

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SCOPE OF SECTION:

This section contains requirements relating to items that are common to more than one section of Division 15 (and in the case of backflow prevention devices Division 2 also).

(All Division 15 items are generally considered to be located within buildings and extend to a maximum distance of 5' outside of the building.)

1.2 PIPES AND PIPE FITTINGS:

- A. GENERAL: All piping systems shall be cleaned, tested, and accepted by PPD prior to being placed in service.
- B. FERROUS PIPE AND FITTINGS: Iron pipe installed in a corrosive area shall be wrapped in a plastic approved for underground applications.
- C. NO HUB COUPLING: All sanitary or storm drain piping connections inside any new & existing building construction where new drain piping will be installed shall be of the 4 band clamp design such as the "Anaco/Husky" manufactured type.
- D. GROOVED FITTINGS, VALVES, AND COUPLINGS: Shall be the product of a single manufacturer and approved for its specific application. Fittings, valves, and couplings must be consistent throughout, with no mismatching of manufacturers.

- 1. Acceptable Manufacturers: Victaulic, Tyco/Grinnell

1.3 PIPING SPECIALTIES:

Dielectric nipples shall be used at all junctions of dissimilar metal piping, but as close as possible to the unit it serves. Provide isolation valves upstream, within 12" of dielectric nipples.

1.4 VALVES:

- A. CHILLED, CONDENSER, AND HEATING HOT WATER:
 - 1. Gate Valves:
 - a) Up to 2": Bronze, rising stem with split wedge gate.
 - b) 2^{1/2"} and Above: Iron, rising stem.
 - c) Acceptable Manufacturers: Dezurik, Nibco, Stockham
 - 2. Check Valves:
 - a) Up to 2": Bronze, swing type.
 - b) 2^{1/2"} and Above: Iron, spring-loaded (non-slam), swing type.
 - 3. Balancing Valves:

- a) Up to 2": Bronze body.
- b) 2^{1/2}" and Above: Iron body.
- c) All Chilled, Heating Hot Water and Condenser Water Balancing Valves: Shall be installed in all Chilled Water, Heating Hot Water and Condenser Water piping and are to be Industrial grade or greater. Settings for all balancing valves shall be permanently marked and not with felt pen.

4. **Triple Duty Valves:** Triple duty (check, balancing, shut-off) valves are not acceptable for chilled water, heating hot water, and condenser water applications.

(The University's experience has been that these types of valves do not work in a dual pump installation with a variable speed drive. The check valves will not seat and stop the flow. This causes the pump not running to rotate backwards, which can damage the impeller.)

5. **Ball Valves:** (Preferred where appropriate, and shall be as follows:)

- a) Full port.
- b) Stainless Steel ball and trim.
- c) Plastic for DI water.
- d) Blow-out proof stem.
- e) At the Health Science Center only ball valves will be used for pipe 2.5" and less.

B. **STEAM:**

1. **Pressure Reducing Valves:**

- a) Lab or Equipment Steam - Up to 1": Union connection, non-pilot operated with stainless steel trim.
- b) Up to 2": Cast iron body, union connection, pilot operated, with stainless steel trim.
- c) 2 1/2" and Above: Carbon steel body, flanged pattern, pilot operated, single seated, and stainless steel trim.
- e) Acceptable Manufacture: Fisher

2. **Gate and Ball Valves:**

- a) Up to 2": Bronze, rising stem with split wedge gate.
- b) 2 1/2" and Above: Iron, rising stem.
- c) All Steam Gate Valves: All gate valve used on steam lines shall be listed for steam use.

1.5 **BACKFLOW PREVENTION DEVICES:**

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 within Division 2 or 15, 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.
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:

Backflow Prevention Requirements: 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 "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 "Hot Box" type removable insulation jacket.
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.

1.6 WET TAPS:

- A. GENERAL: Wet tapping may be performed on potable, fire, irrigation, heating hot water, and sanitary sewer force mains. Any connections to chilled water lines that are direct burial (not in a manhole) shall be welded. Wet taps of chilled water lines may only be performed inside of manholes or machine rooms. All wet tapping shall be coordinated with PPD Operations Engineering.

- B. CONSTRUCTOR'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 either:
 - 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.
2. Tapping Sleeves-Chilled Water and Steam: Use a Double disc-tapping valve, a resilient seat or wedge-tapping valve only.
3. Chilled Water: Use weld-o-lets with outlet size of 2 1/2 inches and larger. Thread-o-lets or sock-o-lets with an outlet size of 2 inch and smaller may be used for branch takeoffs up to one half (1/2) diameter of main. Use thread-o-lets where threaded fittings are specified and sock-o-lets where welded fittings are specified. The material of the thread-o-let and sock-o-let shall match the material of the piping.

D. EXECUTION:

1. After installing the sleeve, and prior to drilling, the Constructor 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. Provide a minimum 24-hour notice for inspections.

