

FLORIDA BUILDING CODE PLUMBING

2003 Revisions

This package of replacement pages is designed to update the 2nd edition of the Florida Building Code® to the latest revisions. To update your existing code, replace sheets by page number. Place all these sheets in the code and remove any existing sheets per instructions contained herein.

PREFACE

Introduction

The State of Florida first mandated statewide building codes during the 1970s at the beginning of the modern construction boom. The first law required all municipalities and counties to adopt and enforce one of the four state recognized model codes known as the state minimum building codes. During the early 1990s a series of natural disasters, together with the increasing complexity of building construction regulation in vastly changed markets precipitated the comprehensive review of the state building code system. The study revealed that building code adoption and enforcement was inconsistent throughout the state and those local codes thought to be the strongest proved inadequate when tested by major hurricane events. The consequences were devastation to lives and economies and a statewide property insurance crisis. The response was reform of the state building construction system which placed emphasis on uniformity and accountability.

The Florida Building Code (the Code) is the central piece of the new building code system. This single statewide unified code is developed and maintained by the Florida Building Commission. It is administered and enforced by local jurisdictions and certain state agencies which may, under certain strictly defined conditions, amend requirements to be more stringent. The reformed building code system also establishes accountability for licensed contractors and designers and for local enforcement jurisdictions. It also establishes building code education requirements for all licensees and uniform procedures and quality control in a product approval system.

The Code supersedes all local codes and is automatically effective on the 2001 date established by state law. The Code is based on a national model building code and national consensus standards and incorporates all state agency building codes and regulations. It has been harmonized with the Florida Fire Prevention Code to established, unified and consistent standards. Together, the Florida Building Code and the Florida Fire Prevention Code contain all state standards for the design and construction of buildings in the state of Florida. All local amendments to these codes may be obtained from the Florida Department of Community Affairs or the Florida Department of Insurance, State Fire Marshal, respectively.

The Code is compiled in four volumes with the National Electrical Code[®] adopted by reference. The four volumes are: Building, which includes energy, accessibility and state agency regulations; Plumbing; Mechanical; and Fuel Gas. The National Electrical Code[®] is reference standard NFPA 70-2002 which must be obtained separately.

Development

Chapter 98-287, Laws of Florida, established the Florida Building Commission and directed it to develop the Code. In October 1998 the Commission selected the model codes which form the base requirements of the Code. These base codes were then amended to tailor requirements, including energy, accessibility and hurricane resistance, to be Florida specific. The draft Code was presented to the 2000 Florida Legislature which directed specific changes and authorized, by Chapter 2000-141, Laws of Florida, the final Code to become effective July 1, 2001. The Commission completed the changes and reconsideration directed by the Legislature and adopted this first edition of the Code by administrative rule in January 2001. The 2001 code became effective on March 1, 2002.

The base codes include: the Standard Building Code, 1997 edition; the National Electrical Code[®], 2002 edition; the Standard Plumbing Code, 1997 edition; the International Mechanical Code, 1998 edition; the International Fuel Gas Code, 1997 edition; and, structural requirements of the South Florida Building Code as they apply to the "High Velocity Hurricane Zone." State codes adopted include the Florida Energy Efficiency Code for Building Construction, the Florida Accessibility Code for Building Construction and the Fair Housing Guidelines.

The base codes were amended through an extensive public review and input process. Nine technical advisory committees (TAC) were established using ANSI guidelines for consensus standards committees. The TACs are: Joint Building Fire (a joint committee of the Commission and the State Fire Marshal); Building Structural; Plumbing and Fuel Gas; Mechanical; Electrical; Energy; Accessibility; Special Occupancy (state agency construction and facility licensing regulations); and Administrative/Enforcement. The TACs reviewed proposed amendments to the Code and made recommendations to the Commission. The Commission obtained public comment on the first working draft compiled from the TAC recommendations then refined the Code through development of two additional drafts. The third draft was presented to the 2000 Legislature for review and approval.

Adoption and Maintenance

The Florida Building Code is adopted and updated by the Florida Building Commission. The first edition and future updates and editions supersede all previous codes upon adoption by the Commission and do not require adoption by local jurisdictions. Minimum requirements for permitting, plans review and inspections are established by the Code, and local jurisdictions may adopt additional administrative requirements which are more stringent. Local technical amendments are subject to strict criteria established by s. 553.73, F.S. They are subject to Commission review when it updates the Code triennially and are subject to appeal to the Commission according to the procedures established by s. 553.73, F.S.

Marginal Markings

Short horizontal lines in the margins within the body of the code indicate a change from the of the base codes except where a change was minor.



Dotted lines in the margins within the body of the code indicate a change from the 2001 Florida Building Code to the 2002 revisions.



Solid lines in the margins within the body of the code indicate a change from the 2002 Florida Building Code to the June 30, 2003 revisions.



Deletion indicators (☆) are provided in the margin where a paragraph or item listing has been deleted if the deletion resulted in a change of requirements through the 2002 revisions.

Deletion indicators (★) are provided in the margin where a paragraph or item listing has been deleted if the deletion resulted in a change of requirements from the 2002 edition to the June 30, 2003 edition.

Acknowledgments

The Florida Building Code is the work product of hundreds of building designers, contractors, regulators and other interested parties. Its development spanned two and one half years and involved more than one hundred thousand hours of volunteer and staff time. The majority of the Code is derived from the base codes and the efforts of the organizations which developed and maintain these codes and the standards referenced within them. These organizations include the Southern Building Code Congress International, the International Code Council, the National Fire Protection Association, the Broward County Board of Rules and Appeals, the Miami-Dade County Building Department and Code Compliance Office and all organizations listed in the reference standards chapters of each volume of the Code. Special acknowledgment is given to staff and the hundreds of volunteers who committed their time and effort to development of the code and to the Florida Conflict Resolution Consortium for its facilitation and consensus processes design. Their commitment and efforts to develop a final consensus code are the basis of its strength and value to the citizens of Florida.

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COMBINATION FIXTURE. A fixture combining one sink and laundry tray or a two- or three-compartment sink or laundry tray in one unit.

COMBINATION WASTE AND VENT SYSTEM. A specially designed system of waste piping embodying the horizontal wet venting of one or more sinks or floor drains by means of a common waste and vent pipe adequately sized to provide free movement of air above the flow line of the drain.

COMBINED BUILDING DRAIN. See “Building drain, combined.”

COMBINED BUILDING SEWER. See “Building sewer, combined.”

COMMON VENT. A vent connecting at the junction of two fixture drains or to a fixture branch and serving as a vent for both fixtures.

CONCEALED FOULING SURFACE. Any surface of a plumbing fixture which is not readily visible and is not scoured or cleansed with each fixture operation.

CONDUCTOR. A pipe inside the building that conveys storm water from the roof to a storm or combined building drain.

CONSTRUCTION DOCUMENTS. All of the written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of the project necessary for obtaining a building permit. The construction drawings shall be drawn to an appropriate scale.

CONTAMINATION. An impairment of the quality of the potable water that creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids or waste.

CRITICAL LEVEL (C-L). An elevation (height) reference point that determines the minimum height at which a backflow preventer or vacuum breaker is installed above the flood level rim of the fixture or receptor served by the device. The critical level is the elevation level below which there is a potential for backflow to occur. If the critical level marking is not indicated on the device, the bottom of the device shall constitute the critical level.

CROSS CONNECTION. Any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other either water of unknown or questionable safety or steam, gas or chemical, whereby there exists the possibility for flow from one system to the other, with the direction of flow depending on the pressure differential between the two systems (See “Backflow”).

DEAD END. A branch leading from a soil, waste or vent pipe; a building drain; or a building sewer, and terminating at

a developed length of 2 feet (610 mm) or more by means of a plug, cap or other closed fitting.

DEPTH OF WATER SEAL. The depth of water that would have to be removed from a full trap before air could pass through the trap.

DEVELOPED LENGTH. The length of a pipeline measured along the centerline of the pipe and fittings.

DISCHARGE PIPE. A pipe that conveys the discharges from plumbing fixtures or appliances.

DRAIN. Any pipe that carries waste water or water-borne wastes in a building drainage system.

DRAINAGE FITTINGS. A special type of fitting or fittings utilized in the drainage system. Drainage fittings are similar to cast-iron fittings, except that instead of having a bell and spigot, drainage fittings are recessed and tapped to eliminate ridges on the inside of the installed pipe.

DRAINAGE FIXTURE UNIT

Drainage (dfu). A measure of the probable discharge into the drainage system by various types of plumbing fixtures. The drainage fixture-unit value for a particular fixture depends on its volume rate of drainage discharge, on the time duration of a single drainage operation and on the average time between successive operations.

DRAINAGE SYSTEM. All of the piping within a public or private premises that conveys sewage, rainwater or other liquid wastes to a point of disposal. A drainage system does not include the mains of public sewer systems or a private or public sewage treatment or disposal plant.

Building gravity. A drainage system that drains by gravity into the building sewer.

Sanitary. A drainage system that carries sewage and excludes storm, surface and ground water.

Storm. A drainage system that carries rainwater, surface water, condensate, cooling water or similar liquid wastes.

EFFECTIVE OPENING. The minimum cross-sectional area at the point of water supply discharge, measured or expressed in terms of the diameter of a circle or, if the opening is not circular, the diameter of a circle of equivalent cross-sectional area. For faucets and similar fittings, the effective opening shall be measured at the smallest orifice in the fitting body or in the supply piping to the fitting.

ESSENTIALLY NONTOXIC TRANSFER FLUIDS. Fluids having a Gosselin rating of 1, including propylene glycol; mineral oil; polydimethylsiloxane; hydrochlorofluorocarbon, chlorofluorocarbon and hydrofluorocarbon refrigerants; and FDA-approved boiler water additives for steam boilers.

ESSENTIALLY TOXIC TRANSFER FLUIDS. Soil, waste or gray water and fluids having a Gosselin rating of 2

or more including ethylene glycol, hydrocarbon oils, ammonia refrigerants and hydrazine.

EXISTING INSTALLATIONS. Any plumbing system regulated by this code that was legally installed prior to the effective date of this code, or for which a permit to install has been issued.

FAUCET. A valve end of a water pipe by means of which water is drawn from or held within the pipe.

FIXTURE. See “Plumbing fixture.”

