite filters the pumps shall be designed to handle the required recirculation flow against a total dynamic head of sixty (60) feet minimum; however, lower or higher head requirement may be used if hydraulically justified by designing engineer. The recirculation pump on vacuum filters shall be designed to handle the necessary flow against a minimum head of fifty (50) feet.

(8) Gauges: Filters shall be equipped with a pressure or vacuum gauge(s) and such gauge(s) shall be located to determine the need for cleaning.

(9) Piping and Valves: The filtering system shall be designed with the necessary piping and valves to permit filtering to pool, vacuuming through filter or to waste, backwash or other method of cleaning, and a method to introduce filter aid to precoat the filter.

(10) Steel Tanks: Steel filter tanks shall be of welded sheet steel construction and shall be hydrostatically tested to a minimum pressure of fifty (50) psi.

(11) Other Materials: Tanks constructed of materials other than steel must comply with all requirements of this section, and may be used subject to submission of rational engineering data and approval by the Building Official/Code Administrator. They must be tested as required in (10) above.

(12) Approval: All filters, approved for use under this section must also bear the seal of approval or indicate to the satisfaction of the Building Official/Code Administrator that it complies with the appropriate standards of the National Sanitation Foundation.

(13) Air Relief: Each pressure filter tank shall be designed to remove air from the tank by an approved method or device.

(f) CARTRIDGE FILTERS:

(1) Filtration Rate: Filter capacities on recirculation systems utilizing cartridge filters, either pressure or vacuum, shall be based on a maximum filtration rate of 1.0 gallons per minute per square foot of actual filter area for pleated or surface cartridges; and a maximum of three gallons per minute per square foot of outer surface area on depth-type cartridges.

(2) Cartridges: The cartridges must be manufactured of materials which will not impart a toxic or harmful material into the water and shall be suitable for a potable water supply. Only cartridges with the same approved amount of surface filter area (or more) as the cartridges originally approved for use in the filter may be used as replacement cartridges.

(3) Pump: The pump shall be designed to handle the required recirculation flow against a minimum total dynamic head of fifty (50) feet.

(4) Filters shall be so designed and installed to permit ready disassembly and removal of cartridges for cleaning.

(5) Filters shall be equipped with pressure or vacuum gauge and such gauge shall be located to determine the need for cleaning.

(6) Steel filter tanks shall be of welded sheet construction and shall be hydrostatically tested to a pressure of fifty (50) psi.

(7) Air Relief: Each pressure filter tank shall be designed to remove air from the tank by an approved method or device.

(8) Piping and Valves: The filtering system shall have the necessary valves and piping to permit filtering to pool, vacuuming to pool or waste, and complete drainage of filter tank.

(9) Other Materials: Tanks constructed of materials other than steel must comply with all requirements of this section, and may be used subject to submission of rational engineering data and approved by the Building Official/Code Administrator. They must be tested as required in (6) above.

(10) Approval: All filters and cartridges approved for use under this Section must also bear the seal of approval or indicate to the satisfaction of the Building Official/Code Administrator that it complied with the appropriate standards of the National Sanitation Foundation.

(g) PUMPS:

(1) Swimming pool pumps shall be listed and labeled by a nationally recognized testing laboratory. Pumps rated three (3) horsepower or less shall comply with ANSI/UL 1081, "Standard for Swimming Pool Pumps, Filters and Chlorinators" or the equivalent.

(2) A pump and motor shall be provided for circulation of the pool water. Performance of all pumps shall meet or exceed the conditions of flow required for filtering and cleaning (if applicable) the filters against the total dynamic head developed by the complete system.

(3) With all pressure filter systems, a cleanable strainer or screen shall be provided upstream of the circulation pump(s) to remove solids, debris, hair, lint, etc.

(4) Pump(s) and motor(s) shall be accessible for inspection and service.

(5) Pump(s) and component parts shall operate so as not to be hazardous to the operator or maintenance personnel.

(6) Where a mechanical pump seal is provided, components of the seal shall be corrosion-resisting and capable of operating under conditions normally encountered in pool operation.

(7) When the pump is below the waterline, valves shall be installed on permanently connected suction and discharge lines, located in an accessible place outside the walls of the pool, where they shall be readily and easily accessible for maintenance and removal of the pump.

(8) If the pit and/or cover or below ground installation is not watertight, the pit shall have approved drainage.

(h) **AIR RELIEF:** Air relief requirements shall be in accordance with ANSI 50 Article #15 and the following:

(1) Any separation tank used in conjunction with any filter tank shall have, as part of its design, an automatic air release, a lid or a manual means which provides a slow and safe release of pressure as it is opened.

(i) **OTHER EQUIPMENT:** Other types of filtration equipment may be used if shown by test to be equal in efficiency as compared to other approved systems in this chapter.

5005.2 SURFACE SKIMMING: Surface skimming shall be in accordance with ANSI 50, Section 9.11.

(a) Surface skimming devices shall comply with ANSI/NSF 50 "Circulation System Components and Related Materials for Swimming Pools, Spas/Hot Tubs" with the latest revision as set forth in Section 402 of this Code or the equivalent.

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
- Brass pipe or tubingAll lines

Stainless Steel, AISI, type 300 seriesAll lines
MonelAll lines

(2) Thermoplastic pipe and fittings may be used as follows:

(aa) Acrylonitrile-Butadiene-Styrene (ABS) shall conform to the Standard for NBS PS 18, as set forth in Section 402. ABS pipe shall be limited to waste and dewatering usage only.

(bb) Polyvinyl chloride (PVC) piping and flexible PVC pool and spa hose shall conform to the Standard for Poly (Vinyl Chloride) (PVC) Plastic Pipe (Schedules 40, 80 and 120), NBS PS21, NSF 14, ASTM D1785, the latest revision as set forth in Section 402 of this Code.

(cc) Polyethylene, Series 3, shall conform to the Standard NBS PS10, the latest revision as set forth in Section 402 of this Code. Polyethylene piping shall be limited to waste and dewatering usage only.

(dd) All thermoplastic pipe and flexible PVC pool and spa hose shall be continuously marked on opposite sides setting forth size, type, schedules, U.S. Commercial Standard and bearing the National Sanitation Foundation (NSF-pw) seal of approval.

(ee) Chlorinated polyvinyl chloride (CPVC) piping shall conform to the standards for poly (vinyl chloride) plastic pipe NBS PS21, NSF 14, ASTM D2485, the latest revision as set forth in Section 402 of this Code.

(ff) Fittings for CPVC, 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 and pipes shall be marked with the National Sanitation Foundation (NSF-pw) seal of approval.

(3) Where dissimilar metals are used in pool piping and filter piping which are not considered compatible on the electromotive scale, insulating dielectric fittings between the two shall be provided.

(b) **INSTALLATIONS:** Pool piping shall be as set forth herein and shall comply with the following minimum requirements of this Code:

(1) Piping shall be installed without undue strains and stresses and provisions shall be made for expansion, contraction and structural settlement.

(2) Thermoplastic pipe and fittings shall be installed and supported in accordance with manufacturer's recommendations and as set forth herein.

(3) Buried piping shall be securely supported in an approved manner to prevent sagging, misalignment and breaking.

(4) Adequate precaution shall be taken to ensure proper compactness of backfill around piping without damage to such piping. Backfilling to point not less than twelve inches above the top of the pipe shall be placed in thin layers with clean fill which does not contain stones, greater than 1/2inch, boulders, cinder-fill, or other material which would damage or break the piping or cause corrosive action.

EXCEPTION: All piping located beneath pool bottom slab may be embedded in the dewatering fill, when the maximum rock diameter of that fill is 3/4 inch.

(5) Except where supported directly on rock or compacted fill, pipe and fittings shall be supported around pool perimeter by approved pipe hangers or on concrete column pedestals. Spacing for pipe supports shall be at a maximum four (4) foot intervals.

(6) Short radius 90 degree pipe elbow fittings two (2) inches and smaller shall not be installed on any suction piping below grade.

(7) All suction piping shall be not less than two (2) inches in diameter and shall not reduce in size below grade.

(8) Valves installed in or under any deck(s) shall be provided with an adequately sized access cover and valve pit to facilitate operation and servicing.

(c) LISTED AND LABELED EQUIPMENT:All pool equipment used for water care or treatment shall be listed and labeled by the National Sanitation Foundation or other Nationally Recognized Testing Laboratory and/or shall conform to Code of Federal Regulations (CFR) Occupational Safety and Health Administration (OSHA) Standards and/or shall conform to the Standards as set forth in Subsection 5001.2.

(1) Suction outlet(s) shall comply with ASME/ANSI A112.19.8M “Suction Fittings for Use In Swimming Pools, Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Appliances” latest revision as set forth in Section 402 of this Code or the equivalent.

5005.4 DIVING BOARDS: All diving board installations and diving bowl configurations, slopes, etc. shall meet the minimum Standards as set forth in Subsection 5001.2 of this Code.

5005.7 POOL HEATER: Through authorization by FS 489.105 (j)(k)(l), a Swimming Pool Contractor may install Package Pool Heaters with the exception of electrical connections, fuel connections and plumbing sanitary or potable water connections. The installation of Package Pool Heaters by all authorized contractors.

(a) This section pertains to appliances using either fossil fuel, such as natural gas, propane (LPG), #2 fuel oil or electrical heating equipment, for heating pool water.

(b) Heaters shall be tested and comply with the requirements of ANSI-Z21.56 “Gas Fired Pool Heaters” the latest revision as set forth in Section 402 and/or “UL 1261 Electrical Water Heaters for Pool and Tubs”, or the equivalent. Heat pumps shall comply with “UL 559 Heat Pumps” the latest revision as set forth in Section 402 and be listed and labeled by a nationally recognized testing laboratory.

(c) The heater(s) shall be installed in accordance with all federal, state and local codes as well as the manufacturer’s specifications.

(d) Heaters shall be installed on a surface with sufficient structural strength to support the heater when it is full of water and operating. The heater shall be level after plumbing, gas and/or electrical connections are completed.

(e) If the heater requires a non-combustible surface per the manufacturer, it shall be placed on a cement or other accepted surface per ANSI Z21.56 latest revision as set forth in Section 402 or federal, state and local codes.

(f) The heater gas supply piping and container placement shall comply with manufacturer’s specifications and ANSI /NFPA 54 & 58, ANSI Z223.1, latest revisions as set forth in Section 402, or the equivalent.

(g) Electric heating appliances shall be installed in accordance with the National Electrical Code (NEC) the latest revision as set forth in Section 402 of this Code and any federal, state, or local codes, of the equivalent.

(h) Grounding and Bonding shall be in accordance with the National Electrical Code (NEC) the latest revision as set forth in Section 402 of this Code.

5005.8 Disinfectant Equipment, Oxidation Equipment, and Chemical Feeders

Shall be in accordance with ANSI/NSPI-5 Article XII the latest revision as set forth in Section 402 of this Code.

5006 PERMITS AND INSPECTIONS

5006.1 PERMITS:

(a) Permit requirements and application for permits for the construction, installation, alteration or major repair of a swimming pool or spa shall be set forth in Sections 301 and 302. A permit shall be required for any alteration or repair that includes dewatering of a swimming pool.

(1) ELECTRICAL: The Chief Electrical Inspector shall require a permit for and inspection of all Swimming Pool/Spa Electrical Installations as set forth in this Chapter, Subsection 305.2 and Chapter 45 of this Code.

(2) PLUMBING: The Chief Plumbing Inspector shall require a permit for and inspection of all Swimming Pool/Spa Plumbing Installations as set forth in this Chapter, Subsection 305.2 and Chapter 46 of this Code.

(3) STRUCTURAL: The Chief Structural Inspector shall require a permit for and inspection of all Swimming Pool/Spa Structural Installations as set forth in this Chapter, Subsection 305.2 of this Code.

(b) A permit to construct, modify, repair, or operate a public swimming pool, spa, wading pool, special purpose pool, or water recreational structure under the provisions of Subsection 5001.2 herein, bath house or related appurtenance shall not be issued until approved by the Florida Department of Health and Rehabilitative Services, Division of Health.

(c) Therapeutic pools/Hydrotherapy spas as set forth in Paragraph 5001.3 (a) shall be exempt from permit requirements.

(d) A safety barrier shall be provided around all swimming pools under construction to prevent any undo hazard.

5006.2 INSPECTIONS: Inspections for Swimming Pools/ Spas shall be requested by the permit holder and made by the Authority Having Jurisdiction Personnel for the following in accordance with this section:

(a) SWIMMING POOL/SPA ROUGH: Prior to any pneumatically applied or poured-in-place concrete is installed in pool/spa floors or walls.

(1) ELECTRICAL: Pool/Spa Bonding

(2) PLUMBING: Main drain piping shall be tested with a forty (40) psi minimum pressure test and approved with all with all joints visible before being covered or concealed.

(3) STRUCTURAL: All reinforcing and proper location of pool.

Note: Electrical, Plumbing and Structural Inspections may be made in any sequence.

(b) SWIMMING POOL/SPA DECK: Prior to any brick pavers, decking or poured-in-place concrete is installed in pool/spa decks.

(1) ELECTRICAL: Pool/Spa Deck Perimeter Bonding

(2) PLUMBING:

(aa) All alterations, repairs, or extensions which include more than ten (10) feet in length of piping and fittings shall be inspected and tested.

(bb) The entire pool pressure and suction piping systems, including main drain, shall be tested with a 40 psi minimum pressure test and approved with all with all joints visible before being covered or concealed.

(cc) Non-pressure gravity drain piping segments and joints installed on public swimming pools as defined in ANSI/NSPI-1 shall be subjected to a minimum test pressure equivalent to a five foot (5) head of water and shall be approved with all with all joints visible before being covered or concealed.

(3) STRUCTURAL: Reinforcing, if applicable.

Note: Electrical, Plumbing and Structural Inspections may be made in any sequence.

(c) SWIMMING POOL/SPA FINAL:

Note: All pool/spa equipment shall be anchored securely in accordance with manufacturers recommendations.

(1) ELECTRICAL: Entire Electrical system and associated bonding complete.

(2) PLUMBING: The pool shall be filled with water, filtration system and waste disposal systems shall be operational.

(3) STRUCTURAL: Completion of all elements, including accessories and finishes.

Note: Final Pool Electrical and Pool Plumbing Inspections shall be approved **Prior** to Final Pool Structural Inspection.

CHAPTER 51

FIRE SUPPRESSION – LIFE SAFETY SYSTEM

5101 SCOPE

5102 FIRE SPRINKLER SYSTEM

5103 FIRE ALARM SYSTEM

5104 FIRE DETECTION SYSTEM

5105 CENTRAL CONTROL SYSTEM

5106 VOICE COMMUNICATION SYSTEM

5107 SMOKE CONTROL

5108 ELEVATORS

5109 EMERGENCY SYSTEMS

5110 EXITS

5111 BUILDINGS OVER 50 FEET TO 75 FEET IN HEIGHT

5101 SCOPE

5101.1

(a) New buildings or buildings altered to increase the area or height of any Occupancy to more than 50 feet in height, as measured vertically from grade to the top of the main roof exclusive of a mechanical penthouse, shall conform to the special requirements of this Chapter in addition to the other applicable provisions of this Code.

(b) Grade shall be the average elevation of the ground, paved or unpaved, adjoining a building or structure at each exterior wall line; this excludes berming or man-made mounds.

(c) EXCEPTION:

(1) Parking garages shall comply with the requirements of Sub-paragraph 3801.3 (e) (3) of this Code.

(2) Group J Occupancies.

(3) Section 5111 herein.

5102 FIRE SPRINKLER SYSTEM

5102.1 The entire building shall be protected by an automatic sprinkler system complying with the Standard "Installation of Sprinkler Systems," NFPA No. 13, as set forth in Section 401 of this Code and as follows:

(a) (1) The automatic sprinkler system may be supplied from the standpipe risers where such standpipe risers are required by Sub-section 3803.2 of this Code and, where standpipes are not required, may be provided with sprinkler feed risers with Fire Department connections sized and located as set forth for Standpipes in Chapter 38 of this Code.

(2) In buildings having more than one standpipe riser, such risers shall be interconnected at one of the first three floors in an accessible location as defined in NFPA 13 and 14.

(3) Interconnect lines shall be sized the same as the risers.

(4) Combined automatic sprinkler and standpipe risers shall not be interconnected by sprinkler system piping.

(b) (1) Branch lines, cross mains and feed mains shall be taken off the riser at the floor served.

(2) Where more than one riser is required, branches, cross mains and feed mains on alternate floors shall be from different risers or branches may be used as loops and connected to each riser at each floor.

(c) (1) There shall be a post indicator valve and check valve on the sprinkler supply line located outside the building.

(2) There shall be an approved indicating valve at each riser position as to isolate each riser from the interconnect.

(3) Such approved indicating valves shall be provided with a tamper indicator monitored at the tamper panel of the Central Control Station.

(4) (aa) At each connection to each riser, there shall be an approved indicating valve with a tamper indicator and also a flow switch, both monitored at the Central Control Station.

(bb) Where branches are looped, such approved indicating valves shall be required only at the floor main.

(5) Water flow devices shall actuate a local alarm on the floor at which water flow is detected. In buildings over 50 feet and under 75 feet, the water flow device shall sound a general building alarm.

(d) Solder connections may be used in copper piping provided the solder used is not less in thermal strength than 95 percent tin and five percent antimony.

(e) Pitching of water lines is not required.

(f) (1) Where more than one fire pump is provided each pump shall be independently driven.

(2) Fire pumps, unless approved to be engine-driven, shall have electric-motor drives.

(3) Fire pumps, and transfer and signaling devices for fire pumps, where dependent on electric energy, shall be supplied by both normal and emergency electric generation service, as set forth in Section 5109 herein.

(g) (1) Where protection by water may be ineffective or undesirable in buildings, or areas thereof, other approved systems may be substituted, as set forth in Section 3802 of this Code.

(2) In hospitals, sprinklers shall not be required in operating rooms, delivery rooms, nurseries, X-ray and therapy equipment rooms, cardiac and intensive care rooms, provided that these rooms, are protected with an automatic fire detection system which will respond to visible or invisible particles of combustion.

(3) Automatic fire sprinklers may be omitted, when approved by the building official, in any area or room where sprinklers are considered undesirable because of the nature of the contents provided that the areas of rooms are protected with an approved automatic fire detection system which will respond to visible or invisible particles of combustion.

(h) 1½ inch hose and hose cabinets as required in Sub-section 3803.7, may be omitted provided that each standpipe outlet is equipped with a 2½ inch hose valve, a 2½ inch by 1½ inch reducer and a cap with attachment chain.

(i)(1) A single source water supply shall be considered to comply with the reliability requirements of the Standard where experience has shown that interruption in service is unlikely to exceed eight hours per year.

(2) Where the out-time is likely to exceed eight hours per year, a secondary supply shall be provided.

(3) Where a secondary supply of water is required, an on-site supply of water equal to a 20-minute demand or 15,000 gallons on a combined sprinkler and standpipe system, which is smaller, shall be provided.

(4) The supply shall be available automatically when the principal supply fails.

5102.2 EXCEPTIONS:

(a) Exterior open balconies need not be sprinkled.

(b) Transformer vaults shall not be sprinkled.

(c) Incombustible stair shafts require sprinklers under each landing accessible from two or more sides or areas, but where such landings are accessible from only one side or area, sprinklers are required only at the top and bottom of the shaft.

(d) In all buildings in Group H Occupancies totally or partially sprinkled as required in Chapter 51, sprinklers shall not be required in closets not over 24 square feet nor bathrooms not over 55 square feet after deduction of floor area of tub and shower.

(e) In auditoriums with fixed seating, and gymnasiums used for no other purposes, in one story buildings of any height.

5102.3 Buildings with sprinkler systems installed in accordance with this Section 5102 shall be considered to be fully sprinklered.

5103 FIRE ALARM SYSTEM

5103.1

(a) A manually operated Fire Alarm System shall be provided.

(b) The alarm system shall comply with either the Standard for Central Station Protective Signaling System for Guard, Fire Alarm and Supervisory Service, NFPA No. 71; the Standard for Local Protective Signaling System for Watchman, Fire Alarm and Supervisory Service, NFPA No. 72A; or the Standard for Auxiliary Protective Signaling Systems for Fire Alarm Service, NFPA No. 27B, as set forth in Section 402 of this Code.

(c) The alarm system shall also comply with the installation requirements provided in Sub-section 3126.2 of this Code.

(d) The operation of the manual fire alarm shall annunciate at a Central Control Station and shall activate a Voice Communication System, as set forth in Section 5106 herein.

(e) All alarm signaling devices on each floor shall activate the alarm device on the signaling floor only and annunciate at the Central Control Station with the further provision that any or all such alarm devices shall be operable from the Central Control Station.

5104 FIRE DETECTION SYSTEM

5104.1

(a) An approved system providing automatic detection of products of combustion other than heat shall be installed in every mechanical equipment room and in the return portion of every air-conditioning and mechanical ventilation system that serves floors other than the floor upon which such equipment is located.

(b) Elevator lobbies and entrance areas to elevators shall be provided with smoke sensing devices complying with the American National Standards Institute Elevator Safety Code A17.1, with Supplements, as set forth in Section 402 of this Code, and the activation of such devices shall automatically operate the alarm system.

5104.2 Smoke detectors shall:

(a) Be located at each floor or lobby opening into a stair tower or elevator shaft as provided in the Standard set forth in paragraph 5104.1(b) herein.

(b) Be set to operate at no less sensitivity than as provided in the Standard set forth in paragraph 5104.1(b) herein.

(c) Activate the alarm system, annunciate at a Central Control System and shut off all ducts or mechanical devices not a part of the smoke Control provisions set forth in Section 5107 herein.

5104.3 In generator rooms, trash rooms, and cooking areas, rate-of-rise heat detectors may be utilized in lieu of smoke detectors.

5105 CENTRAL CONTROL STATION

5105.1 A Central Control Station for Fire Department operations shall be provided in a location at or near the main entrance to the building.

5105.2

(a) The Central Control System shall contain the Fire Detection System and Alarm System panels, a public telephone for emergency use (not coin-operated), sprinkler valve detector indicators, water-flow detector indicators and mechanically ventilating system for smokeproof enclosure annunciators.

(b) The annunciator panel at the Central Control Station shall provide both visible and audible alarms and shall monitor and indicate:

(1) The water-flow signaling devices including trash and laundry chute sprinklers.

(2) The supervisory switches of the branch lines, risers, trash and laundry chute supplies and the suction side of the fire pump.

(3) The fire alarm signaling devices by floor and shall also operate the fire alarm sounding devices.

(c) The panel for the supervisory switches and the water-flow signaling devices shall signal the central Fire Department serving the area, or an approved, monitored, emergency service center.

5106 VOICE COMMUNICATION SYSTEM

5106.1

(a) There shall be two separate, continuously activated, electronically-supervised Voice Communications Systems provided in all buildings 75 feet and over in height; one two-way system for Fire Department use and the other a public address system between the Central Control Station and the following areas:

(1) Elevators, elevator lobbies, corridors and stairways.

(2) Every residential unit or apartment and all hotel and guest rooms shall be within audible range of the Public Address System.

(b) Where approved, the Fire Department System may be combined with the Public Address System.

(c) The Fire Department shall have provision to override the Public Address System in all areas.

(d) Wiring for telephones and Fire Department system shall be so arranged that open circuits or short circuits on individual units will not interfere with communication with any other floor.

5107 SMOKE CONTROL

5107.1 The Standards in this Chapter and Section 402 are established as minimum criteria and all mechanical smoke control systems shall comply with the performance smoke test criteria herein.

(a) Emergency smoke control systems installed, whether required or not required by the South Florida Building Code, shall comply with Chapter 51 for installation and testing criteria.

(b) Group A and B Occupancies, churches, synagogues, theaters, gymnasiums, sport arenas, one story exceeding 50 feet in height, with no intermediate floors other than mezzanines or balconies shall be exempt from Sec. 5107 Smoke Control.

(c) H.R.S. Regulations shall supersede all other references for hospitals.

5107.2 NATURAL VENTILATION:

(a) Operable windows shall provide minimum areas for light and ventilation as set forth in Part III of this Code. Requirements based on occupancy, except as otherwise provided herein.

(b) Operable windows or removable panels in buildings exceeding 50 feet in height shall be at the rate of 20 square feet per 40 linear foot of exterior wall at every story and shall have a first opening a minimum of 10 feet from each corner or intersecting pair of walls and 40 feet on center thereafter and shall provide cross ventilation.

(c) Only corridors leading to an exit shall be mechanically ventilated.

(1) Smoke fans for smoke control in corridors shall be sized using the largest gross floor volume (in cubic feet) at ambient temperature of 78° Fahrenheit at one atmosphere pressure according to the following equations:

$V_t =$ Total largest gross floor volume

Exhaust Fan Volume = $0.20 V_t =$ CFM

Supply Volume = $0.15V_t =$ CFM

(aa) Under fire conditions, the exhaust air shall terminate directly outside without recirculation to other sections of the building.

(1) Termination of smoke exhaust system shall be:

(2) Above the highest roof level

(3) Remote from supply

(4) Remote from other openings on the roof; such that the recirculation of smoke to other sections of the building shall be inhibited.

(bb) Such smoke control equipment is connected to the emergency power generation system and shall be capable of operating five floors of mechanical exhaust and supply simultaneously.

(cc) The mechanical portion of a mechanical ventilation system shall be tested in accordance with Section 5107.6.(d) Such windows or panels shall have minimum dimension of 22 inches, and minimum openable area of five square feet.

(e) Such panels shall be clearly identified as required by the Fire Department.

(f) Removable panels shall be of tempered glass or any other material meeting the wind load requirements of this Code.

(g) Any other design which will provide equivalent results may be used subject to approval of authority having jurisdiction and based on performance test criteria herein.

(h) Breaking of the glass shall not constitute a removable panel.

(i) Cross ventilation, in the context of Chapter 51, will be defined as unobstructed openings in opposing but not adjacent walls or in adjacent walls having an angle not greater than 135° between them. (Except garages meeting the definition of open air parking garages.)

(j) Group H Occupancy need not comply with 5107.2, but shall comply with Section 5107.5(h).

(k) Smoke detectors shall be installed in corridors in accordance with NFPA-72E.

5107.3 MECHANICAL VENTILATION:

(a) Smoke and other products of combustion shall be exhausted by mechanical smoke control supply and exhaust systems provided that:

(1) Under fire conditions, the exhaust air shall terminate directly outside without recirculation to other sections of the building.

(aa) Termination of smoke exhaust systems shall be:

(bb) Above the highest roof level

(cc) Remote from supply

(dd) Remote from other openings on the roof; such that the recirculation of smoke to other sections of the building shall be inhibited.

(2) Such smoke control equipment is connected to the emergency power generation system and shall be capable of operating a minimum of five floors of mechanical exhaust and supply simultaneously.

(3) Smoke fans for smoke control systems in buildings shall be sized; using the largest gross floor volume (in cubic feet) at ambient temperature of 78° Fahrenheit at one atmosphere pressure according to the following equations;

$$V_t = \text{Total largest gross floor volume}$$

$$\text{Exhaust Fan Volume} = 0.67 V_t = \text{CFM}$$

$$\text{Supply Volume} = 0.50 V_t = \text{CFM}$$

5107.4 Where mechanical equipment is used for the removal of products of combustion, provisions shall be made for remote operation (from the Central Control Station) by over-riding the automatic controls.

5107.5 SPECIFIC REQUIREMENTS FOR OCCUPANCY FOR BUILDINGS OVER 50 FEET:

(a) A Occupancy shall comply with 5107.3.

(b) B Occupancy shall comply with 5107.3.

(c) C Occupancy shall comply with 5107.3.

(d) D Occupancy shall comply with 5107.3.

(e) E Occupancy shall comply with Chapter 10.

(f) F Occupancy shall comply with 5107.2 or 5107.3. (Except open air parking garages.)

(g) G Occupancy shall comply with 5107.3.

(h) H Occupancy:

(1) All enclosed corridors lobbies and common areas shall comply with 5107.2 and/or 5107.3, and 5107.6.

(2) Dormitories, rooming houses, fraternity houses and similar uses, which provide accommodations for more than six persons per room, shall comply with 5107.3.

(i) I Occupancy shall comply with 5107.2.

(j) J Occupancy shall comply with 5107.2 or 5107.3.

(k) Each Occupancy in building of mixed Occupancies shall comply with requirements for its specific type as outlined above.

5107.6 TEST CRITERIA FOR MECHANICAL SMOKE CONTROL SYSTEMS:

(a) Prior to testing of the smoke control system, engineer of record shall certify to the appropriate officials that the entire smoke control system has been tested, balanced and installed in accordance with his design plans and specifications and this Code. Testing and balancing of the smoke control system shall be performed by a Certified Testing and Balancing Contractor.

(b) The following shall be notified so that they may witness the system's performance test:

(1) Engineer of record or agent.

(2) Building contractors.

(3) Owner's representative.

(4) Fire Service.

(5) Building Department having jurisdiction.

(c) The engineer or his representative shall supply a plan of the floor or zone layout including cubic area and smoke bomb size and locations accepted by testing authority. Bomb placement and size shall be sufficient to give even disbursement in area being tested.

(d) Sufficient smoke must be generated to produce at least double the volume of the smoke zone being tested.

(e) Timing of the test begins when the smoke bombs are ignited. Smoke control system shall activate within 30 seconds.

(f) Quantity of smoke shall obscure an exit sign from 3 feet within 3 minutes. Design quantity of smoke shall be obtained within 5 minutes.

(g) In cases where smoke is being exhausted so quickly that obscurity cannot be obtained and sufficient smoke has been generated to fill the test area, the system will be considered to be acceptable, if smoke can be observed moving toward the exhaust grills.

(h) Within ten minutes of the start of the test, the exit sign must be legible from 20 feet.

(i) If no exit sign is presented, any object may be used for distance measurement (i.e., door, column).

(j) During the test, no smoke may migrate to other zones.

(k) All testing shall be done under the supervision of mechanical inspector and fire inspector having jurisdiction and final acceptance of the smoke control system, and shall be his responsibility.

(l) All smoke generating devices shall be supplied by the owner or his designer and shall meet with the approval of the fire inspector having jurisdiction.

(m) Required tests:

(1) Test one shall be performed with system in automatic mode. Upon automatic activation of the test floor, four additional floors shall be activated manually.

(2) Test two shall be performed in full automatic mode.

(3) All fire zones which are not typical to any other zone shall be tested independently.

(4) More than one typical zone may be required to be tested.

(n) The engineer of record must certify, in writing, that the system is designed and installed and will function as required by the Broward County Edition of the South Florida Building Code and its adopted standards; and submit plans and specifications including design criteria incorporating volumetric flows, volumes and pressures as a record for testing procedures.

5108 ELEVATORS

5108.1 Elevators shall be arranged for Fire Department use as set forth in the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks, ANSI A17.1, as set forth in Section 402 and referenced in paragraph 3201.2(a) of this Code.

5109 EMERGENCY SYSTEMS

5109.1

(a) A permanently installed emergency power generation system conforming to the National Electric Code, NFPA No. 70, as set forth in Section 402 of this Code, shall be provided in all buildings more than 50 feet in height, and located at an elevation not less than the elevation above MSL required by the National Flood Insurance Program, or encased in a waterproof vault with no openings below the required elevation.

(b)(1) Such systems shall be equipped with suitable means for automatically starting the generator-set upon failure of the normal electrical service and for automatic transfer and operation of all required electrical functions at full power within 60 seconds of such normal service failure.

(2) Two independently operated transfer switches shall be provided; one for the fire pump and the other for elevators, emergency lighting and required mechanical ventilation.

(3) Transfer switches shall provide approved means to manually transfer from emergency to normal operation.

(c) Except in hospitals, systems control, with manual start and transfer features, shall be provided at the Central Control station.

(d) An on-premises fuel supply sufficient for not less than 24 hours full-demand operation of the system shall be provided.

(e) All power, lighting, signal and communications facilities provided in this Chapter and in Chapters 31 and 32 of this Code shall be transferable to the Emergency power system.

(f) The power requirements shall be determined so as to provide service to, but not limited to, the following:

(1) Fire Alarm System.

(2) Exit and Emergency lighting.

EXCEPTION: Rechargeable battery-operated emergency lighting and battery back-up exit lights, independent of the emergency generator, will be permitted in tenant spaces and according to NFPA 70 701-11(F) in lieu of generator.

(3) Fire Protection Equipment.

(4) Required Mechanical Ventilation.

(5) Fire Department Use Elevators.

(6) Water flow indicators and supervisory switches.

(7) Fire Pump.

(8) Voice Communication System.

(9) Mechanical vestibule stairshaft and detector systems, where required.

(g) Emergency power generating equipment, including transfer switches, shall be inspected semi-annually at full generating load under the direction and supervision of Fire Department personnel and all such equipment shall operate to their satisfaction and approval.

(h) All mechanical smoke removal systems shall be inspected semi-annually under the direction and supervision of Fire Department personnel and all such equipment shall operate to the approval design criteria.

5110 EXITS

5110.1 All stairway doors which are locked from the stairway side, including vestibule doors which lead to the smokeproof tower, shall have the capacity of being unlocked remotely upon a signal from the Central Control Station. Loss of power shall cause such doors to unlock.

EXCEPTION: D Occupancy shall be exempt from this section.

5111 BUILDINGS MORE THAN 50 FEET TO 75 FEET IN HEIGHT

(a) New buildings of any group of Occupancy more than 50 feet in height and which are less than 75 feet in height shall be governed by the requirements of this Section and those set forth in Paragraphs 5101.1(a) and (b) of this Chapter.

(b) Except as provided in other applicable Chapters of this Code, the general requirements for such buildings shall be limited to those set forth in;

- (1)** Section 5102 – FIRE SPRINKLER SYSTEM.
- (2)** Section 5103 (a) (b) (c)–FIRE ALARM SYSTEM
- (3)** Section 5107 – SMOKE CONTROL SYSTEM.
- (4)** Section 5108 – ELEVATORS.
- (5)** Section 5109 – EMERGENCY SYSTEMS.
- (6)** Section 5110 – EXITS

CHAPTER 52

SOUTH FLORIDA FIRE CODE

5201 ADMINISTRATION

5201.1 TITLE

This chapter shall be known as the **SOUTH FLORIDA FIRE CODE**, may be cited as such, and will be referred to herein as "this Fire Code".

5201.2 INTENT

(a) It is the intent of this code to prescribe regulations to provide certain minimum standards, provisions, and requirement for safe and stable design, methods of construction and uses of materials consistent with nationally recognized good practice for the safeguarding, to a reasonable degree of life and property from hazards of fire and explosion, arising from the storage, handling, and use of hazardous substances, materials and devices, and from conditions hazardous to life or property in the use or occupancy of buildings or premises.

(b) Where no specific standards or requirements are specified in this Fire Code or contained within other applicable laws or adopted codes or ordinances, compliance with the standards of the National Fire Protection Association or other nationally recognized fire safety standards as are approved by the Fire Code Committee, shall be deemed as prima facie evidence of compliance with this intent.

5201.3 SCOPE

(a) The provisions of this Fire Code shall supplement any and all laws relating to fire safety and shall apply to all persons without restrictions, unless specifically excepted.

(b) Where there is a conflict between a general requirement and a specific requirement for an individual occupancy, the specific requirement shall be applicable.

5201.4 APPLICABILITY OF THIS FIRE CODE

(a) This Fire Code shall apply to both new construction and existing buildings, structures and conditions.

(b) (1) This Fire Code recognizes that it is not always practical to apply any or all of the provisions of this Fire Code to existing buildings. Physical limitations may require a disproportionate effort or expense with little increase in life safety.

(2) Prior to applying the minimum provisions of this Fire Code to an existing building, the Fire Chief shall determine that a threat to life safety or property exists.

(3) If a threat to life safety or property exists, the Fire Chief shall apply the applicable provisions of the Fire Code to the extent practical for existing buildings, to assure a reasonable degree of life safety and safety of property; or the Fire Chief shall fashion a reasonable alternative which affords an equivalent degree of life safety and safety to property. The decision of the Fire Chief may be appealed pursuant to the provisions contained in the South Florida Building Code, Broward County Edition.

(4) Existing facilities may be given reasonable time to comply with the rules and standards of applicable fire codes. Said time shall not exceed six months from the date of inspection with which to comply with such rules and standards.

(aa) One extension, not to exceed six months, may be authorized by the Fire Chief or designee if reasonable progress towards compliance is demonstrated by the facility owner.

(5) Existing apartment buildings as defined in N.F.P.A.-101, Chapter 19, built after June 1, 1972, under the South Florida Building Code, Broward County Edition, shall be deemed an equal alternate to the requirements of Chapter 19 of N.F.P.A.-101, if all dwelling units are equipped with smoke detectors placed as required in the Code. Such smoke detectors shall be connected to the house electric power and shall have battery backup. Where multiple detectors are required in a single dwelling unit to comply with this section, such detectors need

not be interconnected. In buildings having three stories or less with direct access to the outside, battery-operated smoke detectors shall be considered an approved detection device and the requirements of N.F.P.A.-101-19-3.4.2.1 shall not apply. Nothing in this paragraph will exempt any building from compliance with the South Florida Building Code, Broward County Edition in effect at the time of its construction.

(c) When used in this Fire Code, the term Fire Chief shall refer to Chief of the Fire Department or his authorized designee, who is responsible for the enforcement of the Fire Code.

(d) When used in this Fire Code, the term Fire Code Committee shall refer to a committee appointed by the Chairman of the Board of Rules and Appeals, in accordance with Section 5204.3.

5202 ORGANIZATION AND AUTHORITY RESPONSIBILITY FOR ENFORCEMENT

5202.1 The Fire Chief shall be the principle enforcing officer of this Fire Code with the responsibility for the administration and enforcement of this Fire Code. Under his direction, the fire department shall enforce all local ordinances of the jurisdiction pertinent to:

(a) The prevention of fires.

(b) The suppression or extinguishing of fires.

(c) The storage, use and handling of explosive, flammable, combustible, toxic, corrosive and other hazardous gaseous, solid and liquid materials.

(d) The inspection of equipment and maintenance of automatic, manual and other fire alarm systems and fire extinguishing equipment.

(e) The maintenance and regulation of fire escapes.

(f) The maintenance of fire protection and the elimination of fire hazards on land and in buildings, structures and other property, including those under construction.

(g) The means and adequacy of each exit in the event of fire or similar emergency, from factories, schools, hotels, lodging houses, asylums, hospitals, churches, halls, theaters, amphitheaters and all other places in which people work, live or congregate from time to time for any purpose.

(h) The investigation of the origin, cause, and circumstances of fire.

5202.2 No enforcing agency may issue any permit for construction, erection, alteration, repair, or demolition until the local building official, in conjunction with the appropriate fire safety inspector, has reviewed the plans and specifications for such proposal and both officials have found the plans to be in compliance with the South Florida Building Code, Broward County Edition, and the applicable fire safety standards as determined by the local authority in accordance with this Fire Code and Chapter 633, Florida Statutes. In the event that agreement cannot be reached between the Building and Fire Officials, the dispute shall be referred to the Fire Code Committee for review and recommendation to the Broward County Board of Rules and Appeals in accordance with Section 5204.3.

5202.3 Industrial construction on sites where design, construction, and fire safety are supervised by appropriate design and inspection professionals and which contain adequate in-house fire departments, is exempt; subject to local government option, from review of plans and inspections, providing owners certify that applicable codes and standards have been met and supply appropriate approved drawings to the building department. The enforcing agency shall issue a permit to construct, erect, alter, repair, or demolish any building when the plans and specifications for such proposal comply with the provisions of this Fire Code and Chapter 633, F.S.

5202.4 From time to time, when necessary, the Fire Code Committee may request from the Board of Rules and Appeals and/or the director, general releases and procedures pertaining to specific occupancies or operations under the provisions of this Chapter. Such general releases and procedures, when drafted, will be a matter of public record and on file in the office of the Board of Rules and Appeals. The intent of such general releases and

procedures will be to clarify the requirements of this Fire Code and maintain a consistent enforcement and public education program.

5202.5 BUREAU OF FIRE PREVENTION

(a) A Fire Prevention Bureau is established within the fire department, under the direction of the Fire Chief, which shall consist of such fire department personnel as may be assigned thereto, by the Fire Chief, in accordance with the requirements prescribed herein. The function of this bureau shall be to assist the Fire Chief in the administration and enforcement of the Fire Protection Provisions of this Chapter.

(b) Personnel assigned to the bureau as Fire Inspectors must be State Certified Firefighters, State Certified Fire Inspectors, certified by the Board of Rules and Appeals (South Florida Building Code Sec. 201.7). For certification and recertification, refer to Florida State Statute 633.

EXCEPTION 1: Those municipalities currently utilizing Broward or State Certified Fire Inspectors, with a minimum of three (3) years experience with that fire department, at the time of adoption of this Fire Code, shall be certified under this Fire Code.

EXCEPTION 2: At Fire Chief's discretion, a person may be given up to eighteen (18) months to become a Florida Certified Firefighter, from the date of hire.

5202.6 PERSONNEL

(a) The Fire Chief may designate a member of the department to exercise the powers and perform the duties of the Chief. He may also be known as Fire Marshal.

(b) The Fire Chief may also delegate to the Bureau of Fire Prevention, such members of the fire department as may from time to time be necessary, in accordance with Section 5202.5 of this Fire Code.

5202.7 ENFORCED REMOVAL OF PROHIBITED CONDITIONS

(a) Payment of any fine shall not preclude the removal of any violation of this Fire Code.

(b) When the Fire Chief, or his duly authorized representative has cause to believe that any requirement of this Fire Code is being violated, he is hereby authorized to gather any evidence or photographs necessary to substantiate proof that a violation of this Fire Code exists.

5202.8 AUTHORITY TO ENTER PREMISES

(a) The Fire Chief, or any fire inspector or officer, thereof, may at all reasonable hours, enter any building or premises for the purposes of making any inspection or investigation, which under the provisions of this Fire Code, he or they may deem necessary.

