**Florida Supplement to the 2015 IPC**

**ICC EDIT VERSION**

**Note 1**: Throughout the document, change International Building Code to Florida Building Code, Building; change the International Energy Conservation Code tothe Florida Building Code, Energy Conservation; change the International Existing Building Code to Florida Building Code, Existing Building; change the International Fire code to Florida Fire Prevention Code; change International Fuel Gas Code to Florida Building Code, Fuel Gas; change the International Mechanical Code to Florida Building Code, Mechanical; change the International Plumbing Code to Florida Building Code, Plumbing; change the International Residential Code to Florida Building Code, Residential.

**Note 2**: Criteria blocked in yellow indicate Florida specific language from the 2010 FBC.

**PREFACE**

**~~Introduction~~**

**~~Development~~**

**History**

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, led to a 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 of the building codes system failure were devastation to lives and economies and a statewide property insurance crisis. The response was a reform of the state building construction regulatory system that placed emphasis on uniformity and accountability.

The 1998 Florida Legislature amended Chapter 553, *Florida Statutes* (FS), Building Construction Standards, to create a single state building code that is enforced by local governments. As of March 1, 2002, the *Florida Building Code*, which is developed and maintained by the Florida Building Commission, supersedes all local building codes. The *Florida Building Code* is updated every three years and may be amended annually to incorporate interpretations and clarifications.

**Scope**

The *Florida Building Code* is based on national model building codes and national consensus standards which are amended where necessary for Florida’s specific needs. However, code requirements that address snow loads and earthquake protection are pervasive; they are left in place but should not be utilized or enforced because Florida has no snow load or earthquake threat. The code incorporates all building construction-related regulations for public and private buildings in the State of Florida other than those specifically exempted by Section 553.73, *Florida Statutes*. It has been harmonized with the *Florida Fire Prevention Code*, which is developed and maintained by the Department of Financial Services, Office of the State Fire Marshal, to establish unified and consistent standards.

The base codes for the Sixth edition (2014) of the *Florida Building Code* include: the International Building Code®, 2015 edition; the International Plumbing Code®, 2015 edition; the International Mechanical Code®, 2015 edition; the International Fuel Gas Code®, 2015 edition; the International Residential Code®, 2012 edition; the International Existing Building Code®, 2015 edition; the International Energy Conservation Code, 2015; the National Electrical Code, 2014 edition; substantive criteria from the American Society of Heating, Refrigerating and Air-conditioning Engineers’ (ASHRAE) Standard 90.1-2013. State and local codes adopted and incorporated into the code include the *Florida Building Code, Accessibility,* and special hurricane protection standards for the High-Velocity Hurricane Zone.

The code is composed of nine main volumes: the *Florida Building Code, Building*, which also includes state regulations for licensed facilities; the *Florida Building Code, Plumbing*; the *Florida Building Code, Mechanical;* the *Florida Building Code, Fuel Gas*; the *Florida Building Code, Existing Building*; the *Florida Building Code, Residential;* the *Florida Building Code, Energy Conservation*; the *Florida Building Code, Accessibility* and the *Florida Building Code, Test Protocols for High-Velocity Hurricane Zones*. Chapter 27 of the *Florida Building Code, Building*, adopts the *National Electrical Code*, NFPA 70, by reference.

Under certain strictly defined conditions, local governments may amend requirements to be more stringent than the code. All local amendments to the *Florida Building Code* must be adopted by local ordinance and reported to the Florida Building Commission then posted on [www.floridabuilding.org](http://www.floridabuilding.org) in Legislative format for a month before being enforced. Local amendments to the *Florida Building Code* and the *Florida Fire Prevention Code* may be obtained from the Florida Building Commission web site, or from the Florida Department of Business and Professional Regulation or the Florida Department of Financial Services, Office of the State Fire Marshal, respectively.

**Adoption and Maintenance**

**[Note to editor: Replace ICC “Adoption” and “Maintenance” with the following text:]**

The *Florida Building Code* is adopted and updated with new editions triennially by the Florida Building Commission. It is amended annually to incorporate interpretations, clarifications and to update standards. Minimum requirements for permitting, plans review and inspections are established by the code, and local jurisdictions may adopt additional administrative requirements that are more stringent. Local technical amendments are subject to strict criteria established by Section 553.73, *F.S.* They are subject to Commission review and adoption into the code or repeal when the code is updated triennially and are subject to appeal to the Commission according to the procedures established by Section 553.73, *F.S*.

Eleven Technical Advisory Committees (TACs), which are constituted consistent with American National Standards Institute (ANSI) Guidelines, review proposed code changes and clarifications of the code and make recommendations to the Commission. These TACs whose membership is constituted consistent with American National Standards Institute (ANSI) Guidelines include: Accessibility; Joint Building Fire (a joint committee of the Commission and the State Fire Marshal); Building Structural; Code Administration/ Enforcement; Electrical; Energy; Mechanical; Plumbing and Fuel Gas; Roofing; Swimming Pool; and Special Occupancy (state agency construction and facility licensing regulations).

The Commission may only issue official code clarifications using procedures of Chapter 120, *Florida Statutes*. To obtain such a clarification, a request for a Declaratory Statement (DEC) must be made to the Florida Building Commission in a manner that establishes a clear set of facts and circumstances and identifies the section of the code in question. Requests are analyzed by staff, reviewed by the appropriate Technical Advisory Committee, and sent to the Florida Building Commission for action. These interpretations establish precedents for situations having similar facts and circumstances and are typically incorporated into the code in the next code amendment cycle. Non-binding opinions are available from the Building Officials Association of Florida’s web site (www.BOAF.net) and a Binding Opinion process is available online at www.floridabuilding.org.

**Code Development Committee Responsibilities (Letter Designations in Front of Section Numbers)**

**[Note to editor: Use paragraphs 1 and 2 specific to this code through the code committee descriptors. Delete the remaining text in this section.]**

**Marginal Markings**

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2012 edition. Deletion indicators in the form of an arrow (**→**) are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or table has been deleted.

A single asterisk [**\***] placed in the margin indicates that text or a table has been relocated within the code. A double asterisk [**\*\***] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code. ~~The following table indicates such relocations in the 2015 edition of the~~ *~~International Plumbing Code~~*~~.~~ **[Delete table]**

Dotted vertical lines in the margins within the body of the ~~supplement~~ Code indicate a change from the requirements of the base code to the *Florida Building Code, Plumbing, 6th Edition,*  effective ???.

Sections deleted from the base code are designated “Reserved” in order to maintain the structure of the base code.

**Italicized Terms**

**[No change to I Code text.]**

**Acknowledgments**

The *Florida Building Code* is produced through the efforts and contributions of building designers, contractors, product manufacturers, regulators and other interested parties who participate in the Florida Building Commission’s consensus processes, Commission staff and the participants in the national model code development processes.

**[Note to Editor: Delete the following ICC text in its entirety:]**

**~~Effective Use of the …~~**

**~~Legislation~~**

**Chapter 1, SCOPE AND ADMINISTRATION**

**Section 101 General**

***101.1 Title. Change to read as shown:***

**[A] 101.1 ~~Title.~~** ~~These regulations shall be known as the~~ *~~International Plumbing Code~~* ~~of [NAME OF JURISDICTION] hereinafter referred to as "this code.”~~ **~~101.1~~ Scope.** The provisions of Chapter 1, *Florida Building Code, Building* shall govern the administration and enforcement of the *Florida Building Code, Plumbing*.

***101.2 Scope. Change to read as shown:***

**101.2 Scope.**  Reserved.

**101.3 Intent. Change to read as shown:**

**101.3 Intent.** Reserved.

***101.4 Scope. Change to read as shown:***

**101.4** **Severability**. Reserved.

***Section 102 Applicability. Change to read as shown:***

**Section 102 Applicability.** Reserved.

**PART 2 – ADMINISTRATION AND ENFORCEMENT**

***Section 103 Department of Plumbing Inspection. Change to read as shown:***

**Section 103 Department of Plumbing Inspection. Reserved**

***Section 104 Duties and Powers of the Code Official. Change to read as shown:***

**Section 104 Duties and Powers of the Code Official.** Reserved

***Section 105 Approval. Change to read as shown:***

**Section 105 Approval.** Reserved

***Section 106 Permits. Change to read as shown:***

**Section 106 Permits.** Reserved

***Section 107 Inspections and Testing. Change to read as shown:***

**Section 107 Inspections and Testing.** Reserved

***Section 108 Violations. Change to read as shown:***

**Section 108 Violations.** Reserved

***Section 109 Means of Appeal. Change to read as shown:***

**Section 109 Means of Appeal.**  Reserved

***Section 110 Temporary Equipment Systems and Uses. Change to read as shown:***

**Section 110 Temporary Equipment, Systems and Uses.** Reserved.

**Chapter 2 DEFINITIONS**

***Section 202. Add or revise definitions as shown:***

BEDROOM. A room that can be used for sleeping and that:

 a. For site-built dwellings has a minimum of 70 square feet of conditioned space;

 b. For manufactured homes is constructed according to the standards of the United    States Department of Housing and Urban Development and has a minimum of 50 square feet of floor area;

 c. Is located along an exterior wall;

 d. Has a closet and a door or an entrance where a door could be reasonably installed; and

 e. Has an emergency means of escape and rescue opening to the outside in accordance with the *Florida Building Code.*

This definition is specific to on-site sewage treatment system as regulated by Chapter 64E-6 FAC for onsite sewage treatment and Disposal System - See Section 701.2

**RECLAIMED WATER.** Water that has received treatment and is reused after flowing out of a domestic wastewater treatment facility.

**REUSE.** The deliberate application of reclaimed water for beneficial purpose.

**GRAY WATER.**.As defined by 381.0065(2)(b) and (d) *Florida Statutes*, “Graywater” means that part of domestic sewage that is not blackwater, including waste from the bath, lavatory, laundry, and sink, except kitchen sink waste. “Blackwater” means that part of domestic sewage carried off by toilets, urinals, and kitchen drains. ~~Waste discharged from lavatories, bathtubs, showers, clothes washers and laundry trays~~

 **GREASE INTERCEPTOR.**

**Fats, oils and geases (FOG) disposal system.** No change

**Gravity.** Plumbing appurtenances of not less than 75~~50~~0 gallons (2839~~1893~~ L) capacity that are installed in or at the end of the sanitary drainage system to intercept free-floating fats, oils and grease from waste water discharge. Separation is accomplished by gravity during a retention time of not less than 30 minutes.

**INDIVIDUAL SEWAGE DISPOSAL SYSTEM.** An approved onsite sewage treatment and disposal system in accordance with Sections 381.0065 and 381.00655, *Florida Statutes* and Chapter 64E-6, *Florida Administrative Code*, Standards for Onsite Sewage Treatment and Disposal Systems. Synonymous with private sewage disposal system and private septic 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.~~

**[A] REGISTERED DESIGN PROFESSIONAL.** An individual who is registered or licensed to practice professional architecture or engineering as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed. This includes any registered design professional, so long as, they are practicing within the scope of their license, which includes those licensed under Chapter 471 and 481, Florida Statutes. (CA6473 AS)

**Chapter 3 GENERAL REGULATIONS**

***Section 301.3 Connections to drainage system. Change to read as shown:***

**301.3 Connections to drainage system.** Plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary 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 required by Chapter 8.

**Exception:** Bathtubs, showers, lavatories, clothes washers and laundry trays shall not be required to discharge to the sanitary drainage system where such fixtures discharge to an approved gray water system for flushing of water closets and urinals ~~or for subsurface landscape irrigation~~ in accordance with Chapter 13. Any sewage that discharges from the building must be connected to the sanitary drainage system of the building or premises and discharge to a sewage system in accordance with Chapter 7.

***Section 305.1 Corrosion. Change to read as shown:***

**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 the lime and acid of concrete, cinder or other corrosive material. Sheathing or wrapping shall allow for movement including expansion and contraction of piping. Minimum wall thickness of material shall be 0.010 inch (0.25 mm).