FIXTURE BRANCH. A drain serving two or more fixtures that discharges to another drain or to a stack.

FIXTURE DRAIN. The drain from the trap of a fixture to a junction with any other drain pipe.

FIXTURE FITTING. A fitting that is attached to or accessible from a fixture and controls the volume and/or directional flow of water to, or conveys water from, that fixture.

FIXTURE SUPPLY. The water supply pipe connecting a fixture to a branch water supply pipe or directly to a main water supply pipe.

FLOOD LEVEL RIM. The edge of the receptacle from which water overflows.

FLOOD ZONES

Flood-hazard zone (A Zone). Areas that have been determined to be prone to flooding but not subject to high-velocity waters or wave action.

High-hazard zone (V Zone). Areas of tidal influence that have been determined to be subject to wave heights in excess of 3 feet (914 mm) or subject to high-velocity wave run-up or wave-induced erosion.

FLOW PRESSURE. The pressure in the water supply pipe near the faucet or water outlet while the faucet or water outlet is wide open and flowing.

FLUSH TANK. A tank designed with a ball cock and flush valve to flush the contents of the bowl or usable portion of the fixture.

FLUSHOMETER TANK. A device integrated within an air accumulator vessel that is designed to discharge a predetermined quantity of water to fixtures for flushing purposes.

FLUSHOMETER VALVE. A valve attached to a pressurized water supply pipe and so designed that when activated it opens the line for direct flow into the fixture at a rate and quantity to operate the fixture properly, and then gradually closes to reseal fixture traps and avoid water hammer.

GREASE INTERCEPTOR. An interceptor whose rated flow exceeds 50 gpm or has a minimum storage capacity of 750 gallons or more and is located outside the building.

GREASE TRAP. An interceptor whose rated flow is 50 gpm or less and is located inside the building.

HANGERS. See “Supports.”

HORIZONTAL BRANCH DRAIN. A drainage branch pipe extending laterally from a soil or waste stack or building drain, with or without vertical sections or branches, that receives the discharge from two or more fixture drains or branches and conducts the discharge to the soil or waste stack or to the building drain.

HORIZONTAL PIPE. Any pipe or fitting that makes an angle of less than 45 degrees (0.79 rad) with the horizontal.

HOT WATER. Water at a temperature greater than or equal to 120°F (49°C).

HOUSE TRAP. See “Building trap.”

INDIRECT WASTE PIPE. A waste pipe that does not connect directly with the drainage system, but that discharges into the drainage system through an air break or air gap into a trap, fixture, receptor or interceptor.

INDIVIDUAL SEWAGE DISPOSAL SYSTEM. A system for disposal of domestic sewage by means of a septic tank, cesspool or mechanical treatment, designed for utilization apart from a public sewer to serve a single establishment or building.

INDIVIDUAL VENT. A pipe installed to vent a fixture trap and connects with the vent system above the fixture served or terminates in the open air.

INDIVIDUAL WATER SUPPLY. A water supply, except an approved public water supply, that serves one or more families.

INTERCEPTOR. A device designed and installed to separate and retain for removal, by automatic or manual means, deleterious, hazardous or undesirable matter from normal wastes, while permitting normal sewage or wastes to discharge into the drainage system by gravity.

JOINT

Expansion. A loop, return bend or return offset that provides for the expansion and contraction in a piping system and is utilized in tall buildings or where there is a rapid change of temperature, as in power plants, steam rooms and similar occupancies.

Flexible. Any joint between two pipes that permits one pipe to be deflected or moved without movement or deflection of the other pipe.

Mechanical. See “Mechanical joint.”

CHAPTER 3 GENERAL REGULATIONS

SECTION 301 GENERAL

301.1 Scope. The provisions of this chapter shall govern the general regulations regarding the installation of plumbing not specific to other chapters.

301.2 System installation. Plumbing shall be installed with due regard to preservation of the strength of structural members and prevention of damage to walls and other surfaces through fixture usage.

301.3 Connections to drainage system. All plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be connected properly to the drainage system of the building or premises, in accordance with the requirements of this code. This section shall not be construed to prevent indirect waste systems provided for in Chapter 8.

301.4 Connections to water supply. Every plumbing fixture, device or appliance requiring or using water for its proper operation shall be directly or indirectly connected to the water supply system in accordance with the provisions of this code.

301.5 Pipe, tube and fitting sizes. Unless otherwise specified, the pipe, tube and fitting sizes specified in this code are expressed in nominal or standard sizes as designated in the referenced material standards.

301.6 Prohibited locations. Plumbing systems shall not be located in an elevator shaft or in an elevator equipment room.

Exception: Floor drains, sumps and sump pumps shall be permitted at the base of the shaft provided they are indirectly connected to the plumbing system.

SECTION 302 EXCLUSION OF MATERIALS DETRIMENTAL TO THE SEWER SYSTEM

302.1 Detrimental or dangerous materials. Ashes, cinders or rags; flammable, poisonous or explosive liquids or gases; oil, grease or any other insoluble material capable of obstructing, damaging or overloading the building drainage or sewer system, or capable of interfering with the normal operation of the sewage treatment processes, shall not be deposited, by any means, into such systems.

302.2 Industrial wastes. Waste products from manufacturing or industrial operations shall not be introduced into the public sewer until it has been determined by the code official

or other authority having jurisdiction that the introduction thereof will not damage the public sewer system or interfere with the functioning of the sewage treatment plant.

SECTION 303 MATERIALS

303.1 Identification. The manufacturer's mark or name and the quality of the product or identification shall be cast, embossed, stamped or indelibly marked on each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system in accordance with the applicable approved standard.

303.2 Installation of materials. All materials used shall be installed in strict accordance with the standards under which the materials are accepted and approved. In the absence of such installation procedures, the manufacturer's installation instructions shall be followed. Where the requirement of referenced standards or manufacturer's installation instructions do not conform to minimum provisions of this code, the provisions of this code shall apply.

303.3 Plastic pipe, fittings and components. All plastic pipe, fittings and components shall be identified with the mark of an approved agency as conforming to NSF 14.

303.4 Labeled. All plumbing appliances, plastic pipe, plastic fittings, plastic components, potable water pipe, potable water fittings, potable water components, faucets, fixture fittings and backflow preventers shall be labeled by an approved agency. Labeling shall be in accordance with the procedures set forth in Sections 303.4.1 through 303.4.2.3.

303.4.1 Testing. An approved agency shall test a representative sample of the material or piping being labeled to the relevant standard or standards. The approved agency shall maintain a record of all of the tests performed. The record shall provide sufficient detail to verify compliance with the test standard.

303.4.2 Inspection and identification. The approved agency shall periodically perform an inspection, which shall be in-plant if necessary, of the material or piping that is to be labeled. The inspection shall verify that the labeled material or piping is representative of the material or piping tested.

303.4.2.1 Independent. The agency to be approved shall be objective and competent. The agency shall also disclose all possible conflicts of interest so that objectivity can be confirmed.

303.4.2.2 Equipment. An approved agency shall have adequate equipment to perform all required tests. The equipment shall be periodically calibrated.

303.4.2.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests.

SECTION 304 RODENT PROOFING

304.1 General. Plumbing systems shall be designed and installed in accordance with Sections 304.2 through 304.4 to prevent rodents from entering structures.

304.2 Strainer plates. All strainer plates on drain inlets shall be designed and installed so that all openings are not greater than $\frac{1}{2}$ inch (12.7 mm) in least dimension.

304.3 Meter boxes. Meter boxes shall be constructed in such a manner that rodents are prevented from entering a structure by way of the water service pipes connecting the meter box and the structure.

304.4 Openings for pipes. In or on structures where openings have been made in walls, floors or ceilings for the passage of pipes, such openings shall be closed and protected by the installation of approved metal collars that are securely fastened to the adjoining structure.

SECTION 305 PROTECTION OF PIPES AND PLUMBING SYSTEM COMPONENTS

305.1 Corrosion. Pipes passing through concrete or cinder walls and floors or other corrosive material shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from lime and acid of concrete, cinder or other corrosive material. Sheathing or wrapping shall allow for expansion and contraction of piping to prevent any rubbing action. Minimum wall thickness of material shall be 0.025 inch (0.64 mm).

305.2 Breakage. Pipes passing through or under walls shall be protected from breakage.

305.3 Stress and strain. Piping in a plumbing system shall be installed so as to prevent strains and stresses that exceed the structural strength of the pipe. Where necessary, provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement.

305.4 Sleeves. Annular spaces between sleeves and pipes shall be filled or tightly caulked in an approved manner. Annular spaces between sleeves and pipes in fire-resistance-rated assemblies shall be filled or tightly caulked in accordance with the *Florida Building Code, Building*.

305.5 Pipes through or under footings or foundation walls. Any pipe that passes under a footing or through a foundation wall shall be provided with a relieving arch, or a pipe sleeve pipe shall be built into the foundation wall. Such sleeve shall be two pipe sizes greater than the pipe passing through the wall.

305.6 Freezing. Where the design temperature is less than 32°F (0°C), a water, soil or waste pipe shall not be installed outside of a building, in attics or crawl spaces, or be concealed in outside walls in any location subjected to freezing temperatures, unless adequate provision is made to protect them from freezing by insulation or heat or both. Water service pipe shall be installed not less than 12 inches (305 mm) deep or less than 6 inches (152 mm) below the frost line.

305.7 Waterproofing of openings. Joints at the roof, around vent pipes, shall be made water tight by the use of lead, copper, galvanized steel, aluminum, plastic or other approved flashings or flashing material. Exterior wall openings shall be made water tight.

305.8 Protection against physical damage. In concealed locations where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than $1\frac{1}{2}$ inches (38 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective shield plates shall be a minimum of $\frac{1}{16}$ -inch-thick (1.6 mm) steel, shall cover the area of the pipe where the member is notched or bored, and shall extend a minimum of 2 inches (51 mm) above sole plates and below top plates.

305.9 Protection of components of plumbing system. Components of a plumbing system installed along alleyways, driveways, parking garages or other locations exposed to damage shall be recessed into the wall or otherwise protected in an approved manner.

