

DIVISION 22 PLUMBING

Section 22 11 19 – Domestic Water Piping Specialties

PART 1: GENERAL

1.01 Scope of Standards

- A. This design guidelines contained herein includes the requirements for systems, materials, fittings and valves utilized for piping systems at Texas State University. It is the intention of this document to provide a standard for piping systems at Texas State University to provide the highest level of quality and standardization possible; it is not intended to be a guide specification.
- B. Piping identification standard is ANSI A13.1 “Scheme for Identification of Piping Systems”.
- C. All piping shall have flow arrows indicating direction of flow.

PART 2: PRODUCTS

2.01 Piping Specialties:

- A. General: Texas State University Standards dictate factory-fabricated piping specialties recommended by manufacturer for use in service indicated for each service, or if not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide with fittings coordinated to properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Installer’s option, after review with Texas State University Project Manager.

2.02 Pipe Escutcheons:

- A. General: Provide pipe escutcheons with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish cast brass or sheet brass pipe escutcheons with nickel or chrome finish for occupied areas, prime paint finish for unoccupied areas.

2.03 Low Pressure Y-Type Pipeline Strainers at A/C Chill Water Lines:

- A. General: Provide strainers full line size of connecting piping, with ends matching piping system materials. Select strainers for 125 psi working pressure, with Type 304, stainless steel screens, with 3/64” perforations @ 233 per sq. in.

2.04 Dielectric Unions:

- A. General: Provide standard products recommended by manufacturer for use in service indicated, which effectively isolate ferrous from non-ferrous piping (electrical conductance), prevent galvanic action, and stop corrosion.

2.05 Mechanical Sleeve Seals:

- A. General: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.06 Instrumentation and Miscellaneous Piping Taps—Water Systems Below Ambient Temperature:

- A. All taps shall be constructed of ¾" Schedule 80 Thread-o-Let, ¾" 304/316 stainless steel nipples, and ¾" bronze gate valve.

2.07 Basic Pipes and Pipe Fittings:

- A. Standards for Basic Identification: Piping identification Standard at the University is ANSI A13.1 "Scheme for Identification of Piping Systems: All piping shall have flow arrows indicating direction on flow.
- B. General: The following listing is to be used as the standard for domestic and laboratory water pipes and fittings:
- C. Interior Laboratory and Interior Potable Water Piping:
 - 1. Tube Size 2" and Smaller: Comply with Uniform Plumbing Code (U.P.C). Or, copper tube; Type L, with soldered connections
 - 2. Pipe Sizes 2" and Larger: Use type L copper with soldered connections.
 - a. Exception: ProPress Systems
 - ~~3.~~ Copper on potable water systems, no exceptions.
- D. Exterior or Below Grade Potable Water Piping:
 - 1. Tube Size ¾" and Smaller: Copper tube; Type K, soft-annealed temper; cast-copper flared tube fittings.
 - 2. Tube Size 1" and larger Copper tube; Type K, soft-annealed temper; wrought-copper fittings, lead free jointing (Silvabrite).
 - 3. All exterior or below grade potable water lines shall be sleeved

2.08 Basic Piping Specialties Standard:

- A. General: Provide piping specialties in accordance with the following standard listing:
- B. Y Strainers: Provide Y strainers with cast-iron body, 125-psi flanges, bolted type or yoke type cover. Furnish with removable, non-corrosive perforated strainer basket, with 1/8" perforations and lift-out handle.

C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering basket strainers which may be incorporated in the work include, but are not limited to, the following:

1. Nibco – Basis of Design
2. Josam Mfg. Co.
3. Metraflex Co.
4. Spirax Sarco
5. Smith (Jay R.) Mfg. Co.

2.09 Basic Supports and Anchors:

A. General: Provide supports and anchors in accordance with the following listing:

1. Adjustable galvanized steel clevises and adjustable pipe saddle supports are Standard for horizontal piping hangers and supports.
2. Two-bolt riser galvanized clamps are Standard for vertical piping supports.
3. Concrete inserts, C-clasps, and steel brackets are Standard for building attachments.
4. Protection shields are Standard for insulated piping support in hangers.

