# 220000 Plumbing

**Sections Included In This Standard:**



## 1.1 GENERAL

A. New installations in existing spaces need to inspect drain lines back to the main.
**B.** Building grounding. See Standard 260500, 1.0, L for details on electrical system grounding to water piping.

## 1.2 PLUMBING PIPING

A. DOMESTIC WATER (INSIDE THE BUILDING)

1. A Copper tube Type L soldered to wrought copper or cast bronze fittings.

    a. Solder joints shall be provided with a lead free material approved by NSF (National Sanitation Foundation) and in compliance with ANSI 61 suitable for domestic water systems.

    b. Solder paste shall be non-toxic, water-based approved by NSF for use in domestic water systems. Solder paste shall be suitable for solder based filler material used. Acid flux is prohibited. Uses of solder materials not approved by the NSF and not in compliance with ANSI 61 are prohibited and are not acceptable.

2. Press joint systems (ProPress, Vic-Press, etc) copper, brass and SS fittings & adapters are permitted on water piping up to and including 2".

    a. Press joint systems shall not be used behind or inside permanent walls /ceilings or for underground or exterior applications.

3. Grooved pipe and connectors are permitted on all sizes of pipe.

    a. SS or copper pipe for domestic water in buildings.
    b. Grooved pipe and connectors shall not be used behind or inside permanent walls /ceilings or for underground or exterior applications.
    c. Prefer a factory-direct inspection program provided by a Factory authorized inspector to verify properly installed joints
    d. ACCEPTABLE MANUFACTURERS: Viega, Nibco, Muller, Victaulic and Elkhart.

B. REVERSE OSMOSIS:
    a. CPVC shall be used for plumbing piping for RO water systems.

C. DEIONIZED WATER SYSTEMS
    a. Type of pipe shall be a function of the grade of water required.

D. Drain, Waste Vent piping (DWV)
   a. PVC schedule 40 DWV piping shall be permitted in place of cast iron where Florida Building Code allows, but shall not receive hot discharge in excess of 140° F.

E. Flammable Gas
   a. The use of Press joint systems for flammable gasses is not permitted

F. Compressed air
   a. New Systems
      i. Brazed joints (15% silver) are preferred.
      ii. Press joint systems are permitted
      iii. LokRing Technology is permitted
   b. Existing systems: continue with existing material being used (i.e. If brazed, keep brazed)

G. Vacuum
   a. The use of Press joint systems for vacuum gas is **not** permitted
   b. New systems; Brazed joints using 15% silver.
   c. Existing systems: continue with existing material being used (i.e. If brazed, keep brazed)

H. Nitrogen
   a. New Systems
      i. Brazed joints (15% silver) are preferred.
      ii. Press joint systems are permitted
      iii. LokRing Technology is permitted
   b. Existing systems: continue with existing material being used (i.e. If brazed, keep brazed)

I. Other gases
   a. LokRing Technology is permitted
   b. Gas systems supplying medical facilities or laboratories shall not use flux in fittings

J. Fitting / pipe systems and applications not covered by this standard shall be reviewed with the UF user group before being designed into the project or used.

   a. Push to Connect type systems (Sharkbite, etc.) are not permitted on any type of plumbing system

## 1.3 PLUMBING SPECIALTIES

A. ACID DILUTION OR NEUTRALIZATION PITS: Acid dilution or neutralization pits are not required, nor recommended, for any new construction or renovation project.

B. BUILDING FLOOR DRAINS

1. Provide floor drains in all toilet rooms, mechanical equipment rooms, rooms with wash-down capability, and rooms housing equipment with indirect waste.

2. Floor drains in buildings shall be self-priming.

3. Provide electronic trap primers for floor drains unless there is a permanent water supply.

4. Tail piece trap primers shall not be used on campus.

C. Key-operated hose bibs shall be provided in toilet rooms with more than two waste closets or urinals, mechanical rooms, and at 200-foot intervals in exterior areas for maintenance use.

D. Cleanouts

a. Cleanouts shall be provided for all water closets, urinals, vanities (with crosses), all sinks (kitchen, lab, etc) and drinking fountains.

b. Cleanouts shall be a minimum of 6" above the flood level of all fixtures, but no more then 5' above finished floor.

i. Preferred location is within 3' of the fixture.

ii. If it is desired to have the cleanouts be inconspicuous then the location of the cleanouts needs to be coordinated by the Architect, Engineer and Contractor.

c. Cleanouts shall be provided on back-to-back or side-to-side water closets and urinals including those cleanouts designed to rod water closets.

d. Cleanouts shall be within 3" of the access panel.

e. All cross fittings (tapped or not) shall have a cleanout on the vertical leg, at least 6" above the fixture flood lines, but not more than 3' above the cross and not blocked.

f. On horizontal drain lines within 5 feet of a double combination or double y fitting there shall be a cleanout on the main pipe upstream of the fitting.

g. All new buildings shall have a two way cleanout installed within three foot of the exterior of the building. This cleanout shall be installed in a 2 foot sq, 6" thick concrete pad that is labeled that it is a two way cleanout. Label shall be a bronze disk with minimum ½" tall lettering, anchored in pad with at least two ¼" x 2" serrated anchor pins.

h. Accessible clean-outs shall be installed at the base of all sanitary and storm risers.