**Exception:** Sleeving is not required for installation of CPVC into concrete or similar material.

***Section 305.1.1 Penetration. Add text to read as follows:***

**305.1.1 Penetration.** Protective sleeves around piping penetrating concrete slab-on-grade floors shall not be of cellulose-containing materials. If soil treatment is used for subterranean termite protection, the sleeve shall have a maximum wall thickness of 0.010 inch, and be sealed within the slab using a non-corrosive clamping device to eliminate the annular space between the pipe and the sleeve. No termiticides shall be applied inside the sleeve.

***Section 312.2 Drainage and vent water test. Revise to read as follows:***

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| **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 the 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 ~~10~~5-foot (3048 mm) head of water. In testing successive sections, at least the upper ~~10~~5 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a ~~10~~5-foot (3048 mm) head of water. This pressure shall be held for not less than 15 minutes. The system shall then be tight at all points.  |
| (P6421 AS)  ***Section 312.6 Gravity sewer test. Revise to read as follows:*** |

**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, filling the *building sewer* with water, testing with not less than a ~~10~~5-foot (3048 mm) head of water and maintaining such pressure for 15 minutes.
(P6422 AS)

***Section 312.10.1 Inspections. Change to read as shown:***

**312.10.1 Inspections.** Inspections ~~Annual~~ ~~inspections~~ shall be made of all backflow prevention assemblies and air gaps to determine whether they are operable.

***312.10.2 Testing. Change to read as shown:***

**312.10.2 Testing.** Reduced pressure principle, double check, pressure vacuum breaker, reduced pressure detector fire protection, double check detector fire protection, and spill-resistant vacuum breaker backflow preventer assemblies and hose connection backflow preventers shall be tested at the time of installation~~,~~ and immediately after repairs or relocation ~~and at least annually~~. The testing procedure shall be performed in accordance with one of the following standards: ASSE 5013, ASSE 5015, ASSE 5020, ASSE 5047, ASSE 5048, ASSE 5052, ASSE 5056, CSA B64.10 or CSA B64.10.1.

**SECTION 315 PENETRATIONS**

Revise Section 315.1 to read as follows:

Revise Section 316.1.6 to read as follows:

**316.1.6 Inspection and testing.** The *alternative engineered design*shall be tested and inspected in accordance with the requirements of Section~~s 107 and~~312 and Chapter 1 of the Florida Building Code, Building.

***317 Public Food Service Establishments and Food Establishments.******Add to read as shown:***

**317 Public Food Service Establishments and Food Establishments.**

***317.1 Requirements. Add to read as shown:***

**317.1 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 Detailed Requirements Based on Use and Occupancy.

***318 Irrigation****.* ***Add to read as shown:***

S**ection 318 Irrigation**

***318.1. Add to read as shown:***

**318.1 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**

***403.1.3 Add a new section to read as shown:***

**403.1.3 Potty parity.** In assembly occupancies, restrooms which are open to the public must have a ratio of 3:2 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 §553.86, *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.

**403.1.3.1 Definitions.**

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.

 **3. Historic building.** For the purposes of this section, a historic building is:

1. Individually listed in the National Register of Historic Places; or

2. A contributing resource within a National Register of Historic Places listed district; or

3. Designated as historic property under an official municipal, county, special district or state designation, law, ordinance or resolution either individually or as a contributing property in a district, provided the local program making the designation is approved by the Department of the Interior (the Florida state historic preservation officer maintains a list of approved local programs); or

4. Determined eligible by the Florida State Historic Preservation Officer for listing in the National Register of Historic Places, either individually or as a contributing property in a district.

***403.1.4 Add a new section to read as shown:***

**403.1.4** For the purposes of calculating the minimum number of required plumbing facilities, the requirements of Table 403.1 shall apply to any areas outside of the building that are used as part of the building’s designated occupancy (single or mixed). Where additional seating is also utilized in these areas, the actual number of seats shall be added to the number of persons calculated by Table 403.1 to obtain the total additional facilities required.

***403.6 Sanitary Facilities for Public Swimming Pools. Add to read as shown:***

**403.6 Sanitary facilities for public swimming pools.**  Swimming pools with a bathing load of 20 persons or less may utilize a unisex restroom. Pools with bathing loads of 40 persons or less may utilize two unisex restrooms or meet the requirement of Table 403.6. Unisex restrooms shall meet all the requirements for materials, drainage and signage as indicated in sections 45~~2~~4.1.6.1.1 through 45~~2~~4.1.6.1.4 of the *FBC, Building.* Each shall include a water closet, a diaper change table, a urinal, and a lavatory. Pools with a bathing load larger than 40 persons shall provide separatesanitary facilities labeled for each sex. The entry doors of all restrooms shall be located within a 200-foot (60 960 mm) walking distance of the nearest water’s edge of each pool served by the facilities.

**Exception:** Where a swimming pool serves only a designated group of residential dwelling units and not the general public, poolside sanitary facilities are not required if all living units are within a 200 foot horizontal radius of the nearest water's edge, are not over three stories in height unless serviced by an elevator, and are each equipped with private sanitary facilities.

**403.6.1 Required fixtures.** Fixtures shall be provided as indicated on Table 403.6. The fixture count of Table 403.6 is deemed to be adequate for the pool and pool deck area that is up to three times the area of the pool surface provided. An additional set of fixtures shall be provided in the men's restroom for every 7,500 square feet or major fraction thereof for pools greater than 10,000 square feet. Women's restrooms shall have a ratio of three to two water closets provided for women as the combined total of water closets and urinals provided for men. Lavatory counts shall be equal.

**403.6.2 Outside access.** Outside access to facilities shall be provided for bathers at outdoor pools. Where the restrooms are located within an adjacent building and the restroom doors do not open to the outside, the restroom doors shall be within 50 feet of the buildings exterior door. If the restrooms are not visible from any portion of the pool deck, signs shall be posted showing directions to the facilities. Directions shall be legible from any portion of the pool deck; letters shall be a minimum of 1-inch high.

**403.6.3 Sanitary facility floors.** Floors of sanitary facilities shall be constructed of concrete or other nonabsorbent materials, shall have a smooth, slip-resistant finish, and shall slope to floor drains. Carpets, duckboards and footbaths are prohibited. The intersection between the floor and walls shall be coved where either floor or wall is not made of waterproof materials such as tile or vinyl.

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**TABLE 403.6**

**PUBLIC SWIMMING POOL - REQUIRED FIXTURES COUNT**

 **SIZE**  **MEN'S RESTROOMS WOMEN'S RESTROOMS**

 Urinals WC Lavatory WC Lavatory

0 - 2500 sq ft 1 1 1 1 1

2501 - 5000 sq ft 2 1 1 5 1

5001 - 7500 sq ft 2 2 2 6 2

7501 - 10,000 sq ft 3 2 3 8 3

For SI: 1 square foot = 0.0929 m2.

**Section 404 ACCESSIBLE PLUMBING FACILITIES**

***Section 404.1 Where required. Change to read as shown:***

**404.1 Where required.** Accessible plumbing facilities and fixtures shall be provided in accordance with the *~~International~~ Florida Building Code, Accessibility*.

**Sections 404.2 and 404.3 are deleted as follows:**

**~~404.2 Accessible fixture requirements.~~** ~~Accessible plumbing fixtures shall be installed with the clearances, heights, spacings and arrangements in accordance with ICC A117.1.~~

**~~404.3 Exposed pipes and surfaces.~~** ~~Water supply and drain pipes under accessible lavatories and sinks shall be covered or otherwise configured to protect against contact. Pipe coverings shall comply with ASME A112.18.9.~~

***Section 417.5.2 Shower lining. Revise to read as follows:***

**417.5.2 Shower lining.**Floors under shower compartments, except where prefabricated receptors have been provided, shall be lined and made water tight utilizing material complying with Sections 417.5.2.1 through 417.5.2.6. Such liners shall turn up on all sides not less than 2 inches (51 mm) above the finished threshold level. Liners shall be recessed and fastened to an *approved* backing so as not to occupy the space required for wall covering, and shall not be nailed or perforated at any point less than 1 inch (25 mm) above the finished threshold. Liners shall be pitched one-fourth unit vertical in 12 units horizontal (2-percent slope) and shall be sloped toward the fixture drains and be securely fastened to the waste outlet at the seepage entrance, making a water-tight joint between the liner and the outlet. The completed liner shall be tested in accordance with Section 312.9.

**Exceptions:**

1. Floor surfaces under shower heads provided for rinsing laid directly on the ground are not required to comply with this section.

2. Where a sheet-applied, load-bearing, bonded, waterproof membrane is installed as the shower lining, the membrane shall not be required to be recessed.

3. Shower compartments where the finished shower drain is depressed a minimum of 2 inches (51 mm) below the surrounding finished floor on the first floor level and the shower recess is poured integrally with the adjoining floor.

(P6418 AS)

***423.4 Add new section to read as shown:***

**423.4 Reclaimed water.** Reclaimed water shall be permitted to be used for aesthetic uses such as decorative pools or fountains in accordance with Florida Department of Environmental Protection (DEP). Reuse of reclaimed water activities shall comply with the requirements of DEP rules.

**Chapter 6, Water Supply and Distribution**

***602.3 Individual water supply. Change to read as shown.***

**602.3 Individual water supply.** Where a potable public water supply is not available, individual sources of potable water supply meeting the requirements of *Florida Statute* 373 shall be utilized.

[No change to the remaining text.]

***602.4 Add a new section to read as shown:***

**602.4 Reclaimed water.** Reclaimed water shall be permitted to be used for flushing water closets and urinals and other fixtures which do not require potable water in accordance with Florida Department of Environmental Protection (DEP) Chapter 62-610, *F.A.C*. Reuse of reclaimed water activities shall comply with the requirements of DEP Chapter 62-610, *FAC*.

***Section 607.3 Thermal expansion control. Revised to read as follows:***

**607.3 Thermal expansion control.**Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion ~~tank~~ control device shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers. Thermal expansion ~~tanks~~ control devices shall be sized in accordance with the ~~tank~~ manufacturer’s instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section 604.8.

**(P6423 AS)**

**Section 610 Disinfection of Potable Water System.**

***Section 610.1 General. Change to read as shown:***

**610.1 General.** New potable water systems shall be purged of deleterious matter and, where required by the Authority Having Jurisdiction, 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.

[No change to 1 – 4 of the IPC]

***Section 611 Drinking Water Treatment Units.******Change to read as shown:***

**SECTION 611**

**~~DRINKING~~ WATER TREATMENT UNITS**

***611 Replace IPC 611.1, 611.2 and 611.3 in their entirety with the following:***

**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 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 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 backflow-prevention device.

***Section 614* WELL PUMPS AND TANKS USED FOR PRIVATE POTABLE WATER SYSTEMS. Added to read as follows:**

**SECTION 614 WELL PUMPS AND TANKS USED FOR PRIVATE POTABLE WATER SYSTEMS

614.1 Pumps.**

Well pumps used for potable water shall comply with Sections 614.1.1 and 614.1.2  **TABLE 614.1 MINIMUM PRIVATE POTABLE WATER SYSTEM PUMP SIZE**

|  |  |
| --- | --- |
| **MINIMUMPUMP SIZE** | **BATHROOMS IN HOME** |
| 1 | 1 – 11/2 | 2 – 21/2 | 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. |

**614.1.1 Pump installation.**

Pumps shall be installed for operation without repriming 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.

**614.1.2 Pump sizing.**

Minimum pump size shall be determined by Table 614.1.

**614.2 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 (3.8 L) for every gallon per minute produced by the pump.  **Exception:** 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. Fiberglass or other nonmetallic tanks to be buried shall have the structural strength to prevent collapse.

**614.3 Piping.**

Piping associated with pumps and tanks shall comply with Sections 614.3.1 through 614.3.3.