2.10 Basic Valves:

A. General: The following valves are Standard in application at Texas State University. Valves applied to cold water and piping systems with fluids typically less than ambient temperature shall be constructed with all components exposed to atmosphere of stainless steel or brass. Steel components are not acceptable.

B. Type of valves specified in this article include the following:

1. Butterfly valves - for 2 ½" and larger
2. Gate Valves
3. Drain Valves
4. Ball Valves – Full Port, for 2" and smaller
5. Plug Valves

- C. The type valves to be used for each application are listed here. If not specifically listed for an intended use, check with Facilities Planning, Design and Construction.

Service: Hot Water

- Rising Stem Gate Valve
- Lug Mounted Butterfly Valve – 2 ½ inches and larger
- Full Port Ball Valve – 2 inches and smaller
- Plug Valve – Balancing only

Service: Domestic Hot and Cold Water

- Ball Valve – Full Port, 2 inches and smaller
- Gate Valve
- Butterfly valves – for Hot and Cold, 2 ½ “and larger.

Service: Make-up Water - requires meter and backflow preventer.

- Gate Valve
- Plug Valve

- D. Valve Identification: Provide valves with manufacturer’s name (or trademark) and pressure rating clearly marked on valve body.

- E. Codes and Standards:

MSS Compliance: Mark valves in accordance with MSS-25 “Standard Marking System for Valves, Fittings, Flanges and Unions”.

ANSI Compliance: For face-to-face and end-to-end dimensions of flanged or welded-end bodies, comply with ANSI B16.10 “Face-to-Face and End-to-End Dimensions of Ferrous Valves”.

- F. Submittal:

Product Data: Submit manufacturer’s technical product data, including installation instructions for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valve schedule showing Manufacturer’s figure number, size, location, and valve features for each required valve.

Shop Drawings: Submit manufacturer’s assembly-type (exploded view) shop drawings for each type of valve, indicating dimensions, weights, materials, and methods of assembly of components.

Maintenance Data: Submit maintenance data and spare parts lists for each type of valve. Include this data, product data, and shop drawings in maintenance Manual; in accordance with requirements of Division I.

G. Products - Valves:

Sizes: Unless otherwise indicated, provide valves of same size as upstream pipe size.

Operators: Provide handwheel, fastened to valve stem, for valves other than quarter-turn. Provide lever handle for quarter-turn valves, 5" and smaller, other than plug valves. Provide one wrench for every 10 plug valves. Provide gear operators for quarter-turn valves 8" and larger. Provide chain-operated sheaves and chains for overhead valves located 6'-6" or higher above the finished floor. The chain shall be of proper length so that the bottom of the chain "loop" is 5'-0" above finished floor.

1. Section Valves:

- a. 2" and Smaller: Gate valves or ball valves.
- b. 2 ½" and Larger: Gate valves or butterfly valves

2. Shutoff Valves:

- a. 2" and Smaller: Gate valves or ball valves. (above ground only)
- b. 2 ½ or Larger: Gate valves or butterfly valves

3. Drain Valves:

- a. 2" and Smaller: Gate valves or ball valves.
- b. 2 ½ and larger: Gate valves.
- c. Comply with the following standards: Water Heater Drain Valves: ASSE 1005
- d. Manufacturers: Subject to compliance with requirements, provide drain valves of one of the following:
 - Hammond Valve Corp.
 - Lee Brothers; Div. Phelps Dodge Brass Co.
 - Mansfield Plumbing Products
 - Prier Brass Mfg. Co.
 - Tanner Mfg. Co.

4. Check Valves:

- a. All Sizes: Swing check valves.
 - 1). Brass to Brass is not allowed.
 - 2). Use Teflon discs.

5. Plug Valves:

- a. For use on natural gas, use valves approved by Texas State University, AGA or ACA approved and complies with Uniform Plumbing Code.

- b. Manufacturers: Subject to compliance with requirements, provide drain valves of one of the following:

Lunkenheimer Co.
 Power (Wm.) Co.
 Rockwell International; Flow Control Div.(Nordstrom)
 Walworth Co.