SECTION 306 TRENCHING, EXCAVATION AND BACKFILL

306.1 Support of piping. Buried piping shall be supported throughout its entire length.

306.2 Trenching and bedding. Where trenches are excavated such that the bottom of the trench forms the bed for the pipe, solid and continuous loadbearing support shall be provided between joints. Bell holes, hub holes and coupling holes shall be provided at points where the pipe is joined. Such pipe shall not be supported on blocks to grade. In instances where the materials manufacturer's installation instructions are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement.

Exception: Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.

SECTION 311 TOILET FACILITIES FOR WORKERS

311.1 General. Toilet facilities shall be provided for construction workers and such facilities shall be maintained in a sanitary condition. Construction worker toilet facilities of the nonsewer type shall conform to ANSI Z4.3.

SECTION 312 TESTS AND INSPECTIONS

312.1 Required tests. The permit holder shall make the applicable tests prescribed in Sections 312.2 through 312.9 to determine compliance with the provisions of this code. The permit holder shall give reasonable advance notice to the code official when the plumbing work is ready for tests. The equipment, material, power and labor necessary for the inspection and test shall be furnished by the permit holder and the permit holder shall be responsible for determining that the work will withstand the test pressure prescribed in the following tests. All plumbing system piping shall be tested with either water or air. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submitted to final tests. The code official shall require the removal of any cleanouts if necessary to ascertain if the pressure has reached all parts of the system.

312.2 Drainage and vent water test. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 5-foot (1524 mm) head of water. In testing successive sections, at least the upper 5 feet (1524 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 5 feet (1524 mm) of the system, shall have been submitted to a test of less than a 5-foot (1524 mm) head of water. The water shall be kept in the system, or in the portion under test, for at least 15 minutes before inspection starts. The system shall then be tight at all points.

312.3 Drainage and vent air test. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 pounds per square inch (psi) (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period.

312.4 Drainage and vent final test. The final test of the completed drainage and vent system shall be visual and in

sufficient detail to determine compliance with the provisions of this code except that the plumbing shall be subjected to a smoke test where necessary for cause. Where the smoke test is utilized, it shall be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack openings shall be closed and a pressure equivalent to a 1-inch water column (248.8 Pa) shall be maintained for 15 minutes before inspection starts.

312.5 Water supply system test. Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi (344 kPa). The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section 312 of this code.

312.6 Gravity sewer test. Gravity sewer tests shall consist of plugging the end of the building sewer at the point of connection with the public sewer, completely filling the building sewer with water from the lowest to the highest point thereof, and maintaining such pressure for 15 minutes. The building sewer shall be water tight at all points.

312.7 Forced sewer test. Forced sewer tests shall consist of plugging the end of the building sewer at the point of connection with the public sewer and applying a pressure of 5 psi (34.5 kPa) greater than the pump rating, and maintaining such pressure for 15 minutes. The building sewer shall be water tight at all points.

312.8 Storm drainage system test. Storm drain systems within a building shall be tested by water or air in accordance with Section 312.2 or Section 312.3.

312.9 Inspection and testing of backflow prevention assemblies. Inspections shall be made of all backflow prevention assemblies to determine whether they are operable. Reduced pressure principle backflow preventer assemblies, double check-valve assemblies, double-detector check-valve assemblies and pressure vacuum breaker assemblies shall be tested. The frequency of testing shall be determined in accordance with the manufacturer's installation instructions. Where the manufacturer of the assembly does not specify the frequency of testing, the assembly shall be tested at least annually. The testing procedure shall be performed in accordance with one of the following standards:

- ASSE 5010-1013-1, Sections 1 and 2
- ASSE 5010-1015-1, Sections 1 and 2
- ASSE 5010-1015-2
- ASSE 5010-1015-3, Sections 1 and 2
- ASSE 5010-1015-4, Sections 1 and 2
- ASSE 5010-1020-1, Sections 1 and 2
- ASSE 5010-1047-1, Sections 1, 2, 3 and 4
- ASSE 5010-1048-1, Sections 1, 2, 3 and 4
- ASSE 5010-1048-2

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ASSE 5010-1048-3, Sections 1, 2, 3 and 4
ASSE 5010-1048-4, Sections 1, 2, 3 and 4
CSA B64.10.

**SECTION 313
PUBLIC FOOD SERVICE ESTABLISHMENTS
AND FOOD ESTABLISHMENTS**

313.1 Requirements. Public food service establishments and food establishments, as defined in Chapter 381 Florida Statutes, Chapter 500 Florida Statutes and Chapter 509 Florida Statutes, shall comply with the applicable code requirements found in the *Florida Building Code, Building*, Chapter 4, Special Occupancy.

**SECTION 314
IRRIGATION**

314.1 General. Irrigation/sprinkler systems and risers for spray heads shall not be installed within 1 foot (305 mm) of the building sidewall.

CHAPTER 4 FIXTURES, FAUCETS AND FIXTURE FITTINGS

SECTION 401 GENERAL

401.1 Scope. This chapter shall govern the materials, design and installation of plumbing fixtures, faucets and fixture fittings in accordance with the type of occupancy, and shall provide for the minimum number of fixtures for various types of occupancies.

401.2 Prohibited fixtures and connections. Pan, valve, plunger, offset, washout, latrine, frostproof and other water closets having a concealed trap seal or an unventilated space or having walls that are not thoroughly washed at each discharge shall be prohibited. Any water closet that permits siphonage of the contents of the bowl back into the tank shall be prohibited. Trough urinals shall be prohibited.

401.3 Water conservation. The maximum water flow rates and flush volume for plumbing fixtures and fixture fittings shall comply with Section 604.4.

SECTION 402 FIXTURE MATERIALS

402.1 Quality of fixtures. Plumbing fixtures shall be constructed of approved materials, with smooth, impervious surfaces, free from defects and concealed fouling surfaces, and

shall conform to standards cited in this code. All porcelain enameled surfaces on plumbing fixtures shall be acid resistant.

402.2 Materials for specialty fixtures. Materials for specialty fixtures not otherwise covered in this code shall be of stainless steel, soapstone, chemical stoneware or plastic, or shall be lined with lead, copper-base alloy, nickel-copper alloy, corrosion-resistant steel or other material especially suited to the application for which the fixture is intended.

402.3 Sheet copper. Sheet copper for general applications shall conform to ASTM B 152 and shall not weigh less than 12 ounces per square foot (3.7 kg/m²)

402.4 Sheet lead. Sheet lead for pans shall not weigh less than 4 pounds per square foot (19.5 kg/m²) coated with an asphalt paint or other approved coating.

SECTION 403 MINIMUM PLUMBING FACILITIES

403.1 Minimum number of fixtures. Plumbing fixtures shall be provided for the type of occupancy and in the minimum number shown in Table 403.1. Types of occupancies not shown in Table 403.1 shall be considered individually by the code official. The number of occupants shall be determined by the building code. Occupancy classification shall be determined in accordance with the *Florida Building Code, Building*.

**TABLE 403.1
MINIMUM NUMBER OF PLUMBING FACILITIES^a**
(See Sections 403.2 and 403.3)

OCCUPANCY		WATER CLOSETS (Urinals see Section 419.2)		LAVATORIES	BATHTUBS/ SHOWERS	DRINKING FOUNTAINS (see Section 410.1)	OTHERS
		Male	Female				
A	Nightclubs	1 per 40	1 per 40	1 per 75	---	1 per 500	1 service sink
	Restaurants ^g	1 per 75	1 per 75	1 per 200	---	1 per 500	1 service sink
S	Theatres, Halls, museums, etc. ^g	1 per 125	1 per 65	1 per 200	---	1 per 500	1 service sink
S	Coliseums, arenas (less than 3,000 seats)	1 per 75	1 per 40	1 per 150	---	1 per 1,000	1 service sink
	Coliseums, arenas (3,000 seats or greater) ^g	1 per 120	1 per 60	Male 1 per 200 Female 1 per 150	---	1 per 1,000	1 service sink
M	Churches ^{b, g}	1 per 150	1 per 75	1 per 200	---	1 per 1,000	1 service sink
B	Stadiums, (less than 3,000 seats), pools, etc. ^{g, h}	1 per 100	1 per 50	1 per 150	---	1 per 1,000	1 service sink
	Stadiums (3,000 seats or greater) ^g	1 per 150	1 per 75	Male 1 per 200 Female 1 per 150	---	1 per 1,000	1 service sink
Y	Business (see Sections 403.2, 403.4 and 403.5)	1 per 50		1 per 80	---	1 per 100	
	Educational	1 per 50		1 per 50	---	1 per 100	1 service sink
	Factory and industrial	1 per 100		1 per 100	(See Section 411)	1 per 400	1 service sink
	Passenger terminals and transportation facilities	1 per 500		1 per 750	---	1 per 1,000	1 service sink

(continued)

TABLE 403.1--continued
 MINIMUM NUMBER OF PLUMBING FACILITIES a
 (See Sections 403.2 and 403.3)

OCCUPANCY	WATER CLOSETS (Urinals see Section 419.2)		LAVATORIES	BATHTUBS/ SHOWERS	DRINKING FOUNTAINS (see Section 410.1)	OTHERS	
	Male	Female					
I N S T I T U T I O N A L	Residential care	1 per 10		1 per 10	1 per 8	1 per 100	1 service sink
	Hospitals, ambulatory nursing home patients ^c	1 per room ^d		1 per room ^d	1 per 15	1 per 100	1 service sink per floor
	Day nurseries, sanitariums, nonambulatory nursing home patients, etc. ^c	1 per 15		1 per 15	1 per 15 ^e	1 per 100	1 service sink
	Employees, other than residential care ^c	1 per 25		1 per 35	---	1 per 100	---
	Visitors, other than residential care	1 per 75		1 per 100	---	1 per 500	---
	Prisons ^c	1 per cell		1 per cell	1 per 15	1 per 100	1 service sink
	Asylums, reformatories, etc. ^c	1 per 15		1 per 15	1 per 15	1 per 100	1 service sink
Mercantile (see Sections 403.2, 403.4 and 403.5)		1 per 500		1 per 750	---	1 per 1,000	
R E S I D E N T I A L	Hotels, motels	1 per guestroom		1 per guestroom	1 per guestroom	--	1 service sink
	Lodges	1 per 10		1 per 10	1 per 8	1 per 100	1 service sink
	Multiple family	1 per dwelling unit		1 per dwelling unit	1 per dwelling unit	---	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
	Dormitories	1 per 10		1 per 10	1 per 8	1 per 100	1 service sink
	One- and two-family dwellings	1 per dwelling unit		1 per dwelling unit	1 per dwelling unit	---	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit ^f
	Storage (see Sections 403.2, 403.4)	1 per 100		1 per 100	(see Section 411)	1 per 1,000	1 service sink

- a The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated, The number of occupants shall be determined by the *Florida Building Code, Building*.
- b Fixtures located in adjacent buildings under the ownership or control of the church shall be made available during periods the church is occupied.
- c Toilet facilities for employees shall be separate from facilities for inmates or patients.
- d A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient rooms shall be permitted where such room is provided with direct access from each patient room and with provisions for privacy.
- e For day nurseries, a maximum of one bathtub shall be required.
- f For attached one- and two-family dwellings, one automatic clothes washer connection shall be required per 20 dwelling units.
- g In assembly and mercantile occupancies, a unisex toilet room, in accordance with Section 403.7, shall be provided where an aggregate of six or more male and female water closets are required. In buildings of mixed occupancy, only those water closets required for the assembly or mercantile occupancy shall be used to determine the unisex toilet room requirement.
- h In recreational facilities where separate-sex bathing rooms are provided, a unisex bathing room in accordance with Section 403.7, shall be provided. Where each separate sex bathing room has only one shower or bathtub fixture, a unisex bathing room is not required.