**614.3.1 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.

**614.3.2 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.

**614.3.3 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.

**614.4 Electrical wiring.**

All wiring shall be installed in accordance with Chapter 27 of the *Florida Building Code, Building*.  **614.5 Disinfection.**

The pump installer shall disinfect any potable well and water system in accordance with [Section 610](http://ecodes.cyberregs.com/cgi-exe/cpage.dll?pg=x&rp=/indx/ST/fl/st/b900v10/st_fl_st_b900v10_6.htm&sid=2015100111344494632&aph=0&cid=iccf&uid=iccf0002&clrA=005596&clrV=005596&clrX=005596&ref=/nonindx/ST/fl/st/b900v10/index.htm#b=610).  **614.6 Valves.**

A pressure relief valve shall be installed on any pumping system that can produce pressures of 75 psi (517 kPa) or greater. A check valve shall be installed at the well head of submersible pumps.

**(P6416 AS)**

**Chapter 7, Sanitary Drainage**

***701.2 Sewer required. Change to read as shown:***

**701.2 Sewer required.** Every building in which plumbing fixtures are installed and premises having drainage piping shall be connected to a ~~public~~ publicly owned or investor-owned sewage system ~~sewer~~, where available, or an approved onsite sewage treatment and ~~private sewage~~ disposal system in accordance with Chapter 64E-6, *Florida Administrative Code*, Standards for Onsite Sewage Treatment and Disposal Systems. ~~the International Private Sewage Disposal Code.~~

**Chapter 9 – Vents**

***Revise Section 919.1 to read as follows*:**

**919.1 General.**
Engineered vent systems shall comply with this section and the design, submittal, approval, inspection and testing requirements of Section 10~~54.4~~9 of the Florida Building Code, Building..

**Chapter 10, Traps, Interceptors and Separators**

***Section 1003.2 Approval. Change to read as shown:***

**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 an onsite sewage treatment and ~~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. ~~based on the anticipated conditions of use.~~ Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

***Section 1003.3 Grease interceptors. Change to read as shown:***

**1003.3 Grease traps and** **grease interceptors for publicly-owned or investor-owned sewage systems.**Grease interceptors shall comply with the requirements of Sections 1003.3.1 through 1003.3.5.

***Section 1003.3.* Hydromechanical grease interceptors, fats, oils and greases disposal systems and automatic grease removal devices*. Change to read as shown:***

**1003.3.4 Hydromechanical grease interceptors, fats, oils and greases disposal systems and automatic grease removal devices.** Hydromechanical grease interceptors; fats*,* oils, and greases disposal systems and automatic grease removal devices shall be sized in accordance with

ASME A112.14.3, ASME 112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101. Hydromechanical grease interceptors; fats*,* oils, and greases disposal systems and automatic

grease removal devices shall be designed and tested in accordance with ASME A112.14.3, ASME 112.14.4, CSA B481.1, PDI G101 or PDI G102. Hydromechanical grease interceptors; fats*,* oils, and greases disposal systems and automatic grease removal devices shall be installed in

accordance with the manufacturer’s instructions. Where manufacturer’s instructions are not provided, hydromechanical grease interceptors*;* fats*,* oils*,* and greases disposal systems and automatic grease removal devices shall be installed in compliance with ASME A112.14.3, ASME 112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101.

**Exception:** Grease interceptors that are sized, constructed and approved in accordance with Rule 64E-6, *Florida Administrative Code* and that are located outside the building shall not be required to meet the requirements of this section.

***Section 1003.5 Replace to read as shown:***

**1003.5 Grease interceptors for onsite sewage treatment and disposal systems.** Grease interceptors are not required for a residence. However, one or more grease interceptors are required where grease waste is produced in quantities that could otherwise cause line stoppage or hinder sewage disposal. Where a grease interceptor is required or used, only kitchen wastewater shall first pass through the interceptor and then be discharged into the first compartment of a septic tank or other approved system. 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. Grease interceptors shall be sized, constructed and approved in accordance with Rule 64E-6, *Florida Administrative Code*.

***Section 1003.5 Sand interceptors in commercial establishments. Renumber to read as shown:***

**1003.11 ~~5~~ 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).

**Chapter 14 Referenced Standards**

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section ~~102.8~~102.4 of the Florida Building Code, Building.

***Change to add as shown:***

 **Florida Codes** Florida Building Commission

c/o Florida Department of Business and Professional Regulation

                              Building Codes and Standards

                              1940 North Monroe Street, Suite 90A

                              Tallahassee, Florida 32399-0772.

Standard                                                                                                               Referenced in code

Reference number    Title                                                                                            section number

Florida Administrative Code

Ch. 62-610 Florida Administrative Code-Reuse of Reclaimed Water

 and Land Application 602.4

Ch. 64E-6 Florida Administrative Code-Standards for Onsite Sewage

 and Disposal Systems 701.2, 1003.3.4, 1003.5

FBC-A—Sixth Edition (2017) Florida Building Code, Accessibility 404.1, 315.1

FBC-B—Sixth Edition (2017) ~~IBC-12 International Building Code~~ Florida Building Code, Building 101.1, 201.3, 305.4, 307.1,

 307.2, 307.3, 308.2, 309.1, 309.2, 310.1, 310.3,

 315.1, 317.1, 403.1, Table 403.1, 403.4, 403.6,

 404.1, 407.3, 417.6, 502.4, 502.6, 606.5.2, 1106.5

FBC-EC—Sixth Edition (2017) ~~IECC-12 International Energy Conservation Code~~ Florida Building Code, Energy Conservation

 313.1, 607.2, 607.2.1

FBC-FG—Sixth Edition (2017) ~~IFGC-12 International Fuel Gas Code~~ Florida Building Code, Fuel Gas 101.2, 201.3, 502.1

FBC-M—Sixth Edition (2017) ~~IMC-12 International Mechanical Code~~ Florida Building Code, Mechanical 201.3, 307.6, 310.1, 422.9, 502.1, 612.1, 1202.1

FFPC-Sixth Edition (2017) ~~IFC-12 International Fire Code~~ Florida Fire Prevention Code 201.3, 1201.1

Florida Statutes

Ch. 373 Florida Statute, Water Resources 602.3

Ch. 381 Florida Statute, Food Products 202, 317.1

Ch. 500 Florida Statute, Lodging and Food Service Establishments 317.1

Ch. 509 Florida Statute, Public Lodging and Food Service Establishments 317.1, 403.1.3

Ch. 553.86 Florida Statutes, Public Restrooms 403.1.3

**~~ICC~~ [Delete reference to I codes and replace with Florida Codes references as above]**

**NSF**

~~44-2012 Residential Cation Exchange Water Softeners~~

~~62-2012 Drinking Water Distillation Systems~~

**WQA**

Water Quality Association

4151 Naperville Road
Lisle, IL 60532-3696

S-200 Household and Commercial Water Filters (In-Line) 611.1

S-300 Point-of-Use Low Pressure Reverse Osmosis Drinking Water Systems 611.2

**~~APPENDIX F~~**

**~~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 microsprinkler 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.   Preconstruction 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 multiple-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 106 of the~~ *~~Florida Building Code, Building~~*~~.~~

**~~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 preset 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.~~

**~~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.~~

**~~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.~~

**~~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 used to refer to the low flow rate devices used in micro irrigation systems.~~

**~~Fertigation.~~** ~~The application of soluble fertilizers with the water applied through an irrigation system.~~

**~~Filtration System~~**~~. The assembly of physical components used to remove suspended solids from irrigation water. These include both pressure and gravity type devices, such as settling basins, screens, media filters, and centrifugal force units (vortex sand separators).~~

**~~Flexible Swing Joint.~~** ~~A flexible connection between the lateral pipe and the sprinkler which allows the sprinkler to move when force is applied to it.~~

**~~Flow Meters.~~** ~~Devices used to measure the volume of flow of water (typically in gallons), or flow rates (typically in gpm), and to provide data on system usage.~~

**~~Gauge (Wire).~~** ~~Standard specification for wire size. The larger the gauge number, the smaller the wire diameter.~~

**~~Head.~~** ~~A sprinkler head. Sometimes used interchangeably with and in conjunction with “Sprinkler.”~~

**~~Infiltration Rate.~~** ~~The rate of water flow across the surface of the soil and into the soil profile. Units are usually inches/hr.~~

**~~Irrigation.~~** ~~Application of water by artificial means, that is, means other than natural precipitation. Irrigation is practiced to supply crop water requirements, leach salts, apply chemicals, and for environmental control including crop cooling and freeze protection.~~

**~~Irrigation Water Requirement or Irrigation Requirement.~~** ~~The quantity of water that is required for crop production, exclusive of effective rainfall.~~

**~~Landscape.~~** ~~Refers to any and all areas which are ornamentally planted, including but not limited to turf, ground covers, flowers, shrubs, trees, and similar plant materials as opposed to agricultural crops grown and harvested for monetary return.~~

**~~Lateral.~~** ~~The water delivery pipeline that supplies water to the emitters or sprinklers from a manifold or header pipeline downstream of the control valve.~~

**~~Line-Source Emitters.~~** ~~Lateral pipelines which are porous or contain closely-spaced perforations so that water is discharged as a continuous band or in overlapping patterns rather than discrete widely-spaced points along the pipeline length.~~

**~~Looped System~~**~~. A piping system which allows more than one path for water to flow from the supply to the emitters or sprinklers.~~

**~~Mainline.~~** ~~A pipeline which carries water from the control station to submains or to manifolds or header pipelines of the water distribution system.~~

**~~Manifold.~~** ~~The water delivery pipeline that conveys water from the main or submain pipelines to the laterals. Also sometimes called a header pipeline.~~

**~~Manual System.~~** ~~A system in which control valves are manually operated rather than operated by automatic controls.~~

**~~Meter Box.~~** ~~A concrete or plastic box buried flush to grade which houses flow (water) meters or other components.~~

**~~Microirrigation.~~** ~~The frequent application of small quantities of water directly on or below the soil surface, usually as discrete drops, tiny streams, or miniature sprays through emitters placed along the water delivery pipes (laterals). Microirrigation encompasses a number of methods or concepts, including drip, subsurface, bubbler, and spray irrigation. Previously known as trickle irrigation.~~

**~~Overlap.~~** ~~The amount one sprinkler pattern overlaps another one when installed in a pattern. Expressed as a percentage of the diameter of coverage.~~

**~~PE Pipe.~~** ~~Flexible polyethylene pipe for use in irrigation systems, normally manufactured with carbon black for resistance to degradation by ultraviolet radiation.~~

**~~Potable Water.~~** ~~Water which is suitable in quality for human consumption and meets the requirements of the Health Authority having jurisdiction.~~

**~~Pressure Relief Valve~~**~~. A valve which will open and discharge to atmosphere when the pressure in a pipeline or pressure vessel exceeds a pre-set point to relieve the high-pressure condition.~~

**~~Pressure Vacuum Breaker~~**~~. A backflow prevention device which includes a spring-loaded check valve and a spring-loaded vacuum breaker to prevent the backflow of irrigation system water to the water source.~~

**~~Pumping Station.~~** ~~The pump or pumps that provide water to an irrigation system, together with all of the necessary accessories such as bases or foundations, sumps, screens, valves, motor controls, safety devices, shelters and fences.~~

**~~PVC Pipe~~**~~. Polyvinyl chloride plastic pipe made in standard thermoplastic pipe dimension ratios and pressure rated for water. Manufactured in accordance with AWWA C-900 or ASTM D-2241.~~

**~~Rain Shut off Device~~**~~. A calibrated device that is designed to detect rainfall and override the irrigation cycle of the sprinkler system when a predetermined amount of rain fall has occurred.~~

**~~Riser.~~** ~~A threaded pipe to which sprinklers or other emitters are attached for above-ground placement.~~

**~~Sleeve.~~** ~~A pipe used to enclose other pipes, wire, or tubing; usually under pavement, sidewalks, or planters.~~

**~~Spacing.~~** ~~The distance between sprinklers or other emitters.~~

**~~Spray Irrigation.~~** ~~The micro irrigation application of water to the soil or plant surface by low flow rate sprays or mists.~~

**~~Sprinkler.~~** ~~The sprinkler head. Sometimes called “Head.”~~

**~~Supply (Water Source).~~** ~~The origin of the water used in the irrigation system.~~

**~~Swing Joint.~~** ~~A ridged connection between the lateral pipe and the sprinkler, utilizing multiple ells and nipples, which allows the sprinkler to move when force is applied to it.~~