E. Isolation valves

a. Shall be installed on the Domestic cold water, Domestic hot water supply, Domestic Hot water return and Purified water systems (RO and DI) on every floor.

i. These valves will allow the floor of the building to be isolated.

b. Shall be installed in every restroom, break room, and laboratory. Valves shall be located within room before first branch feed or within a hallway no more than 10 feet from the first branch feed.

i. If isolation valve is located in the hallway its location shall be indicated by labeling the ceiling grid.

F. Grease Interceptors

a. Volume controls shall not be concealed in concrete and it must be removable for maintenance without altering piping.

## 1.4 PLUMBING FIXTURES

A. GENERAL

1. Plumbing Fixtures shall be Watersense Certified.

B. WATER HEATERS

1. Provide domestic hot or tempered water as required by code(s) and by the Authority having jurisdiction.

2. Provide thermostatic means of controlling delivery temperature to fixtures per building code requirements. Water heater thermostats are not an acceptable means of control.

3. All domestic hot water systems shall have expansion tanks per building code requirements.

4. Install all storage water heaters on concrete housekeeping pad, metal stand or wall stand.

5. Where domestic hot water systems serve fixtures at least 50’ away in piping length, provide recirculation pump system.
    a. Recirculation pump shall be 120V-1.
    b. Electrical connection shall be plug-in type to standard receptacle.
    c. Do not use timers for recirculation control.
    d. The pump can be variable speed.
    e. Hot water supply and return mains with branch circuits where the branch has circuit setter valves shall have ball valves and unions around the circuit setters.

6. Solar is an acceptable alternative means of heating water, but a positive long-term cost model that justifies the life cycle cost shall be provided during design.

7. Point-of-use gas or electric water heaters may be specified.

    a. Single Point-of-use Water Heaters will serve one fixture only. NO through wall piping.

C. WATER CLOSETS

1. All water closets shall be wall-mounted, standard white vitreous china rated for a maximum of 1.28 gpf valves.

2. All water closets shall have a MaP rating of 1000 or higher.

    a. This rating will be for the water closet and flush valve combined.

3. Rear-spud water closets with recessed flush valves are not allowed.

4. Acceptable Manufacturers: American Standard, Briggs, Kohler, Zurn, Toto, Sloan, Proflo, Moen

5. The harvesting and use of condensate from HVAC as the primary flushing agent for water closets is encouraged. Designers must ensure water is properly filtered before it is used as gray water.

D. URINALS

1. All urinals installed in new construction or renovations shall be low flow (≤ 1 pint). Urinals shall be standard white, vitreous china.

2. Rear-spud urinals with recessed flush valves are not allowed.

3. Acceptable Manufacturers: American Standard, Sloan, Zurn, Kohler, Toto, Moen

4. The harvesting and use of condensate from HVAC as the primary flushing agent for water closets is encouraged. Designers must ensure water is properly filtered before it is used as gray water.

E. FLUSH VALVES

1. Flush valves shall be automatic sensor-driven or low flow manual type. (sensor valves are required in all ADA restrooms)
2. Sensor operated flush valves can be either battery or transformer powered.
    a. If transformer powered
        i. Power cannot cross floors or bathrooms
        ii. If the bathroom has more than 2 sinks and other fixtures (urinals, toilets) there must be more than one transformer.
    b. Sensor flush valves shall have a true mechanical override for flush valve operation.
3. Manual valves could either be single flush or dual flush. Dual flush would be the preferred choice of the two choices.
    a. If dual flush valves are the choice at least one flush option shall be <1.1 gpf.
4. Flush Valves shall be diaphragm style. Piston style flush valves are not allowed.

5. Acceptable Manufacturers: American Standard, Briggs, Hydrotek, Kohler, Sloan, Zurn, Moen

G. LAVATORIES

1. Vanity type is preferred.

2. Acceptable Manufacturers: American Standard, Briggs, Kohler, Moen

3. Wall hung vanities need to be hung using a carrier.

F. FAUCETS

1. Restroom faucets.

    (a) Automatic electronic sensor-controlled faucets shall be used in all restrooms.

    (b) Sensor operated restroom faucets can be either battery or transformer powered.
        a. If transformer powered
            i. Power cannot cross floors or bathrooms
            ii. If the bathrooms has more than 2 sinks and two other fixtures (urinals. Toilets) there shall be more than one transformer.