403.1.1 Potty parity. In assembly occupancies, restrooms which are open to the public must have a ratio of 3 to 2 water closets provided for women as the combined total of water closets and urinals provided for men, unless these are two or fewer such fixtures for men, in accordance with 553.141 Florida Statutes.

Exception: This section does not apply to establishments licensed under Chapter 509 Florida Statutes if the establishment does not provide meeting or banquet rooms which accommodate more than 150 people, 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.

403.1.1.1 Definitions from Section 553.141, Florida Statutes, regarding scope.

- 1. New construction.** Means new construction, building, alteration, rehabilitation, or repair that equals or exceeds 50 percent of the replacement value existing on October 1, 1992, unless the same was under design or construction, or under construction contract before October 1, 1992.
- 2. Assembly occupancy.** The use of a building or structure, or any portion thereof, for the gathering together of people for purposes such as civic, social or religious functions or for recreation, or for food or drink consumption or awaiting transportation.

CHAPTER 5 WATER HEATERS

SECTION 501 GENERAL

501.1 Scope. The provisions of this chapter shall govern the materials, design and installation of water heaters and the related safety devices and appurtenances.

501.2 Water heater as space heater. A water heater used as a part of a space heating system shall have a maximum outlet water temperature of 160°F (71°C). The potability of the water shall be maintained throughout the system.

501.3 Drain valves. Drain valves for emptying shall be installed at the bottom of each tank-type water heater and hot water storage tank. Drain valves shall conform to ASSE 1005.

501.4 Location. Water heaters and storage tanks shall be located and connected so as to provide access for observation, maintenance, servicing and replacement.

501.5 Water heater labeling. All water heaters shall bear the label of an approved agency.

501.6 Water temperature control in piping from tankless heaters. The temperature of water from tankless water heaters shall be a maximum of 140°F (60°C) when intended for domestic uses. This provision shall not supersede the requirement for protective shower valves in accordance with Section 424.4.

501.7 Pressure marking of storage tanks. Storage tanks and water heaters installed for domestic hot water shall have the maximum allowable working pressure clearly and indelibly stamped in the metal or marked on a plate welded thereto or otherwise permanently attached. Such markings shall be in an accessible position outside of the tank so as to make inspection or reinspection readily possible.

501.8 Temperature controls. All hot water supply systems shall be equipped with automatic temperature controls capable of adjustments from the lowest to the highest acceptable temperature settings for the intended temperature operating range.

SECTION 502 INSTALLATION

502.1 General. Water heaters shall be installed in accordance with the manufacturer's installation instructions. Gas- and oil-fired water heaters shall conform to the requirements of this code and the *Florida Building Code, Mechanical*, or the *Florida Building Code, Fuel Gas*. Electric water heaters shall conform to the requirements of this code and the provisions of NFPA 70 listed in Chapter 14.

502.2 Water heaters installed in garages. Water heaters shall be installed in accordance with the manufacturer's installation instructions which shall be available on the job site at the time of inspection.

502.3 Rooms used as a plenum. Water heaters using solid, liquid or gas fuel shall not be installed in a room containing air-handling machinery when such room is used as a plenum.

502.4 Prohibited location. Fuel-fired water heaters shall not be installed in a sleeping room, bathroom or a closet accessed through a sleeping room or bathroom.

Exception: A sealed combustion chamber or direct vent water heater may be installed in a sleeping room, bathroom or closet accessed through a sleeping room or bathroom.

502.5 Water heaters installed in attics. Attics containing a water heater shall be provided with an opening and unobstructed passageway large enough to allow removal of the water heater. The passageway shall not be less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not than 20 feet (6096 mm) in length when measured along the centerline of the passageway from the opening to the water heater. The passageway shall have continuous solid flooring not less than 24 inches (610 mm) wide. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the water heater. The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 762 mm) where such dimensions are large enough to allow removal of the water heater.

SECTION 503 CONNECTIONS

503.1 Cold water line valve. The cold water branch line from the main water supply line to each hot water storage tank or water heater shall be provided with a valve accessible on the same floor, located near the equipment and only serving the hot water storage tank or water heater. The valving shall not interfere or cause a disruption of the cold water supply to the remainder of the cold water system.

503.2 Water circulation. The method of connecting a circulating water heater to the tank shall provide proper circulation of water through the water heater. The pipe or tubes required for the installation of appliances that will draw from the water heater or storage tank shall comply with the provisions of this code for material and installation.

SECTION 504 SAFETY DEVICES

504.1 Antisiphon devices. An approved means shall be provided to prevent siphoning of any storage water heater or tank. A cold water “dip” tube with a hole at the top or a vacuum relief valve installed in the cold water supply line above the top of the heater or tank shall be approved for this purpose.

504.2 Vacuum relief valve. Bottom fed water heaters and bottom fed tanks connected to water heaters shall have a vacuum relief valve installed. The vacuum relief valve shall comply with ANSI Z21.22.

504.3 Energy cutoff device. All automatically controlled water heaters shall be equipped with an energy cutoff device that will cut off the supply of heat energy to the water tank before the temperature of the water in the tank exceeds 210°F (99°C). This cutoff device shall be required in addition to the temperature and pressure relief valves.

504.4 Shutdown. A separate switch shall be provided to terminate the energy supplied to electric hot water supply systems. A separate valve shall be provided to turn off the energy supplied to the main burner of all other types of hot water supply systems.

504.5 Relief valve. All storage water heaters operating above atmospheric pressure shall be provided with an approved, self-closing (levered) pressure relief valve and temperature relief valve or combination thereof. The relief valve shall conform to ANSI Z21.22. The relief valve shall not be used as a means of controlling thermal expansion.

504.5.1 Installation. Such valves shall be installed in the shell of the water heater tank. Temperature relief valves shall be so located in the tank as to be actuated by the water in the top 6 inches (152 mm) of the tank served. For installations with separate storage tanks, the valves shall be installed on the tank and there shall not be any type of valve installed between the water heater and the storage tank. There shall not be a check valve or shutoff valve between a relief valve and the heater or tank served.

504.6 Relief valve approval. Temperature and pressure relief valves, or combinations thereof, and energy cutoff devices shall bear the label of an approved agency and shall have a temperature setting of not more than 210°F (99°C) and a pressure setting not exceeding the tank or water heater manufacturer’s rated working pressure or 150 psi (1035 kPa), whichever is less. The relieving capacity of each pressure relief valve and each temperature relief valve shall equal or exceed the heat input to the water heater or storage tank.

504.7 Relief outlet waste. The outlet of a pressure, temperature or other relief valve shall not be directly connected to the drainage system.

504.7.1 Discharge. The relief valve shall discharge full size to a safe place of disposal such as the floor, outside the building or an indirect waste receptor. The discharge pipe shall not have any trapped sections and shall have a visible air gap or air gap fitting located in the same room as the water heater. The discharge shall be installed in a manner that does not cause personal injury to occupants in the immediate area or structural damage to the building.

504.7.2 Materials. Relief valve discharge piping shall be of those materials listed in Section 605.5 or shall be tested, rated and approved for such use in accordance with ASME A112.4.1. Piping from safety pan drains shall be of those materials listed in Table 605.5.

504.8 Required pan. Where water heaters or hot water storage tanks are installed above the ground floor space, or in attics or ceiling areas, the tank or water heater shall be installed in a galvanized steel or other metal pan of equal corrosion resistance having a minimum thickness of 24 gage, 0.0276 inch (0.70 mm). Electric water heaters shall be installed in a metal pan as herein required or in a high-impact plastic pan of at least 0.0625 inch (1.59 mm) thickness.

504.8.1 Pan size and drain. The pan shall not be less than 1½ inches (38 mm) deep and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe having a minimum diameter of ¾ inch.

504.8.2 Pan drain termination. The pan drain shall extend full-size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate not less than 6 inches (152 mm) or more than 24 inches (610 mm) above the adjacent ground surface.

SECTION 505 INSULATION

505.1 Unfired vessel insulation. Unfired hot water storage tanks shall be insulated so that heat loss is limited to a maximum of 15 British thermal units per hour (Btu/h) per square foot (47 W/m²) of external tank surface area. For purposes of determining this heat loss, the design ambient temperature shall not be higher than 65°F (18°C).

604.4 Maximum flow and water consumption. The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4. Water consumption for water closets listed in the following exceptions shall not be greater than 4 gallons (15 L) per flushing cycle. Water consumption for urinals listed in the following exceptions shall not be greater than 1.5 gallons (5.7 L) per flushing cycle.

Exceptions:

1. Blowout design fixtures.
2. Penalware.
3. Clinical sinks.
4. Service sinks.
5. Emergency showers.
6. Water closets provided for the public in theaters, nightclubs, restaurants, halls, museums, coliseums, arenas, churches, stadiums and similar occupancies.
7. Water closets provided for patients and residents in hospitals, nursing homes, sanitariums and similar occupancies.
8. Water closets provided for inmates and residents in prisons, asylums, reformatories and similar occupancies.