**~~Tubing.~~** ~~Generally used to refer to flexible plastic hydraulic control lines which are usually constructed of PE or PVC.~~

**~~PART II — DESIGN CRITERIA~~**

**~~A.   Design defined~~**~~. Within the scope of this code, irrigation system design is defined as the science and art of properly selecting and applying all components within the system.~~

**~~B.   Water supply.~~**

~~1.   The water source shall be adequate from the stand-point of volume, flow rate, pressure, and quality to meet the irrigation requirements of the area to be irrigated, as well as other demands, if any, both at the time the system is designed and for the expected life of the system.~~

~~2.   If the water source is effluent, it shall meet the advanced waste treatment standard as set forth in Florida Statute §403.086(4) as well as any other standard as set forth by the controlling governmental agency.~~

**~~C.   Application uniformity~~**~~. Irrigation application uniformity describes how evenly water is distributed within an irrigation zone. Irrigation system uniformity is the uniformity coefficient. Use application rates which avoid runoff and permit uniform water infiltration into the soil. Land slope, soil hydraulic properties, vegetative ground cover, and prevailing winds will be considered when application rates are specified. Sprinkler irrigation systems should be designed with the appropriate uniformity for the type of plant being grown and the type of soil found in that area. The general watering of different types of plants as one group without regard to their individual water requirements is to be avoided if at all possible. Different types of sprinklers with different application rates, i.e., spray heads vs. rotor heads, shall not be combined on the same zone or circuit.~~

**~~D.   System zoning.~~** ~~The irrigation system should be divided into zones based on consideration of the following:~~

~~1.   Available flow rate.~~

~~2.   Cultural use of the area.~~

~~3.   Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.~~

~~4.   Type of sprinkler, i.e., sprinklers with matching precipitation rates.~~

~~5.   Soil characteristics.~~

**~~E.   Sprinkler/emitter spacing and selection.~~** ~~Sprinkler/Emitter spacing will be determined considering the irrigation requirements, hydraulic characteristics of the soil and device, and water quality with its effect on plant growth, sidewalks, buildings, and public access areas. When using square spacing, sprinklers should not be spaced farther apart than 55 percent of their manufacturer-specified diameters of coverage for prevailing wind speeds of 5 miles per hour (mph) or less. Spacing should not exceed 50 percent of sprinkler diameters of coverage for wind speeds of 5 to 10 mph, and 45 percent for prevailing wind speeds greater than 10 mph. When using triangular spacing, the above overlap percentages can be reduced by five percent. Water conservation will be emphasized by minimizing irrigation of non-vegetated areas. Microirrigation systems should be designed using the Emission Uniformity concept. Space microirrigation emitters to wet 100 percent of the root zone in turf areas and 50 percent of the root zone for shrubs and trees.~~

**~~F.   Pipelines~~**~~. Pipelines will be sized to limit pressure variations so that the working pressure at all points in the irrigation system will be in the range required for uniform water application. Velocities will be kept to 5 feet (1524 mm) per second.~~

**~~G.   Wells.~~**

~~1.   Well diameters and depths are to be sized to correspond to the irrigation system demand. Refer to SCS Code FL-642 and local water management district regulations.~~

~~2.   Well location and depth shall be in compliance with applicable state, water management district and local codes.~~

**~~H.   Pumps.~~**

~~1.   Pump and motor combinations shall be capable of satisfying the total system demand without invading the service factor of the motor except during start-up and between zones.~~

~~2.   Pumps shall be positioned with respect to the water surface in order to ensure that the net positive suction head required (NPSHr) for proper pump operation is achieved.~~

~~3.   The pumping system shall be protected against the effects of the interruption of water flow.~~

**~~I.    Control valves.~~**

~~1.   Control valve size shall be based on the flow rate through the valve. Friction loss through the valve, an approved air gap separation, or a reduced pressure should not exceed 10 percent of the static mainline head.~~

~~2.   Control systems using hydraulic communication between controller and valve(s) shall comply with the manufacturer’s recommendations for maximum distance between controller and valve, both horizontally and vertically (elevation change).~~

~~3.   The size of the electrical control wire shall be in accordance with the valve manufacturer’s specifications; based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except individual, single lot residential systems.~~

~~4.   Locate manually operated control valves so that they can be operated without wetting the operator.~~

**~~J.   Automatic irrigation controller.~~** ~~Automatic irrigation controllers must be UL approved and have an adequate number of stations and power output per station to accommodate the irrigation system design. The controller shall be capable of incorporating a rain shut off device to override the irrigation cycle when adequate rainfall has occurred, as required by Florida Statutes, Section 373.62.~~

**~~K.   Chemical injection.~~**

~~1.   Chemical injection systems for the injection of fertilizer, pesticides, rust inhibitors, or any other injected substance will be located and sized according to the manufacturers’ recommendations.~~

~~2.   Injection systems will be located downstream of the applicable backflow prevention devices as required by Florida Statutes, Section 487.021 and 487.055; the Environmental Protection Agency (EPA); Pesticide Regulation Notice 87-1; or other applicable codes.~~

~~3.   If an irrigation water supply is also used for human consumption, an air gap separation or an approved reduced pressure principal backflow prevention device is required.~~

**~~L.   Backflow prevention methods~~**~~. Provide backflow prevention assemblies at all cross connections with all water supplies in accordance with county, municipal or other applicable codes to determine acceptable backflow prevention assembly types and installation procedures for a given application. In the event of conflicting regulation provide the assembly type which gives the highest degree of protection.~~

~~1.   Irrigation systems into which chemicals are injected shall conform to Florida state law (Florida Statutes 487.021 and 487.055) and Environmental Protection Agency Pesticide Regulation Notice 87-1, which requires backflow prevention regulations to be printed on the chemical label.~~

~~2.   For municipal water supplies, chemical injection equipment must be separated from the water supply by an approved air gap separation or a reduced pressure principle assembly that is approved by the Foundation for CCC and the Hydraulic Research Institute. The equipment must also comply with ASSE 1013 to protect the water supply from back-siphonage and back-pressure.~~

~~3.   For other water supplies, Florida State law, EPA regulations, or other applicable local codes must be followed. In the absence of legal guidelines at least a PVB should be used.~~

**~~PART III — STANDARDS~~**

**~~1.   American Society of Agricultural Engineers (ASAE) Standards:~~**

**~~ASAE S330.1~~**~~: Procedure for sprinkler distribution testing for research purposes.~~

**~~ASAE S376.1:~~** ~~Design, installation, and performance of underground thermoplastic irrigation pipelines.~~

**~~ASAE S397.1:~~** ~~Electrical service and equipment for irrigation.~~

**~~ASAE S435~~**~~: Drip/Trickle Polyethylene Pipe used for irrigation laterals.~~

**~~ASAE S398.1:~~** ~~Procedure for sprinkler testing and performance reporting.~~

**~~ASAE S339~~**~~: Uniform classification for water hardness.~~

**~~ASAE S394:~~** ~~Specifications for irrigation hose and couplings used with self-propelled, hose-drag agricultural irrigation system.~~

**~~ASAE EP400.1:~~** ~~Designing and constructing irrigation wells.~~

**~~ASAE EP405:~~** ~~Design, installation, and performance of trickle irrigation systems.~~

**~~ASAE EP409:~~** ~~Safety devices for applying liquid chemicals through irrigation systems.~~

**~~2.   ASTM International Standards:~~**

**~~ASTM D 2241:~~** ~~Poly (Vinyl Chloride) (PVC) Plastic pipe (SDR-PR).~~

**~~ASTM D 2239:~~** ~~Specification for polyethylene (PE) plastic pipe (SDR-PR).~~

**~~ASTM D 2466:~~** ~~Specification for socket-type poly (vinyl chloride) (PVC) and chlorinated poly (vinyl chloride) (CPVC) plastic pipe fittings, Schedule 40.~~

**~~ASTM D 2855:~~** ~~Standard recommended practice for making solvent cemented joints with polyvinyl chloride pipe and fittings.~~

**~~ASTM D 3139:~~** ~~Specification for joints for plastic pressure pipes using flexible elastomeric seals.~~

**~~ASTM F 477~~**~~: Specification for elastomeric seals (gaskets for joining plastic pipe).~~

**~~3.   American Water Works Association (AWWA) standards:~~**

**~~AWWA C-900:~~** ~~PVC pipe standards and specifications~~

**~~4.   American Society of Sanitary Engineers (ASSE) Standards:~~**

**~~ASSE 1001:~~** ~~Pipe applied atmospheric type vacuum breakers.~~

**~~ASSE 1013:~~** ~~Reduced pressure principle backflow preventers.~~

**~~ASSE 1015:~~** ~~Double check valve type back pressure backflow preventers.~~

**~~ASSE 1020:~~** ~~Vacuum breakers, anti-siphon, pressure type.~~

**~~ASSE 1024:~~** ~~Dual check valve type backflow preventers.~~

**~~5.   Hydraulic Institute Standards, 14th Edition~~**

**~~6.   Standards and Specifications For Turf and Landscape Irrigation Systems Florida Irrigation Society (FIS) Standards~~**

**~~7.   Soil Conservation Service (SCS) Field Office Technical Guide, Section IV-A — Cropland Codes:~~**

**~~SCS Code 430-DD:~~** ~~Irrigation water conveyance, underground, plastic pipeline.~~

**~~SCS Code 430-EE:~~** ~~Irrigation water conveyance. Low pressure, underground, plastic pipeline.~~

**~~SCS Code 430-FF:~~** ~~Irrigation water conveyance, steel pipeline.~~

**~~SOS Code 441-1~~**~~: Irrigation system, trickle.~~

**~~SCS Code 442:~~** ~~Irrigation system sprinkler.~~

**~~SCS Code 449~~**~~: Irrigation water management.~~

**~~SCS Code 533~~**~~: Pumping plant for water control.~~

**~~SCS Code 642:~~** ~~Well.~~

**~~PART IV: MATERIALS~~**

**~~A.   PVC pipe and fittings.~~**

~~1.   PVC pipe should comply with one of the following standards ASTM D 1785, ASTM D 2241, AWWA C-900, or AWWA C-905. SDR-PR pipe shall have a minimum wall thickness as required by SDR-26. All pipe used with effluent water systems shall be designated for nonpotable use by either label or by the industry standard color purple.~~

~~2.   All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 as set forth in ASTM D 2466.~~

~~3.   Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in ASTM D 2464.~~

~~4.   PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 477.~~

~~5.   PVC flexible pipe should be pressure rated as described in ASTM D 2740 with standard outside diameters compatible with PVC IPS solvent-weld fittings.~~

~~6.   PVC cement should meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.~~

**~~B.   Ductile iron pipe and fittings.~~**

~~1.   Gasket fittings for iron pipe should be of materials and type compatible with the piping material being used.~~

**~~C.   Steel pipe and fittings.~~**

~~1.   All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or black in accordance with ASTM 53.~~

~~2.   Threaded fittings for steel pipe should be Schedule 40 Malleable Iron.~~

**~~D.   Polyethylene pipe.~~**

~~1.   Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 kPa) in accordance with ASTM D 2239.~~

~~2.   Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-435.~~

~~3.   Use fittings manufactured specifically for the type and dimensions of polyethylene pipe used.~~

**~~E.   Sprinklers, spray heads, and emitters.~~**

~~1.   Select units and nozzles in accordance with the size of the area and the type of plant material being irrigated. Sprinklers must fit the area they are intended to water without excessive overspray onto anything but the lot individual landscaped surface. Intentional direct spray onto walkways, buildings, roadways, and drives is prohibited. All sprinklers used with effluent water systems shall be designated for non-potable use by either label or by the industry standard color purple.~~

~~2.   Use equipment that is protected from contamination and damage by use of seals, screens, and springs where site conditions present a potential for damage.~~

~~3.   Support riser-mounted sprinklers to minimize movement of the riser resulting from the action of the sprinkler.~~

~~4.   Swing joints, either flexible or rigid, shall be constructed to provide a leak-free connection between the sprinkler and lateral pipeline to allow movement in any direction and to prevent equipment damage.~~

