

## PIPING AND VALVES - HYDRONIC

### DESIGN & INSTALLATION

#### 1. Piping

- a. Press fittings are allowable only on 2" and smaller piping that is not in a concealed location.
- b. Piping can be soldered, welded, grooved (Victaulic) or flanged. Threaded HVAC piping is not preferred and must be discussed with WUSM project manager on an individual project basis.
- c. Piping to be coordinated with all trades and installed as accessible as possible. Keep as straight as possible in elevation to minimize traps. Coordinate with other trades in 3 dimensional drawing software where located in tight locations.
- d. Condensate drain piping shall be a minimum of ¾". Condensate piping shall be installed concealed within walls where not located within a Mechanical room. Exposed piping is not acceptable. Termination at indirect connection or floor drain shall be visible.
  - Condensate drain termination shall include a union prior to termination over floor drain for removal of floor drain grate or access to floor drain for cleaning.
- e. Piping shall not be routed over electrical areas. In renovation projects, where piping is routed over existing electrical areas, confirm with project manager if this piping is to be relocated or a trough with a drain piped to a floor drain will be required.
- f. All pipe risers shall have isolation valves and strainers.

#### 2. Valves

- a. When two or more valves of the same type are to be used in the same service, all valves of this type shall be of the same manufacturer.
- b. All valves for use with insulated piping shall have stem or neck extensions.
- c. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- d. Locate valves for easy access and provide separate support where necessary. Install valves in horizontal piping with stem at or above center of pipe.
- e. Install valves in position to allow full stem movement.
- f. Butterfly valves larger than 6" shall have gear operators.
- g. Butterfly valves and gate valves located above 12'-0" shall have chain wheel operators.
- h. Where valves installed at equipment above ceilings, access to valves at equipment shall be in same location as access to control panel or vfd. Provide one mock up pipe layout for facilities approval prior to installing piping and valves to all equipment on a project.
- i. Pre-piped valve assemblies are acceptable for VAV boxes. Flexible pipe connections at VAV boxes are also acceptable.
- j. Provide branch shut-off valves for ease of maintenance shutdown.
- k. All balance valves shall have upstream and downstream straight piping distances as required by the manufacturer.

- l. Balance valves shall not be used as a shutoff valve. Additional shut off valves to be installed next balance valves.
  - m. Do not locate valves above other piping or equipment that would interfere with access to valves. Do not locate valves where scaffolding would be required to access valve.
  - n. Valves shall be installed on systems for ease of isolation. Include valves at each floor. Any floor that is over 10,000sf shall be divided into two sections with 10,000sf maximum served by an isolation valve. Include drain valves with hose connections directly downstream isolation valves for draining of system.
  - o. Provide isolation valves to facilitate future renovations where applicable.
3. Dielectric unions
- a. Dielectric unions are not allowed. Utilize alternative fittings.
  - b. Unions shall be slip union only unless absolutely necessary. Copper-male or copper-female unions only.
  - c. All carbon steel to copper transitions on heating hot water piping shall be “Dielectric waterway” fittings by Victaulic or equal.
  - d. Any union or Dielectric water way fitting shall be located above accessible ceiling and not above Labs or critical equipment.
4. Air Vents
- a. Install manual air vents at all high points in piping.
  - b. Automatic air vents are not preferred.
  - c. Label ceiling where all air vents are located. See also Mechanical Identification.
5. Thermometers
- a. Provide all thermometers in a well so that the system does not have to be drained to replace the thermometer.
  - b. Digital thermometers shall not be used.
6. Strainers
- a. Provide mesh and size of strainers.
7. Demolition
- a. Remove all old hangers during demolition.
  - b. Do not abandon unused hangers in place.

#### RELATED SECTIONS

- 1. Mechanical Identification.
- 2. Air Terminal units.
- 3. Piping and Valves – Steam.

#### APPLICATIONS

- 1. Refer to piping Schedules on the documents for specific valve applications.