(b) The Fire Chief, or any inspector or officer, thereof, shall be permitted by the owner, lessee, manager, or operator of any building or premises, at the time and for the purpose stated in this Section.

(c) It shall be unlawful for any person or persons to deny access to the duly authorized representative of the Fire Chief, onto any premises, for the purpose of inspection or investigation.

EXCEPTION: Inspections of private residential dwelling units as prescribed in Sec. 5203.1.

5202.9 LIABILITY FOR DAMAGES

This Fire Code shall not be construed to hold the enforcing jurisdiction responsible for any damage to persons or property by reason of the inspection or re-inspection authorized herein or failure to inspect or re-inspect or the permit issued as herein provided or by reason of the approval of any equipment authorized herein.

5202.10 SAVINGS CLAUSE

If any provision of this Fire Code or the application thereof, to any person or circumstance is held invalid, the remainder of the Fire Code and the application of such provision to other persons or circumstances, shall not be affected thereby.

5203 DUTIES AND PROCEDURES

5203.1 INSPECTION OF BUILDINGS AND PREMISES

(a) It shall be the duty of the Fire Chief of the Fire Department to inspect or cause to be inspected by the officers or members of the Fire Prevention Bureau, as often as may be necessary, but not less than annually, during normal business hours, for the establishment in question, all buildings and premises, including common or public areas of condominium buildings, except the interior of private residential dwelling units, (unless invited therein by the owner or occupancy thereof), as well as all public aisles, corridors, halls, rooms, storage areas, or other nonresidential areas of such buildings, for the purpose of ascertaining and causing to be corrected, any condition liable to cause fire or any violation of the provisions or intent of this Fire Code, and to otherwise enforce any violation of this Fire Code. Whenever the Fire Chief of the Fire Department determines that a violation exists, the person responsible for maintaining the building or area where such violation exists, shall be given reasonable written notice of such violation, and if the violation continues, a presumption of a violation of the Fire Code, shall be created against the person responsible for maintaining the building or area where such violation exists.

(b) If the Fire Chief finds a hazardous condition, which presents immediate danger to life, he shall be authorized to order the hazard removed or remedied immediately, and shall be empowered to order the closing of the building or place where such danger to life violation exists, until such time as same has been corrected. Any failure of immediate compliance shall empower the Fire Chief finding such hazardous condition creating immediate danger to life, to close such building or cause same to be closed and the people herein evacuated and barred from reentering until such time as such immediate danger to life has been corrected.

(c) The Fire Chief is given the authority to order any gas company, power company, or other utility company, to disconnect its service to any building or buildings containing gas or power installations, where such installations, in the opinion of the Fire Chief, creates an immediate danger to life, and to otherwise close or evacuate such building and to bar reentry thereto, until such installation is repaired or replaced and such hazard to life ceases to exist.

(d) The Fire Chief upon the complaint of any person or whenever he shall deem it necessary, shall inspect any buildings and premises within their jurisdiction.

(e) Approval of Fire Department accessibility and all tests of fire alarm detection and suppression systems, smoke evacuation systems and life safety systems shall be conducted prior to final structural inspection and issuance of Certificate of Occupancy. (See Sec. 305.2(d)).

(f) Rejections must include specific reference to the Code Section upon which rejection is based in writing.

5203.2 ORDERS TO ELIMINATE DANGEROUS OR HAZARDOUS CONDITIONS

Whenever the Fire Chief, as mentioned in Sec. 5203.1, shall find in any building or upon any premises, dangerous or hazardous conditions or materials, including, but not limited to violations of the requirements encompassed in Chapter 633, Florida Statutes, or the following Paragraphs, he shall order such violations and dangerous conditions or materials removed or remedied.

(a) Dangerous or unlawful amounts of combustible or explosive or otherwise hazardous materials.

(b) Hazardous conditions arising from defective or improperly installed equipment for handling or using combustible or explosive or otherwise hazardous materials.

(c) Dangerous accumulation of rubbish, wastepaper, boxes, shavings, or other flammable materials.

(d) Accumulations of dust or waste material in air conditioning or ventilation systems or of grease in kitchen or other exhaust ducts.

(e) Obstructions to, on, or under fire escapes, stairs, passageways, or doors, liable to interfere with the operations of the fire department or egress of occupants; locked exits shall constitute an unsafe condition. Exception: unless permitted by Code.

(f) Obstruction to windows. Where windows are required to provide the second means of escape from a room or area, the following are prohibited.

(1) Bars that cannot be opened from the inside.

EXCEPTION: Only one (1) window is required to meet the above where two (2) windows are in the same room or area.

(2) Other obstructions such as security grills.

(g) Any building or other structure which, for want of repairs, lack of adequate exit facilities, automatic or other fire alarm apparatus or fire extinguishing equipment, or by reason of age or dilapidated condition, or from any other cause, create a hazardous condition.

(h) Any building or structure vacated or unoccupied shall be properly secured to prevent entry by unauthorized persons.

(i) The improper storage, transporting or handling of all classes of flammable or combustible liquids or otherwise hazardous substances any place within the enforcing jurisdiction.

5203.3 SERVICE OF ORDERS

(a) The service of the orders authorized under **Section 5203.2** shall be made upon the owner, registered agent, occupant or other person responsible for the conditions, either by delivering a copy of the same to such person or by delivering the same and leaving it with any person in charge of the premises, or, in case no such person is found upon the premises, by affixing a copy thereof in a conspicuous place on the door to the entrance of such premises. Whenever it may be necessary to serve such an order upon the owner, registered agent, occupant or other person responsible of any premises, such order may be served wither by delivering to and leaving with such a person, a copy of such order, or, if such owner, registered agent, occupant or other person responsible is absent from the jurisdiction of the officer making the order, by sending such copy by registered or certified mail to the owner's, registered agent, occupant or other person responsible last known post office address.

(b) If buildings or other premises are owned by one person and occupied by another under lease or otherwise, the orders issued in connection with the enforcing of this fire code shall apply to the occupant thereof, except where the rules or orders require the making of additions to or changes in the premises themselves, such as would immediately become real estate and be the property of the owner of the premises; in such cases the rules or orders shall affect the owner and not the occupant.

(c) Such orders shall be final in nature and shall be complied with after service thereof within the time specified therein and in the manner specified therein by the Fire Chief.

5203.4 INVESTIGATION OF FIRES

The Fire Chief shall investigate the origin, cause, and circumstances of every fire occurring in the enforcing jurisdiction. Such investigations shall begin immediately upon the occurrence of a fire, and the Fire Chief shall be immediately notified of the facts; he shall take charge immediately, of the physical evidence, shall notify the proper authorities designated by law, to pursue the investigation of such matters, and shall further cooperate with the authorities in the collection of evidence and in the prosecution of the case.

5204 SPECIAL PROCEDURES

5204.1 BUILDING PERMITS, PLAN REVIEW AND NEW CONSTRUCTION INSPECTION

(a) Prior to the issuance of any permit for construction, erection, alterations, repair, or demolition, the Fire Chief shall review all plans in conjunction with the Building Department. One and two family detached residential dwelling units shall not be subject to plan review by the Fire Chief as described in this section or inspection by the Fire Chief as described in F.S. 633.081.

(b) Fire Department acceptance of fire and life safety features in buildings after performance objectives are met is required, prior to certificate of occupancy being issued.

(c) Rejections must include specific reference to the Code Section upon which rejection is based in writing.

5204.2 ALTERNATE MATERIALS AND METHODS OF DESIGN AND/OR NEW MATERIALS, PROCESSES OR OCCUPANCIES WHICH MAY REQUIRE PERMITS

(a) The Fire Code Committee may make recommendations to modify this Fire Code in writing to the Broward County Board of Rules and Appeals. Alternative requirements shall not result in a level of fire protection to life, safety, or property less stringent than the standards set forth in this Fire Safety Code.

(b) The Fire Chief may modify any of the provisions of this Chapter upon application in writing by the owner or lessee or his duly authorized representative where there are practical difficulties in the way of carrying out the strict letter of this Fire Code, provided the alternative requirements shall not result in a level of fire protection to life, safety, or property less stringent than the standards set forth in this Chapter.

(1) Where technical documentation or tests are required by the Fire Chief or Fire Code Committee, these shall be prepared by a professional engineer registered in the State of Florida, a certified testing laboratory or a recognized fire safety specialty organization acceptable to the Fire Chief.

(2) The cost of all tests or reports shall be borne by the owner or person in possession or control of the building, structure or condition.

(3) The Fire Code Committee shall recommend to the Broward County Board of Rules and Appeals, after giving affected persons an opportunity to be heard; any new materials, processes or occupancies which shall require permits, in addition to those now enumerated in this Chapter 52.

5204.3 FIRE CODE COMMITTEE

(a) In order to determine the suitability of alternate materials and types of construction, to provide for reasonable interpretation of the provisions of this Fire Code and to assist in the control of the Life/Safety in buildings and structures, there is hereby created a Fire Code Committee, to make recommendations to the Broward County Board of Rules and Appeals.

(b) **MEMBERSHIP:** Fire Code Committee shall consist of:

- One (1) mechanical engineer, Florida PE
- One (1) architect, Florida Registered
- One (1) fire sprinkler contractor
- One (1) handicapped representative
- One (1) master electrician
- Four (4) fire service (certified)
- Two (2) fire service members of the Board of Rules and Appeals
- One (1) contractor certified to install fire alarms
- One (1) general contractor
- One (1) electrical engineer, Florida P.E
- One (1) mechanical contractor
- One (1) consumer advocate
- One (1) structural engineer
- One (1) chief plumbing inspector

(1) In Paragraph 5204.3(c) —Membership, such membership of the Fire Code Committee will be for one year (with members being able to succeed themselves through reappointment by the Broward County Board of Rules and Appeals' Chairman), and that all members, including the Chairman of the Fire Code Committee be selected by the Chairman of the Board of Rules and Appeals. The Chairman of the Fire Code Committee shall be a fire service member of the Broward County Board of Rules and Appeals.

(2) Such recommendations of membership to serve on the Fire Code Committee shall be recommended by letter (including a resume) of each appointee. Appointees shall be recommended to the Board of Rules and Appeals by the League of Cities, Broward County Commission, Fire Service, Organizations, and Industry.

(c) The Fire Code Committee shall be a committee serving and performing its duties and functions under the jurisdiction and supervision of the Broward County Board of Rules and Appeals. The Broward County Board of Rules and Appeals may interpret the provisions of the Fire Code to cover a special case if it appears that the provisions of said law do not definitely cover the point raised, or that the intent of the law is not clear, or that

ambiguity exists in the wording; but it shall have no authority to grant variances where the said law is clear and specific.

(1) Where interpretive powers are vested in the inspection authority by federal, state, county and municipal laws and ordinances, or nationally accepted standards and codes, it shall be construed to mean the Broward County Board of Rules and Appeals.

5204.4 DUTIES:

(a) **APPEAL FROM DECISION OF FIRE CHIEF AND/OR BUILDING OFFICIAL:** The Fire Code Committee shall review all appeals from the decisions of the Fire Chief and/or Building Official wherein such decision is on matters regulated by this Fire Code from any person, aggrieved thereby.

(b) **PROCEDURE FOR APPEALS:** The Fire Code Committee shall review the appeal prior to hearing by the Broward County Board of Rules and Appeals and shall make recommendations to the Broward County Board of Rules and Appeals for resolution of the appeal. The Broward County Board of Rules and Appeals shall then hear the appeal and make a final ruling.

5205 COMPLIANCE WITH ORDERS AND NOTICES

5205.1 UNLAWFUL CONTINUANCE OF FIRE/LIFE SAFETY HAZARD

Any person or persons operating or maintaining any occupancy, premises or vehicle subject to this Code who shall permit any fire and/or life safety hazard to exist on premises or property under their control, and who shall fail to take immediate action to abate such hazards, when ordered or notified to do so by the Fire Chief or designee, shall be guilty of a second degree misdemeanor. Criminal enforcement of this Code shall remain with local law enforcement departments and officials charged with enforcement of laws of the State.

5205.2 COMPLIANCE WITH VIOLATION NOTICES

A building, structure, occupancy, premises or vehicle shall not be used when in violation of this Code as noted on a violation notice affixed under Section 5203.2.

5205.3 REMOVAL OR DESTRUCTION OF SIGNS OR TAGS

(a) It shall be unlawful to remove or tamper with any seal, warning tag or lock placed on an article, appliance, vehicle, meter, tank, or building by the building and zoning department or the fire department, without first obtaining permission to do so by the authority having jurisdiction.

(b) It shall be unlawful for any person to tamper with or change the position of any utility valve, switch, wiring, piping, meter or connection or alter any utility service in any way, unless properly authorized to do so.

5205.4 PROCEDURES IN COUNTY COURT/CODE ENFORCEMENT BOARD

(Existing Buildings)

When charges are filed based upon a violation under this Code, such charges prepared under the direction of the city, state or county attorney, shall be heard by a county judge or Code Enforcement Board, within the time limit prescribed under county court procedures or Code Enforcement Board. Such conditions shall constitute an immediate danger to life.

5206 PERMITS AND CERTIFICATES

5206.1 GENERAL

(a) A permit shall constitute permission to properly maintain, store or handle materials, or to conduct processes, which produce conditions hazardous to life or property, used in connection with such activities. Such permit shall not be transferable, and any change in use or occupancy of premises shall require a new permit.

(b) Before a permit may be issued, the Fire Chief or his designee, shall inspect and approve the containers, vehicles, buildings or storage places to be used. In cases where laws or regulations, enforceable by departments

other than the fire prevention bureau are applicable, joint approval shall be obtained from all departments concerned.

(c) All applications for a permit required by this Section, shall be made to the fire prevention bureau. Applications for permits shall be accompanied by such plan as may be required by the Fire Chief.

(d) Permits shall at all times be kept on the premises designated therein, and shall at all times be subject to inspection by any officer of the fire or police or building departments.

(e) One (1) permit only shall be required by establishments dealing in, or using, explosives or hazardous materials to be kept in the establishment at any one (1) time, but each of the materials shall be listed in the permit.

(f) Permits shall be required for the following:

(1) Cellulose nitrate plastics (pyroxylin) as specified in Section 5246.2.

(2) Compressed gases as specified in Section 5235.3.

(3) Explosives as specified in Section 5237.4.

(4) Fireworks as specified in Section 5238.6.

(5) Reserved for future use.

(6) Hazardous materials as specified in Section 5240.3.

(7) Liquefied petroleum gases and compressed natural gas as specified in Sections 5242.2 and 5242.15.

EXCEPTION: Portable cylinders 20 lbs. or less for portable equipment.

(8) Places of assembly as specified in Sections 5215.1 and 5215.2. Certificate of Occupancy and or Occupational License shall constitute a permit.

(9) General precautions against fire as specified in Section 5212.1(a).

(10) Tents and air-supported structures as specified in Section 5212.2(c).

(11) Remove or abandon, flammable or combustible tank as specified in this Section. Refer to 301.1(j) of the South Florida Building Code.

(12) Welding or cutting, acetylene, generator and calcium carbide, as specified in Section 5230.1.

(13) Storage of flammable and combustible liquids and solids as specified in Section 5239.3.

EXCEPTION: Less than 15 gallons stored in one and two family detached residential dwelling units shall not require a permit.

(14) Open burning as specified in Section 5212.1(a)(1).

(15) Carnivals, circuses and other special events.

5206.2 FEES

(a) **FEE REQUIRED:** Fees may be required for Annual Fire Inspections, Plans Review, Permits and Certificate Applications as set forth in Sections 5203, 5204 and 5206, as well as special testing and inspections of but not limited to, systems and equipment as set forth herein. As provided in H.B. 1337, 633.081(1), Chapter 87.287 F.S.

(b) **FEE SCHEDULE:** Fee Schedules are revised periodically and may vary between jurisdictions. For Specific information, regarding current fee schedules and requirements, contact the Fire Chief and/or Building Department within your jurisdiction.

5206.3 COMPLIANCE

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

(b) Compliance with this Fire Code is the responsibility of the permit holder and/or owner.

5206.4 REVOCATION OF PERMITS

Any permit or certificate issued under Section 5206.1 may be suspended or revoked when it is determined by the Fire Chief that:

- (a) It is used by an applicant other than the person to whom the permit or certificate was issued.
- (b) It is used for a location other than that for which it was issued.
- (c) Any of the conditions or limitations set forth in the permit or certificate have been violated.
- (d) The applicant fails, refuses or neglects to comply with any order or notice duly served upon him under the provisions of this Code within the time provided therein.
- (e) There has been any false statement or misrepresentation as to a material fact in the application or plans on which the permit or application was based.

5207 FEES

5207.1 Local jurisdiction Fire Prevention Bureau and Building Departments shall set their own fee schedules.

5208 DEFINITIONS

ACID is a chemical compound of hydrogen with one or more nonmetals, which yields hydrogen ions, and exhibits a pH of less than 3 in aqueous solution.

ADULT CONGREGATE LIVING FACILITY (Florida State Statutes 400-402) is any building or buildings, section of a building or distinct part of a building, residence, private home, boarding home, home for the aged, or other place, whether operated for profit or not, which undertakes through its ownership or management to provide, for a period exceeding 24 hours, housing, food service, and one or more personal services for one or more adults, not related to the owner or administrator by blood or marriage, who require such services. (Refer to Definitions Florida State Statutes 400-402.)

AEROSOL is a material which is dispensed from its container as a mist, spray or foam by propellant under pressure.

AGA shall mean American Gas Association.

AIA shall mean American Insurance Association.

AIR-REACTIVE MATERIALS are materials including pyrophoric materials which are capable of spontaneous ignition or other dangerous reaction upon exposure to dry or moist air.

AIR-SUPPORTED STRUCTURE is any structure constructed of lightweight fabric or film or any combination thereof which derives its sole support and stability from internal inflation pressure.

ALKALI — See **BASE**

ALTERATION is 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.

ANHYDROUS is without water, not containing water.

ANSI shall mean American National Standards Institute.

APARTMENT BUILDING includes buildings containing three or more living units with independent cooking facilities, whether designated as apartment house, tenement, garden apartment, and condominium, or by any other name.

API shall mean American Petroleum Institute.

APPROVED: Approved by the Fire Chief, or his designee, other authority given jurisdiction by this Fire Code.

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

ASHRA shall all mean American Society of Heating, Refrigerating and Air Conditioning Engineers.

ASME shall mean American Society of Mechanical Engineers.

ASTM shall mean American Society for Testing Materials.

ASPHALT KETTLE is any vessel or container used to process heat, hold for heating or dispense flammable or combustible roofing materials that are in liquid form or will take that form as a result of being exposed to such vessel or container.

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

ATMOSPHERIC TANK is a storage tank which has been designed to operate at pressures from atmospheric through 0.5 psig as measured from the top of the tank.

ATRIUM: A vertical opening within a building that communicates between floors, is enclosed by a roof at its highest point and is bound by enclosing walls a minimum of 30 feet apart.

AUTHORITY HAVING JURISDICTION is the Fire Chief or his duly authorized representative and/or Broward County Board of Rules and Appeals.

AUTOMATIC FIRE ALARM SYSTEM is a system which automatically detects a fire condition and actuates a fire alarm signaling device.

AUTOMATIC FIRE CHECK is a device listed for installation in communicating piping carrying an explosive vapor/air mixture to prevent a flashback from reaching the tanks or equipment in the piping system. These devices shall be equipped with special elements for arresting the explosion wave which may be already established in a pipe. These devices shall contain automatically operated shutoff valve to stop flow of vapor/air mixture in event of a flashback and continued burning at the arrester element. The shutoff valve shall be capable of annual reset.

AUTOMATIC FIRE-EXTINGUISHING SYSTEM is an approved system of devices and equipment which automatically detects a fire and discharges an approved fire extinguishing agent onto or in the area of a fire.

AWNING is any fixed roof-like 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.

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, is an exterior exit, a landing or porch projecting from the wall of a building, where serving as a required means of egress the long side shall be at least 50 percent open and the open area above the guard rail shall be so distributed as to prevent the accumulation of smoke or toxic gases.

BASE is a chemical compound of a metal and the hydroxide (OH-) ion in aqueous solution, which exhibits a pH of greater than 11. An alkali.

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

BELOW GROUND CONTAINER is storage installation in which the maximum liquid level in the container is below the surrounding grade or below a backfill berm, which is at least 10 feet wide at the top and then slopes away from the container at a natural angle of repose or is retained 10 feet from the container by a retaining wall and constructed of earth, concrete, solid masonry or suitable material to prevent the escape of liquid.

BLASTING AGENT is any material or mixture consisting of a fuel and oxidizer intended for blasting, not otherwise classified as an explosive, in which none of the ingredients as classified as explosives, provided that the finished product as mixed and packaged for use or shipment cannot be detonated by means of a No. 8 test

blasting cap when unconfined. Materials or mixtures classified as nitrocarbonitrates by the Department of Transportation regulations shall be included in this definition.

BLASTING CAP is a shell closed at one end and containing a charge of detonating compound which is ignited by a safety fuse. It is used for detonating explosives.

BLEACHERS are seating facilities without backrests in which an area of 3 square feet or less is assigned per person for computing the occupant load.

BOILOVER is the expulsion of crude oil (or certain other liquids) from a burning tank in which the light fractions of the crude oil burn off, producing a heat wave in the residue which, on reaching a water strata, may result in the expulsion of a portion of the contents of the tank in the form of a froth.

BOILING POINT is the boiling point of a liquid at a pressure of 14.7 psia. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for purposes of this classification, the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Products ASTM D86-82 may be used as the boiling point of the liquid.

BTU shall mean British Thermal Unit the heat necessary to raise the temperature of one pound of water one degree Fahrenheit.

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

BULK OXYGEN SYSTEM is an assembly of equipment, such as oxygen storage containers, pressure regulators, safety devices, vaporizers, manifolds and interconnecting piping, which has a storage capacity at normal temperature and pressure of:

1. More than 12,000 cubic feet of oxygen connected in service or ready for service,

or

2. More than 25,000 cubic feet of oxygen, including unconnected reserve on hand at the site.

The bulk oxygen system terminates at the point where oxygen at service pressure first enters the supply line. The oxygen may be stored as a liquid or gas in either stationary or portable containers.

BULK PLANT is that portion of a property where refined flammable or combustible liquids are received by tank vessel, pipeline, tank car or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids in tank vessel, pipeline, tank car, tank vehicle or container.

BULLET RESISTANT is a material and construction method capable of preventing penetration of a 180 grain, 3 caliber, soft-nose, hunting type bullet when propelled at a maximum velocity of 2700 feet per second.

BUREAU OF FIRE PREVENTION is the fire prevention bureau of the jurisdiction.

CGA shall mean the Compressed Gas Association.

CABANA: Shall mean bath cabins, together with only such accessories as board-walks, terraces, sun decks, rubbing rooms and toilet rooms.

CANOPY is any fixed roof-like 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 sidewalls or valances more than 18-inches deep, shall be classified as a tent or cabana as set forth herein.

CARGO TANK is any container having a liquid capacity in excess of 120 gallons used for the carrying of flammable or combustible liquids, LP gas, or hazardous chemicals and mounted permanently or otherwise upon a tank vehicle. The term "cargo tank" does not apply to any container used solely for the purpose of supplying fuel for propulsion of the vehicle upon which it is mounted.

CAUSTIC is a common name for hydroxides such as sodium and potassium hydroxides and for the strongly corrosive solutions they produce when dissolved in water.

CELLULOSE NITRATE PLASTICS (PYROXYLIN) is any plastic substance, material or compound, other than cellulose nitrate film covered by Section 5245 or guncotton or other explosive covered by Section 5237, having cellulose nitrate as a base, or whatever name known, when in the form of blocks, slabs, sheets, tubes or fabricated shapes. For requirements, see Section 5246.

CENTRAL SUPPLY is that portion of the system which normally supplies the piping systems.

CHIEF OR CHIEF OF THE FIRE DEPARTMENT is the chief officer of the fire department, or his authorized representative, serving the jurisdiction.

CHIEF OF THE BUREAU OF FIRE PREVENTION is the head of the fire prevention bureau.

CLOSED CONTAINER is a container so sealed by means of a lid or other device that liquid, vapor or dusts will not escape from it under ordinary conditions of use or handling.

COMBUSTIBLE shall mean capable of undergoing combustion.

COMBUSTIBLE FIBERS are readily ignitable and free-burning fibers, such as cotton, sisal, henequen, ixtle, jute, hemp, tow, cocoa fiber, oakum, baled waste, baled wastepaper, kapok, hay, straw, excelsior, Spanish moss and other like materials.

COMBUSTIBLE FIBER STORAGE BIN is a metal or metal-lined container with a capacity not exceeding 100 cubic feet and equipped with a self-closing cover.

COMBUSTIBLE FIBER STORAGE ROOMS are rooms with a capacity not exceeding 500 cubic feet separated from the remainder of the building by a one-hour occupancy separation constructed as specified in this Code.

COMBUSTIBLE LIQUID is a liquid having a flash point at or above 100 degrees F. Combustible liquids shall be subdivided as follows:

CLASS I: See Flammable Liquids.

CLASS II liquids shall include those having flash points at or above 100 degrees F. and below 140 degrees F.

CLASS III-A liquids shall include those having flash points at or above 140 degrees F. and below 200 degrees F.

CLASS III-B liquids shall include those liquids having flash points at or above 200 degrees F.

COMBUSTIBLE WASTE MATTER shall mean magazines, books, trimmings from lawns, trees, flower gardens, pasteboard boxes, rags, paper, straw, sawdust, packing material, shavings, boxes and all rubbish and refuse that will ignite through contact with flames of ordinary temperatures.

COMBUSTION is any chemical process that involves oxidation sufficient to produce light or heat.

COMMODITY is the combination of product, packing material and container.

COMMON RADIATION SOURCE MATERIALS are radioisotopes other than fissile materials, which are in common usage in various medical and industrial testing and measuring situations.

COMPRESSED GAS is any mixture or material having in the container either an absolute pressure exceeding 40 pounds per square inch at 70 degrees F., or an absolute pressure exceeding 104 pounds per square inch at 130 degrees F., or both; or any liquid flammable material having a vapor pressure as defined in this Section exceeding 40 pounds per square inch at 100 degrees F.

CONVERSION OIL BURNER is a burner for field installation in heating appliances such as boilers and furnaces. It may be furnished with or without a primary safety control. Under special circumstances it may be installed for firing ovens, water heaters, ranges, special furnaces and the like. A burner of this type may be a pressure atomizing gun type, a horizontal or vertical rotary type or a mechanical or natural draft vaporizing type.

CONVERSION RANGE OIL BURNER is an oil burner designed to burn kerosene, range oil or similar fuel. This burner is intended primarily for installation only in a stove or range, a portion or all of which originally was designed for the utilization of solid fuel and which is flue-connected.

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

CORROSIVE MATERIALS are those solids, liquids or gases which when in contact with living tissue will cause destruction or irreversible alteration of such tissue by chemical action. Examples include acid, alkaline or caustic materials.

COURT is an open, uncovered, and unoccupied space, unobstructed to the sky, bounded on two or more sides by exterior building walls.

COURT (enclosed) is a court bounded on all sides by the exterior walls of a building or exterior walls and lot lines on which walls are allowable.

CRUDE PETROLEUM means hydrocarbon mixtures that have a flash point below 150 degrees F.

CRYOGENIC FLUIDS are those fluids that have a normal boiling point below -150 degrees F.

CRYOGENIC IN-GROUND CONTAINER is a container in which the maximum liquid level is below the normal surrounding grade and is constructed essentially of natural materials such as earth and rock and dependent upon the freezing of water-saturated earth materials for its tightness or impervious nature.

CRYOGENIC VESSEL is any pressure vessel, low-pressure tank or atmospheric tank designed to contain a cryogenic fluid on which venting, insulation, refrigeration or a combination of these is used in order to maintain the operating pressure within the design pressure and the contents in a liquid phase.

DECOMPOSITION is the breaking apart of molecules into elements or simpler compounds.

DECORATIVE MATERIALS are materials such as curtains, draperies, streamers, surface coverings applied over the building interior finish for decorative, acoustical or other effect, and also cloth, cotton batting, straw, vines, leaves, trees, moss, and plastics used for decorative effect, but they shall not include floor coverings, ordinary window shades nor materials 1/40 of an inch or less in thickness applied directly to and adhering tightly to a base.

DEFLAGRATION is an exothermic reaction such as the extremely rapid oxidation of a flammable vapor in air, in which the reaction progresses through the material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

DETONATING CORD is a flexible cord containing a center core of high explosives which when detonated will have sufficient strength to detonate other cap-sensitive explosives with which it is in contact.

DETONATION is an exothermic reaction characterized by the presence of a shock wave in the material which establishes and maintains the reaction. The reaction zone progresses through the material at a rate greater than sound. The principal heating mechanism is one of shock compression. Detonations have an explosive effect.

DETONATOR is a component (such as a blasting cap or an electric blasting cap) in an explosive train which is capable of initiating detonation in a subsequent high explosive component.

DIP TANK is a tank, vat or container of flammable or combustible liquid in which sections or materials are immersed for the purpose of coating, finishing, treating or similar processes.

DISPERSAL AREA, SAFE is an area which will accommodate a number of persons equal to the total capacity of the stand and building which it serves such that a person within the area will not be closer than 50 feet from the stand or building. Dispersal area capacity shall be determined by allowing 3 square feet of net clear area per person.

D.I.S.S. DIAMETER INDEX SAFETY SYSTEM is the system outlined in Compressed Gas Association Pamphlet V-5.

DISTILLERY is a plant or that portion of a plant where liquids produced by fermentation are concentrated and where the concentrated products may also be mixed, stored or packaged.

DISTRIBUTING PLANT: A facility, the primary purpose of which is the distribution of gas, and which receives LP-Gas in tank car, truck transport or truck lots, distributing this gas to the end use by portable container (packaged) delivery, by tank truck or through gas piping. Such plants have bulk storage (2,000 gallons water capacity or more) and usually have container filling and truck loading facilities on the premises. Bulk plants are considered as being in this category. Normally no person other than plant management or plant employees have access to these facilities.

DISTRIBUTING POINT: A facility other than a distributing plant or industrial plant, which normally receives gas by tank truck, and which fills small containers or the engine fuel tanks of motor vehicles on the owner of the facility or his employees have access, is considered to be a distribution point. An LP-Gas service station is one type of distributing point.

DRY CLEANING is the process of removing dirt, grease, paints and other stains from wearing apparel, textiles, fabrics, rugs or other material by the use of nonaqueous liquids (solvents), and it shall include the process of dyeing clothes or premises. Any such facility having LP-Gas storage of 100 gallons or more water capacity, and to which persons other than the other fabrics or textiles in a solution of dye colors and nonaqueous liquid solvents.

DUST is pulverized particles which, when mixed with air in the proper proportions, become explosive and may be ignited by a flame or a spark or other source of ignition.

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

DWELLING UNIT is any building or portion thereof which contains living facilities, including provisions for sleeping, eating, cooling and sanitation as required by this Code, for not more than one family.

EGRESS: See **MEANS OF EGRESS**.

ELECTRICAL FIRE CODE is the National Electrical Fire Code promulgated by the National Fire Protection Association.

ELECTRICAL BLASTING CAP is a shell containing a charge of detonating compound designed to be fired by an electric current.

ELECTROSTATIC FLUIDIZED BED is a container holding powder coating material which is aerated from below so as to form an air-supported expanded cloud of such material which is electrically charged with a charge opposite to the charge of the object to be coated. Such object is transported through the container immediately above the charges and aerated materials in order to be coated.

EXISTING: That which is already in existence at the date when this Fire Code goes into effect, as, existing buildings, structures or exit facilities.

EXIT: See **MEANS OF EGRESS**.

EXIT ACCESS: See **MEANS OF EGRESS**.

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

EXIT DISCHARGE: See **MEANS OF EGRESS**.

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

EXPLOSION is an effect produced by the sudden violent expansion of gases, which may be accompanied by a shock wave and/or disruption of enclosing materials or structures. An explosion may result from (1) Chemical changes such as rapid oxidation (deflagration), decomposition of molecules and runaway polymerization (usually detonations); (2) physical changes (e.g. pressure tank ruptures), or (3) atomic changes (nuclear fission or fusion).

EXPLOSIVE is any chemical compound or mechanical mixture that is commonly used or intended for the purpose of producing an explosion, that contains any oxidizing and combustible units or other ingredients in such proportions, quantities, or packing, that an ignition by fire, by friction, by concussion, by percussion or by detonator of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects or of destroying life and limb.

FIRE APPARATUS is a vehicle such as a fire pumper, aerial ladder truck, elevated platform, rescue squad, fire boat or similar fire fighting or rescue equipment.

FIRE APPLIANCE is apparatus or equipment provided or installed for use in the event of an emergency.

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

FIRE BARRIER is a line or barricade designed to keep unauthorized persons out of the area of a fire.

FIRE CHIEF: See **CHIEF**

FIRE DEPARTMENT is any regularly organized fire department, fire protection district or fire company regularly charged with the responsibility of providing fire protection to the jurisdiction.

FIRE DEPARTMENT HOSE CONNECTION is a connection through which the fire department can pump water.

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

FIRE HAZARD is any thing or act which increases or may cause an increase of the hazard or menace of fire to a greater degree than that customarily recognized as normal by persons in the public service regularly engaged in prevention, suppressing or extinguishing fire; or which may obstruct, delay, hinder or interfere with the operations of the fire department or the egress of occupants in the event of fire.

FIRE LANE is a road, path or other passageways developed to allow the passage of fire apparatus through congested areas.

FIRE NUISANCE is any thing or any act which is annoying, unpleasant, offensive or obnoxious because of fire.

FIRE POINT is the lowest temperature of a liquid in an open container at which vapors are evolved fast enough to support continuous combustion.

FIRE-RESISTIVE is the ability to resist fire and prevent its spread as regulated in this Fire Code.

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

FIRE SEPARATION is construction of rated fire resistance or the maintenance of clear area to resist the spread of fire.

FIRE WINDOW is a window assembly, including frame, wired glass and hardware, which meets the fire protective requirements for the location in which it is to be used.

FIREWORKS: As defined by State of Florida.

"Fireworks" means and includes any combustible or explosive composition or substance or combination of substances or, except as hereinafter provided, any article prepared for the purpose of producing a visible or audible effect by combustion, explosion, deflagration, or detonation. The term includes blank cartridges and toy cannons in which explosives are used, the type of balloons which require fire underneath to propel them, fire-crackers, torpedoes, skyrockets, roman candles, daygo bombs, and any fireworks containing any explosives or flammable compound or any tablets or other device containing any explosive substance.

"Fireworks" does not include sparklers approved by the Division of the State Fire Marshal pursuant to S. 791.013; toy pistols, toy canes, toy guns, or other devices in which paper caps containing twenty five hundredths

grains or less of explosive compound are used, providing they are so constructed that the hand cannot come in contact with the cap when in place for the explosion; and toy pistol paper caps which contain less than twenty hundredths grains of explosive mixture, the sale and use of which shall be permitted at all times.

FLAME ARRESTER is a device approved for installation in piping which carries a flammable vapor/air mixture to prevent a flashback beyond the point of installation. Flame arresters installed under this definition shall be installed only in such locations specifically approved by the listing agency.

FISSILE MATERIALS are radioisotopes which may undergo a nuclear fission reaction, and are usually found only at reactor sites, or as part of a nuclear weapon.

FLAME RETARDANT is any approved chemical, chemical compound or mixture which when applied in an approved manner to any fabric or other material will render such fabric or material incapable of supporting combustion.

FLAME SPREAD is the propagation of flame over a surface.

FLAMMABLE ANESTHETIC is a compressed gas which is flammable and administered as an anesthetic and shall include among others, cyclopropane, divinyl ether, ethyl chloride, ethyl ether and ethylene.

FLAMMABLE CRYOGENIC FLUIDS are those cryogenic fluids which are flammable in their vapor state.

FLAMMABLE GAS is a gas which is flammable in mixture of 13 percent or less (by volume) with air, or the flammable range with air is wider than 8 percent, regardless of the lower limit.

FLAMMABLE LIQUID is any liquid having a flash point below 100 degrees F. and having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100 degrees F. Class I liquids shall include those having flash points below 100 degrees F. and may be subdivided as follows:

Class I-A shall include those having flash points below 73 degrees F. and having a boiling point below 100 degrees F.

Class I-B shall include those having flash points below 73 degrees F. and having a boiling point at or above 100 degrees F.

Class I-C shall include those having flash points at or above 73 degrees F. and below 100 degrees F.

FLAMMABLE MATERIAL is (1) any material that will readily ignite from common sources of heat; (2) any material that will ignite at a temperature of 600 degrees F. or less.

FLAMMABLE SOLID is a solid substance, other than one classified as an explosive, which is liable to cause fires through friction, or as a result of retained heat from manufacture or which has an ignition temperature below 212 degrees F., or which burns so vigorously or persistently when ignited so as to create a serious hazard. Finely divided solid material which when dispersed air as a vapor cloud may be ignited and cause an explosion are flammable solids.

FLASH POINT is the minimum temperature at which a liquid gives off vapors in sufficient concentrations to form an ignitable mixture with air near the surface of the liquid.

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

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

FLUIDIZED BED is a container holding powder coating material which is aerated from below so as to form an air-supported expanded cloud of such material through which the preheated object to be coated is immersed and transported.

FOLDING AND TELESCOPING SEATING is a structure that is used for tiered seating of persons and whose overall shape and size may be reduced, without being dismantled, for purposes of moving or storing.

FOOTBOARDS are that part of a raised seating facility other than an aisle or cross aisle upon which the occupant of the stands walks to reach a seat or upon which he may rest his feet.

FUEL BREAK is a strip or block of land on which the vegetation has been permanently modified so that fires burning into it will not propagate across it.

FUEL OIL is kerosene or any hydrocarbon oil conforming to nationally recognized standards and having a flash point not less than 100 degrees F.

FUMIGANT is any substance which by itself or in combination with any other substance emits or liberates a gas, fume or vapor used for the destruction or control of insects, fungi, vermin, germs, rodents or other pests and shall be distinguished from insecticides and disinfectants.

FUMIGATION is the use of any substance which emits or liberates a gas, fume or vapor used for the destruction or control of insects, fungi, vermin, germs, rodents or other pests, and shall be distinguished from insecticides and disinfectants.

GARAGE is a building or portion thereof in which a motor vehicle containing flammable or combustible liquids or gas in its tank is stored, repaired or kept.

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

GRANDSTANDS are tiered or stepped seating facilities wherein an area of more than 3 square feet is provided for each person.

GUARD is a vertical barrier erected along exposed edges of stairways, balconies, etc.

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

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

GUNPOWDER is any of various powders used in firearms and small arms ammunition as propelling charges.

HANDRAIL is a bar, pipe or similar member designed to furnish persons with a handhold. (A handrail, if of suitable design, may also serve as a part of a guard).

HAZARDOUS AREAS are areas of structures, buildings or parts thereof, used for purposes that involve combustible, flammable, or explosive products or materials which are likely to burn with extreme rapidity or which may produce poisonous fumes or gases, including highly toxic, or noxious alkalis, acids, or other liquids or chemicals which involve flame, fume, explosive, poisonous or irritant hazards.

HAZARDOUS CHEMICAL REACTION is any reaction which generates pressure or by-products which may cause injury, illness or harm to humans, domestic animals, livestock or wildlife.

HAZARDOUS FIRE AREA is any land which is covered with grass, grain, brush or forest, whether privately or publicly owned, which is so situated or is of such inaccessible location that a fire originating upon such land would present an abnormally difficult job of suppression or would result in great and unusual damage through fire or resulting erosion. Hazardous fire areas shall be designated by the Chief on a map. This map shall be maintained in the office of the Chief.

HAZARDOUS MATERIALS are those materials, chemicals or substances which are flammable, or which may self-react or react with other materials to cause fires or explosions, or which by their presence create or augment a fire or explosion hazard, or which by their toxicity, radioactivity or any other physical, chemical or nuclear property when contained or when involved in an unauthorized release may cause danger to life or create a serious health hazard. Hazardous materials shall include such materials as compressed gases, cryogenic fluids,

flammable liquids, combustible liquids, flammable solids, corrosives, oxidizing materials, reactive and unstable materials, highly toxic, poisonous and radioactive materials as classified in Section 5240, Division whether the materials are in usable or waste condition.

HEIGHT, BUILDING is the vertical distance from grade, at the center of each exterior wall line, to the highest finished roof surface of a flat roof or to the average level of a gable or hip roof. **NOTE:** The berming/sloping of the ground immediately adjacent to the exterior wall lines of a building or structure, which, in the opinion of the authority having jurisdiction would reduce the effectiveness of emergency equipment and/or operations shall not be permitted.

HIGH-PILED STORAGE is combustible materials in closely packed piles more than 15 feet in height or combustible materials on pallets or in racks more than 12 feet in height. For certain special-hazard commodities such as rubber tires, plastics, some flammable liquids, idle pallets, etc., the critical pile height may be as low as 6 feet.

HIGH-RISE is any building whose height reduces the effectiveness, or nullifies the use of standard ground based emergency equipment and/or operations; and which requires special considerations given to movement of occupants, control of fire and smoke, communications, elevators, emergency planning and overall system reliability.

HIGHLY TOXIC MATERIALS are materials, including those materials classified as "Poison B" by the Department of Transportation, with a health hazard of 3 or 4 when rated in accordance with NFPA-704.

HIGHLY TOXIC PESTICIDE is any pesticide which is required by federal regulation to bear a skull and crossbones and be labeled with the word "POISON".

HIGHWAY is any public street or public road.

HORIZONTAL EXIT is a means of passage from one building into another building occupied by the 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 2 hours.

HOTEL is any building containing 10 or more rooms, intended or designed to be used or which are used, rented or hired out to be occupied, or which are occupied by persons for sleeping purposes by paying guests.

HYPERGOLIC MATERIALS are any materials which are capable of igniting spontaneously upon contact with another substance.