**~~F.   Valves~~**~~.~~

~~1.   Valves must have a maximum working pressure rating equal to or greater than the maximum pressure of the system, but not less than 125 psi (861 kPa). This requirement may be waived for low mainline pressure systems [30 psi (207 kPa) or less]. All valves used with effluent water systems shall be designated for non-potable use by either label or by the industry standard color purple.~~

~~2.   Only valves that are constructed of materials designed for use with the water and soil conditions of the installation shall be used. Valves that are constructed from materials that will not be deteriorated by chemicals injected into the system shall be used on all chemical injection systems.~~

**~~G.   Valve boxes.~~**

~~1.   Valve boxes are to be constructed to withstand traffic loads common to the area in which they are installed. They should be sized to allow manual operation of the enclosed valves without excavation.~~

~~2.   Each valve box should be permanently labeled to identify its contents. All valve boxes used with effluent water systems shall be designated for nonpotable use by either label or by the industry standard color purple.~~

**~~H.   Low voltage wiring.~~**

~~1.   All low voltage wire which is directly buried must be labeled for direct burial wire. Wire not labeled for direct burial must be installed in watertight conduits, and be UL listed TWN or THHN type wire as described in the NEC. All wire traveling under any hardscape or roadway must installed within a pipe and sleeve.~~

~~2.   The size of the electrical control wire shall be in accordance with the valve manufacturer’s specifications, based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating, on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except single lot individual residential systems.~~

~~3.   Connections are to be made using UL approved devices specifically designed for direct burial. All splices shall be enclosed within a valve box.~~

**~~I.    Irrigation controllers.~~**

~~1.   All irrigation controllers shall be UL listed, conform to the provisions of the National Electric Code (NEC), and be properly grounded in accordance with manufacturer’s recommendations. Equip solid state controls with surge suppressors on the primary and secondary wiring, except single lot residential systems.~~

~~2.   The controller housing or enclosure shall protect the controller from the hazards of the environment in which it is installed.~~

~~The rain switch shall be placed on a stationary structure minimum of 5-foot (1524 mm) clearance from other outdoor equipment, free and clear of any tree canopy or other overhead obstructions, and above the height of the sprinkler coverage.~~

**~~J.   Pumps and wells.~~**

~~1.   Irrigation pump electrical control systems must conform to NEC and local building codes.~~

~~2.   The pumping system shall be protected from the hazards of the environment in which it is installed.~~

~~3.   Use electric motors with a nominal horsepower rating greater than the maximum horsepower requirement of the pump during normal operation. Motor shall have a service factor of at least 1.15.~~

~~4.   Casings for drilled wells may be steel, reinforced plastic mortar, plastic, or fiberglass pipe. Only steel pipe casings shall be used in driven wells. Steel pipe must have a wall thickness equal to or greater than Schedule 40. See SCS code FL-642. Steel casings shall be equal to or exceed requirements of ASTM A 589.~~

**~~K.   Chemical injection equipment.~~**

~~1.   Chemical injection equipment must be constructed of materials capable of withstanding the potential corrosive effects of the chemicals being used. Equipment shall be used only for those chemicals for which it was intended as stated by the injection equipment manufacturer.~~

**~~L.   Filters and strainers.~~**

~~1.   Filtration equipment and strainers constructed of materials resistant to the potential corrosive and erosive effects of the water shall be used. They shall be sized to prevent the passage of foreign material that would obstruct the sprinkler/emitter outlets in accordance with the manufacturer’s recommendations.~~

**~~PART V: INSTALLATION~~**

**~~A.   Pipe installation.~~**

~~1.   Pipe shall be installed at sufficient depth below ground to protect it from hazards such as vehicular traffic or routine occurrences which occur in the normal use and maintenance of a property. Depths of cover shall meet or exceed SCS Code 430-DD, Water Conveyance, as follows:~~

~~a.   Vehicle traffic areas.~~

|  |  |
| --- | --- |
| **~~Pipe Size (inches)~~** | **~~Depth of Cover (inches)~~** |
| ~~½ – 2 ½~~  | ~~18 - 24~~ |
| ~~3 - 5~~ | ~~24 - 30~~ |
| ~~6 and larger~~ | ~~30 - 36~~ |

~~b. All areas except vehicle traffic:~~

|  |  |
| --- | --- |
| **~~Pipe Size (inches)~~** | **~~Depth of Cover (inches)~~** |
| ~~½ – 1 ½~~  | ~~6~~  |
| ~~2 - 3~~ | ~~12~~ |
| ~~4 - 6~~ | ~~18~~ |
| ~~More than 6~~ | ~~24~~ |

~~2.   Make all pipe joints and connections according to manufacturer’s recommendations. Perform all solvent-weld connections in accordance with ASTM D 2855.~~

~~3.   Minimum clearances shall be maintained between irrigation lines and other utilities. In no case shall one irrigation pipe rest upon another. Comingling or mixing of different types of pipe assemblies shall be prohibited.~~

~~4.   Thrust blocks must be used on all gasketed PVC systems. They must be formed against a solid, hand-excavated trench wall undamaged by mechanical equipment. They shall be constructed of concrete, and the space between the pipe and trench shall be filled to the height of the outside diameter of the pipe. Size thrustblocks in accordance with ASAE S-376.1.~~

~~5.   The trench bottom must be uniform, free of debris, and of sufficient width to properly place pipe and support it over its entire length. Native excavated material may be used to backfill the pipe trench. However, the initial backfill material shall be free from rocks or stones larger than 1-inch in diameter. At the time of placement, the moisture content of the material shall be such that the required degree of compaction can be obtained with the backfill method to be used. Blocking or mounding shall not be used to bring the pipe to final grade.~~

~~6.   Pipe sleeves must be used to protect pipes or wires installed under pavement or roadways. Use pipe sleeves two pipe sizes larger than the carrier pipe or twice the diameter of the wire bundle to be placed under the paving or roadway and extending a minimum of 3 feet beyond the paved area or as required by the Florida Department of Transportation (FDOT). Use sleeve pipe with wall thickness at least equal to the thickness of schedule 40 or PR 160 pipe, whichever is thicker. Proper backfill and compaction procedures should be followed.~~

**~~B.   Control valve installation.~~**

~~1.   Valve installation shall allow enough clearance for proper operation and maintenance. Where valves are installed underground, they shall be provided with a valve box with cover extending from grade to the body of the valve. The top of the valve body should have a minimum of 6 inches (152 mm) of cover in nontraffic and noncultivated areas and 18 inches (457 mm) of cover in traffic areas. If an automatic valve is installed under each sprinkler, then the valve box may be omitted.~~

~~2.   Install valve boxes so that they do not rest on the pipe, the box cover does not conflict with the valve stem or interfere with valve operation, they are flush with the ground surface and do not present a tripping hazard or interfere with routine maintenance of the landscape.~~

~~3.   Install quick coupling valves on swing joints or flexible pipe with the top of the valve at ground level.~~

~~Any above-ground manually-operated valves on nonpotable water systems will be adequately identified with distinctive purple colored paint. Do not provide hose connections on irrigation systems that utilize nonpotable water supplies.~~

**~~C.   Sprinkler installation.~~**

~~1.   On flat landscaped areas, install sprinklers plumb. In areas where they are installed on slopes, sprinklers may be tilted as required to prevent erosion. Sprinklers should be adjusted to avoid unnecessary discharge on pavements and structures. Adjust sprinklers so they do not water on roads.~~

~~2.   Provide a minimum separation of 4 inches (102 mm) between sprinklers and pavement. Provide a minimum separation of 12 inches (305 mm) between sprinklers and buildings and other vertical structures. Piping must be thoroughly flushed before installation of sprinkler nozzles. Surface mounted and pop-up heads shall be installed on swing joints, flexible pipe, or polyethylene (PE) nipples. Above-ground (riser mounted) sprinklers shall be mounted on Schedule 40 PVC or steel pipe and be effectively stabilized.~~

**~~D.   Pump installation.~~**

~~1.   Install pumps as per the manufacturer’s recommendations. Set pumps plumb and secure to a firm concrete base. There should be no strain or distortion on the pipe and fittings. Pipe and fittings should be supported to avoid placing undue strain on the pump. Steel pipe should be used on pumps 5 horsepower (hp) or larger whenever practical.~~

~~2.   Pumps must be installed in a manner to avoid loss of prime. Install suction line to prevent the accumulation of air pockets. All connections and reductions in suction pipe sizes should be designed to avoid causing air pockets and cavitation.~~

~~3.   Pumps must be located to facilitate service and ease of removal. Appropriate fittings should be provided to allow the pump to readily be primed, serviced, and disconnected. Provide an enclosure of adequate size and strength, with proper ventilation, to protect the pump from the elements (except residential systems).~~

**~~E.   Low voltage wire installation.~~**

~~1.   Install low voltage wire (30 volts or less) with a minimum depth of cover of 12 inches (305 mm). Provide a sufficient length of wire at each connection to allow for thermal expansion/shrinkage. As a minimum, provide a 12-inch (305 mm) diameter loop at all splices and connections. Terminations at valves will have 24 inches (610 mm) minimum free wire.~~

~~2.   Install all above-ground wire runs and wire entries into buildings in electrical conduit. Provide common wires with a different color than the power wires (white shall be used for common wires). Connections are to be made using UL approved devices specifically designed for direct burial. All splices shall be enclosed within a valve box.~~

**~~F.   Hydraulic control tubing.~~**

~~1.   For hydraulic control systems, use a water supply that is filtered and free of deleterious materials, as defined by the hydraulic control system manufacturer. Install a backflow prevention device where the hydraulic control system is connected to potable water supplies.~~

~~2.   Install tubing in trenches freely and spaced so that it will not rub against pipe, fittings, or other objects that could score the tubing, and with a minimum 12-inch (305 mm) diameter loop at all turns and connections. Provide a minimum depth of cover of 12 inches (305 mm).~~

~~3.   Connect tubing with couplings and collars recommended by the tubing manufacturer. All splices shall be made in valve boxes. Prefill tubing with water, expelling entrapped air and testing for leaks prior to installation.~~

~~Install exposed tubing in a protective conduit manufactured from Schedule 40 UV protected PVC or electrical conduit.~~

**~~PART VI: TESTING & INSPECTIONS~~**

**~~A.   Purpose~~**~~. All materials and installations covered by the Irrigation Code shall be inspected by the governing agency to verify compliance with the Irrigation Code.~~

**~~B.   Rough inspections.~~** ~~Rough inspections will be performed throughout the duration of the installation. These inspections will be made by the governing agency to ensure that the installation is in compliance with the design intent, specifications, and the Irrigation Codes. Inspections will be made on the following items at the discretion of the governing agency:~~

~~1.   Sprinkler layout and spacing: This inspection will verify that the irrigation system design is accurately installed in the field. It will also provide for alteration or modification of the system to meet field conditions. To pass this inspection, sprinkler/emitter spacing should be within ± 5 percent of the design spacing.~~

~~2.   Pipe installation depth: All pipes in the system shall be installed to depths as previously described in this code.~~

~~Test all mainlines upstream of the zone valves as follows:~~

~~a.   Fill the completely installed pipeline slowly with water to expel air. Allow the pipe to sit full of water for 24 hours to dissolve remaining trapped air.~~

~~b.   Using a metering pump, elevate the water pressure to the maximum static supply pressure expected and hold there for a period of 2 hours, solvent-weld pipe connections shall have no leakage.~~

~~c.   For gasketed pipe main lines add water as needed to maintain the pressure. Record the amount of water added to the system over the 2-hour period.~~

~~d.   Use the following formulas to determine the maximum allowable leakage limit of gasketed pipe.~~

**~~DUCTILE IRON:~~**

|  |  |
| --- | --- |
| ~~L =~~ | ~~SDP~~ |
| ~~------------~~ |
| ~~133,200~~ |

**~~PVC, GASKETED JOINT:~~**

|  |  |
| --- | --- |
| ~~L =~~ | ~~NDP~~ |
| ~~------------~~ |
| ~~7,400~~ |

~~Where:~~

~~L    =          allowable leakage (gph),~~

~~N    =          number of joints,~~

~~D    =          nominal diameter of pipe (inches),~~

~~P    =          average test pressure (psi), and~~

~~S    =          length of pipe (fi).~~

~~e.   When testing a system which contains metal-seated valves, an additional leakage per closed valve of 0.078 gph/inch of nominal valve size is allowed.~~

