

DIVISION 22 PLUMBING

Section 22 00 00 – Plumbing General System Designs

PART 1: GENERAL

1.1 Scope of Standards:

- A. Plumbing Code Compliance: Comply with 2015 Uniform Plumbing Code, to selection and installation of Plumbing materials and products. (SHALL EXCLUDE APPENDIX L, ALL OF SECTION L 8.0 Circuit Venting

Through L8.5, OF UPC 2009 CODE.)

- B. The design guidelines contained herein include the requirements for systems, materials, fittings, and valves utilized for plumbing systems at Texas State University. It is the intention of this document to provide a standard for piping systems at Texas State University in order to provide the highest level of quality and standardization possible; it is not intended to be a guide specification.

1.2 Design Guidelines

A. General

1. Building Drainage, Waste and Vent System, use Cast Iron Pipe with no Hub Couplings, Basis of Design shall be Hi-Torq 125 Couplings. Alternative manufacturer – Husky 4000 Series couplings.
2. All indirect drains shall be piped to a floor drain or floor sink. (A/C, Relief Valves, Pan Drains, etc.)
3. Building Drainage Systems – all venting to be properly sized and air admittance valves are strictly prohibited.
4. Building Drainage System – Horizontal Double Combination (any size) is strictly prohibited.
5. Seal all openings around piping.
6. Provide metal sleeves for piping passing through walls to provide fire protection equivalent to initial requirements.
7. In lavatories separately valve each riser pipe.
8. Always provide siphon breakers in pipe lines to hose bib-type faucets.
9. Use plugged tees rather than elbows to provide clean out points in plumbing piping.
10. Provide all take-offs from main water supply lines with cutoff valves and provide sufficient clearance for access to valves. Ensure rough-ins of hot & cold lavatory cutoff valves do not conflict with adjacent tailpieces.
11. Provide enough valving so that plumbing systems can be closed down in sections.

12. Provide permanent “as-constructed” drawings which show locations of all piping systems, including those underground.
13. Use an identification system and a color-coding system for plumbing and piping systems as described in mechanical section of these standards.
14. Provide keyed hose bibs within 20’ of main entrance and rear exit no more than 100’ apart around outside perimeter of a new building. Outdoor hose bib shall be non-freeze proof type.
15. All valves concealed within enclosing construction shall be made accessible via appropriate metal access doors. Their location and size shall be provided to the architect/engineer with a record document to be signed off on.
16. When using PVC (in lieu of Cast Iron for building drainage systems) under slab on grade foundations, do not use test tees (see attached Photo).



17. Mixing cast iron pipe and PVC pipe, under slab, is strictly prohibited on building drainage (sanitary) system. PVC pipe for building drainage system above slab is strictly prohibited, except in special situations approved by Texas State University Plumbing Shop.
- B. Plumbing Fixture Standardization: (only floor mount, floor outlet water closets)
1. Standardize plumbing fixtures for Texas State University as much as possible.
 2. With each new construction project verify plumbing fixture selections with Project Manager prior to finalizing the specification of plumbing fixtures.
 3. Specify plumbing fixtures which have been established as Texas State University standards.
 4. Refer to plumbing section for standard plumbing products.
 5. For energy conservation, where water saving devices have been developed and proven such as reduced flow shower heads they will be used.
- C. Floor Drains
1. Provide floor drains, minimum 3", in all restrooms and custodial closets.
 - a. Do not provide drains in elevator pits, (only).
 2. For drains in Restroom/Bathroom for Public use, provide minimum 3" pipe size. Large restrooms may require 2 or more floor drains.
 3. Slope floor to drains, slope floor just around floor drain is not allowed.
 4. Floor Drain Traps installed in inaccessible areas shall be brought to the attention of Texas State University for consideration of priming at that time. No drain seal use trap; primers on floor drains. Trap seal inserts are not allowed on floor drains or floor sinks.
 5. For fixture trap primers, water closet flush valve-type are preferred, but lavatory drain-type trap primers may be used where flush valve-type are not feasible. Manual tapping of fittings for trap primer connections is not allowed, and trap primer connections to break room sink drains are strictly prohibited.
 6. All traps that are remote from a commonly used fixture shall have an electromechanical trap primer for single or multiple primary connections and must be readily accessible.
- D. Floor Sinks
1. Provide 12" x 12" floor sinks without weep-holes in Mechanical Rooms. Approved manufacturer - MIFAB Series FS1740, 12" X 12" X 10".
 - a. Alternate: Trench Drains
- E. Pipe Chases

1. Size pipe chases to be large enough to accommodate the piping to be housed in chases and to be accessible. Locate piping in chases to avoid the obstruction of entrances or openings to pipe chases.
 - a. Minimum pipe chase width is 42".

F. Access to Plumbing

1. Provide minimum of 3'6" crawl space beneath new buildings. Provide easy access to crawl space.
2. Provide lights in crawl space with light switch at entrance.
3. Equip access doors with locks keyed to campus master and grand master key.
4. Grade crawl space toward gravel-filled trenches provided with perforated drainage pipe.
5. Provide all spaces below grade with perimeter drain system.
6. Plan for clean outs at each corner and at high points of subsurface drainage system.
7. Provide adequate access for working on plumbing and piping. See Spec section Campus Standard 08-31-00 1.02 C 1 thru 4 for access door sizes – no exceptions.
8. Afford easy access to all working parts of all plumbing devices.
9. Do not permanently seal in masonry wall those items of plumbing requiring periodic maintenance or repair.
10. Pipes should not be run above electric panels, transformers, etc.
11. Provide adequate crawlspace ventilation.
12. Use forced air ventilation of crawlspace if crawlspace is below grade.
13. Design for crawlspace air charge as determined by soil test results.