1.7 METERING:

A. GENERAL:

1. University Policy: It is the policy of the University that all utilities be metered. Utilities include electricity, potable (domestic) water, chilled water, steam, and irrigation. All new buildings and renovations shall include installation of permanent metering of all utilities.

2. Temporary Utilities: All utilities consumed during construction shall be metered and paid for with project funds. The Constructor shall be billed for consumption, unless specifically stated otherwise in writing and approved by PPD Operations Engineering. No utilities shall be consumed by any constructor unless specifically permitted in writing by the Physical Plant Division.
 3. Meter Installations: All meter installations shall meet the requirements of the manufacturer. Shut-off valves shall be installed upstream and downstream of meters.
- B. POTABLE WATER METERING: Special requirements for the metering of potable water are as follows:
1. Meter:
 - a) Meter shall have a direct read capability and a touch read capability. The lid shall have a porthole for the installation of the touch-read sensor, and a peephole with a hinged metal flap to take direct readings.
 - b) Meter Register: Register shall read in hundreds or thousands of gallons.
 - c) Acceptable Manufacturers: Sensus, Neptune, Badger.
 2. Meter Installation: All meter installations on potable water shall meet the requirements of the manufacturer. In addition, the following shall apply:
 - a) Install exterior to building, with enclosure flush to grade. Meter shall not be more than thirty inches (30") below grade.
 - b) The enclosure shall facilitate reading and repair of the meter. Provide a peephole in large or heavy lids.
 - c) The enclosure shall be constructed of cast iron, pre-cast reinforced concrete, or CMU with reinforcing and cells poured solid (polycarbonate boxes are not acceptable). Enclosure cover shall be load bearing.
 - d) Provide test tap and by-pass (three-valve configuration).
 - e) Provide accessible strainer and blow-off upstream of meter.
 - f) The meter shall have a straight section of pipe at least 10 times the diameter before the meter, and 5 times the diameter length after the meter to allow for accurate flow measurements or as per manufacturers written recommendation.
- C. IRRIGATION SYSTEM METERING: Refer to Sections 02660 and 02810 for irrigation system metering requirements when supplied by ground and surface water sources.
- D. CHILLED WATER METERING: Refer to Section 15950 for chilled water metering requirements.
- E. STEAM METERING: Refer to Section 15950 for steam metering requirements.
- F. ELECTRICAL METERING: Refer to Section 16400 for electrical metering requirements.

1.8 MECHANICAL ROOMS:

- A. STANDARDIZATION OF FLOOR PLAN: All mechanical rooms in new or renovated buildings shall have the same basic floor plan (equipment layout), as practical. Vertical alignment of mechanical rooms within new buildings is preferred, where practical.
- B. PIPING AND COMPONENT DIAGRAM: All mechanical rooms shall be designed to facilitate the installation of components in a serviceable manner. Complete piping and component diagrams shall be included in the construction documents to verify that the design intent is constructible and maintainable.
- C. COORDINATION DRAWINGS: The Constructor shall submit coordination drawings assuring that the various components the Constructor intends to install in mechanical rooms will result in a serviceable installation. These drawings shall be provided to the Physical Plant Division for review.
- D. SERVICEABILITY: Clearances suggested by manufacturers for equipment maintenance, removal, or replacement shall be indicated on the coordination drawings and accommodated by the layout. Larger and heavier components that may require future removal or replacement shall be identified on coordination drawings and a clear path identified to the building exterior. Door sizes, lifting supports, and other pertinent information shall be identified on coordination drawings. All components (cleanouts, shut-off valves, floor drains, pumps, etc.) shall have at least 24" to 36" of radial room around them to allow for maintenance access. All equipment access shall be provided within the equipment room.
- E. PRODUCT SUBMITTALS: It is recommended that a copy of the mechanical and electrical submittals be provided to PPD Systems, not for contract compliance-related approval, but to allow PPD Systems to become familiar with the products to be maintained.
- F. FREIGHT ELEVATOR: Mechanical rooms above the second floor shall have access to a freight elevator. Penthouses shall have access to a freight elevator or a roof-mounted winch rated for the heaviest piece of removable equipment.
- G. FLOOR DRAINS: Provide drains and drain piping that is adequately sized to accommodate water volume when testing as well as normal service loads in all mechanical rooms.

1.9 ISOLATION VALVES:

- A. Provide isolation valves at the beginning of each branch piping takeoff in vertical CHW, HHW, DHW, DCW, and Gas piping risers.
- B. Provide isolation valves for each CHW, HHW, DHW, DCW, and Gas riser. Location of riser isolation valves will be directly after the riser takeoff from the main piping within the building and readily accessible for operating.
- C. Provide isolation valves on both the supply and return pipes in each application for "A" and "B".

END OF SECTION