**~~C.   Final inspection~~**~~. When the work is complete the contractor shall request a final inspection.~~

~~1.   Cross connection control and backflow prevention.~~

~~a.   Public or domestic water systems: Check that an approved backflow prevention assembly is properly installed and functioning correctly. Review the location of the assembly to check that it is not creating a hazard to pedestrians or vehicular traffic.~~

~~b.   Water systems other than public or domestic water systems: Check that the proper backflow prevention assemblies are provided.~~

~~c.   All assemblies that can be, will be tested by a certified technician prior to being placed into service.~~

~~2.   Sprinkler coverage testing.~~

~~a.   All sprinklers must be adjusted to minimize overspray onto buildings and paved areas.~~

~~b.   All sprinkler controls must be adjusted to minimize runoff of irrigated water.~~

~~c.   All sprinklers must operate at their design radius of throw. Nozzle sizes and types called for in the system design must have been used.~~

~~d.   Spray patterns must overlap as designed.~~

~~e.   Sprinklers must be connected, as designed, to the appropriate zone.~~

**~~D.   Site restoration.~~**

~~1.   All existing landscaping, pavement, and grade of areas affected by work must be restored to original condition or to the satisfaction of the governing authority.~~

~~Verify that the pipeline trenches have been properly compacted to the densities required by the plans and specifications.~~

**APPENDIX F**

**PROPOSED CONSTRUCTION BUILDING CODES FOR TURF AND**

**LANDSCAPE IRRIGATION SYSTEMS  (Spelling Correction Also Requested on the PreSet Chapter  Topic Selection from Irragation to Irrigation)**

**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 microsprinkler 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.   Preconstruction 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 multiple-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 there of, 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, precipitation rate per zone, locations of pipe, controllers, valves, sprinklers, sleeves, gate valves, etc. The plans and specifications shall be prepared in accordance with Section 106 of the *Florida Building Code, Building*.

**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.

**Application Uniformity.** Irrigation application uniformity (also known as distribution uniformity) describes how evenly water is distributed within an irrigation zone.

**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 preset 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.

**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.

**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.

**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 used to refer to the low flow rate devices used in micro irrigation systems.

**Fertigation.** The application of soluble fertilizers with the water applied through an irrigation system.

**Filtration System**. The assembly of physical components used to remove suspended solids from irrigation water. These include both pressure and gravity type devices, such as settling basins, screens, media filters, and centrifugal force units (vortex sand separators).

**Flexible Swing Joint.** A flexible connection between the lateral pipe and the sprinkler which allows the sprinkler to move when force is applied to it.

**Flow Meters.** Devices used to measure the volume of flow of water (typically in gallons), or flow rates (typically in gpm), and to provide data on system usage.

**Gauge (Wire).** Standard specification for wire size. The larger the gauge number, the smaller the wire diameter.

**Head.** A sprinkler head. Sometimes used interchangeably with and in conjunction with “Sprinkler.”

**Infiltration Rate.** The rate of water flow across the surface of the soil and into the soil profile. Units are usually inches/hr.

**Irrigation.** Application of water by artificial means, that is, means other than natural precipitation. Irrigation is practiced to supply crop water requirements, leach salts, apply chemicals, and for environmental control including crop cooling and freeze protection.

**Irrigation Water Requirement or Irrigation Requirement** The quantity of water that is required for crop production, exclusive of effective rainfall.

**Landscape.** Refers to any and all areas which are ornamentally planted, including but not limited to turf, ground covers, flowers, shrubs, trees, and similar plant materials as opposed to agricultural crops grown and harvested for monetary return.

**Lateral.** The water delivery pipeline that supplies water to the emitters or sprinklers from a manifold or header pipeline downstream of the control valve.

**Line-Source Emitters.** Lateral pipelines which are porous or contain closely-spaced perforations so that water is discharged as a continuous band or in overlapping patterns rather than discrete widely-spaced points along the pipeline length.

**Looped System**. A piping system which allows more than one path for water to flow from the supply to the emitters or sprinklers.

**Low Volume Sprinklers**. Sprinkler heads that emit less than .5 gallons per minute.

**Mainline.** A pipeline which carries water from the control station to submains or to manifolds or header pipelines of the water distribution system.

**Manifold.** The water delivery pipeline that conveys water from the main or submain pipelines to the laterals. Also sometimes called a header pipeline.

**Manual System.** A system in which control valves are manually operated rather than operated by automatic controls.

**Matched Precipitation.** An equal distribution of water over a given area or zone.

**Meter Box**. A concrete or plastic box buried flush to grade which houses flow (water) meters or other components.

**Microirrigation.** The frequent application of small quantities of water directly on or below the soil surface, usually as discrete drops, tiny streams, or miniature sprays through emitters placed along the water delivery pipes (laterals). Microirrigation encompasses a number of methods or concepts, including drip, subsurface, bubbler, and spray irrigation. Previously known as trickle irrigation.

**Overlap.** The amount one sprinkler pattern overlaps another one when installed in a pattern. Expressed as a percentage of the diameter of coverage.

**PE Pipe.** Flexible polyethylene pipe for use in irrigation systems, normally manufactured with carbon black for resistance to degradation by ultraviolet radiation.

**Potable Water.** Water which is suitable in quality for human consumption and meets the requirements of the Health Authority having jurisdiction.

**Pressure Relief Valve**. A valve which will open and discharge to atmosphere when the pressure in a pipeline or pressure vessel exceeds a pre-set point to relieve the high-pressure condition.

**Pressure Vacuum Breaker**. A backflow prevention device which includes a spring-loaded check valve and a spring-loaded vacuum breaker to prevent the backflow of irrigation system water to the water source.

**Pumping Station.** The pump or pumps that provide water to an irrigation system, together with all of the necessary accessories such as bases or foundations, sumps, screens, valves, motor controls, safety devices, shelters and fences.

**PVC Pipe**. Polyvinyl chloride plastic pipe made in standard thermoplastic pipe dimension ratios and pressure rated for water. Manufactured in accordance with AWWA C-900 or ASTM D-2241.

**Rain Shut off Device**. A calibrated device that is designed to detect rainfall and override the irrigation cycle of the sprinkler system when a predetermined amount of rain fall has occurred.

**Riser.** A threaded pipe to which sprinklers or other emitters are attached for above-ground placement.

**Sleeve.** A pipe used to enclose other pipes, wire, or tubing; usually under pavement, sidewalks, or planters.

**Spacing.** The distance between sprinklers or other emitters.

**Spray Irrigation.** The micro irrigation application of water to the soil or plant surface by low flow rate sprays or mists.

**Sprinkler.** The sprinkler head. Sometimes called “Head.”

**Supply (Water Source).** The origin of the water used in the irrigation system.

**Swing Joint.** A ridged connection between the lateral pipe and the sprinkler, utilizing multiple ells and nipples, which allows the sprinkler to move when force is applied to it.

**Tubing.** Generally used to refer to flexible plastic hydraulic control lines which are usually constructed of PE or PVC.

**PART II — DESIGN CRITERIA**

**A.   Design defined**. Within the scope of this code, irrigation system design is defined as the science and art of properly selecting and applying all components within the system. The irrigation system shall be designed and installed to achieve the highest possible efficiency by providing operating pressures, sprinkler placement and nozzle selection that are within the manufacture’s recommendations, and maintained to keep the system at or within those ranges.

**B.   Water supply.**

1.   The water source shall be adequate from the stand-point of volume, flow rate, pressure, and quality to meet the irrigation requirements of the area to be irrigated, as well as other demands, if any, both at the time the system is designed and for the expected life of the system. The irrigation system shall use the lowest quality water source available on site.

2.   If the water source is effluent, it shall meet the advanced waste treatment standard as set forth in Florida Statute §403.086(4) as well as any other standard as set forth by the controlling governmental agency.

**C.   Application uniformity**.

1. Sprinkler irrigation systems should be designed with the appropriate uniformity for the type of plants  being grown and the type of soil found in that area. The general watering of different types of plants as one group without regard to their individual water requirements is to be avoided.

2. Use sprinkler head spacing, type and nozzle selection to achieve the highest application uniformity.

3. Use application rates which avoid runoff and permit uniform water infiltration into the soil. Land slope, soil hydraulic properties, vegetative ground cover, and prevailing winds and sun exposure will be considered when application rates are specified. Different types of sprinklers with different application rates, i.e., spray heads vs. rotor heads, bubbler heads vs rotor heads, shall not be combined on the same zone or circuit.

**D.   System zoning.** The irrigation system should be divided into zones based on consideration of the following hydrozoning practices.

1.   Available flow rate.

2.   Cultural use of the area.

3.   Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.

4.   Type of sprinkler, i.e., sprinklers with matching precipitation rates.

5.   Soil characteristics and slope.

6.   Sun exposure.

**E.   Sprinkler/emitter spacing and selection.**

1. Sprinkler/Emitter spacing will be determined considering the irrigation requirements, hydraulic characteristics of the soil and device, and water quality with its effect on plant growth, sidewalks, buildings, and public access areas.

2.  All pop-up spray head bodies in turf areas shall be no less than 6” in height for St. Augustine, Zoysia and Bahia and no less than 4” in height for Bermuda, Centapede and Seashore Paspalum.

**3.** Sprinklers should be located in all corners and on the perimeter of each irrigated zone area for a matched precipitation rate objective.

**4.** Single row head spacing should only occur when an additional row will cause saturated soils at the toe of a slope or other inefficiencies.

**5.** All heads shall not exceed 50% of manufacturer’s specified diameters of coverage.

6. Water conservation will be emphasized by minimizing irrigation of non-vegetated areas.

7. Microirrigation systems should be designed using the Emission Uniformity concept. Space microirrigation emitters to wet 100 percent of the root zone in turf areas and 50 percent of the root zone for shrubs and trees.

8. Microirrigation or low volume heads shall be required in all areas less than 4 feet in either direction.

9. All microirrigation zones shall have adequate filtration installed at the zone valve or at the point where the drip tubing is attached to PVC pipe to protect the emission devices from contamination from a PD main or lateral break.

10. Each plant shall have an adequate number and size (gph) of microirrigation devices, properly placed, to meet the plant water requirements for no rainfall.

**F.   Pipelines**. Pipelines will be sized to limit pressure variations so that the working pressure at all points in the irrigation system will be in the range required for uniform water application. Velocities will be kept to 5 feet (1524 mm) per second.

**G.   Wells.**

1.   Well diameters and depths are to be sized to correspond to the irrigation system demand. Refer to SCS Code FL-642 and local water management district regulations.

2.   Well location and depth shall be in compliance with applicable state, water management district and local codes.

**H.   Pumps.**

1.   Pump and motor combinations shall be capable of satisfying the total system demand without invading the service factor of the motor except during start-up and between zones.

2.   Pumps shall be positioned with respect to the water surface in order to ensure that the net positive suction head required (NPSHr) for proper pump operation is achieved.

3.   The pumping system shall be protected against the effects of the interruption of water flow.

**I.    Control valves.**

1.   Control valve size shall be based on the flow rate through the valve. Friction loss through the valve, an approved air gap separation, or a reduced pressure should not exceed 10 percent of the static mainline head.

2.   Control systems using hydraulic communication between controller and valve(s) shall comply with the manufacturer’s recommendations for maximum distance between controller and valve, both horizontally and vertically (elevation change).

3.   The size of the electrical control wire shall be in accordance with the valve manufacturer’s specifications; based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except individual, single lot residential systems.

4.   Locate manually operated control valves so that they can be operated without wetting the operator.

5.   Locate inground valves away from large tree and palm root zones.

6.   A manual shut off valve shall be required to be installed close to the point of connection but downstream from any backflow device to minimize water loss when the system is shut off for repairs or emergencies.