G. Water Meters

1. Include a water meter in each new building and remodel of old buildings if needed.
 - a. Provide a Backflow Preventer at Meter
 - 1). Use Watts 957 for 2-1/2" and larger
 - 2). Use Watts 919 or 909 for 2" and smaller
 - 3). Watts 009 is strictly prohibited
 - b. A bypass system shall be provided for the primary backflow preventer at the meter. The bypass line shall be of equal size to the line feeding the primary backflow preventer, shall have a backflow preventer of equal size to the primary backflow preventer, and shall have isolation valves both upstream and downstream of the bypass backflow preventer.

2. Refer to Section 25 51 00 2.07 Field Devices - Integrated Automation Facility Controls for acceptable domestic water meter.
3. Locate the meter inside a machine room, install meter horizontally no higher than 5' high and no lower than 12" AFF.

H. Pressure Gauge

1. Include a 1-**200** psi pressure gauge, 4-inch or larger, on the domestic water header.
2. Also include an electronic pressure sensor on the header, suitable for connection to Owner's FCMS system.

I. Pipe Size

1. Avoid 2-1/2, 3-1/2 and 5-inch pipe.

J. Solder

1. Must comply to Uniform Plumbing Code 316.1.3
2. Pro Press systems are acceptable.

K. Floor Sinks

1. There shall be one 12" X 12" floor sink, without weep-holes, with 4" outlet pipe size per air handler for fin water (condensate from cooling coils), and one 12"x12" floor sink, without weep-holes, per pump battery to facilitate multiple condensate lines, and to eliminate trip hazard of condensate lines routed over floors. Approved manufacturer - MIFAB Series FS1740, 12" X 12" X 10"

L. Fin Water

1. Fin water may be recovered in some buildings.

M. Water Softening

1. Provide water piping by pass on softener. Bypass will need to be protected by a backflow device.
2. Domestic water feed to heating hot water shall be softened using salt-ion exchange.
 - a. Also provide Backflow Preventer on Softener.
 - 1). Use Watts 957 for 2-1/2" and larger
 - 2). Use Watts 919 or 909 for 2" and smaller
 - 3). Watts 009 is strictly prohibited
3. Water shall be tested for hardness and softening system shall be selected to reduce hardness to acceptable level and sized for building demand. Install test ports (hose bib) for each unit for testing of hardness.

4. Brine storage tank shall be sized for no less than monthly service.
5. System shall consist of two ion exchange tanks each sized for seven (7) days of service.
 - a. No rain bird products.
6. All air admittance valves (auto vents) are prohibited.

N. Vaults

1. Must meet manufacturer's clearances for backflow preventer.
2. Access door/hatch opening shall be 36" to 42" or larger.

O. Water Mains and Distribution Water Lines

1. Water mains 4" and larger use Ductile Iron Pipe/fittings or C900 pipe. 3" and Smaller shall be copper, type K with a 6 mil poly sleeve.
2. AWWA C-900, DR 14 water pipe is acceptable where there are no Steam Lines in the area.
 - a. C-900 or Ductile Iron, Pipe to Pipe joints shall have joint restraints and all Ductile Iron fittings shall be mechanical joints with joint restraints (no exceptions) Use full mechanical bell-end joint restraints for every bell-and-spigot (push-on) joint.
3. All underground PVC (C-900) water distribution pipe must have 12-gauge Tracer Wire.
4.
 - a. Refer to AWWA C605-5 for underground installation of PVC Pressure Pipe and fittings for water.
 - b. Refer to AWWA C600-5 Installation of Ductile Iron water mains
5. Use Resilient Wedge Gate Valves on water distribution mains and provide a 4"x16"x4" concrete pad for proper support of the valve.
6. Use only stainless steel tapping sleeve. Basis of Design, Smith Blair
#665-142512

Smith-Blair® Tapping Sleeves



Tapping Sleeve w/MJ Outlet Option Available on all SB Carbon Steel and Stainless, Steel Tapping Sleeves Use 665-142512MJ-200

7. Fittings:

- a. Use EBAA iron pipe joint restraint (mega lugs) on all mechanical joints.
 - b. Use full mechanical bell-end joint restraints for every bell-and-spigot (push-on) joint.
 - c. Use polyethylene sleeve wrap on Ductile Iron Pipe and mechanical joint fittings.
 - d. 90, 45, ells, tees, 22 ½, or turn of direction shall have a thrust block.
- P. Domestic Utility Water Lines shall have a 4"x16" concrete pad under valves for proper support.
- Q. Sewer Mains
1. Sewer mains shall be a minimum of SDR 26, Heavy Wall, gasket sewer fittings, with 12-gauge tracer wire. Bell Ends must be installed upstream of flow
- R. Storm Drains
1. Storm lines shall be a minimum of SDR 26 Heavy wall, gasket sewer fitting with 12-gauge tracing wire.
- S. Roof Drains
1. Drain inlets and outlets are to be 6" in diameter, minimum.
 2. Downspouts are to be 5" square, minimum, in Copper.

PART 2: PRODUCT (NOT USED)**PART 3: EXECUTION (NOT USED)**

END OF SECTION 22 00 00