- c. 2" and Smaller: 150 psi, bronze body, straightway pattern, square head, threaded ends.

Lunkenheimer: 454

- d. 2-1/2 and Larger: 175 psi, lubricated plug type, semi-steel body, single gland, wrench operated, flanged ends.

Nordstrom: 143
 Powell: 2201
 Walworth: 1718F

6. Gate Valves:

- a. Comply with the following standards:

Cast Iron Valves: MSS SP-70
 Bronze Valves: MSS SP-80
 Steel Valves: ANSI B16.34

- b. Manufacturers: Subject to compliance with requirements, provide gate valves of one of the following:

Crane Co.	Lunkenheimer Co.
Fairbanks Co.	Milwaukee Valve Co., Inc.
ITT Grinnel Valve Co., Inc.	Powell (Wm.) Co.
Jenkins Bros.	Stockham Valves and Fittings
Walworth Co.	

- c. 2" and Smaller: Class 125, bronze, screw-in bonnet, rising stem, solid wedge.

	<u>Threaded Ends</u>	<u>Solder Ends</u>
Crane	428	1334
Fairbanks	0252	0282
Grinnell	3010	3010-SJ
Jenkins	47	1242
Lunkengeimer	2127	2132
Milwaukee	148	1149
Powell	500-S	1821-S

Stockham	B-100	B-108
Walworth	55	55-SJ

- d. 2" and Smaller: Class 125, bronze, screw-in bonnet, non-rising stem, solid wedge.

	<u>Threaded Ends</u>	<u>Solder Ends</u>
Crane	438	1324
Fairbanks	0250	0280
Grinnell	3000	3000-SJ
Jenkins	370	1240
Lunkenheimer	2129	2133
Milwaukee	105	1145
Powell	507	1822
Stockham	B-103	B-104
Walworth	55	4-SJ

- e. 2-1/2" and Larger: Flanged ends, Class 125, iron body, bolted bonnet, solid wedge, bronze mounted.

	<u>OSY</u>	<u>Non-Rising Stem</u>
	15B-9	
Crane	465-1/2	461
Fairbanks	0405	6060
Grinnell	6020	326
Jenkins	651A	326
Lunkenheimer	1430	1428
Milwaukee	F-2885	F-2882
Powell	1793	1787
Stockham	G-623	G-612
Walworth	8726-F	8719-F
Mueller	Resilient Wedge Valves	

- f. Hose End; 2-1\2": FM, 175 psi, bronze body, solid wedge, inside screw, non-rising stem.

Provide cap and chain.

Fairbanks:	0210
Jenkins:	707
Lunkenheimer:	366
Walworth:	115

- g. Threaded End: 2" and Smaller: FM, UL-listed, 175 psi, bronze body, solid wedge, outside screw and yoke, rising system.

Crane:	459
Fairbanks:	0412

Jenkins: 825-A
 Stockham: G-634
 Walworth: 8713-F

7. Ball Valves:

- a. Comply with the following standards:

Cast Iron Valves: MSS Sp-72
 Steel Valves: ANSI B16.34

- b. Manufacturers: Subject to compliance with requirements, provide drain valves of one of the following:

Conbraco Industries, Inc.
 Crane Co.
 Fairbanks Co.
 Hammond Valve Corp.
 ITT Grinnel Valve Co., Inc.
 Jamesbury Corp.
 Jenkins Bros.
 Metraflex Co.
 Nibco, Inc.
 Powell (Wm.) Co.
 Stockham Valves and Fittings
 Walworth Co.
 Watts Regulator Co.

- c. 1" and Smaller: 150 psi, bronze body, (Full port, bronze trim, 2 - piece construction, TFE seats and seals.

	<u>Threaded Ends</u>	<u>Solder Ends</u>
Crane	2182	2182
Grinnell	3700	3700-SJ
Jamesbury	21-1100	----
Jenkins	900T	902T
Stockham	S-216BRRT	S-216BRRS
Watts	B-6000	B-6801

- d. Copper lines 2" and smaller: Approved manufacturer – Apollo series 77W ApolloPress Ball Valve, Bronze, Full-Port, 300 CWP, PXP, Sizes: ½" to 2".