**TABLE 604.4
MAXIMUM FLOW RATES AND CONSUMPTION
FOR PLUMBING FIXTURES AND FIXTURE FITTINGS**

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY ^a
Lavatory, private	2.5 gpm at 80 psi
Lavatory, public	0.5 gpm at 80 psi
Lavatory, public, metering or self-closing	0.25 gallon per metering cycle
Shower head	2.5 gpm at 80 psi
Sink faucet	2.5 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gpm = 3.785 L/m, 1 psi = 6.895 kPa.

^a Consumption tolerances shall be determined from referenced standards.

604.5 Size of fixture supply. The minimum size of a fixture supply pipe shall be as shown in Table 604.5. The fixture supply pipe shall not terminate more than 30 inches (762 mm) from the point of connection to the fixture. A reduced-size flexible connector installed between the supply pipe and the fixture shall be of an approved type. The supply pipe shall extend to the floor or wall adjacent to the fixture. The minimum size of individual distribution lines utilized in parallel water distribution systems shall be as shown in Table 604.5.

604.6 Variable street pressures. Where street water main pressures fluctuate, the building water distribution system shall be designed for the minimum pressure available.

**TABLE 604.5
MINIMUM SIZES OF FIXTURE WATER SUPPLY PIPES**

FIXTURE	MINIMUM PIPE SIZE (inch)
Bathtubs (60" × 32" and smaller) ^a	1/2
Bathtubs (larger than 60" × 32")	1/2
Bidet	3/8
Combination sink and tray	1/2
Dishwasher, domestic ^a	1/2
Drinking fountain	3/8
Hose bibbs	1/2
Kitchen sink ^a	1/2
Laundry, 1, 2 or 3 compartments ^a	1/2
Lavatory	3/8
Shower, single head ^a	1/2
Sinks, flushing rim	3/4
Sinks, service	1/2
Urinal, flush tank	1/2
Urinal, flush valve	3/4
Wall hydrant	1/2
Water closet, flush tank	3/8
Water closet, flush valve	1
Water closet, flushometer tank	3/8
Water closet, one piece ^a	1/2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psi = 6.895 kPa.

^a Where the developed length of the distribution line is 60 feet or less, and the available pressure at the meter is a minimum of 35 psi, the minimum size of an individual distribution line supplied from a manifold and installed as part of a parallel water distribution system shall be one nominal tube size smaller than the sizes indicated.

604.7 Inadequate water pressure. Wherever water pressure from the street main or other source of supply is insufficient to provide flow pressures at fixture outlets as required under Section 604.3, a water pressure booster system conforming to Section 606.5, shall be installed on the building water supply system.

604.8 Water pressure reducing valve or regulator. Where water pressure within a building exceeds 80 psi (552 kPa) static, an approved water pressure reducing valve conforming to ASSE 1003 with strainer shall be installed to reduce the pressure in the building water distribution piping to 80 psi (552 kPa) static or less. Exceptions to this requirement are service lines to sill cocks and outside hydrants, and main supply risers where pressure from the mains is reduced to 80 psi (552 kPa) or less at individual fixtures.

604.8.1 Valve design. The pressure reducing valve shall be designed to remain open to permit uninterrupted water flow in case of valve failure.

604.8.2 Repair and removal. All water pressure reducing valves, regulators and strainers shall be so constructed and installed as to permit repair or removal of parts without breaking a pipeline or removing the valve and strainer from the pipeline.

604.9 Water hammer. The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. A water-hammer arrestor shall be installed

where quick-closing valves are utilized, unless otherwise approved. Water-hammer arrestors shall be installed in accordance with the manufacturer’s specifications. Water-hammer arrestors shall conform to ASSE 1010.

604.10 Parallel water distribution system manifolds. Hot water and cold water manifolds installed with parallel connected individual distribution lines to each fixture or fixture fitting shall be designed in accordance with Sections 604.10.1 through 604.10.3.

604.10.1 Manifold sizing. Hot water and cold water manifolds shall be sized in accordance with Table 604.10.1. The total gallons per minute is the demand of all outlets supplied.

**TABLE 604.10.1
MANIFOLD SIZING**

NOMINAL SIZE INTERNAL DIAMETER (Inches)	MAXIMUM DEMAND (gpm)	
	Velocity at 4 feet per second	Velocity at 8 feet per second
1/2	2	5
3/4	6	11
1	10	20
1 1/4	15	31
1 1/2	22	44

For SI: 1 inch = 25.4 mm, 1 gpm= 3.785 L/m, 1 foot per second = 0.305 m/s.

604.10.2 Valves. Individual fixture shutoff valves installed at the manifold shall be identified as to the fixture being supplied.

604.10.3 Access. Access shall be provided to manifolds.

**SECTION 605
MATERIALS, JOINTS AND CONNECTIONS**

605.1 Water compatibility. Water service pipe and water distribution pipe shall be resistant to corrosive action and degrading action from the potable water supplied by the water purveyor or individual water supply system.

605.2 Soil and ground water. The installation of a water service pipe shall be prohibited in soil and ground water contaminated with solvents, fuels, organic compounds or other detrimental materials causing permeation, corrosion, degradation or structural failure of the piping material. Where detrimental conditions are suspected, a chemical analysis of the soil and ground water conditions shall be required to ascertain the acceptability of the water service material for the specific installation. Where detrimental conditions exist, approved alternative materials or routing shall be required.

605.3 Lead content of water supply pipe and fittings. Pipe and pipe fittings, including valves and faucets, utilized in the water supply system shall have a maximum of 8 percent lead content.

605.4 Water service pipe. Water service pipe shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.4. All water service pipe or tubing, installed underground and outside of the structure, shall have a minimum working pressure rating of 160 psi (1100 kPa) at 73.4°F (23°C). Where the water pressure exceeds 160 psi (1100 kPa), piping material shall have a minimum rated working pressure equal to the highest available pressure. Plastic water service piping shall terminate within 5 feet (1524 mm) inside the point of entry into a building. All ductile iron water pipe shall be cement mortar lined in accordance with AWWA C104.

**TABLE 605.4
WATER SERVICE PIPE**

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D 1527; ASTM D 2282
Asbestos-cement pipe	ASTM C 296
Brass pipe	ASTM B 43
Copper or copper-alloy pipe	ASTM B 42; ASTM B 302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B 75; ASTM B 88; ASTM B 251; ASTM B 447
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D 2846; ASTM F 441; ASTM F 442; CSA B137.6
Ductile iron water pipe	AWWA C151
Galvanized steel pipe	ASTM A 53
Polybutylene (PB) plastic pipe and tubing	ASTM D 2662; ASTM D 2666; ASTM D 3309; CSA B137.8
Polyethylene (PE) plastic pipe	ASTM D 2239; CSA CAN/CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D 2737; CSA B137.1
Cross-linked polyethylene (PEX) plastic tubing	ASTM F 876; ASTM F 877; CSA CAN/CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F 1281; CSA CAN/CSA B137.10
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F 1282; CSA CAN/CSA B137.9
Polyvinyl chloride (PVC) plastic pipe	ASTM D 1785; ASTM D 2241; ASTM D 2672; CSA CAN/CSA B137.3

605.5 Water distribution pipe. Water distribution pipe shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.5. All hot water distribution pipe and tubing shall have a minimum pressure rating of 100 psi (690 kPa) at 180°F (82°C).

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

608.16 Connections to the potable water system.

Connections to the potable water system shall conform to Sections 608.16.1 through 608.16.9.

608.16.1 Beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a double check valve with an intermediate atmospheric vent conforming to ASSE 1012 or ASSE 1022. The double check valve with an intermediate atmospheric vent device and the piping downstream therefrom shall not be affected by carbon dioxide gas. Secondary protection in the form of a dual check valve conforming to ASSE 1032 shall be installed on the beverage-dispensing equipment.

608.16.2 Connections to boilers. The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CSA CAN/CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection shall be protected by an air gap or a reduced pressure principle backflow preventer, complying with ASSE 1013, CSA CAN/CSA B64.4 or AWWA C511.

608.16.3 Heat exchangers. Heat exchangers utilizing an essentially toxic transfer fluid shall be separated from the potable water by double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single-wall construction.

608.16.4 Connections to automatic fire sprinkler systems and standpipe systems. The potable water supply to automatic fire sprinkler and standpipe systems shall be protected against backflow by a double check-valve assembly or a reduced pressure principle backflow preventer.

Exceptions:

1. Where systems are installed as a portion of the water distribution system in accordance with the requirements of this code and are not provided with a fire department connection, isolation of the water supply system shall not be required.
2. Isolation of the water distribution system is not required for deluge, preaction or dry pipe systems.

608.16.4.1 Additives or nonpotable source. Where systems contain chemical additives or antifreeze, or where systems are connected to a nonpotable secondary water supply, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer. Where chemical additives or antifreeze are added to only a portion of an automatic fire sprinkler or standpipe system, the reduced pressure principle backflow preventer shall be permitted to be located so as to isolate that portion of the system.

608.16.5 Connections to lawn irrigation systems. The potable water supply to lawn irrigation systems shall be protected against backflow by an atmospheric-type vacuum breaker, a pressure-type vacuum breaker or a reduced pressure principle backflow preventer. A valve shall not be installed downstream from an atmospheric vacuum breaker. Where chemicals are introduced into the system, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer.

608.16.6 Connections subject to back pressure. Where a potable water connection is made to a nonpotable line, fixture, tank, vat, pump or other equipment subject to back pressure, the potable water connection shall be protected by a reduced pressure principle backflow preventer.

608.16.7 Chemical dispensers. Where chemical dispensers connect to the water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, Section 608.13.2, Section 608.13.3, Section 608.13.5, Section 608.13.6 or Section 608.13.8.

608.16.8 Portable cleaning equipment. Where the portable cleaning equipment connects to the water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, Section 608.13.2, Section 608.13.3, Section 608.13.7 or Section 608.13.8.

608.16.9 Dental pump equipment. Where dental pumping equipment connects to the water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, Section 608.13.5, Section 608.13.6 or Section 608.13.8.

Section 608.17 Reserved.



