DESIGN REQUIREMENTS

GENERAL-DUTY VALVES FOR HVAC PIPING

GENERAL INFORMATION

1.1 This section applies to valves for hydronic and steam systems.

DESIGN REQUIREMENTS

2.1 Design Criteria

a. The Consultant shall confirm the application, including temperature and pressure requirements, of the specified valves to insure suitability of use in the specified systems.

b. The design drawings shall include a riser and flow diagram and details of system specialties for all HVAC systems. Collectively, the drawing elements shall capture and illustrate all valve applications including: shut-off, balancing, bypass, control and direction flow control. Exception: drain valves can be noted on drawings.

2.2 Valve flange rating shall be compliant with system working pressure, per ANSI pressure classification tables. Exception: Chilled Water valves connected to the Campus Loop system shall be 250 psig working pressure unless otherwise noted. All other valves shall have a minimum working pressure of not less than 150 psi.

2.3 Minimum test pressure for all valves to be 1.5 times maximum system working pressure unless noted otherwise.

2.4 Within each building there shall be a building valve to isolate the service to the building.

2.5 Isolation valves shall be provided at all pumps, tanks, reducing and automatic or mechanical flow control devices, radiation, coils and heat exchangers, and at all other apparatus requiring partial drainage of the system for periodic maintenance or inspection. The isolation valves shall be so located as to permit removal and/or service of the isolated equipment without draining complete or substantial portions of the system. Except where flanged valves are used, each connection to equipment shall be made with screwed or flanged union on the equipment side of the valve.

2.6 Isolation valves shall be provided at all branch takeoffs from system mains and risers and returns to system.
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2.7 Drain valves shall be provided on tanks, receivers, risers and where they may be required or necessary, or directed for draining the lines and equipment. Drain valves or plug cocks shall be provided at the low points for proper drainage and, where required or directed, cocks and valves shall be provided with threaded ends for hose connections.

2.8 Check valves installed in the horizontal position shall be swing checks; valves installed in the vertical position shall be silent checks, except that all check valves in pump discharges shall be silent checks.

2.9 Provide blow-off valves at all strainers.

2.10 All Risers shall have drain valves installed at the low point to permit draining of supply and return risers without impacting other system risers. Drain valves shall have hose bibs and caps.

2.11 Provide balancing valves in the branch lines of water systems where hydraulic disparities between the branches may exist. Balancing valves for water systems may also be used for equipment isolation.

2.12 Provide isolation valves on water piping leaving MER’s to permit repairs on leaking pipes, etc. and without draining the entire system.

2.13 Valve Application Types of HVAC Systems
   
a. Valves 4” size and smaller used for HVAC water shut-off shall be ball valve type.
   
b. Valves 4” size and larger used for HVAC water shut-off shall be gate or high performance butterfly type. Only lug type butterfly valves shall be specified.
   
c. Steam and condensate return shut-off valves shall be OS&Y gate valve type for all sizes.
   
d. Valves 4” size and smaller used for hydronic bypass or for flow control shall be ball valve type. Valves 4” and larger shall be high performance butterfly type. Only lug type butterfly valves shall be specified.
   
e. Valves 4” size and larger used for controlling water flow at pumps and at equipment, and for bypass control shall be lubricated plug type.
   
f. All bypass or flow control valves in steam piping shall be globe type.
   
g. Pressure Independent Valves (PIV) and Pressure Independent Control Valves (PICV) shall be used to regulate flow through all hydronic equipment.
   
h. Triple duty valves are NOT permitted in ANY installation on Campus
CONSTRUCTION REQUIREMENTS

3.1 Submit shop drawings complete with: all valves, including valve type, size, service, temperature and pressure class, location, connections (screwed ends, flanged ends or brazing ends), brazing adapters, where required, valve identification tag, installation instructions and maintenance and operating instructions. Submit extension stems of suitable length on insulated piping.

3.2 Each valve shall have the maker’s name or brand, the figure or list number and the guaranteed working pressure cast on the body and cast or stamped on the bonnet, or shall be provided with other means of easy identification.

3.3 Valve Identification:
   a. Each valve in each piping system should be tagged with a brass or aluminum tag numbered consecutively for each system and attached to the valve with a brass or aluminum chain.
   b. Valve tags should have stamped abbreviations of the system in addition to the valve number.
   c. The Contractor should be asked to prepare a valve schedule listing each valve, system, location and purpose.
   d. Tags for renovation projects shall be named consistently with building systems.
   e. Valve numbering sequence shall be submitted for review and approval by Facility Operations Department.

3.4 All valves shall be installed with the best workmanship and are to have neat appearance and be arranged so that they are easily accessible.

3.5 Where insulation is indicated or specified, provide extended stems of suitable length to accommodate the insulation.

3.6 Install valves in horizontal piping with stem at or above center of pipe.

3.7 Install valves in position to allow full stem movement.

3.8 Install chainwheel operators on valves 4-inch and larger and more than 96-inches above floor. Extend chains to 60 inches above finished floor elevation.
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3.9 Install check valves for proper direction of flow and as follows:
   a. Swing Check Valves: In horizontal position with hinge pin level.
   b. Dual-Plate Check Valves: In horizontal or vertical position, between flanges.
   c. Lift Check Valves: With stem upright and plumb.

REFERENCE

4.1 The applicable CSI Specification Section is 23 05 23.