Bibbs and Faucets:

- A. Hose Bibbs (must have vacuum Breaker and be fully recessed)
 - 1. Threaded End: Bronze body, renewable composition disc, tee handle, $\frac{3}{4}$ " NPT inlet, and $\frac{3}{4}$ " hose outlet.
- B. Sill Faucets: Bronze body, renewable composition disc, wheel handle, $\frac{3}{4}$ " solder inlet, $\frac{3}{4}$ " hose outlet.
- C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering bibbs and faucets, which may be incorporated in the work, include, but are not limited to, the following:
 - 1. Chicago
 - 2. Hammond Valve Corp.
 - 3. Lee Brothers; Div. Phelps Dodge Brass Co.
 - 4. Mansfield Plumbing Products.
 - 5. Nibco Inc.
 - 6. Prier Brass Mfg. Co.
 - 7. Tanner Mfg. Co.
 - 8. Watts Regulator Co.

2.11 Hydrants:

- A. Recessed (no exceptions) Non-Freeze Wall Hydrants: Case-bronze casing, length to suit wall thickness, vacuum breaker, hinged locking cover, $\frac{3}{4}$ " inlet, hose outlet.
- B. Project Non-Freeze Wall Hydrants: Cast-bronze hydrant, chrome plate face, tee handle key, bronze casing, length to suit wall thickness, vacuum breaker, $\frac{3}{4}$ " inlet hose outlet.
- C. Projected Non-Freeze Wall Hydrants: Cast-bronze hydrant, chrome plated face, tee handle key, bronze casing, and length to suit wall thickness, vacuum breaker, and $\frac{3}{4}$ " inlet hose outlet.
- D. Floor Level Non-Freeze Hydrants: Bronze hydrant, rough bronze box, tee handle key, bronze casing, length to suit depth of bury, drain hole, vacuum breaker, hinged locking cover, $\frac{3}{4}$ " inlet, hose outlet.
- E. Lawn Non-Freeze Hydrants: Chicago No. 387. Install in 12" x 12" cast iron or concrete box.
- F. Non-Freeze Post Hydrants: Bronze hydrant, tee handle key, bronze casing with cast-iron casing guard, length to suit depth of bury, drain hole, vacuum breaker, $\frac{3}{4}$ " inlet, hose outlet.

2.12 Thermometers:

- A. Provide Solar-Powered Digital Thermometers.

- B. Thermometers in pipe lines shall be installed in sockets fitted into piping by the use of tees, or elbows, or welded into pipe 3" or larger, to permit bulb socket to enter into the pipe stream, and allowance shall be made in necks of thermometers for insulation where same is used.
- C. Thermometers shall be provided in inlets and outlets to each water-cooled condenser, inlets and outlets to each chiller, inlets and outlets to each water coil, common cooling tower supply and return lines, common chilled water supply and return lines, in each zone supply duct at each air handling unit and at any other location indicated on the drawings.
- D. Thermometers shall have a calibration adjustment and same be accurately calibrated.

2.13 Piping Systems:

- A. General: Extend of pipe required by this article of the specifications is indicated on the drawings and/or specified hereinafter.

- B. Type of pipe specified in this article include the following:

Steel Pipe for A/C Shop & Steam Shop use
Copper Tube for Potable Systems
Cast-Iron Pressure Pipe on Ductile Iron
Miscellaneous Piping Materials/Products

- C. The type pipe to be used for each application is indicated on the drawings and/or specified hereinafter:

Domestic Hot Water Pipe:
Above grade - Copper Type L, Hard
Below grade - pre-insulated steel/ductile iron pipe

Domestic Cold Water Pipe:
Above grade - Copper Pipe Type L, Hard
Below grade - steel or ductile iron pipe

Condensate Drain Piping for A/C:
Above grade - copper piping-Type L, Hard with Drainage Type-Copper
Fitting

- D. Available Manufacturers:

1. Josam Mfg. Co.
2. Smith, (Jay R.) Mfg. Co.
3. Tyler Pipe; Sub. of Tyler Corp.
4. Woodford Mfg. Co.
5. Zurn Industries Inc., Hydromechanics Div.