I.C.C. CONTAINER is any container approved by the Interstate Commerce Commission for shipping any liquid, gaseous or solid material of flammable, toxic or other hazardous nature.

I.M.E. shall mean Institute of Makers of Explosives.

INCINERATOR is a structure, or portion thereof, container, device or other appliance designed, used or intended to be used for the disposal of combustible rubbish by burning.

INERT is possessing little or no tendency to undergo chemical change. Unreactive.

INHABITED BUILDING is a building regularly occupied in whole or in part.

JURISDICTION shall mean the legally constituted authority which has adopted this Fire Code as law or ordinance.

JURISDICTIONAL AREA is the Territory of the state, county, city or district adopting this South Florida Fire Code, Broward County Edition.

LABELED is equipment or material to which has been attached a label, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling is indicated compliance with nationally recognized standards or tests to determine suitable usage in a specified manner.

LIQUID is a material which has fluidity greater than that of 300 penetration asphalt when tested in accordance with approved standards. When not otherwise identified, the term "liquid" is both flammable and combustible liquids.

LISTED is equipment or materials included on a list published by a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states that equipment or materials meet nationally recognized standards and has been tested and found suitable for use in a specified manner.

LIQUEFIED PETROLEUM GAS (LP-GAS) is any material which is composed predominantly of the following hydrocarbons or mixtures of them: propane, propylene, butane (normal butane or isobutane) and butylenes.

LIQUEFIED PETROLEUM GAS EQUIPMENT is all containers, apparatus, piping (not including utility distribution piping system) and equipment pertinent to the storage and handling of liquefied petroleum gas. Gas-consuming appliances shall not be considered as being liquefied petroleum gas equipment.

LODGING HOUSE is any building containing less than 10 rooms, intended or designed to be used or which are used rented or hired out, or which are occupied for sleeping purposes by 2 or more paying guests.

LOW PRESSURE TANK is a storage tank designed to withstand an internal pressure of above 0.5 psig but not more than 15 psig.

MAGAZINE is any building or structure used for the storage of explosives.

MAGNESIUM is the pure metal and alloys of which the major part is magnesium.

M.C.A. shall mean the Manufacturing Chemists Association.

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

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

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

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

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

MERCANTILE OCCUPANCY is the occupancy or use of a building or structure or any portion thereof for displaying, selling or buying of goods, wares or merchandise.

MEZZANINE is an intermediate floor placed in any story or room. When the total area of such mezzanine floor exceeds 33-1/3 percent of the total floor area in that room or story in which the mezzanine floor occurs, it shall be considered as constituting an additional story. The clear height above or below a mezzanine-floor construction shall not be less than seven feet.

MIXTURE is a variable composition of elements, compounds or both that have not combined chemically. The components of a mixture preserve their own individual identities and they can be separated by physical means.

MONOMER is a liquid or gaseous hydrocarbon or substituted hydrocarbon material, the molecules of which will under certain conditions, undergo a chain-reaction called polymerization to form large molecules called polymers. Some monomers are unstable and will spontaneously polymerize, while others require heat, pressure, a catalyst or a combination of these to initiate the reaction.

NEW is that which is constructed, erected, or installed subsequent to the date to which this Fire Code goes into effect.

NFPA-shall mean the National Fire Protection Association.

NITRO-COMPOUND is organic material, usually a hydrocarbon, which has been treated with nitric and sulfuric acid (nitrated) to produce a flammable substance containing its own oxygen source. Most will explosively decompose producing a detonation.

NONCOMBUSTIBLE shall have the same meaning as incombustible. See **INCOMBUSTIBLE**.

NONFLAMMABLE MEDICAL GAS is a compressed gas which is nonflammable and used for therapeutic purposes and shall include, among others, oxygen and nitrous oxide.

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

OCCUPANCY CLASSIFICATION for the purpose of this Fire Code, certain occupancies are defined. (South Florida Building Code, Chapters 6 through 15, Part 3.

OIL-BURNING EQUIPMENT is an oil burner of any type together with its tank, piping, wiring, controls and related devices and shall include all oil burners, oil-fired units and heating and cooking appliances but exclude those exempted by Section 5233.

OIL-FIRED UNIT is a heating appliance equipped with one or more oil burners and all the necessary safety controls, electrical equipment and related equipment manufactured for assembly as a complete unit. This definition does not include kerosene stoves or oil stoves.

OPEN-AIR GRANDSTANDS AND BLEACHERS are seating facilities which are located so that the side toward which the audience faces is unroofed and without an enclosing wall.

OPERATING LINE is a group of separated operating buildings of specific arrangement used in the assembly, modification, reconditioning, renovation, maintenance, inspection, surveillance, testing or manufacturing of explosives.

ORGANIC COMPOUND is a carbon-based compound.

ORGANIC COATING is a liquid mixture of binders such as alkyd, nitrocellulose, acrylic or oil and flammable and combustible solvents such as hydrocarbon, ester, ketone or alcohol, which when spread in a thin film converts to a durable protective and decorative finish.

OUTSIDE STAIRS include stairs in which at least one side is open to the outer air.

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

OXIDIZING MATERIALS are substances that readily yield oxygen to stimulate combustion.

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

PENTHOUSE: An enclosed one-story structure extending above the roof of a building not exceeding 25 percent of the area of the roof at the level on which such penthouse or penthouses are located.

PERMANENT STANDS are those seating facilities which remain at a location for more than 30 days.

PEROXIDE FORMING CHEMICAL is a chemical which, when exposed to air will form explosive peroxides which are shock sensitive.

PERSON: A natural person, his heirs, executors, administrators, or assigns, and also includes a firm partnership, or corporation, its or their successors or assigns or the agent of any of the aforesaid.

PERSON, AMBULATORY is one who is capable of leaving a fire area within a reasonable length of time without assistance of any kind in event of an emergency.

PERSON, NON-AMBULATORY is one who is incapable of leaving a fire area within a reasonable length of time without assistance in event of an emergency.

PESTICIDE is any substance or mixture of substances, including fungicides, intended for preventing, destroying, repelling or mitigating any pest and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant. Products defined as drugs in the Federal Food, Drug and Cosmetic Act are exempt. (Also, see Highly Toxic Pesticide.)

pH is a number which represents hydrogen-ion concentration or activity in gram equivalents per liter and used in expressing both acidity and alkalinity on a scale whose values run from 0 to 14, with 7 representing neutrality, numbers less than 7 increasing acidity, and numbers greater than 7 increasing alkalinity; also, the condition represented by such a manner.

PIPED DISTRIBUTION SYSTEM is a central supply system with controlling equipment and a system of piping extending to one or more points where liquids or gases are used and a suitable station outlet valve is located at each use point.

PLATFORM: A portion of an assembly room which may be raised above the level of the assembly floor and which may be separated from the assembly space by a wall and proscenium opening provided the ceiling above the platform shall be not more than five feet above the proscenium opening.

POISONOUS GAS is any gas of such nature that a small amount of the gas when mixed with air is dangerous to life. Poisonous gas shall include any material required to bear a United States Department of Transportation Poison A label and any Highly Toxic Material which is a gas at standard temperature and pressure. See definition of Highly Toxic Materials and Section 5240.

POLYMERIZATION is a chemical reaction in which two or more small molecules combine to form larger molecules that contain repeating structural units of the original unit.

PORTABLE TANK is any closed vessel having a liquid capacity over 60 U.S. gallons and not intended for fixed installation.

PRESSURE DELIVERY SYSTEM OR REMOTE PUMPING SYSTEM is any method of transferring flammable or combustible liquids from underground storage tanks to the fuel tanks of motor vehicles whenever the pump is located elsewhere other than in the dispenser above 15 psig.

PRIMARY CONTAINMENT means the first level of containment, i.e. the inside portion of that container which comes into immediate contact on its inner surface with the material being contained.

PRIVATE STAIRWAY is a stairway serving one tenant only and for general public use.

PROCESSING PLANT is that portion of a property in which flammable or combustible liquids or other hazardous materials are mixed, heated, separated or otherwise processed as principal business, but shall not include plants defined herein as refineries.

PROPRIETARY INFORMATION means information regarding compounds or ingredients used in a process or production which do not qualify as trade secrets but which provides an industry or business with a competitive advantage.

PROSCENIUM WALL is a fire resistive wall which separates a stage or enclosed platform from the public or spectator area of an auditorium or theater.

PROTECTED COMBUSTIBLE FIBER STORAGE VAULT is a room with a capacity exceeding 1000 cubic feet separated from the remainder of the building by a two-hour occupancy separation constructed as specified in this Code and provided within an approved automatic sprinkler system.

PUBLIC CONVEYANCE is any railroad car, streetcar, cab, bus, airplane or other vehicle which is carrying passengers for hire.

PUBLIC LODGING — See Florida State Statutes 509.13(4a & b).

PUBLIC NUISANCE is the existence of dry and drying weeds, rubbish and waste material on property, lands or premises which are dangerous or injurious to that or neighboring property, lands or premises and which are detrimental to the welfare of the occupants or residents of the vicinity.

PUBLIC WAY Any street, alley, or similar parcel of land essentially open to the outside air, deeded, dedicated, or otherwise permanently appropriated to the public for public use and having a clear width and height of not less than 10 feet (3m).

PYROPHORIC MATERIALS are any materials which are capable of spontaneous ignition upon exposure to dry or moist air.

RADIOACTIVE MATERIAL is any material or combination of materials that spontaneously emits ionizing radiation.

RAILWAY is any steam, electric or other railroad or railway which carries passengers for hire.

RAMP is an inclined floor surface.

REACTIVE MATERIALS are those materials which can enter into a hazardous chemical reaction with other stable or unstable materials.

REFINERY is a plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline or other hydrocarbon sources.

REMOTE PUMPING SYSTEM: See **PRESSURE DELIVERY SYSTEM.**

REPAIR: The replacement of existing work with the same kind of material for the purpose of its maintenance, but not including additional work that would affect structural, sanitary or fire-resistive safety or facilities for means of egress.

REQUIRED is a mandatory provision of this Fire Code.

REVIEWING STANDS are elevated platforms accommodating not more than 50 persons. Seating facilities, if provided, are normally in the nature of loose chairs. Reviewing stands accommodating more than 50 persons shall be regulated as grandstands.

SADT is Self-Accelerating Decomposition Temperature.

SAFE DISPERSAL AREA: See **DISPERSAL AREA, SAFE.**

SAFETY CAN is an approved container of not over 5-gallon capacity having a spring-closing lid and spout cover.

SAFETY FACTOR is the ratio of the design burst pressure to the maximum working pressure and shall be not less than four.

SECONDARY CONTAINMENT means that level of containment that is external to and separate from primary containment.

SECURE is safe from intrusion or contained separately to prevent mixing with other materials.

SEGREGATED is storage in the same area but physically separated from other materials by adequate space, walls or partitions and in accordance with the manufacturer's recommendations.

SELF-CLOSING as applied to a fire door or other opening protector, means normally closed and equipped with an approved device which will insure closing after having been opened for use.

SERVICE STATION, AIRCRAFT, is that portion of an airport or heliport where flammable or combustible liquids used as aircraft fuel are used and dispensed into fuel tanks of an aircraft and shall include all facilities essential thereto.

SERVICE STATION, AUTOMOTIVE: A building or portion thereof where gasoline, oil and greases are supplied and dispensed to the motor vehicle trade, also where fire, battery, washing, polishing and lubrication services are rendered and minor adjustments are made.

SERVICE STATION, MARINE, is that portion of a property where liquids used as fuels are stored and dispensed from fixed equipment on shore, piers, wharves or floating docks into the fuel tanks of self-propelled craft and shall include all facilities used in connection therewith.

SERVICE STATION, SELF-SERVICE, See 4A-16.70 (1) State Fire Marshal Rules and Regulations.

SHALL as used in this Fire Code means mandatory.

SHOULD is intended to indicate recommendations or that which is advised but not required.

SMALL ARMS AMMUNITION is any shotgun, rifle, pistol or revolver cartridges.

SMOKE DETECTOR is a device which senses visible or invisible particles of combustion.

SMOKING is the carrying or use of lighted pipe, cigar, cigarette or tobacco in any form.

SPECIAL INDUSTRIAL HIGH EXPLOSIVE DEVICE is any explosive power pack containing an explosive charge in the form of a cartridge or construction device. The term includes but is not limited to explosive rivets, explosive bolts, explosive charges for driving pins or studs, cartridges for explosive-actuated power tools and charges of explosives used in jet tapping of open-hearth furnaces and jet perforation, of oil well casings.

SPECIAL INDUSTRIAL HIGH-EXPLOSIVES MATERIALS are sheets, extrusions, pellets and packages of high explosives containing dynamite, trinitrotoluol, pentaerythritol tetranitrate, cyclotrimethylenetrinitramine or other similar compounds used for high-energy-rate forming, expanding and shaping in metal fabrication and for dismemberment and quick reduction of scrap metal.

SPRAY BOOTH is a power ventilated structure of varying dimensions and construction provided to enclose or accommodate a spraying operation and to confine and limit the escape of spray vapor and residue and to exhaust it safely.

SPRAYING AREA is any area in which dangerous quantities of flammable vapors or combustible residues, dusts or deposits are present due to the operation of spraying processes.

SPRAYING ROOMS are rooms designed to accommodate spraying operations and shall comply with the South Florida Building Code requirements for a Group E, Division 2 Occupancy.

SQUIB-ELECTRIC is a device similar in appearance to an electric blasting cap which, upon activation by an electric current, produces a deflagration instead of a detonation.

STAGE, GENERAL: A stage is a partially enclosed portion of an assembly room or building, cut off from the audience section of a proscenium wall, which is designed or used for the presentation of plays, demonstration, or other entertainment. Stages shall be classified as working stages or non-working stages.

STAGE, WORKING: A working stage is a partially enclosed portion of an assembly room or building, cut off from the audience section by a proscenium wall, and which is equipped with scenery loft, gridiron, fly-gallery, and lighting equipment, and the depth from the proscenium curtain to the back wall is 15 feet or more.

STAGE, NON-WORKING: A non-working stage is a partially enclosed portion of an assembly room or building, cut off from the audience section by a proscenium wall, and which is not equipped with the equipment common to the working stage (such as fly-gallery, gridiron, scenery loft or lighting equipment) and of such dimension that any such equipment cannot be installed (but flat scenery may be used on such stage. The depth of a non-working stage shall be not more than 15 feet from the proscenium wall to the back wall.

STANDPIPE SYSTEM is a wet or dry system of piping, valves, outlets and related equipment designed to provide water at specified pressures and installed exclusively for the fighting of fires and classified as follows:

CLASS I is a wet or dry standpipe system equipped with 2-1/2 inch outlets for use by fire departments or trained personnel.

CLASS II is a wet standpipe system directly connected to a water supply and equipped with 1-1/2 inch outlets intended for use by the building occupants.

COMBINED SYSTEM is a system of water piping which serves 2-1/2 inch hose outlets for use by the fire department and also supplies water to fire sprinklers.

STORAGE the occupancy or use of a building or structure or any portion thereof for the storage of goods, wares, merchandise, raw materials, agricultural, or manufactured products, including parking garages, or the sheltering of livestock and other animals, except when classed as a high hazard occupancy.

STORY:

(a) That portion of a building included between the uppermost surface of any floor and the uppermost surface of the floor or room next above.

(b) That portion of building between floor and ceiling which is so located that more than half of the clear height from floor to ceiling is above grade.

See **BASEMENT**

(c) In a residential-type apartment occupied by a single tenant in which the area of the upper floor does not exceed two-thirds of the area of the main floor, such upper floor shall not be considered a story.

See also **MEZZANINE**

See also **PENTHOUSE**

STP (Standard Temperature and Pressure) is a temperature of 0 degrees C and an atmospheric pressure of 1 atmosphere (760mm Hg).

STREET is any public or private thoroughfare such as, but not limited to, streets, alleys, avenues, land, places, terraces, and roofs, and which is more than 20 feet in width and dedicated or deeded to the public for public use.

STREET FLOOR is any story or floor level accessible from the street or from outside the building at ground level with floor level at main entrance not more than three risers above or below ground level at these points, and so arranged and utilized as to qualify as the main floor. Where due to differences in street levels there are two or more stories accessible from the street, each is a street floor for the purpose of this Fire Code. Where there is no floor level within the specified limits for a street floor above or below ground level, the building shall be considered as having no street floor.

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."

SYSTEM is any assembly of any equipment consisting of the container or containers, appurtenances, pumps, compressors and connecting piping.

TANK is a vessel containing more than 60 gallons.

TANK VESSEL is any vehicle other than railroad tank cars and boats, with a cargo tank mounted thereon or built as a integral part thereof used for the transportation of flammable or combustible liquids, LP gas, or hazardous chemicals. Tank vehicles include self-propelled vehicles and full trailers and semi-trailers with or without motive power and carrying part or all of the load.

TENT is any temporary structure, enclosure or shelter constructed of canvas or pliable material supported by any manner except by air or the contents it protects. Intended for use at a location for not more than 30 days.

TEST BLASTING CAP NO. 8 is one containing two grams of a mixture of 80 percent mercury fulminate and 20 percent potassium chlorate or a cap of equivalent strength.

THERMAL INSECTICIDAL FOGGING is the use of insecticidal liquids which are passed through thermal-fog-generating units where they are, by means of heat, pressure and turbulence, transformed and discharged in the form of fog or mist that is blown into the area to be treated.

TOXIC MATERIALS: Refer to Highly Toxic Materials.

UL, Inc. shall mean the Underwriters Laboratories, Inc.

UNAUTHORIZED DISCHARGE means any release or emission of any material in a manner which does not conform to the provisions of this Fire Code and/or other applicable public health and safety regulations.

UNIT OF EXIT WIDTH — See NFPA, Life Safety Fire Code 101

UNPROTECTED COMBUSTIBLE FIBER STORAGE VAULT is a room with a capacity not exceeding 1000 cubic feet separated from the remainder of the building by a two hour occupancy separation constructed as specified in this Code and provided with approved safety vents to the outside.

UNSTABLE (Reactive) LIQUID is a liquid which in a pure state or as commercially produced or transported will vigorously polymerize, decompose, condense or will become self reactive under conditions of shock, pressure or temperature. See also definition of “liquid.”

UNSTABLE MATERIALS are those materials, other than explosives, which in the pure state or as commercially produced will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor or in the presence of contaminants or in contact with noncompatible materials.

U.S.B.M. shall mean the United States Bureau of Mines.

VAPOR AREA is any area containing quantities of flammable vapors. The Chief may determine the extent of the vapor area, taking into consideration the characteristics of the liquid, the degree of sustained ventilation and the nature of the operations.

VAPOR BALANCE SYSTEM is a system designed to capture and retain, without processing, vapors displaced during the filling of tanks and containers or during the fueling of vehicles.

VAPOR PRESSURE is the pressure measured in pounds per square inch (absolute) exerted by a volatile fluid as determined by ASTM Standard No. D323-72, Vapor Pressure of Petroleum Products (Reid Method).

VAPOR-PROCESSING SYSTEM is a system designed to capture and/or retain vapors displaced during the filling of tanks of containers or during fueling of vehicles, and process vapors by use of mechanical and/or chemical means. Examples are: Systems using blower assist for capturing vapors, refrigeration, absorption and combustion systems for processing vapors.

VAPOR-PROCESSING UNIT is the actual vapor-processing equipment in one contiguous unit in an isolated or separated area. The term “vapor-processing unit” shall not include such items as in-line flame arresters, in-line fire checks, pressure vacuum valves, in-line check valves or flow regulators at the dispenser.

VAPOR RECOVERY SYSTEM is a system designed to capture and retain vapors displaced during filling of tanks or containers or during the fueling of vehicles. The system may be a vapor balance system or other approved system.

VAPOR TRANSFER EQUIPMENT is the components of a vapor-processing system, a vapor balance system, or other approved system which is designed to capture, transfer and prevent emission of vapors or liquids displaced during filling of tanks or containers or during the fueling of vehicles. Examples are the vapor/liquid-dispensing nozzle, vapor transfer lines, and tank vents.

VERTICAL OPENINGS is an opening through a floor or roof.

WATER-REACTIVE MATERIALS are those materials which explode, violently react, produce flammable, toxic or other hazardous gases or evolve enough heat to cause self-ignition or ignition of nearby combustibles upon exposure to water or moisture.

WIRE GLASS where referred to shall be minimum 1/4-inch thick and shall be installed in steel frames.

YARDS: Means the open spaces required adjacent to lot lines, under the Zoning Regulations, for the control of the density of building, and such yards shall be unobstructed from the ground to the sky except as provided herein.

5209 STANDARDS

For the purpose of this Code, all standards not specified herein shall be in accordance with those accepted by NFPA-101, 1985 Edition for existing and NFPA-101, 1994 Edition for new occupancies and buildings plus this Code, and the State Fire Marshal's Rules and Regulations as prescribed.

(a) This Section catalogues by name and address, those agencies, associations, institutes and others who are referred to in this Fire Code by name, initials or symbols.

(b) This Section also lists those agencies, associations, institutes and others whose technical services are available to owners, designers, builders and Fire Officials.

(c) This Section sets forth the date of adoption or date of reference of the Standard applicable to Chapter 52 of the South Florida Fire Prevention Code, Broward Edition.

(d) The Standards set forth in this Section are hereby adopted to supplement, but not supersede, the requirements otherwise set forth in Chapter 52 of the South Florida Fire Prevention Code, Broward Edition.

(e) The provisions of the Standards shall be applicable to only the subject of references in that portion of the Fire Code in which the Standard is referenced; and where the Standard may appear to regulate other topics specifically covered by Chapter 52 of the South Florida Fire Prevention Code, Broward Edition.

(f) Only that portion of the Standards directly applicable and where portions of the referenced documents deal with prefatory or extraneous matter such as purchaser's rights, purchasing agreements, appearance of products, test reports and similar matters, such prefatory and extraneous matter shall not be considered mandatory.

(g) Where the method of installation of equipment is not specified in this Fire Code or in the Product's Approval, the installation shall be in accordance with manufacturer's specifications or recommendations.

(A) The following standards of the National Fire Protection Association, Battery-March Park, Ma. 02269, are hereby adopted by reference as if fully set forth herein:

NOTE: The following standards marked with an "F" are standards for the Fire Code. All other standards will be for both Building and Fire Code.

F NFPA 10-1994	Portable Fire Extinguishers
F NFPA 11-1994	Low Expansion Foam and Combined Agent Systems
F NFPA 11-A-1994	Medium and High Expansion Foam Systems
NFPA 12-1993	Carbon Dioxide Extinguishing Systems
NFPA 12A-1992	Halon 1301 Fire Extinguishing Systems
NFPA 12B-1990	Halon 1211 Fire Extinguishing Systems
NFPA 13-1994	Installation of Sprinkler Systems
NFPA 13D-1994	Sprinkler Systems in One and Two Family Dwellings and Mobile Homes
NFPA 13R-1994	Sprinkler Systems in Residential Occupancies up to Four Stories in Height
NFPA 14-1993	Installation of Standpipe and Hose Systems
NFPA 15-1990	Water Spray Fixed Systems for Fire Protection. Foam-Water Spray Systems
NFPA 16-1995	Deluge Foam-Water Sprinkler Systems and
NFPA 17-1994	Dry Chemical Extinguishing Systems

NFPA 20-1993	Installation of Centrifugal Fire Pumps
NFPA 22-1993	Water Tanks for Private Fire Protection
NFPA 24-1995	Installation of Private Fire Service Mains
NFPA 30-1993	Flammable and Combustible Liquids Code
F NFPA 30A-1995	Automotive and Marine Service Station Fire Code
NFPA 30B-1994	Aerosol Products
NFPA 31-1992	Installation of Oil Burning Equipment
NFPA 32-1990	Dry-Cleaning Plants
NFPA 33-1995	Spray Application Using Flammable and Combustible Materials
NFPA 34-1995	Dipping and Coating Processes Using Flammable or Combustible Liquids.
F NFPA 35-1995	Manufacture of Organic Coatings.
NFPA 37-1994	Installation and Use of Stationary Combustion Engines and Gas Turbines
NFPA 40-1994	Storage and Handling of Cellulose Nitrate Motion Picture Film
F NFPA 40E-1993	Storage of Pyroxylin Plastic
F NFPA 43A-1990	Storage of Liquid and Solid Oxidizing Materials
F NFPA 43D-1994	Storage of Pesticides in Portable Containers
F NFPA 45-1991	Fire Protection for Laboratories Using Chemicals
F NFPA 46-1990	Storage of Forest Products
NFPA 50-1990	Bulk Oxygen Systems at Consumer Sites
NFPA 50B-1994	Liquefied Hydrogen Systems at Consumer Sites
NFPA 51-1992	Design and Installation of Oxygen Fuel Gas Systems for Welding, Cutting and Allied Processes
NFPA 51A-1989	Acetylene Cylinder Charging Plants
F NFPA 51B-1999	Cutting and Welding Processes
F NFPA 52-1995	Compressed Natural Gas (CNG) Vehicular Fuel Systems
NFPA 54-1992	Natural Fuel Gas Fire Code.
NFPA 58-1995	Storage and Handling of Liquefied Petroleum Gases
NFPA 68-1994	Venting of Deflagrations
NFPA 69-1992	Explosion Venting Systems
NFPA 70-1996	National Electrical Code
NFPA 72-1993	National Fire Alarm Code
NFPA 75-1992	Protection of Electronic Computer-Data Processing Equipment
NFPA 80-1995	Fire Doors and Windows
NFPA 82-1994	Incinerators, Waste and Linen Handling Systems and Equipment
NFPA 85C-1991	Furnace Explosions/Implosions in Multiple Burner-Boiler Furnaces
NFPA 86-1995	Ovens and Furnaces-Design, Location and Equipment
NFPA 88B-1991	Repair Garages
NFPA 90A-1993	Installation of Air Conditioning and Ventilating Systems
NFPA 90B-1993	Installation of Warm Air Heating and Air Conditioning
NFPA 91-1995	Installation of Exhaust Systems for Air Conveying of Materials
NFPA 92A-1994	Smoke Control Systems
NFPA 92B-1995	Smoke Management Systems in Malls, Atria and Large Areas
NFPA 96-1994	Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment (Except Chapter 10)
NFPA 97-1992	Glossary of Terms Relating to Chimneys, Vents and Heat-Producing Appliances
NFPA 99-1996	Health Care Facilities
NFPA 99B-1995	Hypobaric Facilities
NFPA 101-1985	Safety to Life from Fire in (Existing) Buildings and Structures

NFPA 101-1994	Safety to Life From Fire in (New) Buildings and Structures.
NFPA 102-1995	Assembly Seating, Tents, and Membrane Structures.
NFPA 110-1996	Emergency and Standby Power Systems
NFPA 111-1996	Stored Electrical Energy Emergency and Standby Power Systems
F NFPA 150-1995	Fire Safety in Racetrack Stables
NFPA 204M-1991	Smoke and Heat Venting
NFPA 211-1992	Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances
NFPA 214-1992	Water Cooling Towers
NFPA 220-1995	Types of Building Construction
NFPA 231-1995	General Storage
NFPA 231C-1995	Rack Storage Materials
NFPA 231D-1994	Storage of Rubber Tires
F NFPA 231E-1989	Storage of Baled Cotton
F NFPA 231F-1987	Rolled Paper Storage
NFPA 241-1993	Construction, Alteration, and Demolition Operations
NFPA 251-1995	Fire Tests of Building Construction and Materials
NFPA 252-1995	Fire Tests of Door Assemblies
NFPA 253-1995	Test for Critical Radiant Flux of Floor Covering Systems, Using a Radiant Heat Energy Source.
NFPA 255-1990	Test of Surface Burning Characteristics of Building Materials
NFPA 256-1993	Methods of Fire Tests of Roof Coverings
NFPA 257-1990	Fire Tests of Window Assemblies
NFPA 303-1995	Marinas and Boatyards
NFPA 307-1995	Marine Terminals, Piers and Wharves
F NFPA 385-1990	Tank Vehicles for Flammable and Combustible Liquids
F NFPA 386-1990	Portable Shipping Tanks for Flammable and Combustible Liquids
NFPA 395-1993	Storage of Flammable and Combustible Liquids on Farms and Isolated Sites
F NFPA 403-1993	Aircraft Rescue and Firefighting Services at Airports
F NFPA 407-1996	Aircraft Fuel Servicing
NFPA 409-1995	Aircraft Hangars
NFPA 416-1993	Construction and Protection of Airports
NFPA 418-1995	Roof-Top Heliport Construction & Protection
F NFPA 480-1993	Storage, Handling & Processing of Magnesium
NFPA 491M-1991	Hazardous Chemical Reactions
F NFPA 495-1992	Explosive Materials Code
NFPA 497B-1991	Classification of Class II Hazardous (Classified) Locations for Electrical Instal- lations in Chemical Process Areas
NFPA 497M-1991	Classification Gases, Vapors and Dusts for Electrical in Hazardous (Classified) Locations.
F NFPA 654-1994	Prevention of Fire and Dust Explosions in Chemical, Dye, Pharmaceutical and Plastics Industries
NFPA 664-1993	Fire and Explosions in Wood Processing and Woodworking Facilities.
NFPA 701-1989	Methods of Fire Tests for Flame-Resistant Textiles and Films
NFPA 703-1995	Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials.
F NFPA 704-1990	Identification of the Fire Hazards of Materials
NFPA 907M-1988	Investigation of Fires of Electrical Origin
NFPA 1123-1995	Outdoor Display of Fireworks

NFPA 1221-1994	Installation, Maintenance & Use of Public Fire Service Communications Systems
F NFPA 1963-1993	Fire Hose Connections

5209.2 The following standards of the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018, are hereby adopted by reference as if fully set forth herein:

A17.1-1984 Safety Fire Code for Elevators and Escalators.

5209.3 The following standards of the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017, are hereby adopted by reference as if fully set forth herein.

A17.1-1984 Safety Fire Code for Elevators and Escalators.

5209.4 The following laws, regulations, rules, and ordinances, as all of same may be amended from time to time, are hereby adopted by reference as if fully set forth herein:

Chapter 633, Florida Statutes, and all the rules and regulations promulgated thereunder by the State Fire Marshal.

Chapters 527, 791, & 806, Florida Statutes, and all the rules and regulations promulgated thereunder.

5210 GENERAL PROVISIONS FOR FIRE SAFETY LIFE SAFETY REQUIREMENTS FOR BUILDINGS

5210.1 STANDARDS

(a) The standards of the National Fire Protection Association for Life Safety from fire as provided in NFPA 101, Life Safety Code, and all appendixes (as reference and guide), shall be a part of the minimum fire safety standards required for this Fire Code. The aforesaid standard is hereby adopted in its entirety and made a part of this Fire Code by reference, with the exception of the following:

The Rules of the State Fire Marshal, with referenced and adopted standards therein, shall be applied as Uniform Fire Standards to state-owned and state-leased buildings and spaces, and all other occupancies designated by the Legislature as subject to uniform fire safety standards, including but not limited to, developmental disability group homes, hospitals, nursing homes, rest homes, correctional facilities, public schools, public lodging establishments, public food-service establishments, elevators, migrant labor camps, mobile home parks, recreational vehicle parks, residential child and non-residential care facilities and self-service gasoline stations. Exception: The Uniform Fire Safety Standards of public schools, K-12 and community colleges shall be the fire safety standards that have been adopted by the State Board of Education for new and existing facilities.

(b) The above referenced NFPA 101, Life Safety Code, is published by the National Fire Protection Association. This publication may be obtained from The National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts.

5211 FIRE PROTECTION

5211.1 AUTHORITY AT FIRES AND OTHER EMERGENCIES

(a) The Fire Chief or his duly authorized representative shall be in charge at the scene of any fire, hazardous condition, or any other emergency that endangers life or property. He shall have the power and authority to direct any and all operations to such a degree as may be necessary to control the emergency. He shall investigate all incidents of fire, hazardous conditions, and any situation that endangers life or property. In the exercise of power, the Fire Chief or his representative may prohibit any person, vehicle, vessel or thing from approaching the scene and may remove, or cause to have removed, or prohibit from entering the area, any vehicle, vessel, thing, or person, from the scene of any emergency.

This action shall be based on the Fire Chief or his representative's opinion and judgement that such person, vessel or thing will impede or interfere with the operation of emergency personnel or equipment, or would cause that person, or other persons, to be in danger of loss of life or injury or cause damage to property.

(b) INTERFERENCE WITH FIRE DEPARTMENT AND OR CERTAIN ACTS PROHIBITED AT OR NEAR FIRES

Refer to Florida State Statute 806.10.

(c) AUTHORITY TO BARRICADE

The Fire Chief or other officer of the fire department in charge at the scene of an emergency shall have the authority to place ropes, guards, barricades or other obstructions across any street, alley, place or private property in the vicinity of such operation, so as to prevent accident or interference with the lawful efforts of the fire department to manage and control the situation and to handle fire apparatus.

5211.2 GENERAL PROVISIONS

(a) TAMPERING WITH FIRE EQUIPMENT

Refer to Florida State Statute 806.10(1)

(b) FOLLOWING OR PARKING NEAR FIRE APPARATUS

Refer to Florida State Statute 316.2025.

(c) CROSSING FIRE HOSE

No vehicle shall be driven over any unprotected hose of the fire department when laid out, without the consent of the fire department official in command.

(d) TAMPERING WITH FIRE HYDRANTS OR FIRE APPLIANCES OR OBSTRUCTING FIRE HYDRANTS, UNAUTHORIZED OPERATION OF HYDRANTS

(1) Refer to Florida State Statute 806.

(2) No person shall obstruct in any manner, the use of any fire hydrant, or have or place or cause to be placed, any material in front thereof from the curb line to the center of the street, within fifteen feet (15') from either side thereof, without adequate distance to rear of hydrant for operation and maintenance. Nor shall any person open or cause to be opened any fire hydrant without the knowledge and consent of the Fire Chief.

(e) TAMPERING WITH BARRICADES, ETC.

No person, except a person authorized by the Fire Chief or public officer acting within the scope of his public duties, shall remove, unlock, destroy, tamper with or otherwise molest in any manner, any lock, gate, door, barricade, chain, enclosure, sign, tag or seal which has been lawfully installed by the fire department or by its order or under its control.

(f) OBSTRUCTION OF FIRE PROTECTION EQUIPMENT

(1) No person shall place or keep any post, fence, vehicle, growth, trash, storage or other material or thing near any fire hydrant, fire department connection or fire protection system control valve that would prevent such equipment or hydrant from being immediately discernible or in any other manner deter or hinder the fire department from gaining immediate access to said equipment or hydrant. A minimum three foot (3') clear space shall be maintained around the circumference of the fire hydrants except as otherwise required or approved by the Fire Chief.

(2) Siamese connection must be kept accessible to the fire department at all times. There shall be a space four feet (4') on both sides of the center line of the Siamese that must be kept open at all times and posted, "**NO PARKING, FIRE DEPARTMENT CONNECTION.**"

(g) EMERGENCY ACCESS FOR FIRE DEPARTMENT EQUIPMENT AND OPERATIONS.

NOTE: See local jurisdiction for local requirements.

(1) Property Access

(aa) Access bridges, where provided, shall be designed to accommodate fire apparatus weighing a minimum of 32 tons.

(2) Vehicular Access

(aa) Fire department access roads shall be provided for all buildings which have a setback of more than 150 feet from a public roadway, or have a setback of more than 50 feet (50') and are more than 30 feet (30') in height.

(bb) Where possible, a building shall be accessible to all elevations for Fire Department emergency use. In all cases, a minimum of one elevation shall be made accessible.

(cc) Where possible, access roads shall extend around the perimeter of the building.

(dd) Required access roads shall be provided with the inner edge of the roadway no closer than ten feet (10') nor further than thirty feet (30') from the building.

(ee) Dead-end roads exceeding 150 feet, shall have a turning area and be of a type and size approved by the Fire Chief. Dead-ends exceeding 300 feet shall have a turning area at the closed end, no less than 100 feet in diameter.

(ff) Fire access roads shall be surfaced with solid pavement, natural or concrete stones or by grass turf reinforced by concrete grids designed to accommodate fire apparatus weighing a minimum of 32 tons.

(gg) Fire access roads shall be a minimum of twenty feet (20') in width, shall have a minimum outside turning radius of fifty feet (50') and a minimum inside turning radius of 38 feet with a twelve foot (12') clear sweep and shall have posted a minimum vertical clearance of fourteen feet (14').

(hh) Buildings having ramps and/or elevated roadways shall have posted weight limit signs showing maximum load capacity.

(ii) Fire access roads shall clearly mark the placement of landscaping, ground markings, and/or signs or as otherwise specified by the Fire Chief.

(jj) Parking in or obstructions of, a fire access road, lane or laddering area shall be prohibited.

(kk) Fire Lane Marking. Fire access roads; lanes shall be designated by yellow painting, striping, or marking of curbs and roadway between each fire lane; sign(s) shall be provided.

(ll) Fire Lane Sign(s) shall be eighteen inches (18") by twenty-four inches (24"), white background with red letters, stating "**NO PARKING FIRE LANE by order of the Fire/Police Department!**" These signs shall be a maximum of seven feet (7') in height from the roadway to the bottom part of the fire lane's signs. Such signs shall face the traffic flow and be no further than 75 feet apart.

(3) Laddering Areas

EXCEPTION: One (1) story, one (1) and two (2) family dwellings, not part of a development on planned community, shall be exempt.

(aa) Laddering areas shall be a minimum of twenty-four feet (24') wide for a length of twenty-four feet (24') feet and shall have a cross slope of less than five percent.

(bb) Surface construction of laddering areas shall be the same as set forth in Section 5211.2(g)(2)(ff).

(cc) Laddering areas shall be constructed with the inner edge no closer than ten feet (10') nor further than thirty feet (30') from the building.

(4) Existing Buildings. The Chief or Fire Marshal shall have the authority to require fire department access be provided for existing building for fire fighting and rescue operations.

(5) Maintenance. It shall be the responsibility of the property owner to maintain fire access roads, fire lanes, and laddering areas for emergency use at all times.

(6) For each building, structure, or portion thereof, having an assigned address number, the owner or person in charge of the building, structure, or portion thereof, shall cause such address number to be properly displayed and maintained at all times, in non-cursive and non-scriptive numerals, so located on or adjacent to

the building, structure, or part thereof, so that the numerals are plainly visible and legible from streets, thoroughfares or alley ways accessing the property to which the number applies. The numerals shall contrast with their background and be kept free of any obstructions to their visibility. Numerals shall be at least four (4) inches in height for residential buildings, structures, or portions thereof, and at least eight (8) inches for all other buildings, structures, or portions thereof.

(h) STANDBY FIRE WATCH

(1) Whenever in the opinion of the Fire Chief it is essential for public safety in any place of public assembly or any other place where people congregate, due to the number of persons, or the nature of the performance, exhibition, display, contest or activity, the Fire Chief may require the owner, agent or lessee to employ one or more certified Fire Inspectors or Firefighters, as required and approved by the Fire Chief, to be on duty at such place. Said Fire Inspectors/Firefighters shall be subject to the Fire Chief's and/or his designee's orders at all times, when so employed, and remain on duty during the times such places are open to the public, or when such activity is being conducted. Before each performance or the start of such activity, said Fire Inspector/Firefighter shall inspect all required fire/life safety equipment, to insure that such equipment is in proper working order, and shall keep diligent watch for any emergency that should arise. Should any emergency arise, the Fire Inspector/Firefighter shall take whatever action necessary to protect the occupants and public from injury or any life threatening condition.

(2) Whenever in the opinion of the Fire Chief or his designee, it is essential for public safety in any place of public assembly or any other place where people congregate, due to the number of persons, or the nature of the performance, exhibition, display, contest or activity, the Fire Chief may require the owner, agent or lessee to employ one or more certified Paramedics or certified EMT, as required and approved by the Fire Chief, to be on duty at such place. Said Paramedic(s) or EMT(s) shall be subject to the Fire Chief's and or his designee's orders at all times when so employed and remain on duty during the times such places are open to the public, or when such activity is being conducted. Said personnel shall keep diligent watch for any emergency that should arise. Should any emergency arise, the Paramedic/EMT shall take whatever action necessary to protect the occupants and public from injury or any life threatening condition.

(i) FIRE PROTECTION LIFE SAFETY SYSTEMS AND APPLIANCE APPLICABILITY

The following Sections shall apply to new and existing conditions, except that Paragraphs (l), (m) and (o) of this Section shall not apply where equivalent or more stringent legal requirements exist.

(j) INSPECTION OF PREMISES AND SPECIFICATION OF EQUIPMENT

(1) The Fire Chief and or his designee shall cause each commercial and industrial occupancy, place of assembly, hotel, multi-family house and trailer cap inspected for compliance with this Chapter of, this Code and any Municipal, County, and State Laws.

(2) Unless specifically provided for in this Chapter, manually operated fire alarm equipment and automatic fire detection systems shall be provided as specified by the applicable provisions of the National Fire Protection Association's Life Safety Code (101), this Code, uniform Fire Safety Standard of the State Fire Marshal, pertaining to that occupancy.

(k) EQUIPMENT MAINTENANCE AND TESTING

(1) It shall be the responsibility of the owner of the property to maintain all Life Safety systems such as but not limited to, automatic sprinkler systems, fire detection and fire alarm systems, smoke removal systems, voice/fire department systems, exit stairways, exit lighting and signs, fire doors, and other items of equipment in continuous and proper operating condition.

(2) All fire extinguishing equipment, fire detecting, smoke removal, mechanical stairway systems, generator and transfer switches, emergency lighting, and any and all life safety equipment shall be tested. Tests shall be conducted at least once a year or when required by this Fire Code or this Code, the Life Safety Code (NFPA 101), or when in the opinion of the Fire Inspector having jurisdiction, a test is necessary to assure proper operation.

(3) Cost for testing of all life safety equipment, fire detecting, fire extinguishing equipment, generator and transfer switches, smoke removal equipment, mechanical ventilated stairways, and emergency lighting and exit sign shall be the responsibility of the owner.

