SECTION 23 05 23 – HVAC&R VALVES

PART 1 - GENERAL
1.1 SUMMARY:
   A. Section includes valves for building services piping.
   B. Related Sections:
      1. Section 01 17 01 – Building Systems Labeling and Identification.
      2. Section 23 00 10 – HVAC Design Criteria
      3. Section 23 09 00 – Building Automation Systems Design Criteria

1.2 GENERAL VALVE APPLICATION REQUIREMENTS:
   A. The pressure class of the valves shall be equal to or greater than the rating of the piping system into which it is installed.
   B. Provide valve handle extensions that allow for continuous insulation thickness for valves on insulated piping.
   C. Provide isolation valves upstream and downstream of automatic control valves.
   D. Refer to section 23 09 00 – Building Automation Systems Design Criteria for additional control valve requirements.
   E. Provide control valves with unions to allow for ready valve removal and replacement. For HPS and HTHW (High Temperature Hot Water) applications, omit the use of unions and instead use flanged-end control valves.
   F. For HTHW applications, Brown preference is to use gate valves, not butterfly valves, for building shut-off service, unless physical limitations in the piping prohibit their use.
   G. Provide strainer ahead of all globe or cage-trim control valves.
   H. Provide bypass globe valve around main steam and HTHW control valves unless there are two, or more, control valves used.
   I. Pressure-reducing valve locations shall have valved bypass lines installed around them.
   J. Provide shut-off valves on supply and return at each floor’s main branch off of building risers in accessible, marked locations.
   K. Provide chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.
   L. Furnish gear operators for valves 8 inches and larger.
   M. Drain Valves:
      1. Provide drain valves (ball-type) at all equipment connections and at all low points in the piping system to allow for complete drainage.
      2. Drain connections shall have full-size threaded hose end with cap/plug. Caps shall be solid threaded brass with pressure rating equal to 1.5 times system design pressure. “Dust caps” are not acceptable.
3. For piping up to 4-inches, provide minimum 3/4-inch valves.
4. For piping between 4 and 10 inches, provide minimum 1-1/2 - inch valves.
5. For piping greater than 10-inches, provide 2-inch valves.

N. Plug valves, both lubricated and non-lubricated types, are not acceptable for HVAC system applications.

1.3 DETAILED VALVE APPLICATION REQUIREMENTS:
A. Use full-port ball valves for shut-off service 3-inches and under on chilled, condenser and hot water systems. Over 3-inches, use High-performance butterfly valves.
B. Use Ball valves for shut-off service on steam systems.
C. Use Spring-loaded silent check valves on all pump discharges where triple-duty valves are not used.
D. Do not use triple-duty valves when pumps have variable-speed drives.

PART 2 - PRODUCTS

2.1 GATE VALVES:
A. Up through 2 inches: Class 150, bronze body, bronze trim, rising stem, hand-wheel, inside screw, solid wedge disc, solder ends.
   1. HTHW Service: OS & Y, steel body, socket weld ends, Class 600.
   2. MTHW/CHW Service: Use ball valves.
B. 2-1/2 inches and Larger: Class 150, iron body, bronze trim, outside screw and yoke, hand-wheel, solid wedge disc, flanged ends.
   1. HTHW Service: OS & Y. steel body, flanged or welded ends; Class 300.
   2. MTHW/CHW Service: Use ball or butterfly valves.

2.2 GLOBE VALVES:
A. Up to and including 2 inches: Class 250, bronze body, bronze trim, hand-wheel, bronze disc, threaded ends. Use Teflon discs where piped fluid requires it.
B. 2-1/2 inches and Larger: Class 300 iron body, bronze trim, hand-wheel, outside screw and yoke, renewable bronze plug-type disc, renewable seat, flanged ends.
C. All globe valves shall have gland followers.