2.14 Backflow Preventers:

- A. General: The standard back flow preventer is of the reduced pressure zone (RPZ) type, the assembly including shutoff valves on inlet and outlet, and strainer on inlet. Backflow preventers shall include test cocks, and pressure-differential relief valve located between 2 positive seating check valves. Construct in accordance with ASSE Standard 1013. The exact model of the backflow preventor shall be coordinated with the Owner prior to incorporation into the design.
 - 1. Must comply with Uniform Plumbing Code.(approved and listed by University of Southern California Foundation for Cross Connection Control and Hydraulic Research)
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering backflow preventers which may be incorporated in the work include, but are not limited to, the following:
 - 1. Watts Regulator Co.

2.15 Pressure Regulating Valves:

- A. General: The standard pressure regulating valve is single seated, direct operated type, bronze body, integral strainer, complying with requirements of ASSE Standard 1003.
- B. Available Manufacturers:
 - 1. Cash (A.W.) Valve Mfr. Corp.
 - 2. Cla-Val Co.
 - 3. Spencer Engineering Co., Inc.
 - 4. Watts Regulator Co.

2.16 Relief Valves:

- A. General: The standard relief valves are to be manufactured in accordance with ASME Boiler and Pressure Vessel Code and are of the following configurations:
 - 1. Combined Pressure-Temperature Relief Valves: Bronze body, test lever, thermostat, complying with ANSI 221.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210 o F (99 o C), and pressure relief at 150 psi.
- B. Available Manufacturers:
 - 1. Cash (A.W.) Valve Mfg. Corp.
 - 2. Conbraco Industries, Inc.
 - 3. Watts Regulator Co.
 - 4. Zurn Industries, Inc.; Wilkins-Regulator Div.

PART 3: EXECUTION

3.01 General:

- A. Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.
 - 1. **Provide clean-out capability** for domestic hot water return piping in recirculating loops. There may be a capped "tee" at each ninety-degree turn in the piped return system.

3.02 Installation of Valves:

- A. Sectional Valves: Install on each branch and riser, close to main, where branch or riser serves 2 or more plumbing fixtures or equipment connections.
- B. Shutoff Valves: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture.
- C. Drain Valves: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain potable water system.
- D. Check Valves: Install on discharge side of each pump.
- E. Balance Cocks: Install in each hot water recirculating loop.
- F. Hose Bibbs: Install on exposed piping where indicated, with vacuum breaker.
- G. Sill Faucets: Install on concealed piping where indicated with vacuum breaker.
- H. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
- I. Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.
- J. Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or type of pipe/tube connections.
- K. Tube Size 2" and Smaller: Soldered-joint valves.
- L. Pipe Size 2-1/2" and Larger: Flanged valves.
- M. Valve System: Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OSY valves.
- N. Non-Metallic Disc: Limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shut-off metal seated valves.

- O. Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.

3.03 Installation of Backflow Preventers:

- A. Install backflow preventers where required by Uniform Plumbing Code 603.0. Locate in same room as equipment being protected. Pipe relief outlet to nearest floor drain.
- B. Backflow preventers shall be installed at any connection between potable and non-potable water systems.

3.04 Installation of Pressure Regulating Valves:

- A. Provide inlet and outlet shutoff valves, and throttling valve bypass. Provide pressure gage on valve outlet.

3.05 Equipment Connections:

- A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by Uniform Plumbing Code.
- B. Mechanical Equipment Connections: Connect hot and cold water piping system to mechanical equipment as indicated, and comply with equipment manufacturer's installation instructions. Provide shutoff valve and union for each connection, provide drain valve on drain connection.

3.06 Adjusting and Cleaning:

- A. Valve Adjustment: After piping systems have been tested and put into service, but before final testing, adjusting, and balancing, inspect each valve for possible leaks. Adjust or replace packing to stop leaks, replace valve if leak persists.
- B. Cleaning: Clean factory-finished surfaces. Repair marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION 22 11 19