7.   An automatic shut-off valve (normally closed) is required on all systems with a constantly pressurized mainline to confine the water loss from minor main line leaks, weeping valves, or stuck on valves to just the time the system is operating automatically.

**J.   Automatic irrigation controller.** Automatic irrigation controllers must be UL approved and have an adequate number of stations and power output per station to accommodate the irrigation system design. The controller shall be capable of incorporating a rain shut off device or other sensors to override the irrigation cycle when adequate rainfall has occurred as required by Florida Statutes, Section 373.62.

**K.   Chemical injection.**

1.   Chemical injection systems for the injection of fertilizer, pesticides, rust inhibitors, or any other injected substance will be located and sized according to the manufacturers’ recommendations.

2.   Injection systems will be located downstream of the applicable backflow prevention devices as required by Florida Statutes, Section 487.021 and 487.055; the Environmental Protection Agency (EPA); Pesticide Regulation Notice 87-1; or other applicable codes.

3.   If an irrigation water supply is also used for human consumption, an air gap separation or an approved reduced pressure principal backflow prevention device is required.

**L.   Backflow prevention methods**. Provide backflow prevention assemblies at all cross connections with all water supplies in accordance with county, municipal or other applicable codes to determine acceptable backflow prevention assembly types and installation procedures for a given application. In the event of conflicting regulation provide the assembly type which gives the highest degree of protection.

1.   Irrigation systems into which chemicals are injected shall conform to Florida state law (Florida Statutes 487.021 and 487.055) and Environmental Protection Agency Pesticide Regulation Notice 87-1, which requires backflow prevention regulations to be printed on the chemical label.

2.   For municipal water supplies, chemical injection equipment must be separated from the water supply by an approved air gap separation or a reduced pressure principle assembly that is approved by the Foundation for CCC and the Hydraulic Research Institute. The equipment must also comply with ASSE 1013 to protect the water supply from back-siphonage and back-pressure.

3.   For other water supplies, Florida State law, EPA regulations, or other applicable local codes must be followed. In the absence of legal guidelines at least a PVB should be used.

**PART III — STANDARDS**

**1.   American Society of Agricultural Engineers (ASAE) Standards:**

**ASAE S330.1**: Procedure for sprinkler distribution testing for research purposes.

**ASAE S376.1:** Design, installation, and performance of underground thermoplastic irrigation pipelines.

**ASAE S397.1:** Electrical service and equipment for irrigation.

**ASAE S435**: Drip/Trickle Polyethylene Pipe used for irrigation laterals.

**ASAE S398.1:** Procedure for sprinkler testing and performance reporting.

**ASAE S339**: Uniform classification for water hardness.

**ASAE S394:** Specifications for irrigation hose and couplings used with self-propelled, hose-drag agricultural irrigation system.

**ASAE EP400.1:** Designing and constructing irrigation wells.

**ASAE EP405:** Design, installation, and performance of trickle irrigation systems.

**ASAE EP409:** Safety devices for applying liquid chemicals through irrigation systems.

**2.   ASTM International Standards:**

**ASTM D 2241:** Poly (Vinyl Chloride) (PVC) Plastic pipe (SDR-PR).

**ASTM D 2239:** Specification for polyethylene (PE) plastic pipe (SDR-PR).

**ASTM D 2466:** Specification for socket-type poly (vinyl chloride) (PVC) and chlorinated poly (vinyl chloride) (CPVC) plastic pipe fittings, Schedule 40.

**ASTM D 2855:** Standard recommended practice for making solvent cemented joints with polyvinyl chloride pipe and fittings.

**ASTM D 3139:** Specification for joints for plastic pressure pipes using flexible elastomeric seals.

**ASTM F 477**: Specification for elastomeric seals (gaskets for joining plastic pipe).

**3.   American Water Works Association (AWWA) standards:**

**AWWA C-900:** PVC pipe standards and specifications

**4.   American Society of Sanitary Engineers (ASSE) Standards:**

**ASSE 1001:** Pipe applied atmospheric type vacuum breakers.

**ASSE 1013:** Reduced pressure principle backflow preventers.

**ASSE 1015:** Double check valve type back pressure backflow preventers.

**ASSE 1020:** Vacuum breakers, anti-siphon, pressure type.

**ASSE 1024:** Dual check valve type backflow preventers.

**5.   Hydraulic Institute Standards, 14th Edition**

**6.   Standards and Specifications For Turf and Landscape Irrigation Systems Florida Irrigation Society (FIS) Standards**

**7.   Soil Conservation Service (SCS) Field Office Technical Guide, Section IV-A — Cropland Codes:**

**SCS Code 430-DD:** Irrigation water conveyance, underground, plastic pipeline.

**SCS Code 430-EE:** Irrigation water conveyance. Low pressure, underground, plastic pipeline.

**SCS Code 430-FF:** Irrigation water conveyance, steel pipeline.

**SOS Code 441-1**: Irrigation system, trickle.

**SCS Code 442:** Irrigation system sprinkler.

**SCS Code 449**: Irrigation water management.

**SCS Code 533**: Pumping plant for water control.

**SCS Code 642:** Well.

**PART IV: MATERIALS**

**A.   PVC pipe and fittings.**

1.   PVC pipe should comply with one of the following standards ASTM D 1785, ASTM D 2241, AWWA C-900, or AWWA C-905. SDR-PR pipe shall have a minimum wall thickness as required by SDR-26. All pipe used with effluent water systems shall be designated for nonpotable use by either label or by the industry standard color purple.

2.   All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 as set forth in ASTM D 2466.

3.   Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in ASTM D 2464.

4.   PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 477.

5.   PVC flexible pipe should be pressure rated as described in ASTM D 2740 with standard outside diameters compatible with PVC IPS solvent-weld fittings.

6.   PVC cement should meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.

**B.   Ductile iron pipe and fittings.**

1.   Gasket fittings for iron pipe should be of materials and type compatible with the piping material being used.

**C.   Steel pipe and fittings.**

1.   All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or black in accordance with ASTM 53.

2.   Threaded fittings for steel pipe should be Schedule 40 Malleable Iron.

**D.   Polyethylene pipe.**

1.   Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 kPa) in accordance with ASTM D 2239.

2.   Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-435.

3.   Use fittings manufactured specifically for the type and dimensions of polyethylene pipe used.

**E.   Sprinklers, spray heads, and emitters.**

1   Select units and nozzles in accordance with the size of the area and the type of plant material being irrigated. Sprinklers must fit the area they are intended to water without excessive overspray onto anything but the lot individual landscaped surface. Intentional direct spray onto walkways, buildings, roadways, and drives is prohibited. All sprinklers used with effluent water systems shall be designated for non-potable use by either label or by the industry standard color purple.

2     Use equipment that is protected from contamination and damage by use of seals, screens, and springs where site conditions present a potential for damage.

3   Support riser-mounted sprinklers to minimize movement of the riser resulting from the action of the sprinkler.

4   Swing joints, either flexible or rigid, shall be constructed to provide a leak-free connection between the sprinkler and lateral pipeline to allow movement in any direction and to prevent equipment damage.

5   Check valves shall be installed on any sprinkler where low point drainage occurs.

6 All tubing shall be installed under ground cover using staples at close enough intervals (24-36”) to secure the tubing and prevent it from moving through the mulch bed.

**F.   Valves**.

1.   Valves must have a maximum working pressure rating equal to or greater than the maximum pressure of the system, but not less than 125 psi (861 kPa). This requirement may be waived for low mainline pressure systems [30 psi (207 kPa) or less]. All valves used with effluent water systems shall be designated for non-potable use by either label or by the industry standard color purple.

2.   Only valves that are constructed of materials designed for use with the water and soil conditions of the installation shall be used. Valves that are constructed from materials that will not be deteriorated by chemicals injected into the system shall be used on all chemical injection systems.

**G.   Valve boxes.**

1.   Valve boxes are to be constructed to withstand traffic loads common to the area in which they are installed. They should be sized to allow manual operation of the enclosed valves without excavation.

2.   Each valve box should be permanently labeled to identify its contents. All valve boxes used with effluent water systems shall be designated for nonpotable use by either label or by the industry standard color purple.

**H.   Low voltage wiring.**

1.   All low voltage wire which is directly buried must be labeled for direct burial wire. Wire not labeled for direct burial must be installed in watertight conduits, and be UL listed TWN or THHN type wire as described in the NEC. All wire traveling under any hardscape or roadway must installed within a pipe and sleeve.

2.   The size of the electrical control wire shall be in accordance with the valve manufacturer’s specifications, based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating, on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except single lot individual residential systems.

3.   Connections are to be made using UL approved devices specifically designed for direct burial. All splices shall be enclosed within a valve box.

**I.    Irrigation controllers.**

1.   All irrigation controllers shall be UL listed, conform to the provisions of the National Electric Code (NEC), and be properly grounded in accordance with manufacturer’s recommendations. Equip solid state controls with surge suppressors on the primary and secondary wiring, except single lot residential systems.

2.   The controller housing or enclosure shall protect the controller from the hazards of the environment in which it is installed.

3.   The rain switch shall be placed on a stationary structure minimum of 5-foot (1524 mm) clearance from other outdoor equipment, free and clear of any tree canopy or other overhead obstructions, and above the height of the sprinkler coverage. Soil moisture sensors and ET sensors shall be installed and monitored per manufacturer’s guidelines per Florida Statutes, Section 373.62 requirements.

**J.   Pumps and wells.**

1.   Irrigation pump electrical control systems must conform to NEC and local building codes.

2.   The pumping system shall be protected from the hazards of the environment in which it is installed.

3.   Use electric motors with a nominal horsepower rating greater than the maximum horsepower requirement of the pump during normal operation. Motor shall have a service factor of at least 1.15.

4.   Casings for drilled wells may be steel, reinforced plastic mortar, plastic, or fiberglass pipe. Only steel pipe casings shall be used in driven wells. Steel pipe must have a wall thickness equal to or greater than Schedule 40. See SCS code FL-642. Steel casings shall be equal to or exceed requirements of ASTM A 589.

**K.   Chemical injection equipment.**

1.   Chemical injection equipment must be constructed of materials capable of withstanding the potential corrosive effects of the chemicals being used. Equipment shall be used only for those chemicals for which it was intended as stated by the injection equipment manufacturer.

**L.   Filters and strainers.**

1.   Filtration equipment and strainers constructed of materials resistant to the potential corrosive and erosive effects of the water shall be used. They shall be sized to prevent the passage of foreign material that would obstruct the sprinkler/emitter outlets in accordance with the manufacturer’s recommendations.

**PART V: INSTALLATION**

**A.   Pipe installation.**

1.   Pipe shall be installed at sufficient depth below ground to protect it from hazards such as vehicular traffic or routine occurrences which occur in the normal use and maintenance of a property. Depths of cover shall meet or exceed SCS Code 430-DD, Water Conveyance, as follows:

a.   Vehicle traffic areas.

|  |  |
| --- | --- |
| **Pipe Size (inches)** | **Depth of Cover (inches)** |
| ½  – 2 ½  | 18 ~~- 24~~ |
| 3 - 5 | 24 ~~- 30~~ |
| 6 and larger | 30 ~~- 36~~ |

b. All areas except vehicle traffic:

|  |  |
| --- | --- |
| **Pipe Size (inches)** | **Depth of Cover (inches)** |
| ½  – 1 ½  | 6  |
| 2 - 3 | 12 |
| 4 - 6 | 18 |
| More than 6 | 24 |

2.   Make all pipe joints and connections according to manufacturer’s recommendations. Perform all solvent-weld connections in accordance with ASTM D 2855.

3.   Minimum clearances shall be maintained between irrigation lines and other utilities. In no case shall one irrigation pipe rest upon another. Comingling or mixing of different types of pipe assemblies shall be prohibited.

4.   Thrust blocks must be used on all gasketed PVC systems. They must be formed against a solid, hand-excavated trench wall undamaged by mechanical equipment. They shall be constructed of concrete, and the space between the pipe and trench shall be filled to the height of the outside diameter of the pipe. Size thrust blocks in accordance with ASAE S-376.1.