2. Chilled-Water / Heating-Water / Condenser Water piping:
  - a. Steel – ASTM A53/A53M Grade B, seamless or ERW, Schedule 40
  - b. Copper – 2-1/2" and smaller – ASTM B88, Type K, hard drawn.
3. Natural Gas Piping: Use the following types of valves:
  - a. Ball Valves: ASTM 8584 bronze 2 piece body, 600 psi WOG, quarter tum lever handle, blow-out proof stem, UL listed, full port 1" and smaller, standard port 1- 1/4" thru 3", reinforced TFE seats, all stainless steel trim, threaded ends.
  - b. Welded Ball Valve, 4" and larger: welded carbon steel body, butt weld ends, full port, stainless steel ball and stem, teflon seat, 2" square operating nut with locking plate.
  - c. Underground Polyethylene: polyethylene ball valve, PE 2406, SDR-11, 80 psig rating, full port polyethylene ball, nitrile seat, 2" square nut operation.
4. Compressed Air Piping: Use the following types of valves:
  - a. Ball Valves: ASTM B584 bronze 2 piece body, 600 psi WOG, quarter tum lever handle, blow-out proof stem, downstream vent, standard port 2" and smaller, reinforced TFE seats, all stainless steel trim, threaded or soldered ends.
5. Vacuum Piping: Use the following types of valves:
  - a. Ball Valves: ASTM B584 bronze 2 piece body, 600 psi WOG, quarter turn lever handle, blow-out proof stem, full port 2" and smaller, standard port 2-112" and larger, reinforced TFE seats, all stainless steel trim, threaded or soldered ends.
6. Chilled-Water / Heating-Water / Condenser Water: Use the following types of valves:
  - a. Ball Valves: ASTM 9584 bronze 2 piece body, 600 psi WOG, quarter tum lever handle, blow-out proof stem, full port 2" and smaller, standard port 2-1/2" and larger, reinforced TFE seats, all stainless steel trim, threaded only.
  - b. Butterfly Valves: ASTM A395 ductile iron body, 1/4 tum, extended neck, geometric drive, EPDM molded-in seat liner, threaded lug type, aluminum bronze disc, 416 SS stem, lubersized bronze or Teflon bushings. Valves shall be rated for 200psi dead end service without use of a downstream flange.
  - c. Balance Valves: Valves shall have position indication and calibrated flow curves. Valves shall provide positive shut-off for service and shall have adjustable memory stops to allow returning to original balanced position after servicing. Valves shall have integral pressure tap ports provided with "drip caps", 2" and smaller bonze body. 2-1/2" and larger iron body.
  - d. Swing Check Valves: 2" and smaller: Class 125 (125 psi at 400°F, 200 psi at 150°F), bronze, horizontal swing, vertical up-flow, Y pattern, teflon renewable seat and disc in conformance with MSS SP80.
  - e. Silent Check Valves: 2-112• - 10, Class 125 (125 psi at 400°F, 200 psi at 150°F), flanged, ASTM A-126 Class 8, cast iron body, bronze trim, resilient seat.
  - f. Resilient Seat Gate Valves: 250 psig non-shock cold working pressure (maximum operating temperature 160°F), ASTM A536 ductile iron body, bolted bonnet, non-rising stem, EPDM coated ductile Iron wedge, epoxy coated inside and outside per AWWA C550, mechanical joint ends.
7. Valve package at coils

- a. Nexus Coil pak or equal on VAV boxes. Provide stainless steel flexible piping or hard pipe.
  - b. Nexus Ultra xb coil pak 02x on fan coil units. Provide stainless steel flexible piping or hard pipe.
8. Thermometers
- a. Provide all thermometers in a well.
  - b. Digital thermometers shall not be used.

#### BIDDING AND CONTRACT DOCUMENT GUIDELINES

1. Installation
  - a. Specify that valves are to be installed with the stem above the horizontal.
  - b. Specify that welded or soldered valves are to have the seats protected from the heat during installation.

END OF SECTION