SECTION 609 HEALTH CARE PLUMBING

609.1 Scope. This section shall govern those aspects of health care plumbing systems that differ from plumbing systems in other structures. Health care plumbing systems shall conform to the requirements of this section in addition to the other requirements of this code. The provisions of this section shall apply to the special devices and equipment

installed and maintained in the following occupancies: nursing homes, homes for the aged, orphanages, infirmaries, first aid stations, psychiatric facilities, clinics, professional offices of dentists and doctors, mortuaries, educational facilities, surgery, dentistry, research and testing laboratories, establishments manufacturing pharmaceutical drugs and medicines, and other structures with similar apparatus and equipment classified as plumbing.

609.2 Water service. All hospitals shall have two water service pipes installed in such a manner so as to minimize the potential for an interruption of the supply of water in the event of a water main or water service pipe failure.

609.3 Hot water. Hot water shall be provided to supply all of the hospital fixture, kitchen and laundry requirements. Special fixtures and equipment shall have hot water supplied at a temperature specified by the manufacturer. The hot water system shall be installed in accordance with Section 607.

609.4 Vacuum breaker installation. Vacuum breakers shall be installed a minimum of 6 inches (152 mm) above the flood level rim of the fixture or device in accordance with Section 608. The flood level rim of hose connections shall be the maximum height at which any hose is utilized.

609.5 Prohibited water closet and clinical sink supply. Jet- or water-supplied orifices, except those supplied by the flush connections, shall not be located in or connected with a water closet bowl or clinical sink. This section shall not prohibit an approved bidet installation.

609.6 Clinical, hydrotherapeutic and radiological equipment. All clinical, hydrotherapeutic, radiological or any equipment that is supplied with water or that discharges to the waste system shall conform to the requirements of this section and Section 608.

609.7 Condensate drain trap seal. A water supply shall be provided for cleaning, flushing and resealing the condensate trap, and the trap shall discharge through an air gap in accordance with Section 608.

609.8 Valve leakage diverter. Each water sterilizer filled with water through directly connected piping shall be equipped with an approved leakage diverter or bleed line on the water supply control valve to indicate and conduct any leakage of unsterile water away from the sterile zone.

SECTION 610

DISINFECTION OF POTABLE WATER SYSTEM

610.1 General. New or repaired potable water systems shall be purged of deleterious matter and, where required by the Administrative Authority, disinfected prior to utilization. The method to be followed shall be that prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in

either AWWA C651 or AWWA C652, or as described in this section. This requirement shall apply to “on-site” or “in-plant” fabrication of a system or to a modular portion of a system.

1. The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.
2. The system or part thereof shall be filled with a water/chlorine solution containing at least 50 parts per million (50 mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing at least 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.
3. Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.
4. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.

SECTION 611

WATER TREATMENT UNITS

611.1 When reduction of aesthetic contaminants, such as chlorine, taste, odor, or sediment are claimed, the drinking water treatment units must meet the requirements of NSF 42, *Drinking Water Treatment Units-Aesthetic Effects*, or Water Quality Association Standard S-200, *Household and Commercial Water Filters (In-Line)*. When reduction of regulated health contaminants is claimed, such as inorganic or organic chemicals, or radiological substances, the drinking water treatment unit must meet the requirements of NSF Standard 53, *Drinking Water Treatment Units-Health Effects*.

611.2 Reverse osmosis drinking water treatment systems shall meet the requirements of NSF 58, *Reverse Osmosis Drinking Water Treatment Units*, or Water Quality Association Standard S-300, *Point-of-Use Low Pressure Reverse Osmosis Drinking Water Systems*.

611.3 When reduction of regulated health contaminants is claimed, such as inorganic or organic chemicals, or radiological substances, the reverse osmosis drinking water treatment unit must meet the requirements of NSF Standard 58, *Reverse Osmosis Drinking Water Treatment Systems*.

611.4 Waste or discharge from reverse osmosis or other types of water treatment units must enter the drainage system through an air gap or be equipped with an equivalent back-flow-prevention device.

SECTION 612

WELL PUMPS AND TANKS USED FOR PRIVATE POTABLE WATER SYSTEMS

612.1 Pumps. Well pumps used for potable water shall comply with Sections 612.1.1 and 612.1.2

**TABLE 612.1
MINIMUM PRIVATE POTABLE WATER SYSTEM PUMP SIZE**

Minimum pump size	BATHROOMS IN HOME				
	1	1 ^{1/2}	2 - 2 ^{1/2}	3-4	5-6
	7 gpm	10 gpm	14 gpm	17 gpm	21 gpm

Notes:

1. Values given are average and do not include higher or low extremes.
2. Installations over 6 bathrooms shall be approved by the code official.

612.1.1 Pump installation. Pumps shall be installed for operation without re-priming or breaking suction. Pumps shall be connected to the well head by means of a union, companion flange or compression coupling in such a manner that it is accessible for maintenance, repair, and removal.

612.1.2 Pump sizing. Minimum pump size shall be determined by Table 612.1.

612.2 Pressure tanks. Tanks relying on expansion of a flexible membrane within a restricting container, or tanks with direct water-to-air interface to provide pressure in the water system, shall be used. All pressure tanks for storing potable water under pressure, including those having an air-space for pressure for expansion, shall be identified by seal, label or plate indicating the manufacturer's name and model number and shall meet the following specifications:

1. Pressure tank drawdown shall be a minimum of 1 gallon for every gallon per minute produced by the pump.

Exceptions: Pump start applications, constant pressure devices, and variable speed pumps.

2. Pressure tanks shall be constructed of steel, fiberglass, or comparable materials. Tanks to be buried shall be built by the manufacturer specifically for underground use. Fiber glass or other non-metallic tanks to be buried shall have the structural strength to prevent collapse.

612.3 Piping. Piping associated with pumps and tanks shall comply with Sections 612.3.1 through 612.3.3

612.3.1 Drop pipe. The drop pipe from the submersible pump to the first fitting past the well seal shall be either galvanized steel, stainless steel, or PVC Schedule 80 threaded/coupled or lock joint pipe. The drop pipe for a single pipe, deep well jet pump shall be either galvanized steel or stainless steel. The drop pipe for a double pipe, deep well jet pump shall be either galvanized steel on the suction side and/or minimum PVC schedule 40 on the pressure side.

612.3.2 Pump discharge pipe sizing. For submersible pumps, pipe size shall be equal to the pump discharge. Piping for all other types of pumps shall be sized in accordance with the pump manufacturer's specifications.

612.3.3 Pressure tank pipe sizing. Piping size for the offset of the pressure tank shall use the piping friction loss charts for the piping material used.

612.4. Electrical wiring. All wiring shall be installed in accordance with Chapter 27 of the *Florida Building Code, Building*.

612.5 Disinfection. The pump installer shall disinfect any potable well and water system in accordance with Section 610.

612.6 Valves. A pressure relief valve shall be installed on any pumping system that can produce pressures of 75 psi or greater. A check valve shall be installed at the well head of submersible pumps.

CHAPTER 10

TRAPS, INTERCEPTORS AND SEPARATORS

SECTION 1001 GENERAL

1001.1 Scope. This chapter shall govern the material and installation of traps, interceptors and separators.

SECTION 1002 TRAP REQUIREMENTS

1002.1 Fixture traps. Each plumbing fixture shall be separately trapped by a water-seal trap, except as otherwise permitted by this code. The trap shall be placed as close as possible to the fixture outlet. The vertical distance from the fixture outlet to the trap weir shall not exceed 24 inches (610 mm). The distance of a clothes washer standpipe above a trap shall conform to Section 802.4. A fixture shall not be double trapped. An automatic clothes washer or laundry tub shall not discharge to a trap serving a kitchen sink.

Exceptions:

1. This section shall not apply to fixtures with integral traps.
2. A combination plumbing fixture is permitted to be installed on one trap provided that one compartment is not more than 6 inches (152 mm) deeper than the other compartment and the waste outlets are not more than 30 inches (762 mm) apart.
3. A grease trap intended to serve as a fixture trap in accordance with the manufacturer's installation instructions shall be permitted to serve as the trap for a single fixture or a combination sink of not more than three compartments where the vertical distance from the fixture outlet to the inlet of the interceptor does not exceed 30 inches (762 mm), and the developed length of the waste pipe from the most upstream fixture outlet to the inlet of the interceptor does not exceed 60 inches (1524 mm).

1002.2 Design of traps. Fixture traps shall be self-scouring. Fixture traps shall not have interior partitions, except where such traps are integral with the fixture or where such traps are constructed of an approved material that is resistant to corrosion and degradation. Slip joints shall be made with an approved elastomeric gasket and shall only be installed on the trap inlet, trap outlet and within the trap seal.

1002.3 Prohibited traps. The following types of traps are prohibited:

1. Traps that depend on moving parts to maintain the seal.
2. Bell traps.
3. Crown-vented traps.
4. Separate fixture traps that depend on interior partitions for the seal, except those traps constructed of an

approved material that is resistant to corrosion and degradation.

5. "S" traps.
6. Drum traps, except where approved.

1002.4 Trap seals. Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm), or deeper for special designs relating to accessible fixtures. Where a trap seal is subject to loss by evaporation, a deep-seal trap consisting of a 4-inch (102 mm) seal or a trap seal primer valve shall be installed. A trap seal primer valve shall conform to ASSE 1018 or ASSE 1044.

1002.5 Size of fixture traps. Fixture trap size shall be sufficient to drain the fixture rapidly and not less than the size indicated in Table 709.1. A trap shall not be larger than the drainage pipe into which the trap discharges.

1002.6 Building traps. Building (house) traps shall not be installed, except where required by the code official. Where installed, each building trap shall be provided with a cleanout and a relief vent or fresh air intake on the inlet side of the trap. The size of the relief vent or fresh air intake shall not be less than one-half the diameter of the drain to which the relief vent or air intake connects. Such relief vent or fresh air intake shall be carried above grade and shall be terminated in a screened outlet located outside the building.

1002.7 Trap setting and protection. Traps shall be set level with respect to the trap seal and, where necessary, shall be protected from freezing.

1002.8 Recess for trap connection. A recess provided for connection of the underground trap, such as one serving a bathtub in slab-type construction, shall have sides and a bottom of corrosion-resistant, insect- and vermin-proof construction.

1002.9 Acid-resisting traps. Where a vitrified clay or other brittleware, acid-resisting trap is installed underground, such trap shall be embedded in concrete extending 6 inches (152 mm) beyond the bottom and sides of the trap.

