

331000 Water Utilities

Sections Included In This Standard:

- 1.1 Identification of Underground Utilities and Piping
- 1.2 Potable Water Systems
- 1.3 Backflow Prevention
- 1.4 Wet Taps
- 1.5 Metering
- 1.6 Hydrants
- 1.7 Insulation
- 1.8 Disinfection of Water Distribution Systems

1.1 IDENTIFICATION OF UNDERGROUND UTILITIES AND PIPING

- A. **WARNING TAPE:** All underground piping and utilities shall have non-detectable warning tape that conforms to the following requirements to identify the specific system buried below. Warning tape shall meet OSHA regulation 1926-956 (C) (I). Tape shall be 6" wide with black lettering imprinted on a color coded background that conforms to APWA color code specifications. Tape shall be installed between 18" to 30" above the top of the pipe and a minimum of 6" below grade.
- B. **TRACER WIRE:** All non-metallic pipes installed underground (except pipe containing electric wires and traceable communication lines) and all piping installed 6 feet or more below grade shall have a tracer wire installed along the length of the pipe. The tracer wire shall be taped to the pipe and not allowed to "float freely" within the backfill. The tracer wire shall be continuous without splicing from access point to access point along the length of the pipe. The tracer wire shall be accessible at all structures (valve boxes, meter pits, manholes, pull boxes, lift stations) along the length of the pipe. The tracer wire shall have an access point at the beginning and ending points of the pipe run with no distance between access points to exceed 400 feet within the pipe run. The tracer wire shall have a color coded jacket as follows:

Potable Water – Blue
Reclaimed Water – Purple

Tracer wire for piping less than 12" diameter shall be a #12 AWG and for piping greater than 12" diameter or 6 feet or more below grade shall be a #10 AWG and HS-CCS high-strength copper clad steel conductor (HS-CCS), insulated with a 30 mil, high-density, high molecular weight polyethylene (HDPE) insulation, rated for direct burial use at 30 volts. HS-CCS conductor must be 21% conductivity for locating purposes, Break load 380# minimum. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Insulation color shall meet the APWA color code standard for identification of buried utilities. Tracer wire shall be *Copperhead*[™] HS-CCS HDPE 30 mil insulation or *pre-approved* equal and made in the USA. Any disturbance of this tape requires replacement after work is completed.

1.2 POTABLE WATER SYSTEMS

- A. Underground piping 4" and larger shall be C900 PVC or cement lined, bituminous sealed ductile iron.
 - 1. Push-on joint pipe should be minimum thickness Class 51, and flanged joint pipe should be minimum thickness Class 53.

2. Use flanged joint type pipe when piping is exposed, and when buried pipe joints are located beneath structures. Welded joints are not permitted.
 3. Ductile iron pipe installed in a corrosive area shall be wrapped in a plastic approved for underground applications.
- B. Pipe size under 4" shall be Schedule 80 PVC. Design shall include a reaction block schedule, if applicable.
 - C. Flanges: Flanges should conform to American Standard B16.1, latest revision. Specify full-faced type rubber gaskets, 1/16" thick, for all flanged joints.
 - D. Minimum Depth of Burial: The minimum depth of burial for potable water piping shall be 30" to the top of the pipe.
 - E. Sleeves Under Roadways and Sidewalks: All buried lines under roadways and sidewalks shall be installed in a pipe sleeve that is a minimum of two pipe sizes larger than the line itself. Pipe sleeves shall be ductile iron pipe (DIP) and shall extend a minimum of 5' beyond both sides of the roadway and a minimum of 1' beyond both sides of the sidewalk.
 - F. Pressure Testing: All potable water systems shall be tested at 150 psi for a minimum of two hours. If test fails, corrections shall be made to the system and the test repeated to confirm correction of deficiencies. All testing shall be performed to ASTM Standards and witnessed by PPD.
 - G. CLEANOUTS: Cleanouts shall be provided at grade. Cleanout caps shall be made of brass. Surround cleanouts with concrete pad with chamfered edges. Pad shall be 18" x 18" x 6" with #10 gauge welded wire mesh.
 - H. VALVE BOXES: Valve boxes shall be cast iron. Surround with concrete pad, with chamfered edges. Pad shall be 18" x 18" x 8" with 6" x 6" #10 gage welded wire mesh. Lid should be marked "WATER." Boxes and lid material shall be AASHTO H-16 rated.
 - I. THRUST RESTRAINTS: Absent the use of mechanical connections on fittings at changes in direction, properly sized concrete thrust blocks shall be installed. To facilitate ease in the future removal of thrust blocks, the affected piping shall be wrapped in 6 mil polyethylene film (Visqueen) prior to pouring the thrust block.