(c) All faucets shall include vandal-resistant aerators with a flow rate of 0.5 gpm or less.

(d) Designers shall consider the size of the faucet or location of the sensors on the faucet as compared to the vanity it serves to avoid excess water on the vanity from normal hand-washing.

(e) Acceptable Manufacturers: Delta; T&S Brass; Sloan; Chicago, Hydrotek, Moen, WaterSaver

2. Spring coiled-self closing faucets shall be used when dispensing with demineralized / deionized water systems and reverse osmosis water.

G. SHOWERS

1. The drain shall have a readily removable strainer for cleaning of the trap.

2. The valve shall have internal stops, internal shutoff valves or individual isolation valves for the hot and cold within 6' of shower stall for service.

3. The shower head shall be no larger than 2.0 gpm.

4. All new showers shall be surface mounted type.

5. Acceptable Manufacturers for Shower Assembly - Delta; T&S Brass; Sloan; Chicago, Hydrotek, Moen, WaterSaver, Bradley

H. WATER COOLERS

1. Coolers shall not be recessed into the wall.

2. New or replacement Coolers shall have both bubblers and water bottle fillers.

3. Coolers that do not require filters or use non proprietary filters are preferred.

4. Coolers that will have filters shall **not** have a filter status indicator system.

5. Backing shall be provided to support coolers. Carriers are not desired.

6. Acceptable Manufacturers: Ebco, Elkay, Oasis, Murdock

I. BACKFLOW PREVENTERS: See section 331000.

## 1.5 DISINFECTION OF WATER DISTRIBUTION SYSTEMS (WITHIN BUILDINGS)

A. GENERAL: All piping for water distribution systems shall be cleaned and tested.

B. POTABLE WATER LINES

1. Flushing, cleaning, sterilization and pressure testing procedures shall be explicitly specified, and shall comply with the State of Florida Health Standards.

2. Water samples shall be tested at Water samples shall be tested at HRS/Alachua County Public Health Unit, Environmental Health Division. Currently a fee is charged for this test. Test results are to be forwarded to the UF Project Manager and Facilities Services ~~Physical Plant~~ Division, Operations Engineering Section before service is turned on. A representative from Facilities Services ~~PPD~~ Operations Engineering should be present during the water sampling.

## 1.6 PLUMBING PIPING INSULATION

A. 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 builder 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. Domestic water piping shall be labeled with the system type at minimum intervals of 25' above ceilings an every 10' in congested ceiling spaces or exposed areas, with direction of flow indicators.
C. Provide fiberglass insulation with white ASJ for domestic water piping systems as follows:
    a. Domestic hot water – All piping – per code
    b. Domestic hot water return – All piping – per code
    c. Domestic cold water - 1/2" minimum in the following locations:
        i. Unconditioned spaces
        ii. Mechanical Rooms
        iii. Routed in exterior walls
        iv. DO NOT insulate DCW pipe in interior walls and plumbing chases (exterior wall chases shall have insulated pipe)
    d. Storm water – 1/2" minimum in the following locations
        i. Horizontal piping
        ii. Exposed vertical piping
    e. Sanitary piping – ½" minimum in the following locations:
        i. Above grade piping receiving discharge from condensate drains such as air handling units, Fan coil units, ice machines and water coolers up to connect at main.
        ii. Projects adding any of these devices shall insulate the trap, to the vertical line.
    f. Indirect waste piping – ½" minimum
D. Application of insulation shall follow the University of Florida's Environmental Safety and Health Policy on Asbestos Labeling. This can be found on the EH&S website.

## 1.7 PLUMBING EQUIPMENT

A. General
    a. The long term operating cost of Equipment shall be considered, along with initial capital cost when specifying.
B. Air Compressors – All Air Compressors shall be Rotary Screw type.
C. Vacuum Pumps – All Vacuum Pumps shall be Dry Claw type.
D. Elevator sump pumps
    a. Shall be a separate pit in the elevator pit for the sump pump.
    b. Pump control shall be done with a float that is integral to the pump.
    c. There shall be an oil sensor system that shall set off an alarm and disable the pump if oil is present. Alarm shall connect to the building automation system (BAS) if possible. If not it shall be audible.

d. Discharge location shall be sanitary sewer.

E. Booster pumps –
   a. Shall be a minimum of a duplex system
   b. Shall be variable speed controlled by a pressure sensor and vfd
      i. Pressure sensor shall be integral to the pump system
   c. If booster pump has an alarm, it is preferred for alarm to connect to the building automation system (BAS) if possible. If not it shall be audible.
   d. Shall have corrosion resistant pump assemblies including impellers.
   e. Booster pump systems shall be designed by an engineer. The engineer shall consider the following during design.
      i. Flow based on total Fixture Units
      ii. Est drop through piping and devices
      iii. Elevation loss
      iv. A minimum of 20psi static pressure at end of line.

END OF SECTION