2.3 BALL VALVES:
A. Construction, 3 inches and Smaller : Class 250 minimum or as required for service, bronze, two piece body, chrome plated brass ball, regular full-port, teflon seats and stuffing box ring, blow-out proof stem, and lever handle with balancing stops.
   1. Low Pressure Steam (< 15 Psig), low pressure condensate and all other normal non-corrosive services, ball valves shall be:
      a. Body Bronze
      b. Body Style Standard Port
      c. Trim 316 Stainless Steel Ball & Stem.
      d. Seat Reinforced Teflon (RTRE), 15 glass filled, double seal.
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2. High Pressure Steam (>15 PSI) shall be:
   a. Body                  Carbon A106 or A1 material, ½ chrome, 1/2 moly or 316 Stainless Steel
   b. Body Style            Standard Port, butt or socket welded
   c. Trim                  316 Stainless Steel Ball & Stem.
   d. Seat                  High Temp. PTFE, double seal
   e. Seat Working P/T      100 psig@450°F Minimum
   f. Body Working P/T      750 psig @100°F Minimum
   g. WOG Rating            400 psig Minimum.
   h. Steam Rating          100 psig@450°F Minimum
   i. Manufacturers:        Apollo, Lance, Jamesbury, Watts

2.4 BUTTERFLY VALVES:

A. General Service: Construction 2-1/2 inches and larger: 200 psi CWP, cast or ductile iron body. Nickel-plated ductile iron disc, resilient replaceable EPDM seat, wafer ends, extended neck, infinite position lever handle with memory stop.

B. CHW, CW and MTHW Service: High-performance. Construction: Lug-style carbon steel body, 316 stainless steel eccentric disc, offset 17-4 stainless steel shaft and filled PTFE soft seat, Class 150 (CHW) and (MTHW).
   1. Manufacturers: Flowseal, Bray, Neles-Jamesbury, DeZurik, Posi-Seal, Zwick (Tri-Con series) or Milwaukee.

   1. Manufacturers: Adams type MAK, Flowseal type TOV, Bray, Neles-Jamesbury, DeZurik, Posi-Seal, Zwick (Tri-Con series) or Milwaukee.

2.5 SWING CHECK VALVES – Horizontal Service:

A. Up To and Including  2 inches (80 mm):
   1. Class 150 minimum or as required for service, bronze body and cap, bronze swing disc with rubber seat, solder ends.
   2. HTHW Service: Class 300, steel body. Flanged ends.
   3. Steam Service: Class 300, malleable iron with stainless-steel 20 mesh strainer. For condensate service, use spring check.

B. 2-1/2  inches and Larger:
   1. Class 250 minimum or as required for service, iron body, bronze swing disc, renewable disc seal and seat, flanged ends.
   2. HTHW Service: Class 300, steel body, flanged ends.
2.6 SPRING LOADED CHECK VALVES:
   A. Construction: Class 250 minimum or as required for service, iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, wafer style ends.
   B. For steam condensate service, use all stainless-steel construction.

2.7 RADIATOR VALVES:
   A. Self-operating angle or in-line type. Provide integral temperature sensor and heat adjustment knob. For inaccessible locations, provide remote adjustment knob and capillary line. Valves shall fail-closed to a minimum position for freeze protection. Manufacturer: Macon or Danfoss. Valves shall be suitable for maximum system operating pressure.

2.8 WATER PRESSURE REDUCING VALVES:
   A. Up to 2 inches:
   B. Over 2 inches:
      1. Construction: MSS SP-85, cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.

2.9 RELIEF VALVES:
   A. Construction: Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated temperature relief for water service maximum 210 °F, capacity certified and labeled.

PART 3 – EXECUTION:

3.1.1 GENERAL:
   A. Locate all valves to provide adequate working clearance from building surfaces and other utility lines, equipment, etc, to allow valve to be operated and to allow for valve component repairs and valve stem removal.
   B. “Pro-Press” valve connections may be used when modifying or connecting to existing copper lines.
   C. Direct relief valve drains to within 6 inches of floor drains.

3.1.2 LABELING AND IDENTIFICATION:
   A. All valves to be identified and tagged in conjunction with building valve list and chart. Existing building valve charts shall be updated whenever new valves are added and installed. Valve tags and labels to be provided indicating their system application (Chilled Water, Domestic Hot water, etc.). Reference Section 01701 - Building Systems Identification & Labeling for details.

END OF SECTION