(4) All systems shall be under the supervision of a responsible person who shall insure proper inspection/tests to be made at specified intervals, and be responsible for any alteration and/or additions as required.

(5) Gauges and cylinder of fire extinguishing equipment in kitchen hood systems shall be so located as to permit them to be inspected. All gauges and cylinders shall not be located within ceilings or other concealed spaces.

(l) SPRINKLERS REQUIRED

Approved automatic fire sprinklers systems shall be installed in all buildings as required by Section 5253 and Section 5254 herein, and this Code, Chapters 38 and 51, Uniform Fire Safety Standards, the Life Safety Code (101), and State Fire Marshal's Uniform Fire Safety Standards.

(m) STANDPIPES REQUIRED

Fire standpipe systems shall be installed in all buildings as required by Sections 5253 and 5254 herein, and Chapters 38 & 51 of this Code, the Life Safety Code (101) and State Fire Marshal's Uniform Fire Safety Standards.

(n) BUILDINGS UNDER CONSTRUCTION

Buildings under construction shall comply with the requirements of this Code, Chapter 33, and the Life Safety Code (101) and NFPA 241, Building Construction and Demolition Operations.

(o) FIRE ALARM REQUIREMENTS

If a fire alarm system and/or suppression, except for single-family and duplex residential property, is disabled for any reason, while the building is occupied, the fire department shall be notified and a watch shall be required by this Code. This watch may be satisfied by the use of fire department personnel, private security services or other responsible persons as determined by the Fire Chief.

(p) PORTABLE FIRE EXTINGUISHERS

Fire extinguishers shall be installed as required by Section 5253 herein, and Chapter 38 of this Code, and the Life Safety Code (101). Installations of fire extinguishers shall be in accordance with the standards of the National Fire Protection Association's standard for the "Installation of Portable Fire Extinguishers", NFPA-10 and NFPA-10A, are adopted as part of this Fire Code.

(q) FIRE ACCESS PANELS

Buildings having exterior walls without openings shall be provided with access panels along street fronts and walls accessible for firefighting entrance to the building as follows:

(1) In buildings not exceeding 50 feet in height, access panels shall be in every story.

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

(3) Access panels shall be identified and easily openable.

(4) The bottom of the access panel shall be not higher than 36" and not lower than 26" above the floor level and with panels removed, the opening shall be not less than 36" wide and 58" high.

(5) Exterior walls shall be considered accessible where a side or rear yard is a minimum of 10 feet in width and is permanently unobstructed.

(r) For new construction, see Sec. 3127.2(h).

5212 GENERAL PRECAUTIONS AGAINST FIRE

5212.1 OPEN BURNING

(a) BONFIRES AND OUTDOOR FIRES

(1) Permit Required. For permits to kindle or maintain any bonfire or outdoor fire, see Section 5206.

(2) Location Restricted. Federal, State, County and Municipal laws or requirements shall be adhered to.

(3) Attendance of Open Fires. Bonfires and outdoor fires shall be constantly attended by competent person until such fire is extinguished.

(b) UNAUTHORIZED FIRES

No person shall kindle a fire upon the land of another without written permission of the owner thereof or his agent.

Burning of rubbish is hereby prohibited.

(c) HOT ASHES AND OTHER DANGEROUS MATERIALS

No person shall deposit hot ashes or cinders, or smoldering coals, or greasy or oily substances liable to spontaneous ignition, into any combustible receptacle or place the same within ten feet (10') of any combustible materials, except in metal or other noncombustible receptacles. Such receptacles, unless resting on a noncombustible floor or on the ground outside the building, shall be placed on noncombustible stands, and in every case shall be kept at least two feet (2') away from any combustible wall or partition or exterior window opening.

(d) BARBECUE GRILLS AND OUTDOOR COOKING

Barbecue grills and similar cooking equipment shall not be used on balconies, terraces, roofs, porches or catwalks of buildings of more than one story. They shall be used only outside and at a safe distance (no less than ten feet (10') from the nearest building.

5212.2 COMBUSTIBLE AND FLAMMABLE MATERIALS

(a) ACCUMULATIONS OF WASTE MATERIALS

Roofs, courts, yards, vacant lots and open spaces shall be kept free and clear of deposits or accumulations of waste paper, hay, grass, straw, weeds, litter or combustible waste or rubbish of any kind. All weeds, grass, vines or other growth, when the same endangers property, or is liable to be fired, shall be cut down and removed by the owner of the property.

(b) HANDLING OF READILY COMBUSTIBLE MATERIALS

No person making, using, storing or having in charge or under his control any shavings, excelsior, rubbish, sacks, bags, litter, hay, straw, saw dust or combustible waste materials shall fail or neglect at the close of each day to cause all such material which is not compactly baled and stacked in an orderly manner to be removed from the building or stored in suitable vaults or in metal or metal lined, covered receptacles or bins.

(c) STORAGE OF READILY COMBUSTIBLE MATERIALS

(1) Permit required. No person shall store in any building or upon any premise in excess of two thousand five hundred (2,500) cubic feet in gross volume of combustible empty packing cases, boxes, barrels or similar containers, or rubber tires, or baled cotton, rubber or cork, sawdust or other similarly combustible material without a permit.

(2) Storage requirement. Storage in buildings shall be orderly, shall not be within two feet (2') of the ceiling, and not so located as to endanger exit from the building. Storage in the open shall not be more than twenty feet (20') in height, shall be so located with respect to adjacent buildings as not to constitute a hazard, and shall be compact and orderly.

(d) FLAMMABLE DECORATIVE MATERIALS IN BUILDINGS OF MERCANTILE AND INSTITUTIONAL OCCUPANCY

Flammable materials such as cotton batting, straw, dry vines, leaves, trees, artificial flowers or shrubbery, foam plastic materials, and other similar materials shall not be used for decorative purposes in show windows or other parts of mercantile and institutional occupancies unless first rendered flameproof in accordance with Sec. 5215.5.

(e) AWNINGS AND CANOPIES

(1) Awnings, canopies and similar products whether attached or detached from a building shall have a flame spread rating of 25 or less.

(2) In fire zones 1 and 2 structures utilizing thatched type roofs shall be limited to 800 square feet in total area of one structure or a cluster of smaller structures which will total 800 square feet. Height of building from finished grade to roof ridge shall not exceed eighteen feet (18'). The use of walls shall be limited to one side only with three sides being open. Said structure or cluster shall have a minimum separation of thirty feet (30') from any other structure. These structures shall be rendered flameproof in accordance with Sec. 5212.5.

EXCEPTION: Exterior window covering.

(3) All heating or cooking equipment shall be installed in accordance with this Code. No open flame or other device, emitting flame or fire, shall be used in or immediately adjacent to any tent or air supported structure, while open to the public.

(f) OPEN FLAMES OR LIGHTS RESTRICTED

No person shall take an open flame or light into any building, barn, vessel, boat or any other place where flammable, combustible or explosive material are kept.

5212.3 FIRE REPORTING AND FALSE ALARMS

(a) REPORTING FIRES

(1) In the event fire occurs on any property the owner or occupant shall immediately report such fire to the fire department.

(2) A fire shall mean any fire not used for cooking, heating or recreational purposes or one not incidental to the normal operations of the property.

(b) FIRE ALARMS

(1) For the purpose of this section a fire alarm shall be deemed and construed as being any act as follows:

The giving, signaling or transmission to any public fire station or company or to any officer or employee thereof, whether by telephone, spoken word or otherwise, information to the effect that there is a fire at or near the place indicated by the person giving, signaling or transmitting such information.

(2) It shall be unlawful for any person to give, signal or transmit or for any person to cause or permit to be given, signal or transmit in any manner any false alarm.

(3) It shall be unlawful for any person to tamper with or maliciously injure any fire alarm equipment maintained for the purpose of transmitting fire alarms.

(4) Nothing in this section shall prohibit the sounding of any such signal essential for the carrying on of any fire drill. The fire department shall be notified in advance when such signals are sounded.

(c) FALSE EMERGENCY CALL; DELAY IN REPORTING PROCEDURES

(1) It shall be unlawful for any person without reasonable cause to summon by outcry, ringing of bells, or otherwise make or circulate, or cause to be made or circulated, a false alarm of fire, or to summon a fire rescue emergency medical unit, when such person knows or has reason to know that services of the fire department or the fire rescue emergency medical unit are not needed.

(2) It shall be unlawful for any person to knowingly aid or abet the commission of any such act resulting in the services of the fire department or fire rescue emergency medical unit being summoned, when their services are not required.

(3) It shall be unlawful for any person to delay reporting immediately any fire discovered, to the fire department or the police department so that firefighting and rescue apparatus may be dispatched.

(4) It shall be unlawful for any person to delay reporting immediately, any alarm of fire in a building whether by phone or alarm device.

(d) AUTOMATIC DIALING ALARMS

Fire alarm systems employing direct circuit connection with signal receiving equipment in a remote station, such as a municipal fire alarm headquarters or fire station, shall not be permitted.

5212.4 USE OF EQUIPMENT, APPLIANCES AND DEVICES

(a) ELECTRICAL WIRING AND EXTENSION CORDS

(1) **MAINTENANCE.** It shall be unlawful to maintain any electrical wiring appliance, apparatus or device in violation of the National Electrical Code.

(2) **FIRE HAZARD.** When any hazardous electrical installation exists, the use of such installation shall be discontinued immediately.

(b) MAINTENANCE OF CHIMNEYS AND HEATING APPLIANCES

(1) All chimneys, smokestacks or similar devices for conveying smoke or hot gases to the outer air and the stoves, furnaces, restaurant-type cooking equipment, incinerators, fireboxes or boilers to which they are connected shall be used constructed and maintained in such a manner as not to create a hazardous condition.

(2) Commercial and industrial-type incinerators used for burning of rubbish or other readily combustible solid waste material and incinerators shall be provided with approved spark arresters or other effective means for arresting sparks and flying particles.

(c) TRAPDOORS AND PULL DOWNS TO BE CLOSED

All trapdoors, and pull down stairs, except those which are automatic in their operation, in any factory building or building used for storage shall be closed at the completion of the business of each day.

(d) SHAFTWAYS TO BE MARKED

Every outside window in building used for manufacturing purposes or for storage which opens directly on any hoistway or other vertical means of communication between two (2) or more floors in such building shall be plainly marked with the word “**SHAFTWAY**” in red letters at least six inches (6") high on a white background. Such warning sign is to be so placed as to be easily discernible from the outside of the building. Every door or window opening on such shaftway from the interior of the building, unless the construction of the partition surrounding the shaftway is of such distinctive nature as to make its purpose evident at a glance, shall be similarly marked, with the warning word “**SHAFTWAY**” so placed as to be easily visible to anyone approaching the shaftway from the interior of the building.

(e) USE OF TORCHES, FLAME OR SPARK PRODUCING DEVICES

Any person using torches or other flame or spark producing devices in or on any building, structure or area shall provide one approved fire extinguisher or water hose equipped with suitable nozzle, sufficient in length to reach all portions of the building or area, and connected to a water supply on the premises where said operation is performed.

Combustible material in the close proximity shall be protected against ignition by shielding, wetting or other means. In all cases, a watch shall be maintained in the vicinity of the operation for one-half hour after the torch, flame or spark-producing device has been used.

(f) VACANT BUILDINGS

Every person owning or in charge or control of any vacant building shall remove therefrom all accumulations of flammable or combustible waste or rubbish and shall securely lock, barricade or otherwise secure all doors, windows and other openings thereof.

5212.5 SMOKING PROHIBITED

(a) “Smoking” shall mean and include the carrying of lighted pipe, cigar, cigarette, tobacco, or similar substances, in any form.

(b) Where conditions are such as to make smoking a fire hazard in any area of piers, wharves, warehouses, stores, industrial plants, institutions, places of assembly and in open spaces where combustible materials are stored or handled “**No Smoking**” signs shall be posted in each building, structure, room or place in which smoking shall be prohibited. Smoking may be permitted in specific safe locations, in any building, structure or place in which smoking may be permitted.

(c) “**No Smoking**” signs of approved size lettering and location required in accordance with Sub-section (b) of this Section shall read “By Order of the Fire Chief”.

(d) It shall be unlawful for any person to remove any legally required “**No Smoking**” sign, or to smoke in any place where such signs are posted.

5213 MEANS OF EGRESS

5213.1 RESERVED

5213.2 DETAILED REGULATIONS — MEANS OF EGRESS

For the purpose of this section, NFPA-101 is hereby adopted. Wherever there is a conflict between NFPA-101 and the South Florida Building Code, Broward County Edition, the more stringent Code shall prevail.

5214 SPECIAL OCCUPANCY USES

AIRPORTS, HELIPORTS, HELISTOPS AND AIRCRAFT HANGARS

5214.1 SCOPE

This Section shall apply to all airports, heliports, helistops, and aircraft hangars.

5214.2 COMPLIANCE

Airports, heliports, helistops, and aircraft hangars shall meet the applicable standards as set forth in Section 5209.

5214.3 MAINTENANCE

(a) Inspection of premises and, maintenance of equipment shall be as set forth in Sections 5211.2(j) and (k) Code.

(b) **Helistop.** No dispensing, transfer or storage of flammable or combustible liquids shall be permitted at a helistop.

(c) **Federal Aviation Approval.** Before operating helicopters from helistops and heliports, approval must be obtained from the Federal Aviation Agency.

5215 ASSEMBLY, PLACES OF (GENERAL)

5215.1 PERMITS

For permits to operate a place of assembly, see Section 5206.1.

5215.2

(a) No place of assembly, shall be maintained, operated or used as such without a permit, except that no permit shall be required for any place of assembly used solely as a place of religious worship. A valid certificate of use and occupational license will constitute an adequate permit hereunder.

(b) No place of assembly which has received approval and licenses to operate for one purpose shall change the use of the occupancy for any other assembly purpose without first obtaining a permit from the fire department for such use.

5215.3 ATTENDANT

Every place of assembly shall be under the constant supervision of a competent adult on the premises during the time that the premises are open to the public.

5215.4 RESERVED

5215.5 DECORATIVE MATERIALS

(a) No decorative material shall be used which, as applied, will ignite and allow flare to spread over the surface, or allows burning particles to drop when exposed to a match flame test applied to a piece removed from the material and tested in a safe place. The piece shall be held in a vertical position and the bottom edge exposed to a flame from a common match held in a horizontal position, one-half inch underneath the piece, and at a constant location for a minimum of fifteen (15) seconds.

(b) Treatments used to accomplish this flameproofing shall be renewed as often as may be necessary to maintain the flameproof effect.

(c) There shall not be suspended from or across any ceiling, draperies, mirrors or like material, in such a manner that in the event of fire or other calamity such material could drop and in so doing endanger the occupants thereof or interfere with the operation of the fire department. Only those materials approved by the fire prevention bureau, building division and/or current ruling of a recognized laboratory "Building Materials List" shall be permitted, when installed in an approved manner.

(d) Exit doors, lights and fire suppression and life safety, systems shall not be concealed or obstructed by any decorative material.

5215.6 PYROXYLIN-COATED FABRIC

Pyroxylin-coated fabric used as a decorative material in accordance with Section 5215.5 or a surface covering on fixed furnishings, shall be limited in amount to the following:

Such fabric containing 1.4 ounces or more of cellulose nitrate per square yard shall not be used in excess of a total amount equivalent to 1 square foot of fabric surface to 15 cubic feet of room volume. Each square foot of such fabric which contains 1.7 ounces or more of cellulose nitrate per square yard shall be counted as 2 square feet in making this computation.

(May be measured by folding a piece to five thicknesses and measuring to see if the thickness of five layers exceeds 1/8-inch).

5215.7 MOTION PICTURE SCREENS

In places of assembly, motion picture screens or screen masking shall not be used unless it is in compliance with Section 5215.5.

5215.8 ASSEMBLY SEATING

(a) Bonding of Chairs. All loose seats, folding chairs or similar seating facilities that are not fixed to the floor shall be bonded together in groups of not less than six.

EXCEPTIONS:

(1) When not more than 500 such seats, chairs or facilities are provided, bonding thereof may be deleted.

(2) The bonding of chairs shall not be required when tables are provided, as when the occupancy is used for dining or similar purposes.

(b) Securing of Chairs, Folding and Telescoping Seat seating, Reviewing Stands, Grandstands, and Bleachers. Refer to Section 10 and NFPA-102, Assembly Seating, Tents and Membrane Structures.

5215.9 PLAN OF EXITWAYS AND AISLES

A plan indicating seating arrangements, capacity, location and width of exitways and aisles leading, thereto shall be submitted for approval to the Fire Chief with an approved copy on display in the premises at all times.

5215.10 MAXIMUM OCCUPANT LOAD

(a) Posting of Room Capacity. In accordance with Section 5213.

(b) Overcrowding. No person shall permit overcrowding or admittance of any person beyond the approved capacity of any place of public assembly. Overcrowding conditions or obstruction in aisles, passageways or other means of egress; or any condition which constitutes a serious menace to life, shall be just cause for the performance, presentation, spectacle or entertainment to be stopped until such condition or obstruction is corrected.

5215.11 USE OF CANDLES AND OPEN FLAME, PERMITS

(a) For permits to use candles or open flames in assembly areas, see Section 5206.1.

(b) The use of open flame, burning candles, dry ice and smoke-making machines, shall not be permitted unless specifically approved by the Fire Chief.

5215.12 FIRE CONTROL

It shall be the duty of the owner and tenant of each building, or part of a building, occupied as a place of assembly to properly train sufficient regular employees in the use of fire appliances so that such appliances can be quickly placed into operation.

5215.13 STANDBY FIREWATCH

See Section 5211.2(h)(1).

5215.14 STANDBY RESCUE SERVICE

See Section 5211.2(h)(2).

5215.15 ASHTRAYS

Ashtrays. Where smoking is permitted, there shall be provided on each table and at other convenient places, suitable noncombustible ashtrays. Where smoking is prohibited, ashtrays shall be provided at all entrances.

5215.16 VEHICLES PARKED INSIDE PLACES OF ASSEMBLIES OR MALLS

No vehicle is to be parked inside a building used as a place of assembly. Exceptions:

(a) Vehicles parked for display purposes only.

(b) Vehicles parked temporarily for service purposes only, e.g. food distribution.

(c) When a vehicle is parked inside a place of assembly or mall, the following conditions shall be met.

(1) Fuel tanks shall be drained to less than 1/4 of tank capacity.

(2) Fuel caps taped shut or fitted with a locking cap.

(3) Hot lead of battery disconnected.

5216 AUTOMOBILE WRECKING YARDS, JUNKYARDS AND WASTE-MATERIAL HANDLING PLANTS

5216.1 COMPLIANCE

Automobile wrecking yards, junkyards and waste-material handling plants shall conform to all other applicable requirements.

5216.2 OCCUPANCY AND LOCATION PERMITTED

(a) Automobile wrecking yards, junkyards and waste-material handling plants are prohibited unless specifically permitted within the jurisdictional area.

(b) If permitted, automobile wrecking yards, junkyards, and waste-material handling plants shall be located as not to endanger adjoining or adjacent properties.

5216.3 BURNING

The burning of wrecked or discarded automobiles or any parts thereof or junk or any waste material is prohibited, unless specifically permitted within the jurisdictional area.

5216.4 CONSTRUCTION AND PROTECTION

(a) Handling and storage of large quantities of wastepaper, rags or other combustible materials shall not be permitted in buildings of Type III, IV, or V construction unless the building is sprinklered. Vertical openings shall be enclosed in an approved manner.

(b) Packing rooms shall be separated from storage rooms by construction having a fire-resistive rating of not less than one (1) hour, with each opening protected with an approved fire assembly. Packing rooms shall be provided with exhaust systems of sufficient capacity to adequately remove dust and lint.

5216.5 FIRE DEPARTMENT ACCESS

Fire Department accessibility shall be provided throughout the entire property in accordance with Section 5211.2(g) of this Fire Code.

5216.6 WATER SUPPLY

Water supply for fire protection and hydrant locations shall be as prescribed in Section 3804 and local ordinances, and in accordance with nationally accepted standards.

5217 BOWLING AND SIMILAR RECREATIONAL ESTABLISHMENTS

5217.1 COMPLIANCE

Bowling and similar recreational establishments shall conform to all other applicable requirements of this Fire Code and State Fire Marshals Rules and Regulations.

5217.2 LANE/COURT RESURFACING

Resurfacing operations shall not be carried on while the establishment is open for business. The bureau of fire prevention shall be notified. Proper ventilation shall be provided. Heating, ventilating or cooling systems employing recirculation of air shall not be operated during resurfacing operations or within one (1) hour following the application of flammable finishes. All electric motors or other equipment in the area which might be a source of ignition shall be shut down. All smoking and use of open flames is prohibited during the application of flammable finishes and for four (4) hours thereafter.

5217.3 BOWLING PIN REFINISHING

(a) Pin refinishing involving the application of flammable finishes shall be done only in a special room meeting the provisions of this Section. Such room shall not be located below grade, nor shall it have communication with any pits, well, pockets or basements.

(b) All power tools in such special rooms shall be effectively grounded. A substantial metal box or other receptacle shall be provided for lathes and sanding or buffing machines to catch dust thrown off during operations. Contents shall be removed daily and disposed of safely.

(c) Storage of flammable or combustible liquids in special rooms shall not exceed a combined aggregate of sixty (60) gallons and shall be in original metal containers, or in approved safety containers not exceeding five (5) gallons individual capacity. A metal waste can with self-closing cover shall be provided for all waste materials and rags, and the contents shall be removed daily. Smoking shall be prohibited at all times in refinishing rooms, and the owner of such establishment shall be held directly responsible for enforcing this no-smoking rule.

5217.4 FIRE EXTINGUISHERS

Fire extinguishers shall be provided of a type and size specified to meet the hazard.

5218 RESERVED

5219 RESERVED

5220 MARINAS, MARINE TERMINALS, PIERS, WHARVES, BOAT STORAGE FACILITIES, AND PRIVATE BOAT DOCKING FACILITIES

5220.1 COMPLIANCE

(a) All marine facilities shall conform to the requirements of this Fire Code, Section 5239 Flammable and Combustible Liquids, and Section 5253 Fire Extinguishing Apparatus.

(b) NFPA-303, Fire Protection Standard for Marinas and Boatyards and NFPA-307, Construction and Fire Protection of Marine Terminals, Piers and Wharves, are hereby adopted in their entirety as part of this Fire Code.

5221 SERVICE OR REPAIR GARAGES

5221.1 CLEANING WITH FLAMMABLE LIQUIDS

No Class I liquid shall be used in any garage for washing parts or removing grease or dirt unless in a special closed machine approved for the purpose or in a separate, well ventilated room enclosed by walls having a fire resistance rating of not less than two (2) hours with openings therein protected by approved fire doors or fire windows, and with no opening from such room to any upper or lower story. Exhaust ventilation shall be provided to produce one complete change of air every ten (10) minutes.

5221.2 HANDLING OF GASOLINE AND OILS

(a) The fuel tanks of motor vehicles shall be filled directly through hose from approved pumps attached to approved portable tanks or drawing from underground storage tanks. Storage and handling of flammable or combustible liquids shall conform to Section 5239. The transfer of gasoline in any garage shall not be made in open container.

5221.3 FIRE EXTINGUISHERS

Fire extinguishers or other extinguishing apparatus shall be provided as prescribed in NFPA-10, Portable Fire Extinguishers.

5222 LUMBER YARDS AND WOODWORKING PLANTS

5222.1 OPEN YARD STORAGE

Standards for Recommended Safe Practices for Storage of Forest Products, NFPA 46, is hereby adopted in its entirety as a minimum requirement of this Chapter.

5222.2 WOODWORKING PLANTS

NFPA-664, Fire and Explosions in Wood Processing and Woodwork Facilities, is hereby adopted in its entirety as part of this Fire Code.

5223 TIRE REBUILDING PLANTS

5223.1 COMPLIANCE

Tire rebuilding plants shall conform to all other applicable requirements of this Fire Code as well as to the following provisions.

5223.2 CONSTRUCTION AND PROTECTION

Tire rebuilding plants shall comply with the requirements of this Code as to construction, separation and protection.

5223.3 BUFFING OPERATIONS

Buffing machines shall be located in a room separated from the remainder of the plant by construction having a fire resistance rating of not less than one (1) hour, with each door opening protected by an approved self closing fire door.

Each machine shall be connected to an ample dust-collecting system discharging to a suitable container which shall be cleaned at frequent intervals.

5223.4 VENTILATION

Each room where rubber cement is used or mixed or flammable or combustible solvents are applied shall be equipped with mechanical or natural ventilation.

5223.5 USE AND STORAGE

Rooms for the use and storage of rubber cement and other flammable or combustible liquids shall conform to the requirements of Section 5239.

5224 FLAMMABLE FINISHES

5224.1 SPRAY FINISHES

Spraying of flammable or combustible materials shall be done in accordance with NFPA-33 “Spraying Application Using Flammable and Combustible Materials”, and this Code.

EXCEPTION: Where quantity of spraying or dipping materials used in a day does not exceed two (2) quarts and the total amount of material stored does not exceed twenty (20) gallons, the Fire Chief may waive or vary these requirements, subject to the consideration of safety.

5224.2 DIP TANKS

Dipping operations, using flammable or combustible liquids shall be in accordance with NFPA-34, “Dipping and Coating Processes Using Flammable or Combustible Liquids”, and this Code.

5224.3 RESERVED

5224.4 RESERVED

5225 FRUIT RIPENING PROCESSES

The minimum standards of the State Fire Marshals Rules and Regulations — Fruit Ripening Processes is hereby adopted in its entirety.

5226 FUMIGATION AND THERMAL INSECTICIDAL FOGGING

Businesses conducting fumigation and/or thermal insecticidal fogging shall notify the Fire Prevention Bureau in that jurisdiction in which the operation is to be performed, 24 hours prior to starting such operation.

EXCEPTION: In verifiable emergencies only, when twenty-four (24) hours advance notification is not possible, advance telephone or telegraph notice shall be made.

5227 MAGNESIUM

5227.1 SCOPE

This Section applies to the storage, handling and processing of magnesium, including the pure metal as well as those alloys of which the major part is magnesium.

5227.2 DEFINITIONS

For definition of **MAGNESIUM** see Section 5208.

5227.3 COMPLIANCE

Applications shall meet the NFPA-480, Storage, Handling and Processing of Magnesium.

5228 ORGANIC COATINGS, MANUFACTURE OF

5228.1 SCOPE

(a) This Section shall apply to (1) processes manufacturing protective and decorative finishes or coating (paints) for industrial, automotive, marine, transportation, institutional, household or other purposes, and (2) the handling of flammable and combustible liquids, certain combustible solids and potential dust explosion condition.

(b) This Section shall not apply to (1) processes manufacturing nonflammable or water-thinned coatings or (2) operations applying coating materials.

5228.2 DEFINITIONS

For definition of **ORGANIC COATING**, see Section 5208.

5228.3 COMPLIANCE

Applications shall meet the NFPA-35, Manufacture of Organic Coatings.

5229 PLASTIC PROCESSING AND FABRICATION

5229.1 SCOPE

(a) This Section shall apply to plastic and other organic peroxide processes and the storage, handling and use of the related materials.

(b) Standards adopted: The following standards of the National Fire Protection Association shall be the accepted standards required by this Fire Code:

(1) Storage, handling and use of flammable liquids shall be in accordance with Flammable and Combustible Liquids Code, NFPA-30, but shall not supersede any requirement as set forth in this Code.

(2) Installation of sprinklers shall be in accordance with Installation of Sprinkler Systems, NFPA-13.

(3) Electrical installations shall be in accordance with National Electric Code, NFPA-70.

(4) Dry chemical automatic extinguishing systems shall be in accordance with Dry Chemical Extinguishing System, NFPA-17.

(5) Carbon Dioxide extinguishing systems shall be in accordance with Carbon Dioxide Extinguishing Systems, NFPA-12.

(6) Blower and exhaust systems shall be in accordance with Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, NFPA-91.

(7) Fire hazards of the plastics manufacturing and fabricating industries NFPA-654, Prevention of Fire and Dust Explosions in the Chemical, Dye, Pharmaceutical and Plastics Industries shall supplement this Fire Code.

5229.2 PROCESS SEPARATED FROM SALES OR DISPLAY AREAS

(a) Process, lay-up and application of fiberglass shall be separated from sales or display area in a manner that is in accordance with this Code.

(b) Ceilings shall be of an approved fire resistive material in accordance with this Code, Chapter 37.

(c) Electrical tools shall be of the type designed for Class I areas as defined in NFPA-70, National Electrical Code.

(d) Grinding, buffering or other dust producing operations shall be performed with tools provided with an approved dust collecting system.

(e) Dispensing of Liquids:

(1) Class I and II flammable liquids shall not be drawn except in protected areas.

(2) Gravity discharge of Class I and II flammable liquids is prohibited except where the manufacturing process requires a gravity flow. Gravity flow shall be permitted only from vessels sufficient for not more than one (1) day operation.

5229.3 FIRE CONTROL

(a) Process, lay-up and application areas shall have an approved automatic fire protection system that is designed for high hazard occupancy as set forth in Section 5253 of this Fire Code.

(b) Carbon dioxide or dry chemical extinguishing systems shall be permitted only where such substitute may be required by a certain process.

5229.4 HOUSEKEEPING

(a) Aisles shall be kept clear and unobstructed.

(b) Hazardous waste materials shall be kept in closed containers appropriate for the use.

(c) Drippings shall not be allowed to accumulate in such a manner as to cause or contribute to the spread of fire.

(d) Flammable cleaning solvents shall be kept in an approved type of container with a self-closing lid.

5229.5 VENTILATION

In process areas or storage areas, a mechanical system of ventilation shall be installed, in accordance with the NFPA-91.

5229.6 EXITS

Exit facilities shall be provided and maintained in accordance with of this Fire Code. Precautions Against Fire, General.

5229.7 PRECAUTIONS AGAINST FIRE, GENERAL

(a) Smoking shall be prohibited and "No Smoking" signs posted in hazardous areas.

(b) Heating devices and processes producing temperature capable of igniting flammable vapors or materials shall be prohibited.

5230 WELDING OR CUTTING; ACETYLENE GENERATORS AND CALCIUM CARBIDE

5230.1 SCOPE

This Section shall apply to the use, storage, and operation of oxygen-fuel gas, gaseous fuels generated from flammable liquids under pressure, or electric arc welding or cutting, or any combination thereof and the storage of calcium carbide and gases used in welding, cutting or heat treating. The requirements of this Section shall be in accordance with federal, state, county, and municipal laws and ordinances and this Code.

(a) NFPA-51, Oxygen-Fuel Gas Systems for Welding, Cutting and Allied Processes, is hereby adopted in its entirety as part of this Fire Code.

(b) NFPA-51A, Acetylene Cylinder Charging Plants, is hereby adopted in its entirety as part of this Fire Code.

(c) NFPA-51B, Cutting and Welding Processes, is hereby adopted in its entirety as part of this Fire Code.

5231 SPECIAL EQUIPMENT

BAKING AND DRYING OVENS

5231.1 SCOPE

This Section shall apply to the location, construction, and operation of industrial baking and drying ovens which are heated with oil or gas fuel or which during operation contain flammable vapors from the products being baked or dried. It is the intent of this Section to provide requirements for the operation of these ovens within certain limitations of control depending on oven design, paint formulation and ventilation requirements, the disregard of which may cause them to function in an unsafe manner, thereby becoming liable to destruction by fire or explosion. In addition to the requirements of this Section, all industrial baking and drying ovens shall comply with the applicable provisions of NFPA 86, Ovens and Furnaces Design, Location, and Equipment.

5231.2 LOCATION AND CONSTRUCTION

(a) Ovens, oven heaters and related equipment shall be located with due regard to the possibility of fire resulting from overheating or from the escape of fuel gas or fuel oil and the possibility of damage to the building and injury to persons resulting from explosion.

(b) Ovens shall be located at or above grade, or, if in basements, at least 50 percent of the wall area of the room in which the oven is located shall be above grade.

(c) Ovens shall be so located as to be readily accessible for inspection and maintenance and with adequate clearances to permit the proper functioning of explosion vents. Roofs and floors of ovens shall be sufficiently insulated and ventilated to keep temperatures at combustible ceilings and floors below 160 degrees F.

(d) Ovens shall be constructed of noncombustible materials throughout except where the maximum oven-operating temperature is not over 160 degrees F. The amount of insulation used in oven panel construction shall be enough to prevent the outside surface temperature from exceeding 160 degrees F, or adequate guards shall be provided to protect personnel.

(e) Ovens which may contain flammable air-gas mixtures shall be equipped with relief vents for freely relieving internal explosion pressures.

(f) All duct work shall be constructed in accordance with NFPA-90A & 91.

5231.3 VENTILATION

(a) Ovens in which flammable or toxic vapors are liberated or through which products of combustion are circulated shall be ventilated by the introduction of a supply of fresh air and proper exhaust to outdoors. Discharge pipes shall not terminate within 10 feet measured horizontally from any door, window or wood frame walls of any building. Such oven ventilation shall be arranged to provide vigorous and well distributed air circulation within the oven and to insure that the flammable vapor concentration will be safely below the lower explosive limit at all times. Unless the oven is operated in accordance with specific approval specifying particular solvents and rate of ventilation, the rate of ventilation shall be not less than 10,000 cubic feet of fresh air per gallon of solvent evaporated in continuous process ovens and not less than 380 cubic feet per minute per gallon of flammable solvent evaporated in batch process ovens.

(b) Exhaust duct openings shall be located in the area of greatest concentration of vapors.

(c) All exhaust shall be by mechanical ventilation.

5231.4 SAFETY CONTROLS

(a) Safety controls, shall be sufficient in number and substantially constructed and arranged to maintain the required conditions of safety and prevent the development of fire and explosion hazards.

(b) Ventilation controls, suitably interlocked, shall be provided which will insure required ventilation of the system.

(c) Fuel safety controls, suitably interlocked and arranged to minimize the possibility of dangerous accumulations of explosive air fuel mixtures in the heating system, shall be provided.

(d) Excess temperature controls shall be provided to maintain a safe operating temperature within the oven.

(e) Conveyor interlocks shall be provided in conveyor ovens having a flammable vapor hazard, so that the conveyor cannot move unless ventilating fans are operating and discharging the required amount of air.

5231.5 FIRE CONTROL

(a) Ovens, furnaces and exhaust ducts containing or processing sufficient combustible materials to sustain a fire shall be equipped with automatic sprinklers.

(b) Approved portable fire extinguishers shall be installed near the oven, furnace, and related equipment to provide reasonable safety to persons and property. Evidence that approved portable fire extinguishers have been provided in accordance with NFPA 10, Portable Fire Extinguishers, shall be evidence that such portable fire extinguishers provide reasonable safety to persons and property.

5232 MECHANICAL REFRIGERATION

5232.1 MAINTENANCE

All refrigeration systems shall be maintained in a clean manner, free from accumulations of oil, dirt, waste and other debris, and shall be kept easily accessible at all times.

5232.2 INSTRUCTIONS

The person in charge of the premises on which a refrigeration system containing more than 50 pounds of refrigerant is installed shall place a card conspicuously and as near as practicable to the refrigerant condensing unit giving instructions for the operation of the system, including precautions to be observed in case of breakdown or leak, as follows:

(a) Instructions for shutting down the system in case of emergency.

(b) The name, address and day and night telephone numbers for obtaining service.

5232.3 EMERGENCY SIGNS

(a) Each refrigeration system shall be provided with an easily legible sign permanently attached and easily accessible, indicating thereon the name and address of the manufacturer or installer, the kind and total number of pounds of refrigerant contained in the system and the field test pressure.

(b) Systems containing more than 100 pounds refrigerant shall be provided with signs having letters not less than 1/2-inch in height designating the main shutoff valves to each vessel, main steam or electrical control, remote control switch and pressure-limiting device.

5232.4 AMMONIA DIFFUSION

Ammonia refrigerating plants containing more than 30 pounds of refrigerant shall be equipped with facilities for diffusing the ammonia vapors.

(a) Systems containing more than 30 pounds of refrigerant shall discharge to the outside of the building at least 2 feet above the roof and be so located that discharged refrigerants will not cause discomfort or harmful effects to persons or such discharge shall be into a tank of fresh water having a capacity of one gallon for each pound of refrigerant and used for no other purpose than ammonia absorption.

(b) Systems containing more than 100 pounds of refrigerant shall be provided with an approved fire department diffuser consisting of 2-1/2-inch hose connections, mixing chamber and a permanent discharge connection to the sewer or drainage system.

(c) Control valves for diffusers shall be outside of the machinery room in a box protected against tampering. Such valve control box shall be plainly marked, "**FOR FIRE DEPARTMENT ONLY — AMMONIA CONTROL VALVES**".

5233 OIL BURNING EQUIPMENT

5233.1 SCOPE

This Section applies to oil burning equipment except combustion engines, oil lamps, and portable devices such as blow torches, melting pots and wood burners. The requirements of this Section shall be in accordance with federal, state, county, and municipal laws and ordinances and this Code

(a) NFPA-31, Installation of Oil Burning Equipment, is hereby adopted in its entirety as part of this Fire Code.

5234 SPECIAL SUBJECTS COMBUSTIBLE FIBERS

5234.1 DEFINITION

Combustible fibers shall mean and include readily ignitable and free burning fibers, such as cotton, sisal, henequen, ixtle, jute, hemp, tow, cocoa fiber, oakum, baled waste paper, kapok, hay, straw, Spanish moss, excelsior, certain synthetic fibers, and other like materials. (Also refer to Sec. 5252 of this Fire Code).

5234.2 LOOSE STORAGE

(a) Loose combustible fibers (not in suitable bales or packages), whether housed or in open, shall not be stored within 100 feet of any building except as hereinafter specified.

(b) Not to exceed 100 cubic feet of loose combustible fibers may be kept in any building provided storage is in a metal or metal-lined bin equipped with a self-closing cover.

(c) Quantities exceeding 100 cubic feet of loose combustible fibers, but not exceeding 500 cubic feet, may be stored in rooms or compartments having floor, walls, and ceiling having a fire resistance rating of not less than one hour. Each opening into such rooms or compartments from other parts of the building shall be equipped with an approved fire door.

(d) Quantities exceeding 500 cubic feet of loose combustible fibers may be stored in approved vaults, constructed as follows:

(1) Storage vaults shall be located outside of buildings or if located inside shall be provided with approved safety vents to the outside.

(2) Walls, floors, and ceilings shall be constructed of approved noncombustible material. Roofs of outside vaults shall be of noncombustible material but may be so constructed as to readily give way in case of an internal explosion.

(3) Openings, if any between vault and main building shall be protected on each side of the wall by an approved fire door. Wall openings in outside vaults exposing other property (not sufficiently detached to be considered cut off), shall be protected by approved fire doors.

(4) Vaults located within buildings and exceeding 1,000 cubic feet storage capacity shall be protected by approved automatic sprinklers, carbon dioxide, or other approved inert gas systems.

(e) No more than 2,500 cubic feet of loose fibers may be stored in a detached building: suitably located, with openings properly protected against entrance of sparks. The "loose house" shall be used for no other purpose. Buildings shall be constructed of brick or other approved noncombustible material. Roofs of buildings shall be of noncombustible material but may be constructed as to readily give way in case of internal explosion.

5234.3 BALED STORAGE (Also refer to Sec. 5252 of this Fire Code)

(a) No single block or pile shall contain more than 25,000 cubic feet of fiber exclusive of aisles or clearances. Blocks or piles of baled fiber shall be separated from adjacent storage by aisles not less than 5 feet wide; or by flash fire barriers consisting of continuous sheets of noncombustible material extending from floor to a height of at least one foot above the highest point of the piles and projecting at least one foot beyond the sides of the piles.

(b) Sisal and other fibers in bales bound with combustible tie ropes, also jute and other fibers liable to swell when wet, shall be stored to allow for expansion in any direction without endangering building walls, ceilings or

columns. Not less than 3 feet clearance shall be left between walls and sides of piles, except that if storage compartment is not more than 30 feet in width, one foot clearance at side walls will be sufficient, provided a center aisle not less than 5 feet wide is maintained.

(c) Not less than 3 feet clearance shall be maintained between sprinkler pipes and tops of piles.

5234.4 STORAGE OR AGRICULTURAL PRODUCTS

Unlimited quantities of hay, straw, and other agricultural products may be stored in or near farm buildings located outside closely built areas.

5235 COMPRESSED GASES FOR MEDICAL USE

5235.1 SCOPE

This article shall apply, to bulk oxygen systems and to the storage, handling, and use of compressed gases as defined herein. All fixed installations of nonflammable medical gases intended for sedation wherein the patient is not rendered unconscious, such as, but not limited to analgesia systems used for dentistry, podiatry and such other similar uses. Liquefied petroleum gases and compressed gases used in conjunction with welding or cutting operations are exempt from these provisions. Wherever the term "oxygen" occurs in this Section, the same requirements shall apply to systems for nitrous oxide.

The requirements of this section shall be in accordance with Federal, state, county and municipal laws and ordinances.

(a) South Florida Building Code, Broward County Edition, Chapters 46 and 48.

(b) The State Fire Marshal's Rules and Regulations, Fire Prevention — Compressed Gases, is hereby adopted in its entirety as part of this Fire Code.

(c) Cylinders shall be designed, constructed, tested and maintained in accordance with U.S. Department of Transportation (DOT) Specifications and Regulations, NFPA-99, HEALTH CARE FACILITIES, and NFPA-99B, Hypobaric Facilities, is hereby adopted in its entirety as part of this Fire Code.

5235.2 DEFINITIONS

For definitions of BULK OXYGEN SYSTEM, CENTRAL SUPPLY, D.I.S.S. DIAMETER INDEX SAFETY SYSTEM FLAMMABLE ANESTRIC, NONFLAMMABLE MEDICAL GAS AND PIPED DISTRIBUTION SYSTEM, see Section 5208.