1002.10 Plumbing in mental health centers. In mental health centers, pipes and traps shall not be exposed.

SECTION 1003 INTERCEPTORS AND SEPARATORS

1003.1 General. Interceptors and separators shall be provided to prevent the discharge of oil, grease, sand and other substances harmful or hazardous to the building drainage system, the public sewer or sewage treatment plant, or processes.

1003.2 Approval. The size, type and location of each interceptor and of each separator shall be approved by the plumbing official. Where the interceptor or separator is located within a private sewage disposal system, such interceptor or separator shall be approved by the health official. The interceptor or separator shall, be designed and installed in accordance with the manufacturer's instructions and the requirements of this section. Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

1003.3 Grease traps and grease interceptors. Grease traps and interceptors shall comply with the requirements of Section 1003.1 through 1003.5

1003.3.1 Grease traps and grease interceptors required. A grease trap or grease interceptor shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas such as restaurants, hotel kitchens, hospitals, school kitchens, bars, factory kitchens, cafeterias or clubs.

1003.3.2 Food waste grinders. Where food waste grinders connect to grease traps or grease interceptors, the grease interceptor or trap shall be sized and rated for the discharge of the food waste grinder.

1003.3.3 Grease trap and grease interceptor not required. A grease trap or grease interceptor shall not be required for individual dwelling units or any private living quarters.

1003.4 Grease traps. Grease traps shall conform to PDI G101 and shall be installed in accordance with the manufacturer's instruction.

1003.4.1 Grease trap capacity. Grease traps shall have the grease retention capacity indicated in Table 1003.4.1 for the flow-through rates indicated.

**TABLE 1003.4.1
CAPACITY OF GREASE TRAPS**

TOTAL FLOW-THROUGH RATING (gpm)	GREASE RETENTION CAPACITY (pounds)
4	8
6	12
7	14
9	18
10	20
12	24
14	28
15	30
18	36
20	40
25	50
35	70
50	100

For S1: 1 gpm = 3.785 L/m, 1 pound = 0.454 kg.

1003.4.2 Rate of flow controls. Grease traps shall be equipped with devices to control the rate of water flow so that the water flow does not exceed the rated flow. The flow-control device shall be vented and terminate not less than 6 inches (152 mm) above the flood rim level or installed in accordance with the manufacturer's instructions.

1003.5 Grease Interceptors. Grease interceptors shall be water and gas tight. Each interceptor shall be engineered to withstand the load, such as from vehicular traffic, to be placed on the interceptor. The minimum tank volume of grease interceptors shall be 750 gallons and the maximum volume shall be 1250 gallons. Interceptors shall be permitted to be installed in series.

1003.5.1 Grease interceptor capacity. The minimum grease retention capacity for interceptors shall be at least two times the flow-through rate.

**TABLE 1003.5.1
SIZING FORMULAS FOR GREASE INTERCEPTORS
PRIVATE SEWAGE DISPOSAL SYSTEM**

SIZING FORMULA FOR RESTAURANTS:	OTHER ESTABLISHMENTS WITH COMMERCIAL KITCHENS:
$(S) \times (GS) \times (HR/12) \times (LF) =$ Effective capacity of grease interceptor in gallons Where: S = Number of seats in dining area GS = Gallons of waste water per seat (Use 25 gallons for restaurants with china dishes and/or automatic dishwasher) (Use 10 gallons for restaurants with paper or baskets and no dishwashers) HR = Number of hours restaurant is open LF = Loading Factor (Use 2.00 interstate highway; 1.50 other freeways; 1.25 recreational area; 1.00 main highway; 0.75 other highway)	$(M) \times (GM) \times (LF) =$ Effective capacity of grease interceptor in gallons Where: M = Meals prepared per day GM = Gallons of waste water per meal (Use 5 gallons) LF = Loading Factor (Use 1.00 with dishwashing machine and 0.75 without dishwashing machine)

Note: For other than private sewage disposal systems, reduce gallon values by 25%.

1003.5.2 Construction of Interceptor. Each interceptor shall be constructed in accordance with Rule 64E-6, *Florida Administrative Code*. Minimum depth of the liquid shall be forty-two (42) inches. Each compartment shall be accessible with a minimum clearance of eighteen (18) inches square or in diameter.

1003.5.3 Inlet and outlet piping. The inlet and outlet piping shall have a two-way cleanout tee installed. Inlet piping shall enter at two-and-one-half ($2\frac{1}{2}$) inches above the liquid level. Inlet piping shall connect to a tee, sweep, or baffle, which shall extend to twenty-four (24) inches below the water level.

The outlet pipe shall start at eight (8) inches above the bottom of the interceptor and extend vertically to a tee. The tee and pipe shall be no less than four (4) inches in diameter. The tee shall be installed with the run in the vertical direction.

1003.6 Separators required. At repair garages; gasoline stations with grease racks, grease pits or work racks; and at factories where oily and flammable liquid wastes are produced, separators shall be installed into which all oil-bearing, grease-bearing or flammable wastes shall be discharged before emptying in the building drainage system or other point of disposal.

1003.7 Separation of liquids. A mixture of treated or untreated light and heavy liquids with various specific gravities shall be separated in an approved receptacle. Separators shall be designed in accordance with Sections 1003.7.1 and 1003.7.2.

1003.7.1 General design requirements. Oil separators shall have a depth of not less than 2 feet (610 mm) below the invert of the discharge drain. The outlet opening of the separator shall not have less than an 18-inch (457 mm) water seal.

1003.7.2 Garages and service stations. Where automobiles are serviced, greased, repaired or washed or where gasoline is dispensed, separators shall have a minimum capacity of 6 cubic feet (0.168 m^3) for the first 100 square feet (9.3 m^2) of area to be drained, plus 1 cubic foot (0.28 m^3) for each additional 100 square feet (9.3 m^2) of area to be drained into the separator. Parking garages in which servicing, repairing or washing is not conducted, and in which gasoline is not dispensed, shall not require a separator. Areas of commercial garages utilized only for storage of automobiles are not required to be drained through a separator.

1003.8 Sand interceptors in commercial establishments. Sand and similar interceptors for heavy solids shall be designed and located so as to be provided with ready access for cleaning, and shall have a water seal of not less than 6 inches (152 mm).

1003.9 Laundries. Commercial laundries shall be equipped with an interceptor with a wire basket or similar device, removable for cleaning, that prevents passage into the drainage system of solids $\frac{1}{2}$ inch (12.7 mm) or larger in size, string, rags, buttons, or other materials detrimental to the public sewerage system.

1003.10 Bottling establishments. Bottling plants shall discharge process wastes into an interceptor that will provide for the separation of broken glass or other solids before discharging waste into the drainage system.

1003.11 Slaughterhouses. Slaughtering room and dressing room drains shall be equipped with approved separators. The separator shall prevent the discharge into the drainage system of feathers, entrails and other materials that cause clogging.

1003.12 Venting of interceptors and separators. Interceptors and separators shall be designed so as not to become air bound where tight covers are utilized. Each interceptor or separator shall be vented where subject to a loss of trap seal.

1003.13 Access and maintenance of interceptors and separators. Access shall be provided to each interceptor and separator for service and maintenance. Interceptors and separators shall be maintained by periodic removal of accumulated grease, scum, oil, or other floating substances and solids deposited in the interceptor or separator.

SECTION 1004 MATERIALS, JOINTS AND CONNECTIONS

1004.1 General. The materials and methods utilized for the construction and installation of traps, interceptors and separators shall comply with this chapter and the applicable provisions of Chapter 7. The fittings shall not have ledges, shoulders or reductions capable of retarding or obstructing flow of the piping.

**TABLE 1106.6
SIZE OF SEMICIRCULAR ROOF GUTTERS**

DIAMETER OF GUTTERS (inches)	HORIZONTALLY PROJECTED ROOF AREA (square feet)					
	Rainfall rate (inches per hour)					
	1	2	3	4	5	6
$\frac{1}{16}$ unit vertical in 12 units horizontal (0.5-percent slope)						
3	680	340	226	170	136	113
4	1,440	720	480	360	288	240
5	2,500	1,250	834	625	500	416
6	3,840	1,920	1,280	960	768	640
7	5,520	2,760	1,840	1,380	1,100	918
8	7,960	3,980	2,655	1,990	1,590	1,325
10	14,400	7,200	4,800	3,600	2,880	2,400
$\frac{1}{8}$ unit vertical in 12 units horizontal (1-percent slope)						
3	960	480	320	240	192	160
4	2,040	1,020	681	510	408	340
5	3,520	1,760	1,172	880	704	587
6	5,440	2,720	1,815	1,360	1,085	905
7	7,800	3,900	2,600	1,950	1,560	1,300
8	11,200	5,600	3,740	2,800	2,240	1,870
10	20,400	10,200	6,800	5,100	4,080	3,400
$\frac{1}{4}$ unit vertical in 12 units horizontal (2-percent slope)						
3	1,360	680	454	340	272	226
4	2,880	1,440	960	720	576	480
5	5,000	2,500	1,668	1,250	1,000	834
6	7,680	3,840	2,560	1,920	1,536	1,280
7	11,040	5,520	3,860	2,760	2,205	1,840
8	15,920	7,960	5,310	3,980	3,180	2,655
10	28,800	14,400	9,600	7,200	5,750	4,800
$\frac{1}{2}$ unit vertical in 12 units horizontal (4-percent slope)						
3	1,920	960	640	480	384	320
4	4,080	2,040	1,360	1,020	816	680
5	7,080	3,540	2,360	1,770	1,415	1,180
6	11,080	5,540	3,695	2,770	2,220	1,850
7	15,600	7,800	5,200	3,900	3,120	2,600
8	22,400	11,200	7,460	5,600	4,480	3,730
10	40,000	20,000	13,300	10,000	8,000	6,660

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m².

SECTION 1107 SECONDARY (EMERGENCY) ROOF DRAINS

1107.1 Secondary drainage required. Secondary (emergency) roof drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason.

1107.2 Separate systems required. Secondary roof drain systems shall have piping and point of discharge separate from the primary system. Discharge shall be above grade in a location which would normally be observed by the building occupants or maintenance personnel.