1.3 BACKFLOW PREVENTION

The following requirements relating to backflow prevention devices apply to the University's potable water, fire water, and irrigation systems regardless of whether the system served is described in these Standards or where the backflow prevention device is physically located (indoors or outdoors).

A. GENERAL

1. Provision Requirement: To reduce the risk for contaminants being introduced into the potable water system, backflow prevention devices are required on all potable water system service laterals, regardless of whether the lateral is used for fire water, potable water, or irrigation. Projects for new buildings and renovations shall provide and install backflow preventers (BFP's) on all such laterals, and elsewhere if required by the below-mentioned applicable design guidelines.

2. Design Guidelines: Pipe, fittings, and devices shall comply with American Water Works Association Manual M-14, Gainesville Regional Utilities' Manual of Cross Connection Control, and Florida Department of Environmental Protection requirements (62-555.360 Florida Statutes).
3. Quality Assurance: All pipe, fittings, and devices shall be approved by the Foundation for Cross-Connection Control and Hydraulic Research (FCCC & HR).
4. Required Type of Device: Use reduced pressure type backflow preventers only, except in cases where an air gap is deemed necessary. Backflow Preventer Assembly shall conform to the AWWA "Recommended Practice for Backflow Prevention and Cross-Connection Control" M-14". All Double Check Valve Assemblies (DCVA) shall be testable. Flow detection meter assembly is not required.
5. Location of Device:
 - a) BFP's should be located indoor, concealed, or landscaped so as not to be visually obtrusive; location shall be coordinated with the UF Project Manager.
 - b) BFP's shall be located above grade in an area not prone to flooding.
6. Test Cocks: All BFP's shall have test cocks.
7. Acceptable Manufacturer: Watts, Febco, Wilkins.

B. SPECIAL REQUIREMENTS BY APPLICATION

Special requirements for fire protection, potable water, irrigation system and health hazard applications are given below.

1. Fire Water System: A single-double check valve is acceptable. If possible, install BFP's for the fire water system indoors.
2. Potable Water System:

Two BFP's, installed in parallel, are to be installed on all potable water system laterals to buildings. The size of each of these two BFP's can be reduced from the size required when using a single BFP, provided the two are identical in size and the combined cross-sectional area of the two BFP's equals, or exceeds, the cross-sectional area of the single BFP.

 - a) The University requires dual BFP's because the buildings cannot be without water during testing and repairs of BFP's (bypasses are not acceptable).
 - b) Laboratory areas within buildings: All laboratory areas within buildings shall be isolated by BFP's located such that they are easily accessible for maintenance.
3. Irrigation System:
 - a) Reclaimed Water As Source: If reclaimed water is used as a source for irrigation water, a reduced pressure backflow preventer is not required to protect the reclaimed water system.

- b) Groundwater/Reclaimed Water As Sources: Wells serving irrigation systems also fed by reclaimed water shall be protected by a reduced pressure backflow preventer.
 - c) Potable Water/Reclaimed Water As Sources: Where potable water serves irrigation systems also fed by reclaimed water, the potable water system shall be protected by an air gap rather than a reduced pressure backflow preventer.
4. Health Hazard Applications: Reduced Pressure Devices for Health Hazard Applications shall have removable insulated valve protection device (i.e." Hot Box") insulation jackets and an air gap drain.

C. EXECUTION

- 1. Method of installation shall be designed to minimize flow restriction.
- 2. Freeze Protection: BFP's shall be insulated to prevent freeze damage with insulated valve protection device. Insulated valve protection device for fire suppression systems must be powered so that insulated valve protection device can be heated during very cold temperatures to prevent BFP from freezing.
- 3. Service Clearances: To facilitate servicing BFP's, the bottom of the BFP shall be located between 12" and 36" above the ground. The side with the test cocks shall be 24" from the nearest fixed wall or obstruction, and all other sides shall be 12" from the nearest fixed wall or obstruction.
- 4. Water Drainage: Provide appropriate means for collection of water from backflow prevention devices if located within the building.

- D. CERTIFICATION: All backflow preventers shall be tested, certified, and tagged following the installation and prior to Substantial Completion.

1.4 WET TAPS

See section 336000 for information specific to heating hot water and chilled water line wet taps.

- A. GENERAL: Wet tapping may be performed on potable, fire, irrigation, and sanitary sewer force mains. All wet tapping shall be coordinated with PPD Operations Engineering.
- B. BUILDER'S EQUIPMENT: Tapping or drilling machine shall have the following features:
 - 1. Automatic feed indicator to show the exact position of the drill at all times.
 - 2. Automatic over-travel protection to prevent the cutter from going through the back side of the main.
 - 3. Automatic disengagement protection.
 - 4. Shell cutters shall be 1/2" undersized.
- C. MATERIALS
 - 1. Tapping Sleeves for potable, fire, irrigation and sanitary sewer.