5235.3 PERMITS

For a permit to store, handle or use flammable compressed gas or nonflammable compressed gas, see Section 5206, Permits and Certificates.

5236 CRYOGENIC FLUIDS

5236.1 SCOPE

This Section shall apply to the storage, handling and transportation of cryogenic fluids as defined herein. This Section is not intended to include liquefied petroleum gas as defined in this Fire Code.

5236.2 DEFINITIONS

For the definitions of BELOW GROUND CONTAINER, CRYOGENIC FLUIDS, CRYOGENIC IN-GROUND CONTAINER, CRYOGENIC VESSEL, FLAMMABLE CRYOGENIC FLUIDS, SAFETY FACTOR and SYSTEM, see Section 5208.

CONTAINER, as used in this Section, is any cryogenic vessel whether used for transportation or storage.

5236.3 APPROVAL OF CONTAINERS, EQUIPMENT AND DEVICES

(a) Joint approval of Fire Chief and Building Official shall be required for this Section.

(b) All containers, equipment and devices used for the storage, handling and transportation of cryogenic fluids shall be of a type, material, design, construction, and testing in accordance with nationally recognized standards.

(c) Containers, equipment or devices which are not in compliance with recognized standards for design and construction may be approved by the Fire Code Committee upon presentation of satisfactory evidence that they are designed and constructed for safe operation.

The following data shall be submitted to the Fire Code Committee with reference to the deviation from the standard with the application for approval.

- (1) Type and use of container, equipment or device.
- (2) Material to be stored, handled or transported.
- (3) Description showing dimensions and materials used in construction.
- (4) Design pressure, maximum operating pressure and test pressure.
- (5) Type, size and setting of safety devices.
- (6) Such other data as the Fire Code Committee may request.

5236.4 ELECTRICAL EQUIPMENT

(a) Electrical equipment shall conform to the provisions of the National Electrical Code.

(b) Lighting, including emergency lighting, shall be provided for fire appliances and operating facilities such as walkways, control valves and gages, as may be required.

5236.5 ELECTRICAL GROUNDING OR BONDING

Containers, systems and equipment used for flammable cryogenic fluids shall be grounded and/or bonded. Electrical grounding and/or bonding shall be provided by an approved system and shall comply with the National Electrical Code. Suitable means shall be taken to protect the system against corrosion, including corrosion caused by stray electrical currents.

5236.6 WARNING LABELS

Warning labels and signs shall be posted on containers and equipment and at such locations as may be prescribed by the Chief.

5236.7 DISPENSING AREAS

Dispensing of flammable cryogenic fluids, liquefied oxygen or liquid oxidizers shall be only at approved locations.

5236.8 STORAGE AREAS

Provisions shall be made in all flammable storage areas for controlling and extinguishing vent line fires.

5236.9 CONTAINER DESIGN, CONSTRUCTION AND TESTING

(a) Containers used for the storage and handling of cryogenic fluids shall be of approved materials and design. Materials shall meet all requirements as set forth in the ASME Boiler and Pressure Vessel Code or shall be proven by test or listed in nationally recognized standards to have suitable mechanical properties for cryogenic use.

(b) Metallic containers shall be built, inspected and tested in accordance with applicable provisions set forth in the ASME Boiler and Pressure Vessel Code or with applicable provisions of API Standard 620, Recommended Rules for Design and Construction of Large, Welded, Low-pressure Storage. Tanks, depending upon temperature and pressure of product stored.

(c) Concrete containers shall be built in accordance with the applicable provisions of this Code. Barrier materials used, shall comply with the ASME Unfired Pressure Vessel Code.

5236.10 CONTAINER PRESSURE-RELIEF DEVICES

(a) All pressure containers shall be protected by a pressure relieving device or devices. If only one pressure relief device is used, it shall be set to operate at a pressure not to exceed the maximum allowable working pressure. Additional relief devices may be set to operate at a higher pressure but shall not exceed 150 percent of the maximum allowable working pressure.

(b) Containers subject to an exposure fire hazard shall be protected by pressure-relieving devices designed to protect against excessive pressure caused by fire exposure. Such devices shall be set to operate at a pressure not in excess of 110 percent of the maximum allowable working pressure and shall have a relieving capacity sufficient to prevent the pressure from rising more than 20 percent above the maximum working pressure. If only one device is used, it shall be set to operate at a pressure not to exceed the maximum allowable working pressure.

(c) Relief devices shall be located so that they are readily accessible for inspection and repair and shall be protected against tampering. All relief devices shall be so designed or located that moisture cannot collect and freeze in a manner which would interfere with proper operation of the device.

(d) No shutoff valve shall be installed between relief valves and container except that a shutoff valve may be used on multiple valve installations where the arrangement of the valves will provide full required flow through the relief devices at all times.

(e) Outer containers shall be equipped with pressure relief devices to adequately protect the containers from excessive pressure.

(f) Heat exchangers and similar vessels shall be protected with a relieving device of sufficient capacity to avoid overpressure in cases of an internal failure.

(g) Safety relief valves shall normally be mounted in a vertical position and shall not be subject to low temperatures except when operating.

5236.11 PRESSURE-RELIEF PIPING

(a) All relief vent piping shall have at least the capacity of the relief valve and so arranged as not to unduly restrict the flow.

(b) Relief devices and/or relief device vent piping shall be so arranged that escaping gas will discharge unobstructed to the open air and not impinge on personnel, containers, equipment and structures or enter enclosed spaces.

(c) Vents shall be installed in such a manner as to exclude or remove moisture and condensation and to prevent malfunction due to freezing or icing. Drains shall be so installed as to prevent possible flame impingement on the container, piping, equipment and structures.

5236.12 INSULATION

Insulation for containers in oxygen service shall be noncombustible and shall be non-reactive with oxygen enriched air.

5236.13 MARKING ON CONTAINERS

Each container shall be identified by the attachment of a nameplate in an accessible place marked with the following information:

- (a) Builder's name and date built.
- (b) Nominal capacity, U.S. gallons.
- (c) Maximum allowable working pressure.
- (d) Maximum permissible specific gravity of liquid to be stored.
- (e) Maximum level to which container may be filled with stored liquid.
- (f) Maximum level to which container may be filled with water for test.

(g) Minimum temperature in degrees Fahrenheit for which container was designed.

5236.14 INSTALLATION OF ABOVE-GROUND CONTAINERS

(a) Containers shall be provided with substantial concrete or masonry foundations. Foundations and support shall be of material and design to withstand the low temperature effects of cryogenic fluid spillage. Structural steel supports, exceeding 18 inches in height, for flammable cryogenic fluid containers shall be protected with protective coating having a two-hour fire-resistive rating as specified in this Code.

(b) Horizontal containers shall be so mounted on foundations as to permit expansion and contraction. Every container shall be supported to prevent the concentration of excessive loads on the supporting portion of the shell. That portion of the container in contact with foundations or saddles shall be protected against corrosion.

(c) Secure anchorage or elevation of containers shall be provided in an area which may be subjected to flooding.

(d) Storage containers, piping, valves, regulating equipment and other accessories shall be protected against physical damage and against tampering.

(e) Containers shall be secured as may be necessary to prevent shifting or upset.

5236.15 DRAINAGE, DIKES AND WALLS FOR ABOVEGROUND CONTAINERS

(a) The area surrounding a container for cryogenic fluids shall be diked to prevent accidental discharge of fluids from endangering adjacent containers, buildings and equipment adjoining property or reaching waterways. These provisions may be altered or waived when determined by the Fire Code Committee that such containers do not constitute a hazard, after consideration of special features such as topographical conditions, nature of occupancy, proximity to buildings on the same or adjacent property, capacity and construction of containers and character of fluids to be stored.

(b) Where a drainage system is utilized to provide the required protection, such system shall comply with the following: Drainage shall be provided by a slope of not less than 1 percent away from the container towards an impounding basin or an approved means of disposal having a capacity equal to the container being served. This termination area and the route of the drainage system shall be so located that a fire occurring in the drainage system will not seriously endanger adjacent containers or property.

(c) Where diked areas are utilized to provide the required protection the following shall apply:

(1) More than one container may be installed in a single diked area, provided:

(aa) The usable volume of the enclosure shall be at least 100 percent of the capacity of the largest container enclosed.

(bb) Containers shall be elevated above grade so that cryogenic liquid will not reach the outside container wall in the event of a liquid spill, or

(cc) If cryogenic liquid can reach the outside container wall, the material that can be wetted by spilled liquid shall be suitable for use at the temperature of the liquid with the lowest normal boiling point within the enclosure.

(2) Dike walls shall be of earth or other materials compatible to the fluid stored, designed to be liquid tight and to withstand thermal shock.

(3) The dike and diked area shall be kept clean of all weeds, grass and other combustible material.

(4) Containers of cryogenic fluids shall not be located within dikes enclosing flammable or combustible liquid containers, LPG containers or compressed gas containers.

5236.16 LOCATION OF ABOVEGROUND CONTAINERS WITH RESPECT TO EXPOSURE

(a) A cryogenic fluid container or containers with an aggregate capacity in excess of 189,000 gallons (4500 bbl.) and their loading stations shall be located a minimum of 50 feet from buildings utilized for the production of such fluids. Such container or containers and their loading stations shall be located a minimum of 100 feet from above ground storage of flammable or combustible liquids and from any buildings of such construction or

occupancy which constitute an exposure hazard to a container in the event of fire or explosion in said buildings. When the capacity is 189,000 gallons (4500 bbl.) or less, the distance required from above ground storage of flammable or combustible liquids and buildings which constitute an exposure hazard shall be based upon the capacity of the container or containers and the physical features of the installation, with 10 feet being the minimum distance allowed.

(b) The minimum distance from the edge of a flammable cryogenic container having a capacity in excess of 189,000 gallons to the nearest important building or group of buildings not associated with the cryogenic liquid plant or to the property line or public way shall be 200 feet, and in no case shall the distance from the dike surrounding the container or the distance from a drainage area be less than 100 feet from the nearest important building or group of buildings or the property line or public way.

(c) Containers and equipment used in the storage and handling of liquid oxygen shall be installed and maintained in accordance with NFPA-50, Bulk Oxygen Systems at Consumer Sites.

(d) A flammable cryogenic fluid container with a capacity of 189,000 gallons or less but more than 30,000 gallons shall be located not less than 100 feet from the nearest important building or group of buildings not associated with the cryogenic liquid plant or to the property line or public way, and in no case shall the distance from the dike surrounding the container or the distance from a drainage area be less than 100 feet from the nearest important building or group of buildings or the property line or public way.

(e) A flammable cryogenic fluid container with a capacity of 30,000 gallons or less shall be located in accordance with NFPA-50B, Liquefied Hydrogen Systems at Consumer Sites.

5236.17 INSTALLATION OF BELOWGROUND CONCRETE CONTAINERS

(a) Suitable test shall be conducted by qualified personnel at the site to determine whether the soil within the expected freezing zone around the container is of the frost-heave susceptible type. If it is determined that the soil is susceptible to ice-lens formation, selection backfill or sufficient width shall be placed around the vessel to prevent excessive pressure from acting on the container or suitable means taken to insure that the zone of freezing will not extend into the frost-heave susceptible soil.

(b) Below-ground concrete containers shall be installed on foundations or supports of concrete, masonry piling, steel or a suitable foundation of aggregate which shall have been designed and constructed in accordance with this Code.

(c) The container storage area shall be fenced or otherwise protected where necessary. A minimum of two access openings shall be provided and they shall be sufficient size to accommodate emergency equipment.

5236.18 INSTALLATION OF CRYOGENIC IN-GROUND CONTAINERS

(a) Natural materials such as earth shall be proven to have adequate chemical and physical properties for the construction and operation of the container at the operating temperature.

(b) Containers shall be bottomed out in material naturally impermeable or made impermeable by artificial means.

(c) Any foundations, such as those for the superstructure or roof, shall be properly designed and constructed in accordance with this Code.

(d) The container storage area shall be fenced or otherwise protected where necessary. A minimum of two access openings shall be provided and they shall be of sufficient size to accommodate emergency equipment.

5236.19 LOCATION OF BELOW-GROUND CONTAINERS WITH RESPECT TO EXPOSURE

The minimum distance from the edge of below-ground and in ground flammable cryogenic containers to the nearest important building, property line or public way or from above ground flammable or combustible liquid storage shall be in accordance with the following table:

CONTAINER CAPACITY (GALLONS)	MINIMUM DISTANCE
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Less than 500	5 feet
More than 500 to 1000	25 feet
Over 1000.....	50 feet

5236.20 LOCATION OF CONTAINERS WITH RESPECT TO DIKES

Containers of cryogenic fluids shall not be located within dikes enclosing flammable or combustible liquid containers, LPG containers or compressed gas containers.

5236.21 PIPING MATERIALS AND CONSTRUCTION

(a) All piping and materials such as gaskets, thread compound, etc., shall be suitable for the intended uses through the full range of pressure and temperature to which they will be subjected, maintaining a safety factor of four to one.

(b) The piping system shall be designed and constructed to provide adequate allowance for expansion, contraction vibration, settlement and fire exposure.

(c) Joints on all container piping and tubing over 2-inch nominal diameter shall be made by welding or with welding flanges. For nonflammable cryogenic fluids, joints may be screwed, welded, silver brazed or with welded flanges.

(d) Piping outside buildings may be either buried or above ground. In either case, it shall be well supported and protected against physical damage and corrosion.

(e) All piping and tubing shall be tested after installation at not less than one and one half times hydraulically or one and one-fourth times pneumatically the maximums working pressure and proven free of leaks.

5236.22 VALVES AND ACCESSORY EQUIPMENT

(a) All valves and accessory equipment shall be suitable for the intended uses at the temperatures of the application and shall be designed for not less than the maximum pressure and minimum temperature to which they may be subjected, maintaining a safety factor of four to one.

(b) Shutoff valves shall be provided on all container connections. Shutoff valves shall be located as close as practicable to the containers.

(c) All liquid and vapor connections on flammable cryogenic fluid containers, except relief and gauging connections over 1/2-inch pipe size, shall be equipped with check valves or a remotely controlled automatic, quick closing valve which shall remain closed except during operating periods.

(d) Shutoff valves shall be installed in the piping system as needed to limit the volume of liquids discharged in event of piping or equipment failure. Relief valves shall be installed between shutoff valves in all pipelines.

(e) All inlet connections except relief valves, liquid level gauging devices and pressure gauges on any container shall be labeled to designate whether they are connected to vapor or liquid space.

5236.23 LOADING AND UNLOADING AREA

Loading and unloading shall be performed in such a manner as not to create an unsafe condition.

(a) Movement of vehicles, starting of engines, loading and unloading operations shall be controlled by personnel responsible for this area.

(b) Loading and unloading of oxygen shall not be permitted in the vicinity of loading or unloading of gaseous or liquid fuel.

(c) Parked vehicles shall have wheel chocks in place.

5236.24 SOURCES OF IGNITION

(a) Flammable cryogenic fluids, cryogenic oxidizers, liquefied oxygen, flammable or combustible liquids shall not be loaded, unloaded, dispensed or handled where vapors may reach a source of ignition. Smoking shall be prohibited except in designated areas. "NO SMOKING" signs shall be conspicuously posted.

(b) Electric ground or bonding wires shall be connected prior to connecting transfer hoses and shall not be removed until after transfer hoses have been removed from flammable cryogenic vehicles, in accordance with NFPA-70.

5236.25 CONTAINERS — TANKS — VESSELS

Containers, tanks and vessels used for transporting cryogenic fluids shall meet all applicable requirements of the United States Department of Transportation.

5236.26 VEHICLES

Vehicles transporting cryogenic fluids and subject to requirements of this Fire Code shall:

(a) Be placarded at the front, rear and on each side identifying the product. Placards shall have letters not less than 4 inches high using approximately a 5/8-inch stroke. Abbreviations shall not be used.

(b) In addition to the placard identifying the product, vehicle shall also bear other placards as may be required by the United States Department of Transportation; e.g., "FLAMMABLE GAS," "OXIDIZER," etc.

(c) Be equipped with not less than one approved-type fire extinguisher, minimum rating 20-B:C.

(d) Be equipped with adequate chock blocks.

5237 EXPLOSIVES AND BLASTING AGENTS

This section shall apply to the manufacture, possession, storage, sale, transportation and use of explosives and blasting agents. NFPA-495 Manufacture, Transportation, Storage, and Use of Explosive Materials are hereby adopted in its entirety as part of this Fire Code.

5237.2 EXCEPTIONS

(a) Nothing in this section shall be construed as applying to:

(1) The armed forces of the United States or the State militia.

(2) Explosives in forms prescribed by the official United States Pharmacopoeia.

(3) The sale, possession or use of fireworks.

(4) The possession, transportation and use of small arms ammunition.

(5) The possession, storage, transportation and use of not more than one pound of black sporting powder, 20 pounds of smokeless powder and 2000 small arms primers for hand loading of small arms ammunition for personal uses.

(6) The transportation and use of explosives or blasting agents by the United States Bureau of Mines, the Federal Bureau of Investigation, the United States Secret Service or Police and Fire Departments acting in their official capacities.

(7) Special industrial explosive devices which in the aggregate contain less than 50 pounds of explosives.

5237.3 DEFINITIONS

For definitions of BLASTING AGENT, BULLET RESISTANT, INHABITED BUILDING, EXPLOSIVES, GUNPOWDER, SPECIAL INDUSTRIAL HIGH-EXPLOSIVE MATERIAL and TEST BLASTING CAP No. 8, see Sec. 5208.

5237.4 PERMITS REQUIRED

(a) Permits shall be obtained:

(1) To manufacture, possess, store, sell or otherwise dispose of explosives or blasting agents.

- (2) To transport explosives or blasting agents.
- (3) To use explosives or blasting agents.
- (4) To operate a terminal for handling explosives or blasting agents.
- (5) To deliver to or receive explosives or blasting agents from a carrier at a terminal between the hours of sunset and sunrise.

(6) To transport blasting caps or electric blasting caps on the same vehicle with explosives.

(b) Permits required by Section 5237.4(a) of this section shall not be issued for:

- (1) Liquid nitroglycerin.
- (2) Dynamite (except gelatin dynamite) containing over 60 percent of liquid explosive ingredient.
- (3) Dynamite having an unsatisfactory absorbent or one that permits leakage of liquid explosive ingredient under any conditions liable to exist during storage.
- (4) Nitrocellulose in a dry and uncompressed condition in quantity greater than 10 pounds net weight in one package.
- (5) Fulminate of mercury in a dry condition and fulminate of all other metals in any condition except as a component of manufactured articles not hereinafter forbidden.
- (6) Explosive compositions that ignite spontaneously or undergo marked decomposition, rendering the products or their use more hazardous, when subjected for 48 consecutive hours or less to a temperature of 167 degrees F.
- (7) New explosives until approved by the U.S. Department of Transportation, except that permits may be issued to educational, governmental or industrial laboratories for instruction or research purposes.
- (8) Explosives condemned by the U.S. Department of Transportation.
- (9) Explosives not packed or marked in accordance with the requirements of the U.S. Department of Transportation.
- (10) Explosives containing an ammonium salt and a chlorate.

(c) No person shall keep or store, nor shall any permit be issued to keep or store, any explosives at any place of habitation or within 100 feet thereof.

(d) No person possessing a permit for storage of explosives at any place shall keep or store any greater amount or other kind of explosives than are authorized in such permit.

(e) The Fire Chief may require that any operations permitted under the provisions of Section 5237.4(a) 2 or 3 shall be supervised at any or all times by employees of the fire department designated by the Fire Chief to see that all safety and fire regulations are observed. Where, in the opinion of the Fire Chief, no undue hazard to life or property exists, the required supervision may be waived.

5237.5 BOND REQUIRED

Before a permit is issued, as required by Section 5237.4(a)(3), the applicant shall file with the jurisdiction a corporate surety bond in the principal sum of \$100,000 or a public liability insurance policy for the same amount for the purposes of the payment of all damages to persons or property which arises from, or are caused by, the conduct of any act authorized by the permit upon which any legal judgment results. The Fire Chief may specify a greater or lesser amount when, in his opinion, conditions at the location of use indicate a greater or lesser amount is required. Public agencies shall be exempt from this bond requirement.

5237.6 GENERAL REQUIREMENTS

(a) The manufacture of explosives shall be prohibited unless such manufacture is authorized by the Fire Chief.

(b) The storage of explosives and blasting agents is prohibited within the limits established by law as the limits of the district in which such storage is to be prohibited, except for temporary storage for use in connection

with approved blasting operations provided; however, this prohibition shall not apply to wholesale and retail stocks of small arms ammunition, explosive bolts, explosive rivets or cartridges for explosive-actuated power tools in quantities involving less than 500 pounds of explosive material.

(c) The Fire Chief may limit the quantity of explosives or blasting agents to be permitted at any location.

(d) No person shall possess, offer for sale, sell or display explosives or blasting agents at any location not authorized by permit issued by the Fire Chief.

5238 FIREWORKS AND SPARKLER/NOVELTY ITEMS

5238.1 DEFINITIONS

For definitions and State Regulations relating to Fireworks and Sparklers, refer to Florida State Statutes, Chapter 791, Rule 4A-50 of the Division of State Fire Marshal's Uniform Fire Safety Rules and Standards, and definitions provided within the standards adopted herein.

5238.2 ADOPTED STANDARDS AND REGULATIONS

Except as specifically modified within this code, for regulations and requirements relating to Fireworks Displays, Use of Pyrotechnics Before a Proximate Audience, and Transportation, Storage and Handling of Fireworks, the provisions of NFPA 1123, 1124, 1126 and all appendices as referenced in 5209, and the regulations set forth by the Department of Transportation (DOT) and Department of Alcohol, Tobacco and Firearms (ATF) are hereby adopted as requirements of this code.

5238.3 GENERAL REQUIREMENTS

(a) The manufacturing of fireworks, sparklers and pyrotechnic materials is prohibited.

(b) The storage of fireworks and pyrotechnic materials is prohibited except as permitted in paragraph (c).

(c) Except as hereafter provided, it shall be unlawful for any person, firm, copartnership or corporation to store, to offer for sale, expose to store, expose for sale, sell at retail, or use or explode any fireworks and/or pyrotechnic materials.

Approved sparklers per F.S. 791.013 and any wholesaler registered in accordance with F.S. 791.015 as of July 1, 1996, who has obtained all applicable governmental licenses and permits to operate from a permanent structure within Broward County as of July 1, 1996, are exempt from this subsection.

(1) Wholesale exemption sales of fireworks pursuant to F.S. 791.04 shall be prohibited at temporary or seasonal sales sites, and sales sites located in tents, canopies and stands.

(d) The Fire Chief or designee may adopt reasonable rules and regulations for the granting of permits for supervised public displays of fireworks and use of pyrotechnics before a proximate audience, by municipalities, organizations, or groups of individuals. Such permits may be granted upon sworn application to the Fire Chief or designee, to be held as provided herein and the filing of a bond by the applicant as provided hereinafter.

(1) Every such display and other permitted events shall be handled by a competent, qualified operator as specified herein.

(2) All such displays shall be of such composition, character and so located, discharged or fired, as in the opinion of the Fire Chief or designee, after proper inspection, shall not be hazardous to property or endanger any persons.

(3) An approved permit shall be required for any fireworks display or use of pyrotechnics before a proximate audience. The Fire Chief or designee is authorized to refuse to issue or to revoke any permit when it is felt that the public safety or property would be endangered.

5238.4 PERMIT REQUIREMENTS AND OPERATOR QUALIFICATIONS

(a) Application for permit to operate a display of fireworks or use of pyrotechnics before a proximate audience shall be made in writing to the Fire Chief or designee at least 15 days prior to the event.

(b) Permit application shall be set forth and contain the following:

(1) The name, address and telephone number of the organization sponsoring the display, the supplier of the fireworks, the operator (pyrotechnician) and all assistants.

(2) Application shall signed by the sponsoring organization representative and the operator (pyrotechnician.)

(3) References for the most recent three firework displays supervised and discharged by the designated operator shall be required for review by Authority Having Jurisdiction. Said referenced displays shall be similar in size and complexity and will provide contact persons and telephone numbers.

(4) The date and time of day at which the display is to be held and the duration time for said display.

(aa) No permit shall be issued for a display between the hours of 11:00 p.m. and 7:30 a.m.

Exception: Time restrictions stated above shall not be applicable on January 1, July 4, and December 31, or any other time where specific permission to operate a display of fireworks is granted by the Authority Having Jurisdiction.

(5) The exact location address for the display, event or production.

(6) A copy of a location site plan with dimensions indicating the exact location planned for the display site and all grounds and facilities at which the event will be held.

(aa) For outdoor displays and events, this plan shall include the location of all structures, audience viewing areas, roads, trees and utilities within a distance equal to twice the required diameter of the display site as set forth in NFPA 1123.

(bb) For use of pyrotechnics before a proximate audience, content of plans shall be as specified in NFPA 1126.

(7) The type and number of fireworks to be discharged.

(aa) Aerial displays: Size and number of each type of burst (single, multiple, etc.)

(bb) Fixed displays: Size, type and description of displays.

(8) The manner and place of storage of fireworks prior to the display. The date, time and travel route from the point the fireworks enter Broward County.

(9) Before any permit for a pyrotechnic display shall be issued, the person or organization making application shall furnish proof of financial responsibility to satisfy claims for damages to property or personal injuries arising out of any act or omission on the part of such person or any agent or employee thereof, in such amount, character, and form as the Fire Chief or designee determines to be necessary for the protection of the public.

(aa) A copy of the certificate of insurance naming the permitting agency as additional insured is required.

(bb) Minimum required amount of certificates of insurance for permit issuance is as follows: \$1,000,000 for bodily injury, and \$50,000 for property damage, per occurrence.

(10) Operator and assistant qualifications shall comply with the provisions of NFPA 1123 and NFPA 1126.

(aa) The operator shall be responsible for ensuring that a sufficient number of assistants are available on site for the safe storage and conduct of the fireworks display.

(bb) Operators must be at least 21 years of age and all assistants must be at least 18 years of age. A copy of a valid driver's license or other valid picture I.D. acceptable to the Authority Having Jurisdiction must be provided for all operators and assistants.

(11) The Fire Chief or designee shall require one or more standby firewatch personnel employed by the Fire Department, to be on-duty for each display or performance. When deemed necessary by the Fire Chief or designee, additional fire rescue apparatus may be required for the display or performance. The expense of such personnel services and apparatus shall be borne by the permit holder, and shall be paid prior to issuance of the permit.

(aa) The firewatch shall be on duty from the time of display set up, during the display, and until termination of the display and removal of all fireworks, debris, pyrotechnic materials and devices from the site.

(bb) In the case of indoor displays or performances, firewatch shall be maintained until total restoration of normal functioning of the fire safety systems has been verified.

(cc) At a minimum, at least one of the assigned firewatch personnel shall be a Florida State Certified Fire Inspector.

5238.5 DISPLAY SITE DISTANCE SEPARATION REQUIREMENTS

Except as otherwise specified in this code section, fireworks display distance separation requirements shall comply with NFPA 1123 and NFPA 1126.

(a) The following minimum distance separations shall be required for the aerial fireworks display site.

(1) Minimum distance separation shall comply with NFPA 1123, but in no case be less than 200 feet from the nearest dwelling, building or structure, including canopies, chickee huts or similar structures, bulk storage areas, public highways, railroads or other means of travel.

(2) Not within 500 feet of a school, theater, church, hospital or similar structures or institutions.

Exception: Unless specifically approved by the Authority Having Jurisdiction and said occupancy owner/agent.

(3) No less than 50 feet radius from the nearest aboveground utility, telephone or telegraph line, tree or other overhead obstruction.

(4) The spectators shall be restricted to locations that comply with the spectator viewing area distance separation requirements in NFPA 1123, but in no case less than 200 feet from the discharge site. Only those persons authorized by the Fire Chief or designee shall be permitted within the restricted areas during the preparing, unloading or firing of fireworks displays.

(b) For indoor displays, effects or use of pyrotechnics before a proximate audience, the minimum separation distances for any audience shall be as specified in NFPA 1126.

5238.6 REQUIREMENTS FOR DISPLAY FIREWORKS, AERIAL SHELLS AND EQUIPMENT

(a) All aerial shells six inches or greater in diameter shall be fired using electrical ignition.

(b) All electrically fired displays shall provide a solid barrier located at least 100 feet from the mortar location from which all operators (pyrotechnicians) shall control the display with the exception of displays on barges. When manual ignition is used, sand bags or similar protection shall be placed between the operator and the mortars.

(c) During setup, firing and cleaning of the display, all operators and assistants shall wear the OSHA approved, personal protective clothing and equipment as specified in NFPA 1123 and NFPA 1126.

(d) The operator (pyrotechnician) shall provide compatible two-way radio communication in quantity and quality acceptable to the Fire Chief or designee for all agencies involved in the display.

(e) The areas selected for the discharge site, spectator viewing areas, parking areas, and the fallout areas shall be inspected and approved by the Fire Chief or designee. Scheduling of the site inspections shall be as determined by the Fire Chief or designee.

5238.7 SAFETY PRECAUTIONS

(a) If in the opinion of the Fire Chief or designee, any unsafe or hazardous condition exists, the fireworks display shall be postponed until such time as said conditions are corrected.

(b) If high winds, precipitation or other adverse weather conditions prevail, such that in the opinion of the Fire Chief or designee a significant hazard exists, the fireworks display shall be postponed until weather conditions improve to an acceptable level to allow discharge.

(1) No discharge of a fireworks display shall be permitted to take place when the wind velocity is 17 knots (20 mph) or greater.

(c) No smoking shall be allowed within 50 of any area where fireworks or other pyrotechnic materials are present.

Exception: Smoking as permitted in NFPA 1126.

(d) No operators, assistants or other personnel shall use or handle any fireworks, pyrotechnic materials or pyrotechnic devices and equipment while under the influence of any intoxicating beverages, narcotics, controlled substances, or prescription or non-prescription drugs which can impair judgment, mobility or stability.

(e) Immediately upon delivery to the display site, all fireworks shall be properly secured and shall not be left unattended at any time. When deemed necessary, the Fire Chief or designee may require the operator to employ special security measures to ensure the proper security of the stored fireworks.

(f) A minimum of two, two and one-half gallon pressurized water fire extinguishers shall be available in the discharge area. Additional extinguishers or equipment may be required if conditions warrant. In addition, adequate water supply for fire protection shall be available at the discharge site.

5238.8 ADDITIONAL REQUIREMENTS FOR OFFSHORE AND BARGE FIREWORKS DISPLAYS

(a) A valid copy of a current U.S. Coast Guard permit of operation shall be provided for each barge display, if required by the U.S. Coast Guard.

(b) At least two chase boats shall be provided to maintain a clear separation distance of at least 1,000 feet radius around the barge from other vessels, structures and the beach. Chase boats shall also provide transportation of fire rescue personnel when required.

(c) Two-way compatible communication shall be provided for use by fire rescue and law enforcement personnel, chase boats and barge crew.

(d) Ladder access shall be provided to allow immediate access for inspection and emergency response.

(e) Stabilization shall be provided to secure the barge and prevent rotation from wind, water current and firing angle.

(f) Inspection of the barge by the Fire Department shall occur at least one to two hours prior to the scheduled departure for sea.

5238.9 ADDITIONAL REQUIREMENTS FOR OUTDOOR DISPLAY OF FIREWORKS ON PRIVATE RESIDENTIAL PROPERTY

(a) In addition to the permit requirements specified within Section 5238.4, written approval from the property owners located adjacent to the proposed display site property is required prior to approval of a permit for outdoor fireworks display.

(b) The following minimum distance separations shall be required for all aerial fireworks display sites:

(1) The display site shall have at least a 100 feet per inch radius of internal mortar diameter of the largest aerial shell to be fired.

(2) Minimum distance separation shall be no less than 300 feet from the nearest dwelling, building or structure, including canopies, chickee huts or similar structures, bulk storage areas, public highways, railroads or other means of travel.

(3) Not within 1,000 feet of a school, theater, church, hospital, nursing home, assisted living facility, livestock/animal storage site, or similar structures or institutions.

(4) No less than 50 feet radius from the nearest aboveground utility, telephone or telegraph line, tree or other overhead obstruction.

(5) The audience shall be restricted behind an approved barrier, located no less than 200 feet from the outside perimeter of the required display site distance separations specified in Section 5238.9(b)(1).

(c) The requirements for display fireworks, aerial shells and equipment shall be as specified in Section 5238.6(a-e).

Exception: All aerial shells shall be fired using approved electrical ignition.

(d) Safety precaution provisions shall be as specified in Section 5238.7(a-f).

(e) Operator and assistant qualifications shall comply with the requirements specified in Section 5238.4(b)(10).

(f) Use of pyrotechnics before a proximate audience shall be as specified in NFPA 1126.

5238.10 POST-DISPLAY OPERATIONS

(a) All fireworks that remain unfired after display discharge is concluded shall be immediately disposed of or removed in a manner safe for that particular type of fireworks. The debris from the discharged fireworks shall be properly disposed of by the operator before leaving the premises. The operator shall remain at the discharge site for at least one hour after the completion of the display to ensure the site is secure.

5238.11 PERMIT REQUIREMENTS AND PROCEDURES FOR SPARKLERS AND NOVELTY ITEMS: RETAIL SALES, STORAGE AND HANDLING

(a) The following requirements shall apply to retail sales, storage and handling of sparklers and novelty items:

(1) It shall be unlawful for any person, firm, corporation, business or enterprise to sell, offer for sale, distribute, store or handle any sparklers and/or novelty items as defined in F.S. 791 without an approved permit.

(2) Before any permit is issued for the sales, storage and/or handling of approved sparklers, within a structure or outdoor site, a written sworn application, signed by the applicant, shall be submitted with all required attachments to the Fire Chief or designee at least 30 days prior to the beginning for the designated permit period.

(aa) A separate permit is required for each sale, storage, and handling site. Permits shall be non-transferable.

(3) Final approval for any permit is subject to an on-site inspection by the Fire Chief or designee.

(4) The permit issued shall be posted conspicuously at the approved site location.

(5) The Fire Chief or designee shall have the right to deny or revoke any permit, at any time, for any unsafe conditions or acts, or non-compliance of any provisions of the applicable codes.

(6) Letters of application shall set forth and contain the following:

(aa) The name, local and permanent address, and telephone number of the person, business, company, corporation or enterprise to sell, store or handle approved sparklers.

(bb) The proposed location, dates and time period for which the permit is requested for sales, storage or handling of sparklers.

(cc) The name(s) of the person(s) responsible for the management and supervision of the approved site.

(dd) Submittal of an approved site plan indicating exact sales, storage, and/or handling site information:

(i) Location and description of required fire protection equipment and “No Smoking” signs.

(ii) Location of storage area and/or storage containers on site.

(iii) Location and description of electrical equipment and/or generators and associated wiring to be used at the site.

(iv) Site plan shall include sales area configuration, including exits/exit access throughout interior of sales, storage and/or handling sites.

(v) For outdoor sites, the site plan shall include exact distances from all structures, roadways and fuel storage or dispensing areas.

(ee) Submittal of written notarized permission from the property owner or authorized agent for site location.

(ff) Submittal of proof of public premises liability insurance, in an amount determined by the permitting agency, but not less than the amount of \$300,000, naming the permitting agency as an additional insured of the policy.

(gg) Submittal of valid copy of State Fire Marshal’s Office License approving applicant(s) as a “Florida Seasonal Retailer” or “Retailer” as defined in F.S. 791.

(hh) Applicant to provide quantity and inventory list of all items proposed for sale, storage, and/or handling at the site location, in compliance with the State Fire Marshal’s Office “Approved Sparklers List,” as specified in F.S. 791.

5238.12 REQUIREMENTS FOR THE SALES, DISPLAY, MERCHANDISING, STORAGE AND HANDLING OF APPROVED SPARKLERS AND NOVELTY ITEMS WITHIN BUILDINGS, STRUCTURES, CANOPIES AND OUTDOOR SITES

(a) No person shall be in possession of a lighted cigarette, cigar or pipe, or any open flame, within fifty (50) feet of any sales, displays, merchandising, storage, or handling areas. Proper receptacles for disposal of smoking materials shall be provided at all entrances to such areas (i.e., water-filled/sand-filled buckets.)

(b) A minimum of two (2) approved two and one-half (2-1/2) gallon pressurized water fire extinguishers shall be available within the sales, display, storage and handling areas. Additional fire extinguishers or fire protection equipment may be required by the Authority Having Jurisdiction.

(c) Precautions shall be taken to protect against fires or spread of fires in all site areas located within fields or lots with ground cover such as brush, grass or other overgrowth of vegetation.

(d) Durable and readily visible signs, to read “Caution Sparklers – No Smoking” shall be posted on the exterior of each entrance way into and throughout all sparkler sales, storage and handling areas within the interior of each building, structure, canopy or outdoor site. These signs shall be readily visible in all directions.

(e) The use, ignition or discharge of any approved sparklers or novelty items is prohibited within buildings or structures where sparklers or novelty items are offered for sale, displayed or stored, and within one hundred (100) feet of any outdoor sales, storage or handling sites.

(f) Buildings or structures, used in whole or in part for the sales (retail or wholesale,) display, merchandising, handling or storage of sparklers and /or novelty items shall be fully protected throughout with an approved automatic sprinkler system in accordance with NFPA 13.

Exception: Canopies, as defined in SFBC Sec. 4302 and approved steel storage vaults or containers, when used outdoors.

(g) No storage of sparklers or novelty items shall be permitted in vehicles.

Exception: Transportation purposes only, to and from the site, or at a permitted site, if approved by the Authority Having Jurisdiction.

(h) Sales, display and merchandising shall be conducted in a safe manner in order to control handling by the general public.

(i) Amounts of sparklers and related novelty items displayed within the sales area shall not exceed those amounts approved by the Fire Chief or designee.

(1) Where the primary business of the occupancy is not the sales of sparklers and fireworks, the sales areas of sparklers or novelty items shall not exceed two percent of the net floor space of the affected building or structure.

(j) Storage of approved sparklers and novelty items shall comply with the following?

(1) Sparklers shall not be stored or kept in any area:

(aa) In which paints, oils or varnishes are manufactured or kept for use or sale, unless the paints, oils or varnishes are unbroken (sealed) containers.

(bb) In which resin, turpentine, gasoline or flammable substances, or substances, which may generate vapors, are used, stored, or offered for sale unless the resin, turpentine, gasoline or substance is in unbroken (sealed) containers.

(cc) In which there is not at least one 1A20BC fire extinguisher available in the area used for storage.

(2) Storage of sparklers shall be in an approved manner, remote from the public, and separated from all other merchandise by at least one-hour fire protection and an approved automatic sprinkler system.

Exception: Canopies as defined in SFBC 4302 and approved steel storage vaults or containers when used outdoors.

(3) Approved storage facilities shall be labeled with an approved Explosives placard complying with the Department of Transportation (DOT) Standard.

(k) Outdoor sites for sales, storage, and/or handling of approved sparklers shall comply with the following distance requirements:

(1) The minimum distance required between a site and any building or structure shall be 50 feet.

(2) The minimum distance required between a site and any fuel storage/dispensing area or device shall be fifty (50) feet.

(3) Storage areas shall be separated from sales and handling areas by a minimum of 25 feet.

Exception: Approved steel storage vaults may be located near or adjacent to sparkler sales and handling areas when approved by the Authority Having Jurisdiction.

(4) Any buildings or structures used as storage facilities for sparklers and novelty items in conjunction with outdoor sites shall comply with the one hour fire protection separation and automatic sprinkler system requirements as required for storage areas within buildings and structures.

Exception: Canopies as defined in SFBC 4302 and approved steel storage vaults or containers.

(l) When a canopy is to be used in conjunction with an outdoor site operation, the following shall apply.

(1) Canopy as defined in SFBC Section 4302, no sides of any kind are permitted on the canopy at any time. Provide copy of Building Permit for canopy.

(2) The canopy must comply with the flame-retardant requirements as specified in SFBC Section 4305.2(a), proper flame retardant certificate required.

(3) Proper exit and exit access shall be maintained at all times within the interior of the canopy. No obstruction to egress from any portion of the canopy is permitted.

(4) Provide and maintain a minimum of one 2A40BC dry chemical fire extinguisher, with properly updated service tag for each 2,500 square feet of canopy area. Not less than one fire extinguisher for each canopy.

(m) If the site is to be operated after daylight hours, the site shall be properly illuminated. If electrical power and/or electrical equipment is used, the following shall apply:

(1) All electrical equipment and associated wiring shall comply with NFPA 70. Provide copy of permit for electrical service and equipment.

(2) If fuel powered generator is to be used to supply power to the site, the following shall apply:

(aa) Generator shall be kept a minimum distance of 25 feet from sales, storage, or handling areas.

(bb) Precautions against fires or fire-spread shall be taken when generator sites are located within fields or grassed lots.

(cc) Only an approved metal five-gallon safety container shall be used to store fuel for the generator. Fuel containers shall be properly stored with a total maximum of ten gallons per site.

(i) Approved fuel container shall not be stored in sales, storage, handling areas or vehicles.

(dd) Durable sign to read "No Smoking" shall be posted at the generator site.

5238.13 SEIZURE OF FIREWORKS, PYRO TECHNICAL MATERIALS, SPARKLERS AND NOVELTY ITEMS. PENALTIES PROVIDED FOR

(a) All sales, display, merchandising, storage, handling and use of sparklers and related novelty items shall comply with all applicable State, Country and local laws and ordinances.

(b) The Sheriff or appointee, municipal law enforcement agency or police officer, or other law enforcement agency, at the request of the Fire Chief or designee, shall seize, take, or remove, or cause to be removed, at the expense of the owner, all stocks of fireworks, pyrotechnic materials, sparkers and novelty items offered or exposed for sale, possessed, stored, used, or held in violation of this code. The provisions for seizure of illegal fireworks as specified in F.S. 791 shall also apply.

Exception: Approved sparklers and wholesale exemptions per F.S. 791.04.