1107.3 Sizing of secondary drains. Secondary (emergency) roof drain systems shall be sized in accordance with Section 1106 based on the rainfall rate for which the primary system is sized but with the sizing adjusted by dividing the values for horizontally projected roof area in Tables 1106.2, 1106.3 and 1106.6 by two. The minimum cross-sectional area of an overflow scupper shall be three times the cross-sectional area of the primary roof drain and the scupper shall have a minimum opening dimension of 4 inches (102 mm). The flow through the primary system shall not be considered when sizing the secondary roof drain system.

SECTION 1108 COMBINED SANITARY AND STORM SYSTEM

1108.1 Size of combined drains and sewers. The size of a combination sanitary and storm drain or sewer shall be computed in accordance with the method in Section 1106.3. The fixture units shall be converted into an equivalent projected roof or paved area. Where the total fixture load on the combined drain is less than or equal to 256 fixture units, the equivalent drainage area in horizontal projection shall be taken as 4,000 square feet (372 m²). Where the total fixture load exceeds 256 fixture units, each additional fixture unit shall be considered the equivalent of 15.6 square feet (1.5 m²) of drainage area. These values are based on a rainfall rate of 1 inch (25 mm) per hour.

SECTION 1109 VALUES FOR CONTINUOUS FLOW

1109.1 Equivalent roof area. Where there is a continuous or semicontinuous discharge into the building storm drain or building storm sewer, such as from a pump, ejector, air conditioning plant or similar device, each gallon per minute (L/m) of such discharge shall be computed as being equivalent to 96 square feet (9 m²) of roof area, based on a rainfall rate of 1 inch (25 mm) per hour.

SECTION 1110 CONTROLLED FLOW ROOF DRAIN SYSTEMS

1110.1 General. The roof of a structure shall be designed for the storage of water where the storm drainage system is engineered for controlled flow. The controlled flow roof drain system shall be an engineered system in accordance with this

section and the design, submittal, approval, inspection and testing requirements of Section 312 of this code. The controlled flow system shall be designed based on the required rainfall rate in accordance with Section 1106.1.

1110.2 Control devices. The control devices shall be installed so that the rate of discharge of water per minute shall not exceed the values for continuous flow as indicated in Section 1109.1.

1110.3 Installation. Runoff control shall be by control devices. Control devices shall be protected by strainers.

1110.4 Minimum number of roof drains. Not less than two roof drains shall be installed in roof areas 10,000 square feet (930 m²) or less and not less than four roof drains shall be installed in roofs over 10,000 square feet (930 m²) in area.

SECTION 1111 SUMPS

1111.1 Subsoil drains. Subsoil drains shall be open-jointed, horizontally split or perforated pipe conforming to one of the standards listed in Table 1102.5. Such drains shall not be less than 4-inch (102 mm) diameter. Where the building is subject to backwater, the subsoil drain shall be protected by an accessibly located backwater valve. Subsoil drains shall discharge to a trapped area drain, sump, dry well or approved location above ground. The subsoil sump shall not be required to have either a gas-tight cover or a vent.

1111.2 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.

1111.3 Pumping system. The sump pump, pit and discharge piping shall conform to Sections 1111.3.1 through 1111.3.4.

1111.3.1 Pump capacity and head. The sump pump shall be of a capacity and head appropriate to anticipated use requirements.

1111.3.2 Construction. The sump pit shall not be less than 18-inch (457 mm) diameter and shall be constructed of tile, steel, plastic, cast iron, concrete or other approved material, with a removable cover adequate to support anticipated loads in area of use. The pit floor shall provide permanent support for the pump.

1111.3.3 Electrical. Electrical service outlets, when required, shall meet the requirements of Chapter 27 of the *Florida Building Code, Building*.

1111.3.4 Piping. Discharge piping shall meet the requirements of Section 1102.2, Section 1102.3 or Section 1102.4 and shall include a gate valve and a full flow check valve. Size and fittings shall be the same size as, or larger than, pump discharge tapping.

**PROPOSED CONSTRUCTION
BUILDING CODES FOR TURF AND
LANDSCAPE IRRIGATION SYSTEMS**

PART 1: GENERAL

A. Description

- 1. Purpose.** To establish uniform minimum standards and requirements for the design and installation of safe, cost effective, reliable irrigation systems for turf and landscape areas which promote the efficient use and protection of water and other natural resources.
- 2. Definition.** Turf and landscape irrigation systems apply water by means of permanent above-ground or subsurface sprinkler or micro-sprinkler equipment under pressure.
- 3. Scope.** These Construction Codes shall apply to all irrigation systems used on residential and commercial landscape areas. They address the design requirements, water quality, materials, installation, inspection, and testing for such systems. These Construction Codes do not apply to irrigation systems for golf courses, nurseries, greenhouses, or agricultural production systems.
- 4. Application.** All new irrigation systems and any new work to existing irrigation systems shall conform to the requirements of this code.
- 5. Application to Existing Irrigation Installations.** Nothing contained in this code shall be deemed to require any irrigation system or part thereof, which existed prior to the establishment of this code, to be changed altered or modified to meet the standards of this code.

B. PERMITS

- 1. Permits Required.** It shall be unlawful to construct, enlarge, alter, modify, repair, or move any irrigation system or part thereof; or to install or alter any equipment for which provision is made or the installation of which is regulated by this code; without first having filed application and obtained a permit therefore from the Building Official. A permit shall be deemed issued when signed by the Building Official and impressed with the seal of the governmental agency issuing said permit.
- 2. Exceptions.** All work where exempt from permit shall still be required to comply with the code. No permit shall be required for general maintenance or repairs which do not change the structure or alter the system

and the value of which does not exceed \$600.00 in labor and material based on invoice value.

C. Pre-Construction Submittals

1. Plans or Drawings

a. Single Family Residence. Provide design drawings or shop drawings, where required, for the installation prior to start of construction. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, and include all improvements. Drawings can be prepared by a properly licensed qualified Contractor.

b. Commercial, Industrial, Municipal and Multi-family. Provide professionally designed drawings prior to start of construction. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, including all improvements, and shall include but not be limited to: date, scale, revisions, legend, specifications which list all aspects of equipment and assembly thereof, water source, water meter and/or point of connection, backflow prevention devices, pump station size, pump station location, design operating pressure and flow rate per zone, locations of pipe, controllers, valves, sprinklers, sleeves, gate valves, etc. The Plans and Specifications shall be prepared in accordance with section 104.2.

D. Definitions

ABS Pipe: Acrylonitrile-butadiene-styrene black, semi-rigid, plastic pipe extruded to IPS. ABS pipe is in limited use in present day irrigation systems. Solvent weld fittings are used with this pipe. (See ASTM D 1788.)

Air Release Valve: A valve which will automatically release to the atmosphere accumulated small pockets of air from a pressurized pipeline. A small orifice is used to release air at low flow rates. Air release valves are normally required at all summits of mainline and submain pipelines in an irrigation system.

Anti-Siphon Device: A safety device used to prevent back-flow of irrigation water to the water source by back-siphonage.

Application Rate: The average rate at which water is applied by an irrigation system, sometimes also called precipitation rate. Units are typically inches/hr or mm/hr.

Arc: The angle of coverage of a sprinkler in degrees from one side of throw to the other. A 90-degree arc would be a quarter-circle sprinkler.

Atmospheric Vacuum Breaker: An anti-siphon device which uses a floating seat to direct water flow. Water draining back from irrigation lines is directed to the atmosphere to protect the potable water supply.

Automatic Control Valve: A valve in a sprinkler system which is activated by an automatic controller by way of hydraulic or electrical control lines and controls a single device or multiple devices.

Automatic System: An irrigation system which operates following a pre-set program entered into an automatic controller.

Backflow Prevention Device: An approved safety device used to prevent pollution or contamination of the irrigation water supply due to backflow from the irrigation system.

Belled (Pipe): Pipe which is enlarged at one end so that the spigot end of another length of pipe can be inserted into it during the assembly of a pipeline.

Block (of sprinklers): A group of sprinklers controlled by one valve. Also called zones or subunits.

Block System: An irrigation system in which several groups of sprinklers are controlled by one valve for each group.

Bubbler Irrigation: The application of water to the soil surface or a container as a small stream or fountain. Bubbler emitter discharge rates are greater than the 0.5 to 2 gph characteristic of drip emitters, but generally less than 60 gph.

Check Valve: A valve which permits water to flow in one direction only.

Chemical Water Treatment: The addition of chemicals to water to make it acceptable for use in irrigation systems

Chemigation: The application of water soluble chemicals by mixing or injecting with the water applied through an irrigation system.

Control Lines: Hydraulic or electrical lines which carry signals (to open and close the valves) from the controller to the automatic valves.

Controller: The timing mechanism and its mounting box. The controller signals the automatic valves to open and close on a pre-set program or based on sensor readings.

Contractor: Any person who engages in the fabrication and installation of any type of irrigation system on a contractual basis in accordance with all stipulations receiving his compensation.

Coverage: Refers to the way water is applied to an area.

Cycle: Refers to one complete run of a controller through all programmed controller stations.

Demand (or irrigation demand): Refers to the irrigation requirements of the irrigated area. Demand primarily depends on the type of crop, stage of growth, and climatic factors.

Design Area: The specific land area to which water is to be applied by an irrigation system.

Design Emission Uniformity: An estimate of the uniformity of water application with an irrigation system.

Design Pressure: The pressure at which the irrigation system or certain components are designed to operate. The irrigation system design pressure is that measured at the pump discharge or entrance to the system if there is no pump, and a zone design pressure is the average operating pressure of all emitters within that zone.

Direct Burial Wire: Plastic-coated single-strand copper wire for use as control line for electric valves.

Discharge Rate: The instantaneous flow rate of an individual sprinkler, emitter, or other water emitting device, or a unit length of line-source micro irrigation tubing. Also, the flow rate from a pumping system.

Double Check Valve: An approved assembly of two single, independently-acting check valves with test ports to permit independent testing of each check valve.

Drain Valve: A valve used to drain water from a line. The valve may be manually or automatically operated.

Drip Irrigation: The precise low-rate application of water to or beneath the soil surface near or directly into the plant root zone. Applications normally occur as small streams, discrete or continuous drops, in the range of 0.5 to 2.0 gph.

Effluent water: Also referred to as reclaimed or gray water is wastewater which has been treated per Florida Statute 403.086 and is suitable for use as a water supply for irrigation systems.

Emitters: Devices which are used to control the discharge of irrigation water from lateral pipes. This term is primarily