5.   The trench bottom must be uniform, free of debris, and of sufficient width to properly place pipe and support it over its entire length. Native excavated material may be used to backfill the pipe trench. However, the initial backfill material shall be free from rocks or stones larger than 1-inch in diameter. At the time of placement, the moisture content of the material shall be such that the required degree of compaction can be obtained with the backfill method to be used. Blocking or mounding shall not be used to bring the pipe to final grade.

6.   Pipe sleeves must be used to protect pipes or wires installed under pavement or roadways. Use pipe sleeves two pipe sizes larger than the carrier pipe or twice the diameter of the wire bundle to be placed under the paving or roadway and extending a minimum of 3 feet beyond the paved area or as required by the Florida Department of Transportation (FDOT). Use sleeve pipe with wall thickness at least equal to the thickness of schedule 40 or PR 160 pipe, whichever is thicker. Proper backfill and compaction procedures should be followed.

**B.   Control valve installation.**

1.   Valve installation shall allow enough clearance for proper operation and maintenance. Where valves are installed underground, they shall be provided with a valve box with cover extending from grade to the body of the valve. The top of the valve body should have a minimum of 6 inches (152 mm) of cover in nontraffic and noncultivated areas and 18 inches (457 mm) of cover in traffic areas. The valve box shall be installed so as to minimize the effect of soil intrusion within the valve box with the use of filter fabric, pea gravel, or other acceptable material. If an automatic valve is installed under each sprinkler, then the valve box may be omitted.

2.   Install valve boxes so that they do not rest on the pipe, the box cover does not conflict with the valve stem or interfere with valve operation, they are flush with the ground surface and do not present a tripping hazard or interfere with routine maintenance of the landscape.

3.   Install quick coupling valves on swing joints or flexible pipe with the top of the valve at ground level.

4. Any above-ground manually-operated valves on nonpotable water systems will be adequately identified with distinctive purple colored paint. Do not provide hose connections on irrigation systems that utilize nonpotable water supplies.

**C.   Sprinkler installation.**

1.   On flat landscaped areas, install sprinklers plumb. In areas where they are installed on slopes, sprinklers may be tilted as required to prevent erosion.

2. Sprinklers should be adjusted to avoid unnecessary discharge on pavements and structures.

a. Adjust sprinklers so they do not water on roads.

b. Provide a minimum separation of 4 inches (102 mm) between sprinklers and pavement.

c. Provide a minimum separation of 12 inches (305 mm) between sprinklers and buildings and other vertical structures.

d. Polyethylene (PE) nipples shall not be used in maintenance equipment traffic areas or alongside roadways and driveways.

3. Piping must be thoroughly flushed before installation of sprinkler nozzles.

4. Surface mounted and pop-up heads shall be installed on swing joints or flexible pipe.

5. Above-ground (riser mounted) sprinklers shall be mounted on Schedule 40 PVC or steel pipe and be effectively stabilized.

6.   The pop-up height for sprays and rotator nozzles shall be adequate to prevent being obstructed by the turf grass blades: 6” height for St. Augustine, Zoysia and Bahia, 4” height for Bermuda, Centapede and Seashore Paspalum.

7.   All microirrigation zones shall have adequate filtration installed at the zone valve or at the point where the drip tubing is attached to PVC pipe to protect the emission devices from contamination from a PVC main or lateral break.

8   All microirrigation zones shall have adequate pressure regulation installed at the zone valve or at the point where the drip tubin is attached to the PVC to ensure that all emission devices meet the manufacturer’s performance standards.

9.   Each plant shall have a adequate number and size(gph) of microirrigation devices, properly placed to meet the plant water requirements for no rainfall.

10. All tubing shall be installed under ground cover using staples at close enough intervals (24-36”) to secure the tubing and prevent it from moving through the mulch bed.

**D.   Pump installation.**

1.   Install pumps as per the manufacturer’s recommendations. Set pumps plumb and secure to a firm concrete base. There should be no strain or distortion on the pipe and fittings. Pipe and fittings should be supported to avoid placing undue strain on the pump. Steel pipe should be used on pumps 5 horsepower (hp) or larger whenever practical.

2.   Pumps must be installed in a manner to avoid loss of prime. Install suction line to prevent the accumulation of air pockets. All connections and reductions in suction pipe sizes should be designed to avoid causing air pockets and cavitation.

3.   Pumps must be located to facilitate service and ease of removal. Appropriate fittings should be provided to allow the pump to readily be primed, serviced, and disconnected. Provide an enclosure of adequate size and strength, with proper ventilation, to protect the pump from the elements (except residential systems).

**E.   Low voltage wire installation.**

1.   Install low voltage wire (less than 98 volts) with a minimum depth of cover of 12 inches (305 mm) where not installed directly under the mainline.

2. Provide a sufficient length of wire at each connection to allow for thermal expansion/shrinkage.

3. As a minimum, provide a 12-inch (305 mm) diameter loop at all splices and connections.

4. Terminations at valves will have 24 inches (610 mm) minimum free wire.

5.   Install all above-ground wire runs and wire entries into buildings in electrical conduit.

Exception: No conduit is required when wiring above ground manifolds from the valve to the ground immediately beneath it.

6.   Provide common wires with a different color than the power wires (white shall be used  for common wires).

7. Connections are to be made using UL approved devices specifically designed for direct burial.

 8. All splices shall be enclosed within a valve box.

**F.   Hydraulic control tubing.**

1.   For hydraulic control systems, use a water supply that is filtered and free of deleterious materials, as defined by the hydraulic control system manufacturer. Install a backflow prevention device where the hydraulic control system is connected to potable water supplies.

2.   Install tubing in trenches freely and spaced so that it will not rub against pipe, fittings, or other objects that could score the tubing, and with a minimum 12-inch (305 mm) diameter loop at all turns and connections. Provide a minimum depth of cover of 12 inches (305 mm).

3.   Connect tubing with couplings and collars recommended by the tubing manufacturer. All splices shall be made in valve boxes. Prefill tubing with water, expelling entrapped air and testing for leaks prior to installation.

Install exposed tubing in a protective conduit manufactured from Schedule 40 UV protected PVC or electrical conduit.

**PART VI: TESTING & INSPECTIONS**

**A.   Purpose**. All materials and installations covered by the Irrigation Code shall be inspected by the governing agency to verify compliance with the Irrigation Code.

**B.   Rough inspections.** Rough inspections will be performed throughout the duration of the installation. These inspections will be made by the governing agency to ensure that the installation is in compliance with the design intent, specifications, and the Irrigation Codes. Inspections will be made on the following items at the discretion of the governing agency:

1.   Sprinkler layout and spacing: This inspection will verify that the irrigation system design is accurately installed in the field. It will also provide for alteration or modification of the system to meet field conditions. To pass this inspection, sprinkler/emitter spacing should be within ± 5 percent of the design spacing.

2.   Pipe installation depth: All pipes in the system shall be installed to depths as previously described in this code.

3. Test all mainlines upstream of the zone valves as follows:

a.   Fill the completely installed pipeline slowly with water to expel air. Allow the pipe to sit full of water for 24 hours to dissolve remaining trapped air.

b.   Using a metering pump, elevate the water pressure to the maximum static supply pressure expected and hold there for a period of 2 hours, solvent-weld pipe connections shall have no leakage.

c.   For gasketed pipe main lines add water as needed to maintain the pressure. Record the amount of water added to the system over the 2-hour period.

d.   Use the following formulas to determine the maximum allowable leakage limit of gasketed pipe.

**DUCTILE IRON:**

|  |  |
| --- | --- |
| L = | SDP |
| ------------ |
| 133,200 |

**PVC, GASKETED JOINT:**

|  |  |
| --- | --- |
| L = | NDP |
| ------------ |
| 7,400 |

Where:

L    =          allowable leakage (gph),

N    =          number of joints,

D    =          nominal diameter of pipe (inches),

P    =          average test pressure (psi), and

S    =          length of pipe (fi).

e.   When testing a system which contains metal-seated valves, an additional leakage per closed valve of 0.078 gph/inch of nominal valve size is allowed.

**C.   Final inspection**. When the work is complete the contractor shall request a final inspection.

1.   Cross connection control and backflow prevention.

a.   Public or domestic water systems: Check that an approved backflow prevention assembly is properly installed and functioning correctly. Review the location of the assembly to check that it is not creating a hazard to pedestrians or vehicular traffic.

b.   Water systems other than public or domestic water systems: Check that the proper backflow prevention assemblies are provided.

c.   All assemblies that can be, will be tested by a technician certified for back flow testing by a State recognized certifying board prior to being placed into service.

2.   Sprinkler coverage testing.

a.   All sprinklers must be adjusted to minimize overspray onto buildings and paved areas. Minor tolerances shall be made to allow for prevailing winds.

b.   All sprinkler controls must be adjusted to minimize runoff of irrigated water. Water application rates shall not exceed the absorption rate of the soil.

c.   All sprinklers must operate at their design radius of throw. Nozzle sizes and types called for in the system design must have been used. All nozzles within the same zone shall have matched precipitation rates unless otherwise directed in order to increase efficiency by adjusting the nozzle selection to match site conditions.

d.   Spray patterns must overlap as designed (a.k.a. head to head coverage) or placed to achieve the highest possible distribution uniformity using the manufacturer’s specifications.

e.       Sprinklers must be connected, as designed, to the appropriate zone.

f.       Sprinkler heads must operate within 20% of the optimum operating pressure but not more than the maximum nor less than the minimum guidelines as specified by the manufacturer. If the dynamic water pressure at the site’s water source(s) is too low to achieve this pressure range at the sprinklers, a booster pump or alternate source shall be required. If the dynamic water pressure at the sites water source(s) is too high to achieve this pressure range at the sprinklers, a pressure regulating device shall be required at either the source, the zone valve, or the sprinklers, or any combination there of.

**D.   Site restoration.**

1.   All existing landscaping, pavement, and grade of areas affected by work must be restored to original condition or to the satisfaction of the governing authority.

Verify that the pipeline trenches have been properly compacted to the densities required by       the plans and specifications

     E.    Record Drawings.

 1. A record drawing shall be required of all irrigation systems installed on commercial and residential developments and shall contain the following information:

a.    Location, type pressure and maximum flow available of all water sources.

               Include limitations like days of week watering requirements.

b.    Location type and size of all components including sprinklers, microirrigation, main and lateral piping, master valves, valves, moisture sensors, rain sensors, controllers, pump start relays, backflow devices, pumps, wells, etc.

c.    The flow rate, application rate(inches per hour), and the operating pressure for the sprinklers and micro irrigation within each zone.

d.    An irrigation schedule for each zone, for each season (monthly is preferred), indicating the frequency and duration each zone should operate to meet the plant water requirements without rainfall and stay within the hydraulic capacities of the sprinkler system installed.

e.    The name, address, phone, email, professional license or certification number of the installation contractor.

                        f.    Date of installation.

g. Irrigation system maintenance schedule that shall include, but is not limited to the following:

            1.  routine visual inspections (at least 4 per year),

2.   adjustments to components to keep sprinklers straight,

       at the right height,

3. aligned and unobstructed nozzles and screens cleaned,

4. filters cleaned and sensors monitored,

5. pressures and flows at the source and sprinklers are correct for original design.

            F.         Irrigation System Maintenance

a.       Repairs to all irrigation components shall be done with originally installed

components, equivalent components or those with greater efficiency.

b.      The operation of the irrigation system outside of the normal watering window shall be allowed for evaluating, maintaining or repairing the system or its components.

G.   Irrigation system management

a.   The frequency (times per week/month) and duration (minutes/hours) of the operation of each zone shall be adjusted and operate in order to meet the water needs of the plants within each zone as a supplement to rainfall. Adjustments shall be made a minimum 4 times per year to match the seasonal changes of the plants and the operational restrictions.

b.   It is recommended that the schedule be adjusted monthly or controllers be properly installed and programmed to automatically adjust to maximize water savings.

**(P6667 AM)**

**[NOTE TO EDITOR: DO NOT INCLUDE THE INTERNATIONAL PRIVATE SEWAGE DISPOSAL CODE WITH THE FLORIDA BUILDING CODE, PLUMBING.]**