(c) Sale, display, merchandising, possession, discharge, use, storage or handling of fireworks, pyrotechnical items, sparklers or novelty items in violation of this code, or other applicable statutes, codes or ordinances, shall constitute a fire/life safety hazard as specified in Section 5205.1 of this Code. Violators shall be subject to criminal code enforcement and penalties as provided therein. The provisions for penalties as specified in F.S. 791.06 shall also apply.

5239 FLAMMABLE AND COMBUSTIBLE LIQUIDS

5239.1 STANDARDS

The Flammable and Combustible Liquids code, NFPA-30, the Installation of Oil Burning Equipment, NFPA-31, are hereby adopted.

5239.2 SCOPE

These provisions shall apply to new and existing buildings, equipment, and installations.

5239.3 CLASSIFICATION

(a) Flammable Liquids shall be as defined in NFPA 30.

(b) Combustible Liquids shall be as defined in NFPA 30.

(c) Any manufactured liquid or fluid commodity, such as, but not limited to paint, varnish, dryer, cleaning solution and polishing liquid which contains certain flammable or combustible liquid as herein defined, shall be classified as being one of the classes defined in NFPA 30.

5239.4 DETAILED REGULATIONS — See References Chapters 4102.4(a) through 4102.4(j).

5239.5 WARNING LABELS

Warning labels shall conform with the Federal Hazardous Substance Labeling Act, applicable state laws and Identification of the Fire Hazard Materials NFPA.

All flammable liquids, flammable and liquid compounds or mixtures manufactured, packaged or offered for sale shall be conspicuously marked or labeled in easily legible type which is in contrast by typography, layout or color with any other printed matter on the label.

EXCEPTION: Foods, drugs or cosmetics subject to the Federal Food, Drug and Cosmetics Act.

5239.6 WARNING SIGNS

(a) **GENERAL** — The Fire Chief may require warning signs as he deems necessary for the purpose of pointing out the hazards of storing or using flammable liquids.

(b) **STYLE** — Warning signs shall be of a durable material with red lettering on a white background and shall read DANGER FLAMMABLE LIQUIDS, to be identified as required by NFPA-704.

(c) **LOCATION** — Signs shall be posted in locations as directed by the Fire Chief.

5239.7 OPERATION OF HEATING, LIGHTING AND COOKING APPLIANCES

Heating, lighting or cooking appliances which utilize Class I liquids shall not be operated within a building or structure.

5239.8 UNLAWFUL SALES OF FLAMMABLE LIQUIDS

It shall be unlawful for any person to sell or offer for sale Class I or Class II liquids with a flash point of 110 degrees F., or less for the express purpose of domestic cleaning.

5239.9 CLEANING WITH FLAMMABLE LIQUID

Class I liquids and Class II liquids with a flash point below 110° F. shall not be used within a building for washing parts or removing grease or dirt unless they are used in a closed machine approved for that purpose.

5239.10 WASTE PETROLEUM PRODUCTS AND FLAMMABLE OR COMBUSTIBLE LIQUIDS

Flammable or combustible liquids or any waste liquids containing crude petroleum or its by-products shall not be discharged into or upon any street, highway, drainage canal or ditch, storm drain, sewer or flood-control channel, lake or tidal waterway, or upon the ground.

5239.11 SOURCES OF IGNITION

In locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition.

5239.12 STORAGE AND DISPENSING OF FLAMMABLE LIQUIDS EXCEPT COMBUSTIBLE LIQUIDS

(a) **PERMIT REQUIRED.** No person shall have, store, or keep manufacture, use, sell or give away gasoline, benzene, naphtha, or other volatile substances except as provided in this section, and no permit shall be issued, where a permit is required, until after application therefore has been filed and considered, and the rules and regulations provided in this section have been complied with.

(b) APPLICATION. Application for permit shall be made to the building department of the city and the chief of the fire department in writing. Such application shall state the location of the building and the quantity of gasoline, benzene, naphtha or other volatile substance which is to be kept in storage or for sale; provided no provision in this section is intended to prohibit the carrying of gasoline in the fuel tanks of automobiles or other gasoline driven vehicles.

(c) UNDERGROUND TANKS, SIZE, DEPTH, LOCATION FOR RETAIL FILLING STATIONS, GARAGES OR ANY ESTABLISHMENTS SUPPLYING GASOLINE TO ANY GASOLINE DRIVEN VEHICLE OR EQUIPMENT. No gasoline, benzene, naphtha or other volatile substance shall be stored or kept, except in approved underground tanks, bearing the Underwriters' label, and not exceeding four thousand gallons capacity, except as hereinafter provided. The number of such approved tanks in any one location shall not exceed five. Such tanks shall not be banked less than two feet (2') apart, each tank shall be provided with a separate vent pipe on each tank, not less than one and one quarter inches in diameter, and such pipe shall extend not less than one foot six inches (1'6") above the highest part of the nearest building. Such storage shall be under the following regulations:

(1) All electrical connections around pump and tanks shall be approved by the electrical inspector.

(2) When tanks are to be installed, the same must not be less than 10 feet (10') from all walls of adjoining buildings that have basements or not less than five feet (5') from a building having no basement. The top of the tank must not be less than two feet six inches (2'6") below the grade level and covered with a concrete slab not less than six inches (6") in thickness and extending one foot six inches (1'6") over all edges of the tank. All pipe work must be uncovered until inspected by the Building, Fire and Plumbing Departments.

(3) Gasoline must be stored in underground tanks bearing an Underwriters' label. Any tank to be installed, having a storage capacity in excess of four thousand (4,000) gallons, but not more than twelve thousand (12,000) gallons, shall be jointly approved in writing by the Fire Chief, Building Official, and the director of building and zoning, after an appropriate review has been conducted. Such review includes, but is not limited to, an analysis of the proposed installation, location, distance separations, types of occupancies in the vicinity, tank corrosion protection and construction, and applicable zoning restrictions. For purpose of this Sub-section, a "location" is a parcel of land with a minimum of seventeen thousand five hundred (17,500) square feet, with a minimum street or waterway frontage of one hundred seventy five (175) feet. The maximum storage capacity of gasoline in any one location shall not exceed forty-eight thousand (48,000) gallons. When gasoline is stored in more than one location, tanks shall not be interconnected between locations. Airports may exceed the maximum storage capacity provided no single tank exceeds 25,000 gallons with a maximum capacity of 100,000 gallons per location.

(4) The maximum storage of gasoline on private property for use by the owner shall not exceed 1,000 gallons. This tank must be Underwriters approved and a permit for the installation shall be obtained from the Building Department. The installation shall be in compliance with other sections of this Fire code. Fire extinguishing appliances required by the Fire Chief shall be installed in places designated to protect the hazard in the dispensing of such fuel. NOTE: See local jurisdiction for local requirements.

(5) Underground tanks installed in soil known to be unusually corrosive due to the conditions hereinafter set forth, shall be protected from corrosion based on evaluation and design by a Professional Engineer or Architect:

(aa) Low soil resistivity to current flow.

(bb) Very acid or very alkali soil.

(cc) Excessive anaerobic bacteria.

(dd) High water table.

(ee) Backfill and land fill areas with high organic content.

(ff) Location near waterfront areas.

(6) Underground tanks temporarily out of service shall immediately have the fill line gauge openings and pump suction capped and secured against tampering. The vent lines shall be left open. Underground tanks out of service for a period of one year, shall be removed.

(d) ONLY APPROVED PUMPS SHALL BE USED; GRAVITY FLOW PUMPS PROHIBITED. Gasoline shall be drawn from underground storage tanks by pumps bearing the label of Approved Testing Laboratory. The use of pressure systems or gravity flow type pump systems is prohibited.

(e) WARNING SIGNS OF VENDORS OF GASOLINE. Filling stations, garages, or any establishment supplying gasoline to any gasoline driven vehicle or equipment at their establishment shall display warning signs approved by the Fire Chief. "No Smoking" signs must be displayed on each island of filling stations and in each bay.

(1) The signs must have letters at least two inches high and must be painted red on a white background.

(2) Signs must state "No Smoking".

(3) Additional signs may be required by the Fire Chief.

(f) AUTOMATIC DISPENSING UNITS. The installation and use of unattended dispensing devices for Class I flammable liquids is prohibited.

(1) **MANUAL NOZZLES.** The dispensing of Class I flammable liquid into the fuel tank of a vehicle or into a container shall be under the control of a competent attendant at all times, and said attendant shall be in the immediate vicinity of the vehicle or container at all times while said vehicle or container is being filled. The use of any device which permits the dispensing of Class I flammable liquids when the hand of the operator of the discharge nozzle is removed from the nozzle control lever, is hereby forbidden, except when using an automatic nozzle at an automotive service station as provided in Paragraph (2).

(2) **AUTOMATIC NOZZLES. WITH LATCH-OPEN DEVICES.** In lieu of being held open by hand, an approved automatic nozzle may be used for dispensing Class I liquid into the fuel tank of a vehicle. Such a nozzle shall have the latch open device as an integral part of the assembly and shall shut off the liquid reliably and positively when the gasoline tank is filled, when it falls from the filling neck of an automobile tank, when it is subject to rough usage such a dropping or lack of proper lubrication, or when an automobile is driven away while the nozzle is still in the tank. A competent attendant shall be in the immediate vicinity of the vehicle being filled by such an approved nozzle.

EXCEPTION: Self-service station pursuant to Chapter 526.141, Florida Statutes.

(g) DISPENSING OF FLAMMABLE LIQUIDS INTO PORTABLE CONTAINERS. It shall be unlawful to dispense or deliver any gasoline or other volatile flammable liquid having a flash point of less than 110 degrees Fahrenheit closed cup tester into portable containers, unless the container is of sound metal construction and has a tight closure with screwed or spring cover and is fitted with a spout or so designed that the contents can be poured without spilling. Such containers should be clearly marked with the name of the product contained therein.

(h) FLAMMABLE LIQUID STORAGE AT PORT EVERGLADES AND THE FORT LAUDERDALE-HOLLYWOOD INTERNATIONAL AIRPORT.

(1) Aboveground storage of flammable liquids shall only be permitted at Port Everglades and the Fort Lauderdale-Hollywood International Airport ("Airport"). All tank locations at the Airport must be approved by the Broward County Fire Code Official, or his or her designee, prior to the issuance of a permit to erect or install a tank.

(2) All flammable liquid storage tanks at Port Everglades must be constructed, installed and maintained in accordance with the Port Everglades Authority Security Regulations.

5239.13 STORAGE AND USE OF COMBUSTIBLE LIQUIDS SHALL BE UNDER THE FOLLOWING REQUIREMENTS

(a) Where combustible liquids which do not emit a flammable vapor at a temperature of one hundred degrees Fahrenheit, are stored for private use, such as hotels, apartment buildings, laundries, bakeries and restaurants, they shall be stored in approved tanks as follows:

(1) If underground installation, it shall be according to the regulations governing the installation of gasoline tanks. Such tanks shall not exceed 4,000 gallon capacity. Vent pipes shall terminate outside the building at a point not less than three feet measured vertically or horizontally from any window or other building opening, and sufficiently above the ground to prevent their being covered with water, but in no case less than four feet above the ground.

(2) If aboveground installation, it may be stored in an approved tank having a capacity up to 550 gallons, or in an approved fire resistive tank enclosure assembly, in accordance with Sub-section 5239.15. Tanks having a capacity up to 275 gallons may be installed adjacent to buildings or the line of adjoining property. Tanks having a capacity of 276 gallons to 550 gallons shall be installed not less than five feet (5') from buildings or the line of adjoining property.

(b) Suitable pumps shall be provided to pump oil from the storage tanks to the burners, and such pumps shall be arranged so that dangerous pressure will not be produced in any part of the system.

(c) Combustible liquids storage for private use for dwellings may be stored in any underground or above-ground approved tank having a capacity up to 550 gallons. Tanks having a capacity up to 275 gallons may be installed adjacent to buildings or the line of adjoining property. Tanks having a capacity of 276 gallons to 550 gallons shall be installed not less than five feet from buildings or the line of adjoining property. Tanks with a capacity of 100 gallons or more shall be supported on iron pipe legs, or concrete cradle, set on a four inch (4") concrete pad so constructed as to be six inches (6") larger in length and width than the dimensions of the tank. Tanks with a capacity of less than 100 gallons may be securely fastened to the building with fabricated steel wall brackets one-fourth inch (1/4") thick by two inches (2") wide, spaced a minimum of two feet (2') on center.

Tanks are to be set level, and if shims are required under one or more legs, pieces of metal must be employed; wood shims are not permitted.

A shut-off valve shall be provided in the burner supply line immediately adjacent to the gravity feed connection of a supply tank.

A tank shall be provided with a gauge to determine the liquid level. The fill opening shall be of such size and so located as to permit ready filling in a manner which will avoid spillage.

(d) Combustible liquids burning system for oil use shall be equipped with antiflooding devices. Such systems shall bear the label of an Approved Testing Laboratory. Delivering combustible liquids from tanks by pressure is prohibited, unless equipped with power pump on wagon. All piping, appliances, and other installations for use with combustible liquids shall comply with, and shall be installed, maintained and regulated in conformity with, the recommendations of the National Fire Prevention Association as set forth in NFPA-31, and supplements thereto.

(e) Combustible liquid tank fill pipes shall be placed in the curb or other suitable places, and flush with such curb, so that fuel oil tank wagons, or any part of their equipment, shall not obstruct the sidewalk while making deliveries.

(f) Where combustible liquids of the above specifications is stored for private use for such as power plants, ice plants and other industrial plants, they may be installed above ground, according to the following table:

Capacity in gallons	To line of adjoining unprotected building or property which may be built upon	To line of adjoining protected buildings	To line of existing frame buildings
1,000.....	12 feet.....	8 feet.....	20 feet
2,000.....	20 feet.....	15 feet.....	40 feet
3,000.....	20 feet.....	15 feet.....	40 feet

(g) Installation of combustible liquid tanks of greater capacity than specified in this table must be approved by the Fire Code Committee.

(h) Each aboveground tank shall be surrounded with an embankment or impervious dike not less than four feet high and capable of holding not less than one and one half times the capacity of the tank surrounded. Embankments or dikes shall be continuous, with no opening for piping or roadways. (Exception Section 5239.15.)

(i) All aboveground storage tanks shall be identified by a suitable sign which will state type of fuel and capacity of the tank.

(j) For diesel oil storage tanks in filling stations, see Sec. 5239.12.

5239.14 AUTOMOTIVE AND MARINE SERVICE STATIONS

NFPA-30A, Automatic and Marine Service Station Code is hereby adopted in its entirety as part of this Fire Code.

5239.15 ABOVEGROUND STORAGE AND DISPENSING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS

(a) Such storage shall comply with the following regulations.

(b) The provisions in this Section shall not supersede any zoning standard that might regulate or eliminate the use of aboveground storage tanks.

(1) PERMIT REQUIRED. No person shall have, store or keep, manufacture, use, sell, or give away gasoline, diesel fuel, benzene, naphtha, or other volatile substances, except as provided in this Sub-section or Sub-section 5239.12 and 5239.13 and no permit shall be issued where a permit is required, until after application therefore has been filed and considered, and the rules and regulations provided in this Section have been complied with.

(2) APPLICATION. See Paragraph 5239.12(b).

(3) ABOVEGROUND TANKS, size and location for retail service stations, agriculture, golf courses and other zoned establishments supplying fuel to any internal combustion engine or equipment. No gasoline, diesel fuel, benzene, naphtha or other volatile substance shall be stored or kept aboveground, except in accordance with Sub-sections 5239.12 and 5239.13 or in approved fire resistive tank enclosure assemblies, with the primary tank bearing the Underwriters' label, and not exceeding twenty-two hundred (2,200) gallons capacity; The number of such approved tank assemblies in any one location shall not exceed two (2). Such tank assemblies shall not be installed less than three feet (3') apart. Each tank assembly shall be provided with normal venting meeting the requirements of N.F.P.A. 30. Except as provided in (cc) or (ee) below.

(aa) All electrical connections around pump and tank assemblies shall be approved by the electrical inspector. A clearly identified and easily accessible switch or circuit breaker shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency. Their location shall be acceptable to the Fire Code Official and the controls shall be more than twenty feet (20'), but less than one hundred feet (100') from the dispensers.

(bb) Tank assemblies shall not be installed less than ten feet (10') from nearest side of any public way, walls of buildings, or any building opening and not less than 15' from property lines. The Fire Code Official may require additional spacing, or deny a location based on estimated hazard, risk or local zoning regulations. The tank assembly shall be installed upon a minimum four-inch (4") slab, meeting requirements of the manufacturer's specifications.

Each tank assembly shall be anchored to withstand uplifting by flooding or storm surges, including when the tank is empty.

Area around tank assembly shall be maintained free of combustible waste, debris and all types of storage. Any tank assembly exposed to vehicular traffic shall have collision barrier posts installed on all corners

and sides so exposed and shall not be spaced more than four feet (4') apart, center to center. Such posts shall be constructed and installed in accordance with Sub-paragraphs 4805.6(b)(1) through 4805.6(b)(6). Fire Code Official may require the installation of collision barrier posts, even if the clearance guidelines can be achieved as stated in Paragraph 4805.6(b).

(cc) A fire resistive tank enclosure assembly shall consist of a tank bearing an Underwriters' label which is protected by a monolithically poured six inch (6") thick, 3000 psi concrete encasement (all sides, top and bottom), and has its own integral weather protected secondary containment. It shall have been tested as a unit in accordance with UL 1709 for the tank and its contents. Such an enclosure may contain two separate tanks totaling not more than twenty-two hundred (2,200) gallons combined, containing different contents that are compatible, provided that the tanks are independent and do not share a common tank wall. The top of the tank shall be provided with an overspill reservoir manufactured as part of the tank, holding a minimum of seven (7) gallons, which drains back into the tank. The fill connection shall be equipped with a tight fill device for connecting the hose to the tank. The tank shall be fitted with a device which will alert the transfer operator by restricting the flow of liquid into the tank to a maximum rate of 2.5 gpm, when the fluid level reaches 90%, or automatically stops the delivery when the fluid level reaches 95%. The assembly must provide a secondary containment monitoring point for either visual or automatic monitoring, and a path by which any liquid leaking from any point of the primary tank may reach the monitoring point within 24 hours. Emergency venting shall comply with NFPA 30, except that no reduction shall be allowed for the insulation. The tank assembly shall be California Air Resources Board (CARB) approved. Tank and tank enclosure openings shall be through the top only. Tank assemblies shall be labeled with tank capacity and contents in addition to complying with Paragraph 5239.12(e). Tank assemblies and appurtenances shall be maintained in proper operating condition. Any damage to the tank assembly shall be repaired immediately with materials having equal or greater strength and fire resistance. Tank assemblies which comply with the requirements of this Sub-sub-paragraph are exempt from Paragraph 5239.13(h).

EXCEPTION: Underwriters Laboratories 2085 Labeled above ground tank or combination of tanks not exceeding twelve thousand (12,000) gallons capacity shall be permitted. Only one tank shall be permitted on site if its capacity is twelve thousand gallons (12,000).

(dd) The storage at Group I Occupancies of flammable or combustible liquids aboveground is specifically prohibited by Paragraph 5239.15(a).

EXCEPTION: Installation complying with Paragraph 5239.13(a).

(ee) Installations may comply with Paragraph 5239.13(f) by compliance with Sub-section 5239.15.

(ff) All tank design, appurtenances and plans shall be signed and sealed by a professional engineer.

(gg) Dispensing devices are allowed to be installed on top of the tank enclosure assembly. Any such device dispensing Class 1 liquids shall have installed on the fill hose, a UL listed emergency breakaway device designed not to lose liquid from either side of the breakaway point. All product piping attached to the tank enclosure assembly shall be double walled, and shall be installed by an authorized pollutant storage system specialty contractor. External piping leading away from the tank shall have a valve located within six inches (6") to the shell of the tank. Approved antisiphon devices shall be installed at each connection of piping to a tank when such piping extends below the level of the top of such tanks both internally and externally. All underground pipe work must be uncovered until inspected by building and fire departments, and other regulatory agencies.

(hh) Aboveground tank assemblies temporarily out-of-service for a period not exceeding ninety (90) days shall immediately have the fill, gauge openings and pump suction capped and secured against tampering. The vent lines shall be left open. Aboveground tank assemblies out-of-service for a period exceeding ninety (90) days, shall be removed.

(4) ONLY APPROVED PUMPS SHALL BE USED; GRAVITY FLOW PUMPS ARE PROHIBITED. Fuel shall be drawn from aboveground storage tanks by pumps bearing the label of Approved Testing Laboratory, such as Underwriters Laboratory, Inc. The use of pressure systems or gravity flow type pump systems is prohibited.

(5) WARNING SIGNS — Sub-paragraphs 5239.12(e)(1), 5239.12(e)(2) and 5239.12(e)(3), AUTOMATIC DISPENSING UNITS, Sub-paragraph 5239.12(f), MANUAL NOZZLES, Sub-paragraph 5239.12(f)(1), AUTOMATIC NOZZLES, Sub-paragraph 5239.12(f)(2), DISPENSING OF FLAMMABLE LIQUIDS INTO PORTABLE CONTAINERS, Sub-paragraph 5239.12(g) and NFPA 704 IDENTIFICATION OF THE FIRE HAZARDS OF MATERIALS.

(6) DISPENSING AREAS

(aa) Dispensing areas shall be provided with a vehicular driveway constructed of reinforced concrete. It shall be sloped to allow any accidental discharge from the dispensing of fluid to flow away from the dispenser or any building, and shall be subject to the approval of the Fire Code Official. This driveway shall be a minimum of twelve feet (12') wide and twenty feet (20') long, minimum. In every case, this driveway must be large enough that the fuel hose, when fully extended, does not reach the far edge of the driveway.

(bb) A fire extinguisher with a minimum classification 4A-60BC shall be provided and so located that it will be not more than one hundred feet (100') from any pump, dispenser, or fill-pipe opening.

5239.16 FLAMMABLE AND COMBUSTIBLE LIQUIDS DURING BUILDING CONSTRUCTION AND DEMOLITION

NFPA-241, Building Construction and Demolition Operations is hereby adopted in its entirety as part of this Fire Code.

5239.17 STORAGE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS ON FARMS AND ISOLATED CONSTRUCTION AREAS

NFPA-395, Storage of Flammable and Combustible Liquids on Farms and Isolated Construction Projects is hereby adopted in its entirety as part of the Fire Code.

5239.18 SCOPE

This division shall apply to those industrial plants where the use of flammable or combustible liquids is incidental to the principal business or where flammable or combustible liquids are used only in unit physical operations such as mixing, drying, evaporating, filtering, distillation and similar operations which do not involve chemical reaction.

Where portions of such plants involve chemical reactions such as oxidation reduction, halogenation, hydrogenation, alkylation, polymerization and other chemical processes, those portions of the plant shall be in accordance with Division 8, "Chemical and Processing Plants."

5239.19 INCIDENTAL STORAGE AND USE OF LIQUIDS

(a) GENERAL. This Section shall apply to those portions of an industrial plant where the storage and use of liquids are incidental to the principal business, such as automobile assembly, construction of electronic equipment, furniture manufacturing or similar operations.

(b) STORAGE OF LIQUIDS. Storage of Class I, II, and III-A liquids shall be in accordance with NFPA-30.

(c) USE OF LIQUIDS. The use of Classes I, II, and III-A liquids shall be in accordance with NFPA-30.

5239.20 VENTILATION

(a) OPEN SYSTEMS AND PROCESSES. Buildings, rooms or other enclosures in which Class I, II or III-A liquids are used or stored in open systems and processes shall be provided with ventilation in accordance with the provisions of this Section. Where natural ventilation is not sufficient under conditions to prevent the accumulation of flammable vapors, mechanical ventilation shall be provided and used.

(b) DESIGN. Design of ventilating systems shall take into account the relatively high specific gravity of the vapors. Openings to the outside for natural ventilation shall be 6 inches above floor level and shall be unobstructed except by louvers or coarse screens. Mechanical systems for removing flammable and combustible liquid vapors shall be designed and installed in accordance with the provisions of the Mechanical Code. (Chapter 48, South Florida Building Code.)

5239.21 IGNITION SOURCES

Open flames, heating devices and processes employing temperatures capable of igniting vapors of Class I or Class II liquids shall be prohibited in buildings, rooms or other confined spaces in which Class I are used in the open or in which Class II or III-A liquids are used for the purpose of saturating, coating or otherwise treating goods or materials. Artificial lighting shall be by electricity only. Electrical devices shall be a type approved for such locations and shall comply with the applicable provisions of the National Electrical Code. Smoking shall be prohibited, and suitable signs to that effect shall be displayed.

5239.22 SEPARATION OF UNSTABLE LIQUIDS

Areas where unstable liquids are used or small-scale unit chemical processes are carried on shall be separated from the remainder of the building in conformance with Chapter 10 of this Code.

5239.23 DRAINAGE

(a) **CONTROL OF DRAINAGE.** Emergency drainage systems shall be provided to direct flammable or combustible liquid leakage and fire-protection water to a safe location. The industrial plant shall be designed and operated to prevent the normal discharge of flammable or combustible liquids into public waterways, public sewers or adjoining property.

5239.24 TANK VEHICLE AND TANK CAR LOADING AND UNLOADING

Tank vehicle and tank car loading and unloading facilities shall conform to NFPA-385, "Tank Vehicles for Flammable and Combustible Liquids."

5239.25 ELECTRICAL EQUIPMENT

GENERAL: All electrical equipment and wiring shall be installed in accordance with the National Electrical Code.

5239.26 REPAIRS TO EQUIPMENT

Hot work, such as welding or cutting operations, use of spark-producing power tools and chipping operations shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

5239.27 HOUSEKEEPING

(a) **GENERAL:** Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills shall be cleaned up promptly.

(b) **ACCESS:** Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of flammable or combustible liquid storage, use or any unit physical operation.

(c) **DISPOSAL OF WASTE:** Combustible waste material and residues in a building or unit operating area shall be kept to a minimum, stored in covered metal receptacles and disposed of daily. See Section 5212.2.

(d) **MAINTENANCE OF YARDS:** Ground area around buildings and unit operating areas shall be kept free of weeds, trash or other unnecessary combustible materials. See Section 5212.2.

5239.28 FIRE PROTECTION

(a) **APPLIANCES:** Where Class I, II, or III-A liquids are used or dispensed, fire-protection appliances shall be provided in accordance with Section 5212.2.

(b) **ACCESS.** Industrial plants shall be located so that each building or unit of equipment is accessible from at least one side for firefighting and fire control purposes. Access shall be provided by unobstructed aisles whereby fire control apparatus may be brought to bear on any part of such Class I, II or III-A liquid storage or use.

(c) **FIRE FLOW.** Water shall be available in volume and at adequate pressure to supply water hose streams, foam producing equipment, automatic sprinklers or water-spray systems as the need is indicated by the special hazards of operation, dispensing and storage.

(d) **SPECIAL EXTINGUISHING EQUIPMENT.** Special extinguishing equipment such as that utilizing foam, inert gas or dry chemical shall be provided as the need is indicated by the special hazards of operation, dispensing and storage.

(e) **SPECIAL HAZARDS.** Where the need is indicated by special hazards of operation, liquid-processing equipment, major piping and supporting steel shall be protected by approved water-spray systems, deluge systems, approved fire resistant coatings, insulation or any combination of these.

(f) **INSPECTING AND TESTING.** All plant fire-protection facilities shall be adequately maintained, inspected and tested.

5239.29 CHEMICAL AND PROCESSING PLANTS SCOPE

This division shall apply to those plants or buildings which contain chemical operations such as oxidation, reduction, halogenation, alkylation, polymerization, fractional distillation, where liquids are produced by chemical reactions or used in chemical reaction and other chemical processes.

EXCEPTION: Refineries or distilleries. See Division 9 of this Section.

5239.30 LOCATION

New chemical and processing plants are prohibited unless specifically permitted within the jurisdictional area.

5239.31 CONSTRUCTION

The requirements of this Section shall be in accordance with Federal, State, County and Municipal Laws and Ordinances, this Code and the applicable NFPA-Codes.

5239.32 MAINTENANCE AND REPAIR

Hot work, such as welding or cutting operations, use of spark-producing power tools and chipping operations, shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

5239.33 ELECTRICAL EQUIPMENT

(a) **GENERAL:** All electrical equipment and wiring shall be installed in accordance with the National Electrical Code.

5239.34 FIRE PROTECTION

Fire protection shall be provided in accordance with Section 5211.

5239.35 VENTILATION

(a) **GENERAL:** Enclosed processing buildings for Class I or Class II liquids or other hazardous materials, shall be ventilated at a rate of not less than six air changes per hour. Where natural ventilation is inadequate, mechanical ventilation shall be provided in and use. Natural or mechanical ventilation shall discharge or exhaust to a safe location outside of the building. Provisions shall be made for introduction of makeup air in such a manner as to include all floor areas or pits where hazardous vapors may collect. Local or spot general ventilation may be needed for the control of special fire or health hazards. Such ventilation, if provided, can be utilized for up to 75 percent of the required ventilation (reference Chapter 48 of this Code).

(1) **STANDARDS OF GOOD PRACTICE:** The published "Standards" of the National Fire Protection Association and the handbooks published by the American Society of Heating, Refrigerating and Air Conditioning Engineers shall be accepted as standards of good practice.

5239.36 EXPLOSION RELIEF

Areas where Class I-A or unstable products are processed shall have explosion venting in accordance with the Section 5239.35(a) herein.

5239.37 STORAGE OF LIQUIDS

(a) **TANKS:** The storage of flammable and combustible liquids in tanks shall be in accordance with the applicable provisions of NFPA-30.

(b) **SPECIAL TANKS:** Day tanks, running tanks and surge tanks are permitted in process area.

(c) **CONTAINERS:** The storage of liquids in containers shall be in accordance with the applicable provisions of this Section.

5239.38 PIPING, VALVES AND FITTINGS

(a) **GENERAL:** Piping, valves and fittings shall be in accordance with this Section.

(b) **CONNECTIONS:** Listed flexible connectors may be used where vibration exists or where frequent movement is necessary. Approved hose may be used at transfer stations.

(c) **IDENTIFICATION:** Piping containing liquids shall be identified in accordance with NFPA-704, "Identification of the Fire Hazards of Materials."

5239.39 TRANSFER

The transfer of large quantities of Class I, II or III-A liquids shall be through piping by means of pumps, water displacement or inert gas. Except as required in process equipment, gravity flow shall not be used. Compressed air shall not be used as a transferring medium. Positive displacement pumps shall be provided with pressure relief discharging back to the tank or to pump suction.

5239.40 EQUIPMENT

Equipment shall be designed and arranged to prevent the unintentional escape of liquids and vapors and to minimize the quantity escaping in the event of accidental release.

5239.41 IGNITION SOURCES

Open flames, heating devices and processes employing temperatures capable of igniting the vapors of flammable products shall be prohibited in buildings, rooms and other confined spaces. Artificial lighting shall be by electricity only. Electrical devices shall be of type approved for such locations. Electrical devices shall be installed in accordance with the National Electrical Code.

5239.42 REFINERIES AND DISTILLERIES SCOPE

This division shall apply to a plant or portions of a plant in which flammable liquids are produced on a commercial scale from crude petroleum, natural gasoline or other hydrocarbon sources or where liquids produced by fermentation are concentrated and where concentrated products may also be mixed.

5239.43 LOCATIONS

New refineries and distilleries are prohibited unless specifically permitted within the jurisdictional area. If allowed, permits shall not be issued for the operation of a chemical plant, distillery, refinery or plant storing crude petroleum until approval has been given for the operation with respect to topography, nearness to places of assembly, residential or mercantile occupancy and adequacy of water supply for fire control.

5239.44 BULK PLANTS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

NFPA-30, Flammable and Combustible Liquids Code, is hereby adopted in its entirety as part of this Fire Code.

5239.45 DRY CLEANING PROCESSES

NFPA-32, Dry Cleaning Plants, is hereby adopted in its entirety as part of this Fire Code.

5240 HAZARDOUS MATERIALS

5240.1 SCOPE

(a) The general provisions and requirements contained in this Section shall apply to all hazardous materials including those materials otherwise covered in this Fire Code which exhibit or manifest the characteristics described in this Sub-section, except that when the general requirements conflict with those other requirements, the requirements which apply to the specific material shall prevail.

The classification system contained in Section 5240.9 of this Section shall apply to all hazardous materials including those materials otherwise covered in this Fire Code, which exhibit or manifest the characteristics described in this Sub-section.

This Section shall apply to materials not otherwise covered in this Fire Code which are flammable, or which may react to cause fires or explosions, or which by their presence create or augment a fire or explosion hazard, or which because of the toxicity, flammability or liability to explosion render fire fighting abnormally dangerous or difficult; also to flammable or combustible liquids which are chemically unstable and which may spontaneously form explosive compounds or undergo spontaneous reactions of explosive violence or with sufficient evolution of heat to be a fire hazard. Hazardous materials shall include such materials as flammable solids, corrosive materials, poisonous gases or highly toxic, radioactive, oxidizing unstable, reactive, or thermally reactive, operatic or pyrophoric, combustible metal as defined. Also, any substance or mixture of substances which is an irritant, a strong sensitizer, or which generates pressure through exposure to heat, decomposition or other means. Except as otherwise provided herein, the regulations contained in this Section supplement existing federal, state and local regulations relating to the storage, use and transportation of hazardous materials.

EXCEPTIONS:

(1) The off-site transportation of hazardous materials when in conformity with the Department of Transportation (DOT) regulations on file with and approved by the Department of Transportation.

(2) Hazardous materials in retail sales uses, provided the materials are packaged in individual containers not exceeding 10 liters (2.6 gallons) for liquids or 25 kilograms (55 pounds) for solids. There are no exceptions for highly toxic or poisonous gases, or for explosives and potentially explosive unstable materials.

(b) This Section shall also apply to chlorinated hydrocarbons and other materials which if not properly safeguarded may pose a threat to the public health and safety in a manner not directly related to the hazards associated with fire or explosion. It shall include but is not limited to any material listed by any federal or state public health and safety agency as a hazardous and/or extremely hazardous material, chemical or substance and any material which appears on the list of Environmental Protection Agency (EPA) priority pollutants.

(c) The specific requirements contained in Section 5240.21 shall apply to hazardous materials not otherwise covered in this Fire Code. When a material exhibits a hazardous characteristic in only one category of the classification system in Section 5240.9; and it is regulated elsewhere in this Fire Code, the requirements contained in Section 5240.21 shall not apply (for example a flammable liquid which is not unstable or highly toxic is regulated according to the requirements contained in Section 5239. When a material exhibits hazardous characteristics in more than one category of the classification system in Section 5240.9 and it is regulated elsewhere in this Fire Code, the requirements contained in Sections 5240.21, 5240.32, and 5240.39 shall apply in addition to the other requirements (for example a flammable liquid which is also unstable and highly toxic is regulated in accordance to the requirements contained in Section 5239 and those contained in Sections 5240.21, 5240.32, and 5240.39 for unstable and highly toxic materials.) When requirements conflict, the requirements related to the greater hazard shall take precedence. An attempt shall be made to satisfy the intent of all requirements.

5240.2 DEFINITIONS

For definitions, see Section 5208 of this Fire Code.

5240.3 PERMITS

(a) No person, firm or corporation shall store, handle or use any hazardous material specified in Section 5206 unless and until a valid permit has been issued pursuant to the Section.

(b) No person, firm or corporation shall construct, install, repair, abandon, remove, place temporarily out-of-service, close or substantially modify a storage facility for the handling of hazardous materials regulated

by this section been issued. Permittee shall apply for approval to close any storage facility at least (30) thirty days prior to the termination of the storage of hazardous materials at the facility. Such application shall include any change or alteration of the facility closure plan filed pursuant to Sec. 5240.6. This (30) thirty-day period may be waived if there are special circumstances requiring such waiver.

(c) HAZARDOUS MATERIALS MANAGEMENT PLAN: Each application for a permit pursuant to this section shall include a Hazardous Materials Management Plan (HMMP).

(d) HAZARDOUS MATERIALS INVENTORY STATEMENT: Each application for a permit pursuant to this section shall include a Hazardous Materials Inventory Statement.

(e) HAZARDOUS MATERIALS: For a permit to store, handle, transport on site or use ammonium nitrate, corrosive materials and solids, flammable solids, highly toxic liquids and solids, oxidizing liquids and solids, reactive materials, hypergolic materials, pyrophoric materials, unstable materials or organic peroxides, see Section 5206.

(f) RADIOACTIVE MATERIALS. For a permit to store, handle, transport on site or use radioactive materials see Section 5206.

NOTE: Where a material may be classified in more than one hazard category, the permit shall be obtained under the category in which the permit is required for the smallest amount.

(g) All hazardous materials permits shall be posted in a conspicuous location on the premises.

5240.4 GENERAL REQUIREMENTS

(a) The manufacture, storage, on-site transportation or use of hazardous materials shall be safeguarded with such protective facilities as public safety requires.

(b) Tanks, piping, valves, fittings and related components intended for use with hazardous fluids shall be designed and fabricated from suitable materials compatible with the hazardous fluid and having adequate strength and durability to withstand the pressures, structural stress and exposure to which they may be subjected.

Such tanks, valves and equipment shall conform to nationally recognized engineering standards, be listed by a recognized testing laboratory for the particular application. Abandonment of tanks in place shall be prohibited. Underground tanks used for the storage of hazardous liquids shall be located and protected in accordance with Section 5239 of this Fire Code. Secondary containment shall be provided for all underground tanks as required by state and local regulations pertaining to underground tanks.

Stationary above-ground tanks used for the storage of hazardous liquids shall be located and protected in accordance with Section 5239.16 of this Fire Code. Unstable, reactive, highly toxic poisonous liquids shall be treated as Class I-A flammable liquids. Other hazardous liquids shall be treated as Class II combustible liquids.

(c) In the absence of other requirements, portable tanks, containers and equipment intended for use with hazardous liquids shall conform to the requirements in Section 5239 of this Fire Code.

Materials shall be compatible with the liquids to be contained. Unstable, reactive, highly toxic, or poisonous liquids shall be treated as Class I-A flammable liquids. Other hazardous liquids shall be treated as Class II combustible liquids.

(d) Defective containers which permit leakage or spillage shall be disposed of or repaired in accordance with recognized safe practices; no spilled materials shall be allowed to accumulate on shelves or floors. Hazardous materials shall not be released into any sewer, storm, drain, ditch, drainage canal, lake, river or tidal waterway, or upon the ground, sidewalk, street or highway.

(e) Storage of hazardous materials on shelves shall be neat and orderly. Shelves shall be of substantial construction, adequately braced and shall have a lip or guard when used for storage of individual containers.

(f) Accurate records shall be kept of all leaks, spills or other unauthorized discharges of hazardous materials, and the Fire Department Chief shall be immediately notified when such discharges may create an imminent danger to life.

(g) Provisions shall be made for containing or neutralizing spills or leakage of hazardous materials which may occur.

(h) Accurate records shall be kept on peroxide forming chemicals and other substances which may dangerously deteriorate. Records shall include receiving, opening and disposal dates.

Periodic tests shall be made and recorded. Materials shall be properly disposed of on or before the required disposal date or when indicated by tests. All records shall be made, maintained, and available to the Fire Chief or his representative.

(i) Information regarding type, location, and amounts of hazardous materials including Material Safety Data Sheets or documents containing equivalent information for all hazardous materials on the premises shall be readily available.

No owner or person in charge shall refuse to supply such information immediately in an emergency, or within 15 days if no emergency exists.

(j) Visible hazard identification signs as specified in Identification of the Fire Hazards of Materials NFPA-704, or as otherwise specified, shall be placed at all entrances to and in locations where hazardous materials are stored, handled or used in quantities requiring a permit. This may waive this requirement in special cases when consistent with safety. Individual containers, cartons or packages shall be conspicuously marked or labeled.

(k) Secondary, containment shall be provided for portable tanks and containers used for storage or processes involving liquid hazardous materials. Such containment shall be in the form of barriers (dikes, curbs, berms) channels or drains to approved holding tanks, or by other suitable means so that leaks or spills will not endanger surrounding areas and in order to prevent the intermixing of materials which may react to cause fire, explosion, generation of flammable or toxic gas or large amounts of heat, or otherwise threaten life or property.

The containment shall be impervious to and compatible with the liquid to be contained. This requirement may be waived, when consistent with safety, and the aggregate quantity of the hazardous liquid is 60 gallons or less.

(l) The Fire Chief may require any or all of the following:

(1) Protection or removal of open flames, heated elements, mechanical equipment, electrical wiring and equipment, other potential ignition sources and initiating sources for other dangerous reactions.

(2) Fire or explosion detection, alarm and suppression systems.

(3) Overfill and leak detection and alarm systems, and excess flow limiters.

(4) Vapor or gas detection and alarm systems.

(5) Vapor or gas control and exhaust systems.

(6) Separation or isolation of materials where a fire, explosion or other dangerous reaction in one material may cause a fire, explosion, release of flammable or toxic gas or other dangerous reaction in the other material. Such separation may be by distance, fire-resistive construction, enclosure within a storage cabinet, or by other suitable means.

(7) Separation of occupancies, buildings, or areas within buildings, when handling, use or storage of hazardous materials creates a fire or life hazard to adjacent occupancies, buildings or areas within buildings. Such separation may be by distance, fire-resistive construction or other appropriate means.

(8) Breathing apparatus, protective clothing and equipment, testing devices or other emergency equipment.

(9) Tests and/or studies by recognized independent agencies as necessary to determine conformance with standards for equipment or compliance with requirements contained within this Fire Code.

(10) Written operation, emergency, or evacuation plans as deemed necessary for fire or life safety, by owner.

(m) Where specific requirements are not otherwise established, manufacture, storage, on-site transportation or use of hazardous materials shall be in accordance with nationally recognized standards of good practices.