- a) When tapping ductile or cast iron mains (12" and above), use one of the following:
 - 1) Fusion epoxy coated steel with stainless steel nuts and bolts; or
 - 2) Mechanical joint sleeve; or
 - 3) Stainless Steel Full Circle Tapping Sleeve: Romac SST with ductile flange, JCM 432 or mechanical joint sleeve with a test plug is acceptable.
- b) When tapping asbestos-cement or PVC pipe (of any size), or iron pipe (12" and smaller), use only a Stainless Steel Full Circle Tapping Sleeve, with 304 Stainless Steel lugs, bolts, nuts and washers. The distance between bolts should not exceed 3".
- c) All sleeves used in wet tapping must have a test plug for pressure testing.

D. EXECUTION

1. After installing the sleeve, and prior to drilling, the Builder shall pressure test the installed material, using chlorinated water.
2. If thrust blocks are needed, they shall not be installed until after the tap has been made. Pipe shall be wrapped with a visqueen liner before cement is poured so concrete does not adhere to pipe.
3. Do not backfill until inspected by PPD Operations Engineering.

1.5 **METERING**

- A. See section 253000 for water metering requirements.

1.6 **HYDRANTS**

A. GENERAL

1. All hydrants shall be a dry-barrel, breakaway type with 5 1/4-inch seats, meeting AWWA C502 standards for dry-barrel hydrants.
2. Hydrants shall have two 2 1/2-inch nozzle connections and one 4 inch nozzle connection. The nozzle section of the hydrant shall be able to rotate 360° during field installation.
3. The rated water working pressure for all hydrants shall be 200 psi and tested to 400 psi by an independent laboratory testing agency.
4. The main valve closure shall be compression type. The hydrant will be breakaway type so main valve will remain closed if hydrant is damaged by a vehicle.
5. The main valve opening shall not be less than 5 1/4 inches. The internal working parts shall be removable through the top of the hydrant. The seat and subseat shall be made of bronze.

6. The drainage system of the hydrant shall be activated by the main stem and shut-off by direct compression closure.
 7. A gate valve shall be installed in the line feeding the hydrant, as close as possible to the hydrant.
 8. Hydrant must have a 6" inlet pipe connection.
 9. Hydrant shall not have a tamperproof cover.
- B. INSTALLATION HEIGHT: Centerline of pumper nozzle shall be a minimum of 18" and a maximum of 22" above grade.
 - C. ACCEPTABLE MANUFACTURERS: American Darling, Mueller.
 - D. CLEARANCES: No obstructions within a 6' radius; and no building within 10'.
 - E. OPERATION:
 1. Unless properly metered by the University, Builders shall not operate fire hydrants for the purpose of using water on construction.
 2. Builders shall not operate fire hydrants without proper fire hydrant tools. The use of pipe wrenches, monkey wrenches, or any other device not made for fire hydrant use is prohibited.

1.7 INSULATION

- A. DOMESTIC WATER PIPING: All domestic water piping and equipment shall be labeled as "Domestic Water" and insulated so as to prevent moisture condensation on exterior surfaces. If condensation occurs at any time during the warranty period, the constructor shall be required to re-work the insulation until satisfactory, at no additional expense to owner. In exposed locations where insulation may be subject to damage, specify a protective aluminum jacket cover.
- B. PROCESS WATER PIPING: All process water piping and equipment shall be insulated so as to prevent moisture condensation on exterior surfaces. If condensation occurs at any time during the warranty period, the constructor shall be required to re-work the insulation until satisfactory, at no additional expense to owner. In exposed locations where insulation may be subject to damage, specify a protective aluminum jacket cover.

1.8 DISINFECTION OF WATER DISTRIBUTION SYSTEMS

- A. GENERAL: All piping for water distribution systems shall be cleaned and tested.
- B. Specify thorough flushing, and cleaning with a "Polly Pig" where necessary. Sterilization and pressure testing procedures shall be explicitly specified and shall comply with the appropriate AWWA standard and State of Florida Health Standards.
- C. Water samples shall be tested at HRS/Alachua County Public Health Unit, Environmental Health Division in Gainesville. Currently a fee is charged for this test. Test results are to be forwarded to the UF Project Manager and PPD before service is turned on. A

representative from PPD must be present during the water sampling – no exceptions.

END OF SECTION