5240.5 CONSTRUCTION REQUIREMENTS

Buildings or portions thereof in which hazardous materials are stored, handled or used shall be constructed in accordance with this Code.

5240.6 FACILITY CLOSURE PLAN

The permit holder or applicant shall submit a plan to terminate the storage of hazardous materials storage facility in a manner that eliminates the need for further maintenance, eliminates the threat to public health and safety and the environment by residual hazardous materials in the facility and demonstrates that hazardous materials which were stored in the facility have been transported, disposed of or reused in an appropriate manner. Additional criteria appropriate for the quantity or types of material stored, may be required.

5240.7 OUT OF SERVICE STORAGE FACILITIES

Storage facilities may be placed out of service in accordance with the following:

(1) Temporarily out-of-service facilities: Storage facilities which are temporarily out-of-service and are intended to be placed back in service within 90 days, shall continue to be permitted, monitored and inspected.

(2) Permanent out-of-service facilities: Storage facilities for which a permit is not kept current or is not being monitored and inspected shall be deemed to be permanently out-of-service and shall be closed in accordance with Section 5240.6.

5240.8 SPECIAL INSPECTIONS

When expertise is not available within the Fire Department, the periodic employment of special inspectors may be required, to conduct an audit or assessment of permittee's facility to make a hazardous material safety with the purpose and provisions of this Section. The cost for such inspections shall be borne by the owners of the facility.

5240.9 SCOPE

(a) Scope. For the purposes of this Fire Code, hazardous materials shall be divided into "hazard categories." The categories shall include those materials regulated under this Section, and those materials regulated under other Sections of this Fire Code.

(b) Multiple Hazards. Materials may pose multiple hazards, that is, they may exhibit hazards in more than one hazard category. When this is the case, the hazards in each category shall be considered separately and collectively to determine requirements.

(c) Specific Requirements: The specific requirements for each hazard category are contained in Sections 5240.21, 5240.32 and 5240.39.

(d) General Requirements: General Requirements for all hazard categories are contained in Section 5240.

(e) Definitions: For definitions see Section 5208.

5240.10 EXPLOSIVES AND BLASTING AGENTS

Category I — Explosives and Blasting Agents. Explosives and blasting agents shall be divided into Sub-categories:

(1) High Explosives (Detonating)

(2) Low Explosives (Deflagrating)

(3) Blasting Agents

5240.11 COMPRESSED GASES

Category II — Compressed Gases. Compressed Gases shall be divided into Sub-categories.

(1) Flammable

(2) Oxidizing

- (3) Corrosive
- (4) Highly Toxic or Poisonous
- (5) Reactive or Unstable
- (6) Liquefied (except Cryogenic Fluids)
- (7) Inert (Chemically unreactive)

5240.12 FLAMMABLE AND COMBUSTIBLE LIQUIDS

Category III — Flammable and Combustible Liquids. Flammable and combustible liquids shall be divided into Sub-categories which correspond with the classes described in Section 5208 of this Fire Code.

5240.13 FLAMMABLE SOLIDS

Category IV — Flammable Solids. Flammable solids may also exhibit explosive, reactive or unstable characteristics. Flammable solids shall be divided into the following Sub-categories:

- (1) Organic Solids
- (2) Inorganic Solids (except metals)
- (3) Combustible Metals (except dusts and powders)
- (4) Combustible Dusts and Powders (including metals)

5240.14 OXIDIZING MATERIALS

(a) Category V Oxidizing Materials. Oxidizing Materials shall be divided into Sub-categories.

- (1) Oxygen, Ozone
- (2) Other Gases
- (3) Liquids
- (4) Solids

(b) Classification of liquid and solid oxidizers according to hazard:

Class 1 — An oxidizing material whose primary hazard is that it may increase the burning rate of combustible material with which it comes in contact.

Class 2 — An oxidizing material that will moderately increase the burning rate or which may cause spontaneous ignition of combustible material with which it comes in contact.

Class 3 — An oxidizing material that will cause a severe increase in the burning rate of combustible material with which it comes in contact.

Class 4 — An oxidizing material that can undergo an explosive reaction when catalyzed or exposed to heat, shock, or friction.

5240.15 HIGHLY TOXIC MATERIALS

(a) Category VI Highly Toxic Materials. Highly Toxic Materials shall be divided into Sub-categories:

- (1) Poisons, Class A
- (2) Other Highly Toxic Materials (including pesticides, and fumigants and all Class B Poisons)
- (3) Chemical Asphixiants
- (4) Anesthetics
- (5) Etiologic Agents
- (6) Carcinogens, Mutagens and Teratogens

(b) Only those materials included within the definition of “Highly Toxic Materials”, “Highly Toxic Pesticide” and “Poisonous Gas” are regulated by this Fire Code. See definition, Section 5208, Highly Toxic Materials.

5240.16 RADIOACTIVE MATERIALS

Category VII — Radioactive Materials. Radioactive Materials shall be divided into Sub-categories.

- (1) Common Radiation Source Materials
- (2) Fissionable Materials

5240.17 CORROSIVES

Category VIII — Corrosives. Corrosives shall be divided into Sub-categories:

- (1) Acids
- (2) Bases, Alkalis, Caustics
- (3) Other corrosives

5240.18 CRYOGENIC FLUIDS

Category IX — Cryogenic Fluids. Cryogenic Fluids shall be divided into Sub-categories:

- (1) Flammable
- (2) Nonflammable
- (3) Corrosive/Highly Toxic
- (4) Oxidizer

5240.19 REACTIVE MATERIALS

(a) Category X — Reactive Materials. Reactive materials shall be divided into Sub-categories:

- (1) Air-reactive Materials
- (2) Water-reactive Materials
 - (aa) Alkali Metals
 - (bb) Metallic Carbides
 - (cc) Metallic Hydrides
 - (dd) Organo-metallic Compounds
 - (ee) Other Water Reactive Compounds
- (3) Other Reactive Materials

(b) Those materials which are rated with a reactivity (instability), rating of 3 or 4 when rated in accordance with NFPA-704, are regulated as reactive materials. Combinations of materials listed in NFPA-491M, Hazardous Chemical Reactions, are regulated as reactive materials.

5240.20 UNSTABLE MATERIALS

(a) Category XI Unstable Materials. Unstable materials shall be divided into Sub-categories:

- (1) Materials Which Vigorously Decompose (including organic peroxides)
- (2) Materials Which Vigorously Polymerize
- (3) Peroxide Forming Chemicals

(b) Only those materials which would be rated with a reactivity (instability) rating of 3 or 4 when rated in accordance NFPA-704 are regulated by this Section. See definition, Section 5208 Unstable Materials.

5240.21 STORAGE REQUIREMENT COMPRESSED GASES

(a) General. Storage of compressed gases shall comply with the provisions of Section 5235.

Storage of compressed gases which are radioactive shall comply with the provisions of Sec. 5240.25. Storage of compressed gases which are highly toxic or poisonous shall comply with the provisions of Sec. 5240.28.

(b) Indoor Storage. Indoor storage of flammable or oxidizing gases in quantities which exceed 3000 cubic feet shall be within a room or compartment separated from other hazardous materials storage by one-hour

fire-resistive construction. Lesser quantities of flammable or oxidizing gases shall be separated from combustible and from other hazardous materials storage by noncombustible construction or a minimum distance of 10 feet.

Where the aggregate quantity of flammable or oxidizing gases exceeds 6,000 cubic feet, an automatic sprinkler system shall be installed, and the storage area shall be separated from all other occupancies by an occupancy separation of not less than one-hour fire rating, constructed in accordance with the South Florida Building Code. Explosion venting, in accordance with the NFPA-68 shall be provided for flammable gas storage which exceeds 6000 cubic feet.

(c) Exterior Storage. Exterior storage of flammable and oxidizing gases shall not be within 25 feet of any property line, street, public way, or exit to a public way. An unpierced, solid concrete or masonry wall, constructed in accordance with this Fire Code to meet a four-hour fire-resistive rating may be accepted in lieu of such distance. Buildings not connected with such storage, and all combustible materials, and other hazardous materials storage shall be separated from the storage of flammable and oxidizing gases by one-hour fire-resistive construction or a minimum distance of 15 feet. Exterior storage of compressed gases shall be provided with protection from the sun, well drained concrete pad and shall be secured against tampering.

5240.22 CRYOGENIC FLUIDS

(a) Cryogenic fluids shall be stored and used in accordance with the provisions of Section 5236.

(b) Storage and use of cryogenic fluids which are highly toxic shall also comply with the provisions of Sec. 5240.28.

5240.23 FLAMMABLE AND COMBUSTIBLE LIQUIDS

Storage and use of flammable and combustible liquids which exhibit other hazardous characteristics shall also comply with the applicable provisions of this Section.

5240.24 OXIDIZING MATERIALS

(a) General. Liquid and solid oxidizing materials shall be segregated from other chemicals and from combustible materials by distance or by fire-resistive construction. Oxidizing materials which are also flammable shall be stored out of doors or within a room equipped with an automatic sprinkler system. Where oxidizing liquids are stored, secondary containment or other means shall be provided to prevent the mixing of incompatible materials or the contamination of surrounding areas. Class 4 Oxidizers and any oxidizers which violently decompose or otherwise react explosively shall be stored in accordance with Section 5240.29. Oxidizers which are corrosive materials shall also meet the requirements contained in Section 5240.29. Oxidizers that are highly toxic liquids or solids shall also meet the requirements contained in Section 5240.27. In addition to the requirements of this Section, all oxidizing materials shall comply with the applicable provisions of NFPA-43A, Storage of Liquid and Solid Oxidizing Materials.

(b) Indoor Storage. Indoor storage of liquid and solid oxidizing materials in quantities which exceed the following maximum quantities shall be within a room or compartment separated from combustible material and other hazardous materials storage by fire-resistive construction with a minimum rating of one-hour:

Oxidizer	Maximum Quantity
Class 1 and 2 liquids	500 gallons
Class 1 and 2 solids.....	1000 pounds
Class 3 liquids	40 gallons
Class 3 solids	500 pounds
Any combination of Class 2 and 3 solids	1000 pounds
Class 4 liquids and solids.....	any amount See Sec. 5240.26

Lesser amounts of liquid and solid oxidizing materials shall be separated from combustible materials and from all other hazardous materials storage by noncombustible construction or by a distance of not less than 10 feet. Storage within metal storage cabinets constructed in accordance with Section 5240.30(b)(1) shall satisfy this requirement.

Liquid oxidizing materials shall be stored within metal storage cabinets constructed in accordance with Section 5240.30(b)(1), or within a room or area provided with recessed floors, raised sills or open trench grating designed to contain the entire capacity of the largest single container.

When the total amount of such liquids stored in any one room or area exceeds 55 gallons, a drainage system which drains to a safe holding location shall be provided. When required the drainage system shall be designed and sized to carry off any anticipated spill, plus the minimum calculated fire flow in sprinklered rooms or areas.

Ventilation for highly toxic or corrosive oxidizing materials shall be provided in accordance with Sec. 5240.27(b) or Sec. 5240.29(b).

(c) Exterior Storage. Exterior storage of liquid or solid oxidizing materials shall not be within 15 feet of any property line, street, public way, or exit system to a public way. An unpierced, solid concrete or masonry wall, constructed in accordance with this Code to meet a four-hour fire-resistive rating may be accepted in lieu of such distance. Buildings not connected with such storage, and all combustible materials, and other hazardous materials storage shall be separated from the storage of liquid or solid oxidizing materials by one-hour fire-resistive construction or a minimum distance of 15 feet and shall be secured by a fence to prevent unauthorized intrusion.

Exterior storage areas for liquid oxidizing materials shall be provided with raised sills, open grate trenches or other means to contain leaks and spills. The volume to be contained shall not be less than 130% of the capacity of the largest individual tank or container.

5240.25 RADIOACTIVE MATERIALS

(a) General. When not in use, radioactive materials shall be kept in adequately shielded containers of such design that the gamma radiation will not exceed 200 milliroentgen per hour or equivalent at any point of readily accessible surface. Containers shall be fire-resistant or shall be stored within a storage cabinet which complies with Section 5240.30.

Canisters or tanks of radioactive gases shall be stored within a fire-resistive cabinet which is equipped with an automatic sprinkler, or within a room separated from all other storage or use by fire-resistive construction with a minimum rating of one hour and equipped with an automatic sprinkler system.

(b) Indoor storage of contaminated combustible materials shall be in closed noncombustible containers within a room separated from all other storage or use by fire resistive construction with a minimum rating of one hour.

(c) Exterior storage of radioactive materials and contaminated combustible materials shall require specific approval by the Fire Chief and shall be subject to such requirements as he might prescribe.

(d) Durable, clearly visible signs of warning of radiation dangers shall be placed at all entrances to areas or room's where radioactive materials are used or stored. In addition, each container in which radioactive materials are used, stored or transported shall bear a durable, clearly visible, appropriate warning sign. Such signs shall bear the three-bladed radiation symbol in magenta or purple on a yellow background in accordance with nationally recognized good practice.

(e) Signs are not required for storage of manufactured sections other than liquids, such as instruments or clock dials, electronic tubes or apparatus of which radioactive materials are a component part, and luminous compounds, when securely packed in strong containers, provided the gamma radiation at any surface of the package is less than 10 milliroentgen in 24 hours.

5240.26 REACTIVE AND UNSTABLE MATERIALS

(a) General. Reactive and unstable materials shall be stored away from open flames, heated elements and other reaction initiating sources, and shall be separated from combustible materials and other hazardous materials storage by fire-resistive construction with a minimum rating of one hour.

(b) Indoor Storage. Potentially explosive materials, including but not limited to Class 4 Oxidizers, unstabilized organic peroxides and materials with a reactivity (instability,) rating of 4 when rated in accordance with NFPA-704 and Identification of the Fire Hazards of Materials shall be stored in rooms or buildings which conform to requirements for Group E, Division I occupancies according to the South Florida Building Code. The room or area shall conform to the South Florida Building Code requirements for explosion venting. Except where water reactive materials are stored, an automatic sprinkler system shall be provided.

When the amount of organic peroxide or other unstable material stored is 50 pounds or more, such storage shall be in a detached, well ventilated storage building with walls having not less than a two-hour fire-resistive rating, constructed in accordance with this Code requirements for a Group E, Division I occupancy. An automatic sprinkler system shall be provided. The building shall be located the following minimum distances from any other hazardous material storage, combustible materials in the open and from any building, property line, street, or public way.

WEIGHT OF MATERIAL		DISTANCE
(Pounds Over)	(Pounds Not Over)	(Feet)
50..... to.....	100.....	75
100..... to.....	500.....	100
500..... to.....	1000.....	125
1000..... to.....	3000.....	200
3000..... to.....	5000.....	300

The materials shall be store in their original (Department of Transportation approved) containers. Care shall be taken to avoid rough handling and contamination.

(c) Nitromethane. A suitable isolated outdoor storage area shall be provided for nitromethane. Hazardous processing shall not be permitted in the vicinity of this storage area. Nitromethane shall be stored in the drums in which it is received or in an underground tank with suitable corrosion protection and a minimum of 2 feet of earth over the tank or in barricaded tanks aboveground.

If the drum storage is not adequately protected by a fast-acting deluge-type automatic sprinkler system, the storage of 2000 pounds or more shall be located the following minimum distances from inhabited buildings:

WEIGHTS		APPROXIMATE NO.	DISTANCE
(Pounds Over)	(Pounds Not Over)	OF DRUMS	
2,000	to 10,000.....	20.....	200
10,001	to 20,000.....	40.....	300
20,001	to 40,000.....	80.....	400
40,001	to 80,000.....	160.....	500

Care shall be taken to avoid rough handling or contamination of this chemical. Legible warning signs and placards shall be prominently placed in the storage and processing areas.

(d) Ammonium Nitrate. In addition to the requirements of this Section, ammonium nitrate shall comply with the applicable provisions of NFPA-495, Manufacture, Transportation, Storage, and Use of Explosive Materials and to the following requirements.

(1) All flooring in storage and handling areas shall be of noncombustible material and shall be without drains, traps, pits or pockets into which any molten ammonium nitrate could flow and be confined in case of fire.

(2) Each storage pile of bags or other authorized packages and containers of such materials shall not exceed 12 feet in height, 12 feet in width and 30 feet in length. Such pile units shall be separated by a clear space of not less than 36 inches in width from the base to the top of the piles, serving as cross aisles. At least one service or main aisle in the storage area shall be not less than 4 feet in width. A clearance of not less than 30 inches shall be maintained from building walls and partitions and of not less than 36 inches from ceilings or roof structural members with a minimum of 18 inches from sprinklers.

(3) Ammonium nitrate storage areas shall be separated by a space of 30 feet or by a tight noncombustible partition from storage of organic chemicals, corrosive materials, compressed gases, flammable and combustible materials or other contamination substances such as sulphur, coal, flour and metallic powders such as zinc, copper and magnesium where storage of such materials is permitted with ammonium nitrate. Separation shall also be maintained from pesticides and other highly toxic materials.

(4) Quantities of ammonium nitrate or ammonium nitrate fertilizer having no organic coating, in the form of crystals, flakes, grains or pills, including fertilizer grade, dynamite grade, nitrous oxide grade and technical grade ammonium nitrate and ammonium nitrate phosphate (containing 60 percent or more ammonium nitrate by weight) of more than 50 tons total weight shall be stored in a well ventilated building. Such building shall be of one-hour fire-restrictive or noncombustible construction as specified in this Code or shall be equipped with an approved automatic sprinkler system. No combustible materials or ammonium nitrate sensitizing contaminants shall be stored in this building.

(5) Storage of ammonium nitrate, coated or mixed with organic anti-caking materials, except compounded blasting agents, shall not be permitted in populated and congested areas.

(6) Distance to any other building, property line or street shall be as required, herein.

(e) Materials which may decompose, polymerize or otherwise react in a violent manner and/or release highly toxic or poisonous gases, vapors or fumes at normal ambient temperatures shall be stored in temperature-controlled rooms or areas. Temperature control shall be designed for the specific hazard of the material. The system of temperature control shall be supplemented by an emergency system supplied from a separate power source, and designed so that the emergency system will automatically operate when the temperature in the room or area reaches a predetermined level. The activation of the emergency system shall cause an alarm to be transmitted to an approved alarm service company or to a control station on the premises which is equipped with a public telephone and is manned 24 hours a day, every day. Temperature control is required in addition to all other requirements.

(f) Materials which are shock sensitive shall be padded, suspended, or otherwise protected. Special consideration shall be given to seismic protection.

(g) Materials which are pressure sensitive shall be stored in rooms designed to prevent the development of dangerous pressures.

(h) Materials which are light sensitive shall be stored in containers designed for such use.

(i) Water-reactive materials shall not be stored in any room or area with combustible or flammable materials. The storage area shall be dry, water-proof and well ventilated. Unless otherwise specified, automatic sprinklers and other piping carrying water shall be excluded from the room or area. See Section 5230 for specific requirements for the storage of calcium carbide.

(j) Secondary containment or other means shall be provided to prevent the intermixing of materials which are dangerously reactive in combination, or contamination of materials which react when contaminated. Materials which may have become contaminated shall be disposed of in a safe manner.

(k) Exterior Storage. Exterior storage of potentially explosive materials, including but not limited to Class 4 oxidizers, unstabilized organic peroxides and materials with a reactivity (instability) rating of 4 when rated in accordance with NFPA-No. 704, Identification of the Fire Hazards of Materials, shall not be within 50 feet of any property line, street, public way or exit to a public way; nor within 25 feet of combustible materials, or other hazardous materials storage; nor within 25 feet of any building not connected with such storage. Storage of potentially explosive materials shall comply with the provision of Section 5237.

5240.27 HIGHLY TOXIC MATERIALS (LIQUIDS AND SOLIDS)

(a) General: Highly toxic liquids and solids shall be segregated from other chemicals and from combustible and flammable substances by distance or by fire-resistive construction. Highly toxic materials which are also flammable shall be stored out of doors or within a room equipped with an automatic sprinkler system. Where highly toxic liquids are stored secondary containment or other means shall be provided to prevent the mixing of incompatible materials or the contamination of surrounding areas.

Tanks used for the storage of highly toxic liquids under pressure shall be provided with monitoring and alarm devices to warn of pressure buildup beyond the maximum allowable working pressure. Means for transfer of the contents of the tank to a safe holding location, initiated manually and automatically upon signal from the monitoring devices may be required.

(b) Indoor storage of highly toxic liquids and solids shall be within a room or compartment separated from all other storage by one-hour minimum fire-resistive construction. Storage rooms or areas shall be separated from other occupancies within the building by an occupancy separation with a rating of one-hour. Storage within storage cabinets constructed in accordance with Sec. 5240.30(b) shall satisfy this requirement for limited amounts.

Highly toxic liquids shall be stored within storage cabinets constructed in accordance with Sec. 5240.30, or within a room or area provided with recessed floors, raised sills, or open trench grating designed to contain the entire capacity of the largest single container.

When the total amount of such liquids stored in any one room or area, exceeds 55 gallons, a drainage system which drains to a safe holding location shall be provided. The drainage system shall be designed and sized to carry off any anticipated spill, plus the minimum, calculated fire flow in sprinklered rooms or areas.

Mechanical ventilation which provides a minimum of 6 air changes per hour shall be provided in accordance with Section 5239 herein. Such ventilation shall not discharge to a point where vapors may endanger any person, domestic animal or wildlife.

A manual control, located outside the room or area protected shall be provided. Approved vapor detection devices shall be provided which will automatically activate the mechanical ventilation system. Exhaust scrubbers or processing as in Section 5240.28(b) may be required.

(c) Exterior storage of highly toxic liquids or solids shall not be within 15 feet of any property line, street, public way, or exit to a public way. An unpierced, solid concrete or masonry wall, constructed in accordance with the South Florida Building Code to meet a four-hour fire resistive rating may be accepted in lieu of such distance.

Highly toxic liquids that are flammable shall not be stored within 50 feet of any property line, street or public way unless protected by an automatic fire extinguishing system. Buildings not connected with such storage, and all combustible materials and other hazardous materials storage shall be separated from storage of highly toxic liquids and solids by not less than 15 feet, or by fire-resistive construction with a minimum rating of one-hour.

All exterior storage areas for highly toxic liquids shall be provided with raised sills, open grate trenches or other means to contain leaks and spills. The volume to be contained shall be not less than the capacity of the largest individual tank or container.

(d) Legible warning signs and placards shall be posted at all entrances to areas where highly toxic materials are stored or used.

5240.28 HIGHLY TOXIC AND POISONOUS GASES

(a) General: Storage of highly toxic or poisonous gases shall be within buildings or rooms that comply with the provisions of Section 5240.8(b) or in approved exterior locations in accordance with the provisions of Section 5240.28(c). All storage shall comply with the following:

(1) Container Support. Containers shall be individually secured at the top and bottom, so as to prevent falling during seismic activity or being knocked over. Containers not in use shall have valve protection devices in place or comparable protection provided at all times.

(2) Security: Areas where highly toxic or poisonous gases are stored or used shall be secured against unauthorized entry.

(3) Handling: Handling of highly toxic or poisonous gas shall be only by persons fully trained in the hazards involved and the safety precautions required.

(4) Breathing Apparatus: Two approved self-contained breathing apparatus units and suitable protective clothing shall be provided in the immediate area of storage.

(5) Excess Flow Control. Excess flow control valves or the equivalent shall be provided at the source.

(6) Automatic Fire Extinguishing System. An automatic fire extinguishing system which is compatible with the particular gas or gases stored shall be provided to protect all interior storage areas.

(7) No other storage of combustible or hazardous materials is permitted within rooms or areas used for storage of highly toxic or poisonous gases unless separated by not less than 25 feet or by fire-resistive construction with a minimum rating of one-hour.

(8) Individual cylinders or tanks and systems of cylinders or tanks in which the aggregate capacity exceeds a water capacity of 30 gallons and which are used for the storage of highly toxic or poisonous gases shall be provided with monitoring and alarm devices to warn of pressure buildups beyond maximum allowable working pressure. Means for transfer of the contents to another tank or container, initiated manually and automatically upon signal from the monitoring devices.

(9) All interior storage areas shall be equipped with a floor drain to prevent the accumulation of standing water.

(10) There shall be no storage (below ground level) for heavier than air toxic or poisonous gases.

(11) Cylinders shall be stored in upright position with empty cylinders segregated from full cylinders. All cylinders whether empty or full shall be stored with valve protection hoods in place.

(12) The Fire Chief may require the submission of an emergency response plan. (By owner/occupant.)

(b) Inside storage of highly toxic or poisonous gases shall be within a building or room which meets construction and location requirements specified in this Code. The building or room shall be of fire resistive construction, with a minimum rating of one hour and shall conform to all of the following:

(1) Monitoring. The atmosphere in storage rooms, areas or cabinets shall be monitored for the particular gas or gases present. An audible and visual alarm shall be activated when the maximum safe level for long-term exposure is reached.

(2) Controls. Emergency shut-off controls shall be provided inside and outside the area of use.

(3) Ventilation. South Florida Building Code Chapter 48, mechanical ventilation, installed in accordance with the mechanical code shall be provided. Such ventilation shall not discharge to a point where gases may en-

danger any person, domestic animal or wildlife. Approved gas detection devices shall be provided which activate the mechanical ventilation system.

(4) Discharge Treatment or Containments. Storage areas shall be provided with a system to control sudden or slow release of gas from containers or associated piping and/or equipment.

Such system shall be capable of diluting, filtering, absorbing or otherwise processing 100% of the capacity of the container presenting the highest potential hazard for each gas stored so that the maximum concentration at the point of discharge to the atmosphere shall not exceed the short term exposure limit of the material released.

The system shall be designed to handle anticipated pressure from a sudden release to the largest single container.

For the purpose of calculating system capacity, a release time of 5 minutes from maximum container capacity to empty is deemed to be a sudden release. More stringent design criteria where necessary to protect human life.

EXCEPTION: Storage areas that contain chlorine gas, ammonia gas or sulfur dioxide gas shall have treatment systems designed to reduce the maximum allowable discharge concentration of the gas to one half of the IDLH at the point of discharge to the atmosphere. The IDLH number shall be in accordance with National Institute for Occupational Safety and Health Guide system, the treatment system shall be designed to handle the worst case release rate, the quantity and the IDLH for all gases stored or use.

(5) Associated piping shall be installed in accordance with Section 5240.39.

EXCEPTION: The storage of small amounts of highly toxic or poisonous gases may be exempt from certain provisions of this subsection when supporting data is presented which shows that the danger to public safety is mitigated by engineering and/or operational controls.

Exterior Storage. Exterior storage of highly toxic or poisonous gases, shall not be located within 25 feet of any building not connected with such storage, nor within 25 feet of any property line, street, public way or exit to a public way. All combustible materials and other hazardous materials storage shall be separated from highly toxic or poisonous gas storage by not less than 25 feet, or by fire-resistive construction with a minimum rating of one-hour.

5240.29 CORROSIVE MATERIALS

(a) General: Corrosive materials shall be segregated from other chemicals, including other corrosives which are incompatible, and from combustible materials by distance or noncombustible construction. Secondary containment or other means shall be provided to prevent the mixing of incompatible materials or the contamination of surrounding areas. See Sec. 5240.24 and Sec. 5240.27.

(b) Indoor Storage: Indoor storage of corrosive material in quantities which exceed 110 gallons shall be within a room or compartment separated from all other storage by one-hour fire-resistive construction. Lesser quantities of corrosive materials shall be separated from combustibles and from other hazardous materials storage by noncombustible construction or a minimum distance of 10 feet.

Corrosive materials shall be stored with compatible corrosives within storage cabinets constructed in accordance with Sec. 5240.30, or within a room or area provided with recessed floors, raised sills, or open trench grating designed to contain the entire capacity of the largest single container.

When the total amount of such materials stored in any room or area exceeds 55 gallons, a drainage system which drains to a safe holding location shall be provided. The drainage system shall be designed and sized to carry off any anticipated spill, plus the minimum calculated fire flow in sprinklered rooms or areas. Secondary containment shall be of noncombustible material treated to prevent degradation from liquid contact.

When the total amount of corrosive materials in any room or area exceeds 110 gallons, mechanical ventilation which provides a minimum of 6 air changes per hour shall be provided in accordance with Chapter 48 and Section 5239 herein. Such ventilation shall not discharge to a point where vapors may endanger any person, domestic animal, or wildlife. A manual control, located outside the protected room or area, shall be provided.

(c) Exterior Storage. Exterior storage of corrosive materials shall not be within 10 feet of any property line, street, public way or exit to a public way. An unpierced, solid concrete or masonry wall, constructed in accordance with this Code to meet a four-hour fire-resistive rating may be accepted. (See Sec. 5240.44.)

All exterior storage areas for corrosive materials shall be provided with raised sills, open grate trenches or other means to contain leaks and spills. The volume to be contained shall be not less than 120% of the capacity of the largest individual tank or container.

(d) Legible warning signs and placards shall be posted at all entrances to areas where corrosive materials are stored or used.

5240.30 STORAGE CABINETS FOR HAZARDOUS MATERIALS

(a) General. When provisions of this Fire Code require that hazardous materials be stored in storage cabinets, such cabinets shall be in accordance with this Section. Cabinets shall be conspicuously labeled in red letters on contrasting background "HAZARDOUS — KEEP FIRE AWAY".

(b) Construction. Cabinets may be constructed of wood or metal. Cabinets shall be listed or constructed in accordance with the following:

(1) Unlisted Metal Cabinets. Metal cabinets shall be of steel having a thickness of not less than 0.043 inch. Doors shall be well fitted, self-closing and equipped with a latching device. Joints shall be riveted or welded and shall be tight fitting. The bottom of a cabinet designed for the containment of liquids shall be liquid tight to a height of at least 2 inches.

(2) Wooden cabinets, including the doors, shall be of not less than 1-inch exterior grade plywood, doors shall be of not less than 1-inch exterior grade plywood or equivalent, which is compatible with the material being stored. Doors shall be well fitted, self-closing and equipped with a latch, and piano type hinges. The bottom of a cabinet designed for containment of liquid shall be liquid tight to a height of at least 2 inches. Cabinets shall be painted with an intumescent-type paint.

Incompatible materials and materials which may cause a hazardous reaction shall not be stored within the same storage cabinet.

5240.31 ABOVE-GROUND TANKS AND PRESSURE VESSELS

(a) All aboveground storage tanks, pressure vessels and containers over 100 gallons (water capacity) permanently installed, mounted or affixed and used for the storage of flammable and combustible liquids, compressed gases, or hazardous chemicals regulated by this Section, shall be identified in accordance with NFPA-704, Identification of the Fire Hazards of Materials.

EXCEPTION: Portable tanks not permanently mounted, temporary tanks used on construction sites, drum storage and packaged materials in containers of 55-gallon or less capacity.

Labels shall conform with NFPA-704, Identification of the Fire Hazards of Materials, for size and color and shall be affixed to tank, vessel or container so as to be conspicuously visible at all times.

(b) When any tank covered in this Section is housed within a building, the building shall have the same hazard identification label in a conspicuous location on the exterior of the building.

5240.32 DISPENSING

(a) Dispensing of hazardous materials shall only be permitted in accordance with Sec. 3240.35 or in buildings, rooms or areas within buildings which comply with the provisions of Section 5240.21, for storage of the particular material.

EXCEPTION: Small amounts of hazardous materials, excluding potentially explosive, reactive or unstable materials and highly toxic or poisonous gases may be dispensed from approved containers not exceeding 5 gallons capacity in other locations, when approved.

(b) Liquid hazardous materials shall be dispensed only by approved pumps taking suction from the top container.

5240.33 USE

Use of hazardous materials shall only be permitted in accordance with Sec. 5240.35 or in buildings, room's, or areas within buildings which comply with the provisions of Sec. 5240.21 for storage of the particular material, and which meet South Florida Building Code requirements for Group E Occupancies when required.

EXCEPTIONS:

(1) Small amounts of hazardous materials may be used in other locations, when approved.

(2) Hazardous materials which are used within instruments, machinery or equipment that have been designed and instruments, machinery or equipment that have been designed and approved for that use, for example: Photocopy and blueprint machines, and devices which contain a controlled radioactive source.

(3) Hazardous materials which are used within enclosures that have been designed and approved for the particular hazard involved for example: Spray booths, and laboratory fume hoods.

(4) Hazardous materials which are used in areas provided with special engineering controls.

(aa) Control or removal of ignition sources such as smoking, open flames, static electricity, etc.

(bb) Control of flammable, toxic, corrosive and other hazardous vapors, fumes or gases by means of special exhaust systems, gas detection and alarm systems and automatic gas shutoff valves.

(cc) Dust removal systems.

(dd) Isolation of materials which could interact.

(ee) Storage of hazardous materials within approved storage cabinets.

(ff) Procedural controls on use of hazardous materials.

(gg) Fire extinguishing systems, alarm systems and other special systems.

(hh) Adequate exiting from the area.

5240.34 EQUIPMENT

(a) Equipment. All equipment and machinery used for dispensing, processing, or any other operation involving hazardous materials shall be of an approved type, and listed by a nationally recognized testing agency. Such equipment shall be maintained in an operative condition at all times and shall be replaced or repaired when defective.

(b) Electrical Devices. Electrical wiring and equipment in hazardous materials dispensing and use areas shall be installed in accordance with the National Electrical Code and classed for the hazardous atmosphere that may develop.

(c) Static Accumulation. When hazardous materials which are flammable liquids, dusts or powders are dispensed or used, adequate grounding or bonding shall be provided to prevent the accumulation of static electricity.

5240.35 EXTERIOR DISPENSING

Exterior dispensing and use of hazardous materials shall meet the requirements of Sections 5240.32(b), 5204.34, 5240.36, 5240.37, and 5240.38 and shall comply with the provisions of Section 5240.21 for exterior storage of the particular material.

5240.36 VENTILATION

(a) Ventilation shall be provided in all rooms or areas within buildings where hazardous materials are dispensed or used in accordance with requirements contained in Section 5240.21.

(b) Location of the intake shall be dictated by the vapor density of the material.

(c) Manual control shall be provided for all mechanical ventilation systems required for removal of flammable and other hazardous gases, vapors or dusts. A remote control switch shall be installed at an approved location outside of the area served by the system.

EXCEPTIONS: Ventilation may be omitted where inert or other special atmospheres are required.

5240.37 CONTAINMENT

Containment in the form of recessed floors, raised sill, or open trench grating shall be provided where hazardous liquids are dispensed or used. Such containment shall be in accordance with requirements contained in Section 5240.21.

5240.38 OPERATIONAL PROCEDURES

Written procedures shall be established for hazardous operations and processes. The procedures shall include a description of the hazards, proper operating procedures and an emergency action guide. A copy of the approved procedures shall be posted owner/operator at the site of the operation or process, and a copy shall be retained for Fire Department use.

Persons in charge of hazardous operation and processes shall be adequately trained concerning the nature of the hazards, proper operating procedures, and necessary emergency actions. Written documentation or other evidence of such training shall be required.

5240.39 ON-SITE

Hazardous materials, excluding reactive or unstable materials rated 3 or 4 in accordance with NFPA-704, Identification of the Fire Hazards of Materials, and highly toxic or poisonous gases, may be transported through, but shall not be left unattended, even momentarily, nor stored within any part of an exit.

5240.40 CARTS AND TRUCKS

(a) Carts and trucks used to transport hazardous materials shall be provided with means for restraining containers. Incompatible materials shall not be transported on the same cart or truck.

(b) Power carts and trucks shall be approved for Class 1, Division 1 or Class 1, Division 2 hazardous locations as classified in the National Electrical Code. Internal combustion engines shall not be used in areas where hazardous materials are stored or used.

5240.41 PIPING

(a) A building permit is required for installation of piping systems used to convey hazardous materials.

(b) Piping and tubing shall be installed in accordance with all approved standards. All hazardous materials piping shall bear visible identification.

(c) Piping which carries hazardous materials having a (NFPA-704) health hazard rating of 3 or 4 shall have welded connections throughout unless an exhausted enclosure is provided.

(d) Piping which carries hazardous materials shall not be run within any portion of an exit system which is required to be enclosed in fire-resistive construction.

(e) Excess flow control protection shall be provided on all piping which carries pressurized gaseous hazardous materials. A fail-safe system shall shut off flow due to rupture or other failure of piping, fittings or equipment. Where the piping originates outside the building, the valve shall be located outside the building as close to the bulk source as possible.

(f) Shutoff valves. Readily accessible manual and/or manually activated fail-safe emergency shutoff valves shall be provided as follows:

(1) at the tank, cylinder or bulk source

(2) at the branch piping connection into the area of use. The valves shall be identified and the location shall be clearly visible, or indicated by means of a sign.

5240.42 OFF-SITE

No person shall operate any vehicle transporting any hazardous materials unless at the time of such transportation there are affixed to both sides, the front and the rear of the vehicle placards and identification numbers in conformity with Title 49, Code of Federal Regulations.

5240.43 ALARM SYSTEM

Where highly toxic materials, poisonous gases, or corrosive liquids are stored or used in such quantity as to constitute a distinct hazard to the surrounding community, such storage or usage shall be provided with an approved automatic leak detection system connected to a local alarm and supervisory system.

5240.44 USE AND STORAGE OF MURIATIC ACID AND CHLORINE DERIVATIVES IN COMMERCIAL ZONING (COMMERCIAL ZONING is intended to be defined as areas where there is permitted sales to the public)

(a) GAS CHLORINE

(1) No container shall be larger than 150 lbs. and no more than 24 units may be stored at any one site and in accordance with 5240.28.

(2) No chlorine to be stored in a multiple tenant building.

(3) Chlorine transferring from container to container shall not be permitted.

(b) CALCIUM HYPOCHLORITE

(1) Quantities over 500 lbs. are to be stored in a separate four-hour room conforming with this Code.

(2) Quantities under 500 lbs. are to be stored in pre-packaged containers (approved for that use) only.

(3) Material should be kept at least ten feet (10') (horizontal and vertical) from packaged muriatic acid oil, brake fluid or other reactive materials. (No above liquid storage.)

(4) Cardboard drums shall not be stacked on the floor. Drums shall be elevated at least one inch (1") and protected from contamination, dampness, wetness and provided with adequate ventilation as per 5240.27 and 5240.29 and pallets shall not be double stacked.

(5) No container shall be larger than 100 lbs.

(c) CHLORINATED TRIAZINETRIONE COMPOUNDS (DI-CHLOR, TRI-CHLOR, TRI-CHLOR TABLETS)

(1) Quantities over 1000 lbs. are to be stored in a separate four-hour room conforming with this Code. (Exception: 2000 lbs. maximum on tablets 1/2" or larger.)

(2) Material should be kept at least ten feet (10') from packaged or bulk muriatic acid, oil, brake fluid or other reactive materials; no container larger than 300 lbs.

(3) Cardboard drums shall not be stacked on the floor. Drums shall be elevated at least one inch (1") and protected from contamination, dampness, and wetness and provided with adequate ventilation as per 5240.27 and 5240.29.

(4) Cardboard drums shall not be stacked in excess of manufacturer's recommendations.

(d) BULK STORAGE OF MURIATIC ACID

(1) All tanks shall be installed according to the licensing requirements of BCDNRP including secondary containment and requirements of this Code.

(2) No bulk storage shall be permitted of muriatic acid higher in strength than 37.5%.

(3) No filling of muriatic acid shall be permitted in any structure. Re: Outside filling. (Dispensing by gravity feed is permissible.)

(4) New installation of muriatic acid tanks are prohibited where sodium hypochlorite is bulk stored on same premises.

EXCEPTION: Existing tanks may be repaired or replaced as required by this Code.

(5) Solid foundations shall be provided where the tanks are resting (concrete pad and block is acceptable). Remodeled platforms over 48 inches in height shall be designed and sealed by professional engineers and/or architects. The structural integrity of all platforms must be protected from possible chemical erosion (as approved by the Building Department).

(6) Tanks shall be at least ten feet (10') from all operative doors, windows and vents of a neighboring facility.

(7) Tanks shall be labeled with muriatic acid label and a DOT 1789 label with six-inch high lettering.

(8) Bulk storage of muriatic acid in any structure or outside of any structure shall be completely sealed and vented through a scrubber. In the absence of a commercial scrubber, the tank may be vented to a barrel filled with water and soda ash (or equivalent) and equipped with a vacuum break.

(9) Neutralization chemicals, soda ash or sodium bicarbonate shall be on hand to neutralize the site. (The following amounts shall be kept on site: at least 200 lbs. soda ash or 400 lbs. sodium bicarbonate stored in a water-proof container.)

(10) Water hose and outlet shall be accessible to tanks. An eyewash station or eyewash bottle within twenty feet of bulk storage area shall be provided.

(e) BULK STORAGE OF CHLORINE BLEACH

(1) All tanks shall be installed in accordance with 5240.44(d)(1) and (5). (New platforms over 48 inches in height shall be designed and sealed by professional engineers.) The structural integrity of all platforms must be protected from possible chemical erosion.

(2) Tanks shall be labeled with sodium hypochlorite label and a DOT 1791 label with six-inch high letters.

(3) No flammable or solid reactive materials are to be stored within 10 feet of bulk storage area. Liquid reactive material must be stored in a separate secondary containment system in lieu of a distance requirement. All indoor liquid bulk storage shall be vented through the wall to outside atmosphere at least three feet above the roof of the structure. Adequate ventilation will be provided in all storage rooms as per 5240.27 and 5240.29 (Dispensing by gravity feed is permissible).

(4) Required safety equipment as per 5240.44(d)(10).

(f) ADDITIONAL REQUIREMENT FOR FACILITIES WITH BULK STORAGE OF BOTH MURIATIC ACID CHLORINE BLEACH

(1) Separate containment basins as per BCDNRP and this Code.

(2) No joint bulk storage within 50 feet of residential property.

(3) If both tank hoses are stored outdoors, an additional locking shut off valve for at least one of the chemicals is required.

(4) All individual requirements for bleach tanks or acid tanks still apply as referenced by 5240.44 d, e, f, and this Code.

(g) Chemical supplier shall issue inspection certificate to facility twice a year, June 30th and December 31st. Facility will post copy of certificate with their BCDNRP license and facility operator will file one copy with the local fire department. All storage shall be approved by the Fire Department.

(h) THE ABOVE DOES NOT REFLECT ALL THE SAFEGUARDS, BUT DETAILS THE ITEMS ACCORDING TO THE APPLICABLE CODES PERTAINING TO THE CHEMICALS LISTED HEREIN, FOR STORAGE INSIDE AND OUTSIDE OF A STRUCTURE.

(i) DEFINITIONS(Note: Specific definitions for 5240.44 only)

(1) **BULK STORAGE** is containers larger than sixty gallons from which smaller containers are filled.

(2) **CHLORINE BLEACH** pertains to sodium hypochlorite solutions between 5% and 16%.

(3) **MURIATIC ACID** is a solution of HCL in water concentrations of 1% to 31.5%.

5241 HIGH PILE COMBUSTIBLE STOCK

5241.1 SCOPE

This Section shall apply to the storage of high-pile combustible stock. Factors such as method and height of stock piling, combustibility of materials, fuel load and rate of heat release, areas and size of piles, aisles, automatic fire extinguishing systems, smoke-removal systems, building construction and fire separations are considered in setting forth the provisions of this Section.

In all cases, the minimum requirements addressed in NFPA-231, General Storage; NFPA-231C, Rack Storage of Materials; NFPA 231D, Storage of Rubber Tires; NFPA-231E, Storage of Baled Cotton and NFPA-231F, Roll Paper Storage, shall apply.

5241.2 DEFINITIONS — For definitions of HIGH-PILED STORAGE and COMMODITY, see Section 5208.

CLASSIFICATION OF CONTENTS

Commodity classification shall be as defined and in accordance with the appropriate standards.

5241.3 AUTOMATIC FIRE-EXTINGUISHING SYSTEMS

(a) An approved automatic fire-extinguishing system shall be required throughout the building when the contiguous area (minimum separation between storage areas is 60 feet) used for high-piled combustible storage exceeds 12,000 square feet, inclusive of aisles.

EXCEPTION: Automatic fire-extinguishing systems may be provided only in the storage area when it is separated from the remainder of the building by fire resistive separation in accordance with this Code.

(b) The design and installation of automatic fire extinguishing systems shall conform to requirements in this Code.

The fire-extinguishing systems shall be designed by a registered engineer or approved designer.

(d) The design of automatic fire-extinguishing systems shall be approved by the Fire Chief and Chief Plumbing Inspector. The Fire Chief shall be guided by the standards and recommendations of the National Fire Protection Association, Factory Mutual Engineering and other nationally recognized fire protection authorities.

5241.4 ROOF VENTS, VENTING RATIOS AND DRAFT STOP

(a) Roof vents and draft stop shall be installed when the contiguous area (minimum separation between areas is 60 feet) used for high piled combustible stock exceeds 2,500 square feet.

EXCEPTION: Areas protected by an approved fire extinguishing system.

(b) The design and installation of roof vents and draft stop shall be as specified in this Code except as herein provided.

(c) Vents shall be installed in the roof, except that perimeter venting in the exterior walls by the use of automatic opening windows will be permitted to vent roof areas within 75 feet of an exterior wall. The top of such windows shall be located within one (1) foot of the roof or ceiling level and the windows shall be not less than 30 inches nor more than 60 inches in depth. Roof areas more than 75 feet from an exterior wall shall be provided with roof vents. Venting shall be provided in accordance with the following table.

Hazard Classification	Vent Area to Floor Area	Maximum Spacing Between Vent Centers
Classes I, II, III	1:100	120 feet
Class IV.....	1:50	100 feet
Special Hazard Commodities.....	1:30	75 feet

(d) The minimum dimension of any roof vent shall be not less than four (4) feet.

(e) Vents shall consist of automatic roof vents or automatic opening windows equipped with a fusible link designed to release at 165 degrees F.

(f) Draft stop shall be provided to aid the operation of roof vents. Draft curtains shall comply with the requirements of this Code except as herein provided.

(g) Draft stop shall be at least six (6) feet in depth and shall be of approved materials. For Classes I, II, and III commodities, draft stop shall divide the under roof area into sections not to exceed 10,000 square feet. For Class IV and Special Hazard Commodities, draft stop shall divide the under roof area into sections not to exceed 6000 square feet.

5241.5 AISLES

Aisles of not less than 44 inches in width shall be established to provide access to exits and fire department access doors.

5241.6 ACCESS TO BUILDING

Access door shall be provided at or near ground level for firefighting purposes in accordance with the Fire Code, except as herein provided. There shall be at least one door not less than three (3) feet in width and not less than 6 feet 8 inches in height in 100 lineal feet or major fraction thereof of the exterior wall which faces the access roadways required by Section 5211.2(g). Metal roll-up doors are not acceptable for such purposes unless approved by the Fire Code Committee.

5241.7 WET STANDPIPE

(a) A Class II standpipe system shall be provided for all high piled stock areas that are not protected by automatic sprinklers. One and one-half inch hose connections complying with NFPA-14 shall be provided in high-piled storage areas which are protected by automatic sprinklers.

(b) Approved and listed hose reels or approved and listed semiautomatic hose racks shall be provided and shall be located so as to make the hose accessible at all times. The reels or racks shall be recessed or protected by suitable cabinets designed for such use.

5242 LIQUEFIED PETROLEUM GASES

5242.1 SCOPE

This Section shall apply to the storage, handling and transportation of liquefied petroleum gas and the installation of all equipment pertinent to systems for such uses. NFPA-58, Storage and Handling of Liquefied Petroleum Gases, is hereby adopted in its entirety as part of this Fire Code.

5242.2 DEFINITIONS

For definitions, see Section 5208 of this Fire Code.

5242.3 PERMITS AND REPORTS OF INSTALLATIONS

(a) For a permit to install or maintain an LP-gas container or operate LP-gas tank vehicles, see Section 5206.

(b) Installers shall maintain a record of all installation for which a permit is not required by Section 5206 (but not including installation of gas-burning appliances and replacing of portable cylinders) and have it available for inspection by the Fire Chief.

5242.4 INSTALLATION OF EQUIPMENT

All liquefied petroleum gas equipment, including such equipment installed at utility gas plants, shall be installed in accordance with the provisions of NFPA-58 and NFPA-59, except as otherwise provided in this Section or in other laws or regulations legally in effect.

5242.5 LOCATION OF CONTAINERS AND LIMITS

(a) All new liquefied petroleum gas storage installation and handling shall be in accordance with NFPA-58, the laws of the State of Florida, and all applicable rules, regulations, and ordinances of the jurisdictional areas.

(b) Within the limits established by law restricting the storage of liquefied petroleum gas for the protection of heavily populated or congested commercial areas, the aggregate capacity of any one installation shall not exceed 2,000 gallons water capacity, except that in particular installations this capacity limit may be altered at the discretion of the Fire Board after consideration of special features such as topographical conditions, nature of occupancy and proximity to buildings, capacity of proposed tanks, degree of private fire protection to be provided and facilities of the local fire department. The storage of liquefied petroleum gas shall conform to the provisions of the local zoning ordinance.

(c) Where a distributing point is allowed, there shall be in attendance a qualified person to make the transfer of liquefied petroleum gas. This person shall have been trained by a licensed gas company, and be in possession of documents certifying such training. The owner of the distributing point shall be licensed by the LP Division of the State of Florida.

(d) All plans for installations at distributing points shall be submitted to the authorities having jurisdiction for permits and approval. In addition, plans for locations at distributing points for fixed (stationary) installations of (1) 2,000 gallons individual water capacity, or (2) with the aggregate water capacity exceeding 4,000 gallons, or (3) any installation, regardless of size, which will be used for resale to the public, shall be submitted the State of Florida LP Division for approval and proper licensing, and be approved before the installation is started. Other safety precautions shall be adhered to as designated by the Fire Chief.

(e) An LP Gas storage tank shall not be installed on the same island used for gasoline or diesel fuel dispensing. A minimum distance of 25 feet shall be maintained between the LP gas storage tank and the flammable liquid dispensing devices.

(f) A distributing plant as defined in Section 5242.2 shall be prohibited unless approved by the Fire Chief.

(g) Multiple container installations with a total storage water capacity of more than 180,000 gallons (150,000 gallons LP-gas capacity) shall be subdivided into groups containing not more than 180,000 gallons in each group. Such groups shall be separated by a distance of not less than 50 feet, unless the tanks are

(1) buried or mounted in an approved manner, or

(2) protected with approved insulation on such areas that may be subject to impingement of ignited gas from pipelines or other leakage, or

(3) protected by fire-walls of approved construction, or

(4) protected by an approved system for application of water, or

(5) protected by other approved means, where one of these forms of protection is provided, the separation shall not be less than 25 feet between such container groups.

(h) The storage and transportation of liquefied petroleum gas and the installation of all pertinent equipment shall be installed and maintained in accordance with NFPA-58, and subject to the approval of the Fire Chief. These orders shall apply to all persons and places within the jurisdiction except as herein provided.

5242.6 PARKING AND GARAGING

The parking and garaging of tank vehicles used for the transportation of liquefied petroleum gases shall be in accordance with Section 5242.1.

5242.7 PROHIBITED USE OF LIQUEFIED PETROLEUM GAS

(a) Liquefied petroleum gas shall not be used for the purpose of operating any device or equipment unless such equipment or device is approved for use with a liquefied petroleum gas.

(b) Liquefied petroleum gas shall not be released to the atmosphere except through an approved liquid level gauge or other approved device.

5242.8 DISPENSING AND OVERFILLING

(a) The dispensing of liquefied petroleum gases shall be performed by a qualified attendant.

(b) It shall be illegal for any person, firm, corporation, association, club or organization to operate a self-service liquefied petroleum gas dispensing operation which is open to the public.

(c) A person shall not fill or maintain a liquefied petroleum gas container with liquefied petroleum gas in excess of the fixed outage gauge installed by the manufacturer or the weight stamped on the tank.

5242.9 SAFETY DEVICES

A person shall not tamper with or make ineffective the safety devices of any liquefied petroleum gas container.

5242.10 SMOKING AND OPEN-FLAME DEVICES

(a) **NO SMOKING SIGNS** shall be posted. No person shall smoke within a minimum of ten (10) feet of any LP gas container of 1,200 gallon capacity or less, nor within a minimum of 25 feet of any such container over 1,200 gallon capacity.

(b) A person shall not install or maintain any open-flame device outside of buildings within 25 feet of any LP gas container having a capacity of 1,200 gallons or less, nor within 50 feet of any such container having a capacity over 1,200 gallons.

(c) A person shall not install or maintain any LP gas container with a capacity of 1,200 gallons or less within 25 feet of any open-flame device outside of buildings, nor shall any person install or maintain any such container with a capacity in excess of 1,200 gallons within 25 feet of any such open-flame device.

5242.11 CLEARANCE OF COMBUSTIBLES

Refer to NFPA-58.

5242.12 ABANDONMENT OF LIQUEFIED PETROLEUM GAS EQUIPMENT

Whenever the use of liquefied petroleum gas equipment has been discontinued, it shall be abandoned in an approved manner within a period of 30 days.

(a) The following procedures may be used when approved by the Fire Chief.

(1) Removal of all liquefied petroleum equipment.

(2) Burn-off content of container.

(3) Venting contents of container to atmosphere when discharge gas can be led to a safe point of discharge.

(b) All service openings shall be capped or plugged after contents have been removed from container.

(c) All LP tanks, abandoned or out of service in excess of ninety (90) days, shall be removed and properly disposed of.

5242.13 PROTECTING CONTAINERS FROM VEHICLES

LP gas containers located in or adjacent to areas such as alleys, driveways or parking lots where they may be damaged by vehicles, shall be protected from contact damage.

5242.14 COMPRESSED NATURAL GAS, SCOPE

This division shall apply to the design and installation of compressed natural gas (CNG) engine fuel systems on vehicles of all types and to their associated fueling (dispensing) systems.

5242.15 PERMITS

For permits to use equipment, structures or enclosures for the installation or storage of compressed natural gas (CNG) systems and/or components, see Section 5206.

5242.16 COMPLIANCE

Applications shall meet the applicable standards set forth in NFPA 52, Compressed Natural Gas (CNG) Vehicular Fuel.

5242.17 MAINTENANCE

In addition to the maintenance provisions set forth in the applicable standard, survey of premises and maintenance of equipment, shall be as set forth in Section 5211.2(i).

5243 MATCHES

5243.1 WHOLESALE STORAGE

(a) At wholesale establishments and wherever matches exceeding 60 matchman's gross (14,400 matches each gross) are stored, shipping containers containing matches shall be arranged in piles not exceeding 10 feet in height nor 1500 cubic feet in volume with aisles at least 4 feet wide.

(b) Where other materials or commodities are stored on the same floor with matches, a portion of the room shall be devoted to match storage exclusively and a clear space of not less than 4 feet maintained between match storage and such other material or commodities.

5243.2 STORAGE NOT TO BE NEAR VERTICAL OPENINGS

Matches shall not be stored within 10 feet of any open elevator shaft opening, open stairway or other vertical opening.

5243.3 MATCH BINS REQUIRED

Where shipping containers containing matches are opened, the contents of such broken containers shall be removed and stored in metal or metal-lined bins equipped with self-closing metal or metal-lined covers.

5243.4 STORAGE BY RETAILERS

Where matches are sold at retail, original sealed packages may be stored on shelves. When such packages are broken, individual boxes shall be stored in metal or metal-lined bins as described in Section 5243.3.

5244 MOTION PICTURE PROJECTION

5244.1 SCOPE

The provisions of this Section shall apply where ribbon-type cellulose acetate or other safety film is used in conjunction with electric arc, xenon or other light-source projection equipment which develops hazardous gases, dust or radiation.

The provisions of this Section shall apply to the projection of ribbon-type cellulose nitrate film regardless of the light source used in projection.

5244.2 PROJECTION ROOM

(a) Every motion picture projection machine used for projecting film regulated under Section 5244.1 shall be operated within a motion picture projection room complying with the requirements of Section 5253 of this Fire Code.

(b) Projection rooms which are limited to the projection of safety film shall be posted on the outside of each projection room door and within the projection room itself with a conspicuous sign with 1-inch block letters stating **SAFETY FILM ONLY IS PERMITTED IN THIS ROOM**.

(c) There shall be installed and maintained ready for use in every projection room not less than two portable fire extinguishers with at least a 10-B:C rating.

5244.3 SMOKING

A person shall not smoke or maintain any other source of ignition within any projection room in which cellulose nitrate film is permitted, nor shall the operator or manager of the premises permit any person to smoke or

to maintain any other source of ignition within said projection room. Conspicuous NO SMOKING signs shall be posted in such a room.

5244.4 PROJECTION EQUIPMENT

A person owning, controlling or managing any motion picture projection equipment shall not use or permit the use of projection equipment or film which is in a hazardous condition.

5244.5 FILM STORAGE AND USE

(a) Cellulose nitrate film may not be used or stored except within an enclosed film magazine, an approved storage cabinet or transportation container. Rewinding of cellulose nitrate film shall be done within an enclosed film rewind machine. Examination of film may be done on an open hand rewind machine with not more than one reel outside an approved container at any time.

(b) Safety film which is not mounted for projection shall be stored in approved transportation containers or an approved film cabinet.

5245 MOTION PICTURE FILM, CELLULOSE NITRATE

5245.1 APPLICABILITY OF DIVISION

This division applies to the storage and handling of cellulose nitrate motion picture film hereafter referred to as "nitrate film." Film having a cellulose acetate or other approved, low burning base, marked "safety film," is exempt from these provisions. Standards for Storage and Handling Cellulose Nitrate Motion Picture Film, NFPA 40 and the State Fire Marshal's Rules and Regulations 4A-5, are hereby adopted in their entirety as a minimum requirement of this Fire Code. See all Section 5253 of this Fire Code.

5246 CELLULOSE NITRATE PLASTIC (PYROXYLIN), STORAGE AND HANDLING

5246.1 DEFINITION

For definition of CELLULOSE NITRATE PLASTICS (PYROXYLIN), see Section 5208.

The Fire Code for Storage of Pyroxylin Plastic, NFPA-40E and the State Fire Marshal's Rules and Regulations 4A-6, are hereby adopted in their entirety as a minimum requirement of this Fire Code.

5246.2 PERMITS

For permits to store, handle, manufacture or assemble Sections of cellulose nitrate, see Section 5206.

5247 PESTICIDES

5247.1 SCOPE

This Section shall apply to both inside and outside storage of all forms of pesticides in portable containers other than fixed installation on transportation equipment.

The Fire Code for Storage of Pesticides in Portable Containers, NFPA 43D, is hereby adopted in its entirety as a minimum requirement of this Fire Code.

EXCEPTIONS:

(1) Highly toxic pesticides, see Section 5240.

(2) Storage in dwellings or private garages of pesticides registered by the Environmental Protection Agency for use around the home. Such pesticides are registered under the Federal Insecticide, Fungicide and Rodenticide Act of 1945 (FIFRA) as amended by the Federal Economic Poison Control Act of 1972.

5247.2 GENERAL REQUIREMENTS

(a) Containment of Hose Stream Runoff. Pesticides storage shall be located or constructed so that runoff from firefighting operations will not be located or constructed so that run off from firefighting operations will not contaminate streams, ponds, groundwater, croplands, pasture land or buildings.

(b) Flammable or Combustible. Pesticides that are flammable or combustible liquids shall be stored in accordance with the provisions of Section 5239.

(c) Oxidizers. Pesticides that are oxidizing agents shall be stored in accordance with Section 5240.

(d) Storage with Ammonium Nitrate. Pesticide shall not be stored in the same area with ammonium nitrate fertilizer.

(e) Storage Methods. Pesticides shall be stored in accordance with the recommendations of the manufacturer. Storage of pesticides shall be arranged according to compatibility.

(f) Location of Storage. Pesticide storage shall be restricted to a first-story room, or area which has direct access to the outside without passing through intervening rooms or corridors.

EXCEPTION: A facility used exclusively for pesticide storage. Pesticides shall not be stored in basements.

(g) Storage on Damp Floors. Pesticides in containers which could be damaged by moisture or water shall be stored off the floor.

(h) Damaged Containers. Leaking or damaged container of pesticides or materials contaminated by pesticides shall be immediately segregated and disposed of or decontaminated in accordance with regulatory requirements, manufacturer's instructions or recommended industry practice.

(i) Toxicity Data. Material safety data sheets for each toxic pesticide shall be available at each storage location.

5247.3 SIGNS

(a) Identification of Buildings, Rooms or Areas. Pesticide storage buildings, storage rooms or storage areas shall be identified by prominent and legible signs in accordance with NFPA 704.

(b) Container Labels. Each group of pesticide containers shall have labels visible to readily permit identification.

5247.4 FIRE PROTECTION

Storage facilities shall be protected in accordance with the provisions of Section 5211.

5247.5 EMERGENCY MANAGEMENT

Emergency preplanning and post-fire management shall be established and displayed to assist in proper action.

5247.6 DISPLAY

The quantity of pesticides in rooms or areas accessible to the public shall be limited to that needed for display. Drums and large packages shall be stacked in a safe manner.

5247.7 STORAGE AREAS

(a) Designating Areas. A separate building, room, portion of a building or outside area shall be designated as the pesticide storage area.

(b) Security. The storage area shall all be secured in such a manner as to prevent unauthorized entry.

5247.8 PESTICIDES STORED AS COMPRESSED GASES

(a) Sources of Heat. Compressed gas pesticides shall be stored away from heat (steam pipes, heaters, direct sun).

(b) Anchoring. All compressed gas cylinders in service or in storage shall be adequately secured to prevent their falling.

(c) Closing Containers and Safety Cap. Containers shall be tightly closed and provided with a safety cap when not in use, whether empty or full.

(d) Separation from Other Gases. Pesticide containers shall be separated from other compressed gases by pipe railings or other effective means.

5248 PREVENTION OF DUST EXPLOSION

5248.1 For the definition of DUST as used in this Section, see Section 5208.

The Standard on Explosion Prevention Systems, NFPA 69 is hereby adopted in its entirety as a minimum requirement of this Fire Code.

5248.2 GENERAL REQUIREMENTS

(a) All dust-producing or dust-agitating machinery, such as grinding mills and separators, and all elevators, elevator legs, spouts, hoppers and other conveyors shall be provided with casing or enclosures maintained as nearly dust-tight as possible.

(b) Approved magnetic or pneumatic separators shall be installed ahead of all shellers, crackers, crushers, grinding machines, pulverizers and similar machines in which the entrance of foreign material may cause sparks to be generated.

(c) Suitable dust-collecting equipment shall be installed, and accumulation of dust shall be kept at a minimum in the interior of buildings. Exhaust and dust collecting systems shall be provided on any single piece of equipment or power tool producing or generating combustible fibers, chips, shavings, and dusts and exceeding 2 HP or any quantity of equipment or power tools exceeding 5 HP

(d) All machinery and metal parts of the crushing, drying, pulverizing and conveying system shall be electrically grounded in accordance with the National Electrical Code.

(e) Smoking and the carrying of matches, the use of heating devices employing an open flame or use of any spark producing equipment is prohibited in areas containing dust producing or dust-agitating operations. Artificial lighting in such areas shall be by electricity with all wiring and electrical equipment installed in accordance with the National Electrical Code.

(f) Properly designed and located vents which will relieve the pressure resulting from an explosion and prevent or reduce damage to buildings or equipment shall be required in all buildings where flammable or explosive dusts are manufactured, processed or generated. The design and amount of such equipment shall be in accordance with this Code.

(g) Static electricity shall be removed from all machinery and other component parts by permanent grounds or bonds or both. The design and installation of such grounds shall be in accordance with approved standards.

5249 VEHICLES AND VESSELS

5249.1 DEFINITIONS

For the purpose of this Section, vehicles and vessels are defined as any house trailer, railroad car, street car or bus, ship, barge or similar conveyance no longer mobile and permanently fixed to a foundation or mooring.

5249.2 COMPLIANCE

Any vehicle which is subject to human occupancy and is fixed or otherwise prevented from being mobile, shall comply with the appropriate provisions of the Fire Code applicable to buildings of similar occupancy or process.

5249.3 DEFINITIONS

For definition of VESSEL, see Section 5249.1.

5249.4 COMPLIANCE

Any ship, barge or other vessel which is subject to occupancy for any purpose other than navigation and is permanently moored, set aground or otherwise fixed, shall comply with this Fire Code applicable to buildings of similar occupancy or process.

5250 TENTS AND AIR-SUPPORTED STRUCTURES

5250.1 SCOPE

(a) Permits. For permits to use or operate a tent or air supported structure covering an area in excess of 200 square feet, see Section 5206.

(b) Compliance. The Standard for Assembly Seating, Tents and Membrane Structures, NFPA 102, is hereby adopted in its entirety as a minimum requirement of this Fire Code.

5250.2 PLACES OF ASSEMBLAGE

For the purpose of this Section, a place of assembly shall include any circus, sideshow, carnival, tent show, theater, skating rink, dance hall or any other exhibition, production, engagement or offering, or other place of assembly in or under which 10 or more persons may gather for any purpose.

5250.3 PARKING OF VEHICLES

Automotive equipment that is necessary to the operation of the establishment shall not be parked within 20 feet of the tent or air-supported structure except by special permit. (See Section 5206.1) No other automotive equipment or internal combustion engines shall be located within 50 feet of the tent except upon a public street.

5250.4 LOCATION OF TENTS AND AIR-SUPPORTED STRUCTURES

(a) A tent or air-supported structure shall be located not less than 10 feet from any property line or permanent structure except where the property line is a street or alley.

(b) Tents or air supported structures having a floor area in excess of 1,500 square feet but less than 15,000 square feet shall be located not less than 30 feet from any other tent, air supported structure or structure.

(c) Tents or air-supported structures having an area of 15,000 square feet or more shall be located not less than 50 feet from any other tent or structure as measured from the side wall of the tent, unless joined together by a corridor.

EXCEPTION: Where conditions make it impossible to provide the required distance between tents or air-supported structures as specified in Sub-sections (b) and (c), the Chief may approve the locations of tents and air-supported structures closer than that specified if required passageways are provided and, in his opinion, adequate safety will be afforded.

(d) Tents and air-supported structures may be joined together by means of corridors, but such corridors shall be open to the sky. On each side of such corridor and approximately opposite each other, there shall be provided openings not less than 12 feet wide. These openings shall be equipped with sliding curtains as specified in Section 5250.11(e).

(e) See Section 5211 for required emergency access.

5250.5 FLAME-RETARDANT TREATMENT

The sidewall, drops and top of all tents and air-supported structures shall be of flame-retardant material or shall be made fire retardant. All bunting and other flammable decorations or effects and sawdust when used on floors or passageways shall likewise be treated with a flame-retardant solution.

An affidavit or affirmation shall be retained at the premises on which the tent or air-supported structure is located, attesting to the following information relative to the flame-retardant treatment of the fabrics:

- (1) Date fabric was last treated with flame-retardant solution.
- (2) Trade name or kind of chemical used in treatment.
- (3) The name of person or firm treating the material.

(4) The name and address of the owners of the tent.

5250.6 FIRE-RESISTIVE STANDARDS

Fire-resistive standards shall be in accordance with the applicable provisions of NFPA-701 Standards, Methods of Fire Tests for Flame-Resistant Textiles and Films, or of a recognized testing laboratory.

5250.7 SMOKING AND OPEN FLAME

(a) Smoking shall not be permitted in any tent or air-supported structure or in any adjacent areas where hay, straw, alfalfa, sawdust or other highly combustible materials are kept or stored.

Approved **NO SMOKING** signs shall be conspicuously posted.

(b) No fireworks, open flame or other device emitting flame or fire shall be used in or immediately adjacent to any tent or air-supported structure while open to the public, upon special permit as in Section 5206.

(c) Toy balloons or other similar devices that are inflated with poisonous, explosive or flammable gas shall not be permitted in or on the premises adjacent to any tent or air-supported structure.

(d) An approved receptacle for the disposal of lighted smoking materials shall be provided at all entrances to tents and air-supported structures.

5250.8 FIRE EXTINGUISHERS AND OTHER FIRE-PROTECTION EQUIPMENT

Fire extinguishers and other fire protection equipment shall be provided in every tent or air-supported structure as follows:

(1) One 2-A type extinguisher shall be provided in every tent or air supported structure having a floor area less than 1,000 square feet and also one in each additional 2,000 square feet or fraction thereof.

(2) At least one 40-B:C type fire extinguisher shall be provided for each kitchen, mess hall, power generator or transformer and at locations where flammable or combustible liquids are used, stored or dispensed.

(3) Fire hose line, water supplies and other auxiliary fire equipment shall be maintained at the site in such numbers and size as may be required.

5250.9 STANDBY FIREWATCH

Standby firewatch shall be provided in accordance with Section 5211.2(h)(1).

5250.10 ABATEMENT OF FIRE OR PANIC HAZARDS NOT SPECIFICALLY COVERED BY THIS ARTICLE

Any unforeseen condition that presents a fire hazard or would contribute to the rapid spread of fire, or would delay or interfere with the rapid exit of persons from the tent or air-supported structure or would interfere with or delay the extinguishment of a fire and which is not otherwise covered by this Section shall be immediately abated, eliminated or corrected.

5250.11 EXITS

(a) The aggregate width of exits from any tent or air supported structure shall be not less than one (1) foot for each 50 persons.

(b) An exit shall be not less than 36 inches wide.

(c) Exits shall be spaced at approximately equal intervals around the perimeter of the tent or air-supported structure and shall be so located that no point is more than 100 feet from an exit.

(d) Exits shall be provided in accordance with the following table:

CAPACITY OF TENT OR AIR-SUPPORTED STRUCTURE

Capacity	Minimum Number		Air Supported Structure
	of Exits	Tent	
Up to 199.....	2.....	6.....	3
200 to 499	3.....	6.....	6

500 to 999	4.....	8.....	6
1000 to 1999	5.....	10.....	8
Over 2000.....	6.....	10.....	8

(e) Exit openings from any tent shall remain open, or may be covered by canvas curtain, provided:

(1) Said curtains shall be so arranged that when open no part of the curtains shall obstruct the exit.

(2) Said curtains shall be of a color, or colors, definitely contrasting with the color of the tent.

(f) Exit doors from air-supported structures shall swing in the direction of exit travel. To avoid hazardous air and pressure loss, all such doors shall be automatically closing against operating pressures. Opening force at the door edge shall not exceed 15 pounds.

(g) Smooth-surfaced, unobstructed aisles having minimum width of not less than 44 inches shall be provided from all seating areas and their width shall be progressively increased in width to provide at all points not less than one (1) foot of aisle width for each 50 persons served by such aisle at that point.

5250.12 MAINTENANCE OF EXIT WAYS

The required minimum clear width of exits, aisles and passageways shall be maintained at all times.

5250.13 MARKING OF EXITS

At every exit and wherever otherwise required to clearly indicate the direction of egress, an exit sign with letters at least 6 (six) inches in height shall be provided.

5250.14 EXIT ILLUMINATION

(a) Exits shall be illuminated at all times with light having an intensity of not less than one foot candle at floor level.

(b) Exit signs shall be lighted in tents and air-supported structures with occupant loads over 100 persons, by two separate power sources.

(c) Emergency exit illumination shall be provided by Type 1 emergency lighting, in accordance with Section 5213.

5250.15 OCCUPANT LOAD

(a) The occupant load shall be in accordance with the provisions of Section 5212.

(b) The owner or manager shall not permit a number of persons in excess of the capacity determined by the above method to enter the tent or air-supported structure.

5250.16 SEATING ARRANGEMENTS

The seating arrangements shall be in accordance with Section 5215.

5250.17 HEATING AND COOKING EQUIPMENT

(a) All heating or cooking equipment shall be installed as specified in the appropriate Section of this Code.

(b) Gas, liquid and solid fuel burning equipment designed to be vented shall be vented to the outside air as specified in the appropriate Section of this Code. Such vents shall be equipped with spark arresters when required.

(c) Heating and cooking apparatus shall not be located in exits, aisles, passageways or near combustibles.

5250.18 STORAGE OF FLAMMABLE OR COMBUSTIBLE LIQUIDS

(a) Flammable or combustible liquid shall not be stored in a tent or air-supported structure nor less than 50 feet from any tent or air-supported structure used for public assembly.

(b) The storage and dispensing of flammable or combustible liquids shall be in accordance with Section 5239.

(c) Liquefied petroleum gas shall not be stored or used in connection with any tent or air-supported structure unless the storage containers, equipment, fittings and appliances, and the placement, use, and operation of such equipment comply with Section 5242.

5250.19 HOUSEKEEPING

(a) All weeds and flammable vegetation shall be removed from the premises adjacent to or within 35 feet of any tent or air-supported structure.

(b) Hay, straw, trash and other flammable material shall not be stored less than 35 feet from any tent or air-supported structure, except by special permit in Section 5206.1 from the Fire Chief.

(c) The grounds both inside and outside of tents and air-supported structure shall be kept free and clear of combustible waste. Such waste shall be stored in approved containers or removed from the premises. The burning of rubbish on the premises shall not be permitted.

5251 MOBILE HOMES AND RECREATIONAL VEHICLE PARKS

5251.1 SCOPE

This Section shall apply to all mobile home and recreational parks.

5251.2 COMPLIANCE

Mobile home parks and recreational vehicle parks shall meet the requirements of the uniform Standards of the State of Florida Fire Marshal Rules, Chapter a-42.

5252 GENERAL STORAGE

5252.1 COMPLIANCE

NFPA-101, 1985 Life Safety Code
NFPA-231, Standards for General Storage
NFPA-231C, Standards of Rack Storage of Materials
NFPA-231D, Standard of Storage of Rubber Tires, and
NFPA-231F, Standard of Rolled Paper Storage
are hereby adopted in their entirety as part of this Fire Code.

5253 FIRE-EXTINGUISHING APPARATUS AUTOMATIC-SPRINKLER SYSTEMS

See Chapter 38

Exception: Sec. 5253.1
Sec. 5253.2
Sec. 5253.3
Sec. 5253.4

5253.1 GENERAL

(a) In new buildings or in buildings altered to increase the area or height, and in existing buildings as set forth in Section 5201 and 5202 of this Chapter, approved automatic-sprinkler systems shall be installed and maintained as provided in this Section and in Section 5254 of this Chapter, except that the Fire Chief may require or may permit a carbon dioxide fire-extinguishing system, as set forth in Section 5253.3 or other approved automatic fire extinguishing system, to be used in lieu of such sprinkler system.

(1) Where Buildings exceed 50 feet in height, standpipe riser shall be designed to requirements of Chapter 2 of NFPA-14 as adopted by this Code.

(b) As used in this Section.

(1) Area shall be the allowable floor area set forth in this Code for the various types of construction.

(2) Height shall be the vertical distance from grade to the top of the main roof, exclusive of a mechanical penthouse.

(3) Grade shall be as set forth in Section 5254.1 of this Chapter.

(c) Combustible goods or merchandise shall include those made of wood, plastics, cloth or rubber; those containing flammable liquids; those packed with excelsior, paper or moss; those packaged or packed in paper; cardboard or wood containers and other goods or merchandise of equivalent, or greater, combustibility.

(d) Combustible, incombustible and noncombustible shall be as defined in the Standards Section of this Chapter.

(e) The installation of fire extinguisher or standpipes shall not reduce or nullify the requirements for automatic fire-extinguishing systems, as set forth in this Section and in Section 5254 of this Chapter.

(f) Where automatic fire-extinguishing protection is provided in other than High Hazard Occupancies, the fire-resistive requirements may be reduced by one hour in the area or portion of buildings so protected provided such buildings are not more than 50 feet in height, however, in no case shall it be less than one-hour fire-rated.

5253.2 BASEMENTS

Approved automatic-sprinkler systems shall be required:

(a) In basements or underground structures occupied as bowling lanes, restaurants, or for the manufacture, sale, or storage of combustible goods or merchandise (not including garages) and exceeding 2,500 square feet in area.

(b) In basements used as workshops or for storage of combustible goods in buildings used for assembly, educational or residential occupancies where the area used for such workshops or such storage of combustible goods exceeds 2,500 square feet.

(c) In basements of buildings used for assembly, educational, or residential occupancies where the area of such basements exceeds 5,000 square feet.

REQUIREMENTS BASED ON OCCUPANCY — See Chapter 38

5253.3 CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS — GENERAL

(a) The Fire Chief may require and may approve substitution for required sprinkler systems in places not commonly used by the public and, where so approved, carbon dioxide or other Underwriter Laboratories (UL) listed fire-extinguishing systems may be provided.

(b) Piping and materials shall comply with the Standards set forth in NFPA-13 & 13D, and this Code.

DESIGN AND CONSTRUCTION

Carbon dioxide fire extinguishing systems shall comply in all respects with the Standard for Carbon Dioxide Fire Extinguishing Systems, NFPA 12, as set forth in the Standards Section of this Chapter.

APPLICATION

Carbon dioxide fire-extinguishing systems may be used in rooms or enclosures containing flammable liquids in closed or open containers; ovens; dryers; electrical and other special machinery, apparatus and processes involving the use of flammable liquids, vapors, or dust; fur storage areas; lumber kilns; coal bins; loose textile stock areas; grain-handling machinery and in other enclosures containing stocks through which gas may permeate and where protection by water or other means may be ineffective or undesirable, and also in vaults; library stockrooms; organs and other places where fires may be extinguished by carbon dioxide gas with less loss than if water were used.

STANDPIPES AND HOSE STATIONS — See Chapter 38, Section 3803

WATER SUPPLY — See Chapter 38, Section 3804

FIRE DEPARTMENT CONNECTIONS — See Chapter 38, Section 3805

YARD HYDRANTS — See Chapter 38, Section 3806

PORTABLE FIRE EXTINGUISHERS — See Chapter 38, Section 3807

5253.4 FIRE PROTECTION

In all buildings in which standpipes are required, such standpipes shall be installed as the construction progresses, and installations shall be in such a manner that they are always ready for Fire Department use, to the topmost constructed floor. Such standpipes shall be provided with a Fire Department connection(s) on the outside of the building at the street level and with one outlet at each floor.

In every building operation wherever a tool house, storeroom or other shanty is placed, or a room or space is used for storage, dressing room or workshop, at least one approved portable chemical extinguisher shall be provided and maintained in an accessible location.

During building operations, free access from the street to fire hydrants and to outside connections for standpipes, sprinklers or other fire-extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times.

No material or construction equipment shall be placed within ten feet of such hydrant or connection, nor between it and the central line of the street.

5254 FIRE SUPPRESSION — LIFE SAFETY SYSTEM

See Chapter 51

FIRE SPRINKLER SYSTEM — See Chapter 51

5254.1 SMOKE CONTROL — GENERAL

(a) The standards in this Section shall be those of Chapter 5254 of this Code. **EXCEPTION:** Unless it is addressed in this Chapter.

(b) The Fire Chief shall review all smoke control systems.

(c) The Fire Chief shall approve the location of all alarm initiating devices, (controls & panels), and monitoring equipment.

EXCEPTION: Duct smoke detectors.

(d) H.R.S. regulations shall supersede all other references for Hospitals.

5254.2 PANELS OR WINDOWS

(a) Operable windows shall provide minimum areas for light and ventilation as set forth in Part III of this Code. Requirements based on occupancy, except as otherwise provided herein.

(b) Operable windows or removable panels in buildings exceeding 50 feet in height shall be at the rate of 20 square feet per 40 linear foot of exterior wall at every story and shall have a first opening a minimum of 10 feet from each corner or intersecting pair of walls and 40 feet on center thereafter and shall provide cross ventilation.

(c) Such windows or panels shall have minimum dimensions of 22 inches, and minimum openable area of five square feet. Refer also to Section 5211.2(q) herein.

(d) Such panels shall be clearly identified as required by the Fire Department.

(e) Removable panels shall be of tempered glass or any other material meeting the wind load requirements of this Code.

(f) Any other window or panel design which will produce equivalent results may be used subject to approval of authority having jurisdiction and based on performance test criteria herein.

(g) Breaking of the glass shall not constitute a removable panel.

(h) Smoke detectors shall be installed in corridors in accordance with NFPA-72E.

5254.3 TEST CRITERIA FOR MECHANICAL SMOKE CONTROL SYSTEMS

(a) Prior to testing of the smoke control system, engineer of record shall certify to the appropriate officials that the entire smoke control system has been tested, balanced and installed in accordance with his design plans and specifications and this Fire Code.

(b) The following shall be notified so that they may witness the system's performance test:

- (1) Engineer of record or agent
- (2) Building contractors
- (3) Owner's representative
- (4) Fire Department
- (5) Building Department having jurisdiction

(c) The engineer or his representative shall supply a plan of the floor or zone layout including cubic area and smoke bomb size and locations accepted by testing authority. Bomb placement and size shall be sufficient to give even disbursement in area being tested.

(d) Sufficient smoke must be generated to produce at least double the volume of the smoke zone being tested.

(e) Timing of the test begins when the smoke bombs are ignited. Smoke control system shall activate within 30 seconds.

(f) Quantity of smoke shall obscure an exit sign from 3 feet within 3 minutes. Design quantity of smoke shall be obtained within 5 minutes.

(g) In cases where smoke is being exhausted so quickly that obscurity cannot be obtained and sufficient smoke has been generated to fill the test area, the system will be considered to be acceptable, if smoke can be observed moving toward the exhaust grills.

(h) Within ten minutes of the start of the test, the exit sign must be legible from 20 feet.

(i) If no exit sign is present, any object may be used for distance measurement (i.e. door, column).

(j) During the test no smoke may migrate to other zones.

(k) All testing shall be done under the supervision of mechanical inspector and/or fire inspector having jurisdiction and final acceptance of the smoke control system, and shall be his responsibility.

(l) All smoke generating devices shall be supplied by the owner or his designee and shall meet with the approval of the fire inspector having jurisdiction.

(m) Required tests:

(1) Test one shall be performed with system in automatic mode. Upon automatic activation of the test floor, four additional floors shall be activated manually.

(2) Test two shall be performed in full automatic mode.

(3) All Fire zones which are not typical to any other zone shall be tested independently.

(4) More than one typical zone may be required to be tested.

(n) The engineer of record must certify, in writing, that the system is designed and installed and will function as required by this Code and its adopted standards; and submit plans and specifications including design criteria incorporating volumetric flows, volumes and pressures as a record for testing procedures.

EMERGENCY SYSTEMS — See Chapter 51, Section 5109

EXITS — See Chapter 51, Section 5110

BUILDINGS MORE THAN 50 FEET TO 75 FEET IN HEIGHT — See Chapter 51, Section 5111.

5255 RACETRACKS AND STABLE FACILITIES COMPLIANCE

NFPA-150, Standard on Fire Safety on Racetrack Facilities is hereby adopted in its entirety.

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NOTES

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

CHAPTER 71-575

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

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

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

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

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

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

Section 3.

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

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

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

Section 4.

(a) For the purpose of inspection, competent and qualified building inspectors shall be employed by these elected or appointed officials charged with the responsibility of enforcing this act. If any of the elected or appointed officials named

in Section 3 of this act knowingly allow or permit any new buildings or structures, both private and public or any alterations, additions and repairs in any new or existing building or structure, both private and public, including but not limited to public schools, county buildings or structures, municipal and state buildings or structures, hospitals, and any other building or structure of any governmental authority, to be erected within Broward County in violation of the South Florida Building Code, or if any of the elected or appointed officials prohibit, by any means, directly or indirectly, the use of any materials, types of construction and methods of design authorized by the Code or alternate materials, types of construction and methods of design approved by the provisions of the Code, then the elected or appointed official or officials may be removed from office for nonfeasance, misfeasance or malfeasance in office. Violation of this Section by an appointed or elected official shall constitute a misdemeanor of the second degree, punishable as provided in Florida Statutes Section 775.082 or 775.083.

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

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

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

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

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