This master should be used by designers working on Port of Portland construction projects and by designers working for PDX tenants (“Tenants”). Usage notes highlight a few specific editing choices, however the entire section should be evaluated and edited to fit specific project needs.

SECTION 230523 – GENERAL-DUTY VALVES FOR HVAC PIPING

1. GENERAL
   * + 1. DESCRIPTION
          1. This section describes valves, balancing valves, automatic flow control valves, pressure-reducing valves, specialty valves, safety shutoff valves, pressure relief/bypass valves, and water relief valves.
       2. RELATED WORK SPECIFIED ELSEWHERE
          1. Section 230553, Identification for HVAC Piping and Equipment
          2. Section 230719, HVAC Insulation
          3. Section 230900, Instrumentation and Controls for HVAC
       3. REFERENCES
          1. ASME: American Society of Mechanical Engineers

ASME BPVC Section IV: Rules for Construction of Heating Boilers

* + - * 1. MSS: Manufacturers Standardization Society
      1. SUBMITTALS
         1. Submit product data, shop drawings, and maintenance data for products specified in this section.

1. PRODUCTS
   * + 1. GENERAL
          1. All instances of each valve type shall be of one manufacturer.
          2. All gate, globe, ball, butterfly, and check valves shall meet MSS standards.
          3. Bronze gate, globe, ball, and check valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
          4. Full lug and grooved butterfly valves shall be suitable for bi-directional dead-end service at full rated pressure without the use or need of a downstream flange.
          5. Valves in insulated piping: Have stem extensions and the following features:

Gate Valves: Rising-stem type.

Ball Valves: Have extended operating handle of non-thermal-conductive material, protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation, and memory stops that are fully adjustable after insulation is applied, Nibco Nib-seal or equal, handle extension.

Butterfly valves: Have extended necks.

* + - 1. GATE VALVES
         1. Acceptable Manufacturers: Jenkins, Crane, Hammond, Nibco, Vogt, or equal.
         2. Bronze Gate: Bronze body, bronze trim, screwed, bronze screwed bonnet, copper-silicone bronze rising stem, solid wedge, malleable iron h/w, 150 psi SWP, 300 psi CWP, Nibco T-134. With soldered ends, Nibco S-134.
         3. Iron Gate, OS&Y: Cast iron body, bronze trim, flanged, OS and Y pattern, solid wedge, 125 psi SWP, 200 psi CWP, Nibco F-617-O.
         4. Bronze Gate, High Pressure: Bronze body, bronze trim, screwed, bronze union bonnet, copper-silicone bronze rising stem, solid wedge, malleable iron h/w, 300 psi SWP, 600 psi CWP, Nibco T-174-A.
         5. Iron Gate, High Pressure: Iron body, bronze trim, flanged, rising stem, OS and Y pattern, solid wedge, 250 psi SWP, 500 psi CWP, Nibco F-667-O.
         6. Iron Gate, High Pressure, Steam: Iron body, Class 800, Body-A 105, NPT x NPT, Vogt 12111.
      2. GLOBE VALVES
         1. Acceptable Manufacturers: Jenkins, Crane, Hammond, Nibco, Vogt, or equal.
         2. Bronze Globe and Angle Globe: Bronze body, bronze-mounted, screwed, bronze union bonnet, copper-silicone bronze rising stem, TFE disc, malleable iron h/w, 150 psi SWP, 300 psi CWP, Nibco T-235-Y (globe) or T-335-Y (angle). With soldered ends, Nibco S-235-Y (globe).
         3. Bronze Globe and Angle Globe High Pressure: Bronze body, stainless steel disc, bronze union bonnet, copper-silicone bronze rising stem, malleable iron h/w, 300 psi SWP, 600 psi CWP, Nibco T-276-AP (globe) or T-376-AP (angle).
         4. Iron Globe: Iron body, bronze-mounted, flanged, OS and Y pattern, bronze disc, 125 psi SWP, 200 psi CWP, Nibco F-718-B.
         5. Iron Globe, High Pressure: Iron body, bronze mounted, flanged, OS and Y pattern, renewable stainless steel disc, 250 psi SWP, 500 CWP, Nibco F-768-B.
      3. CHECK VALVES
         1. Acceptable Manufacturers:

Swing Check: Jenkins, Crane, Hammond, Nibco, Vogt, or equal.

Silent Check: Jenkins, Mueller, Metraflex, Nibco, or equal.

Spring Check: Nibco, or equal.

* + - * 1. Horizontal Bronze Swing Check: Bronze body, bronze-mounted, screwed, TFE disc, 150 psi SWP, 300 psi CWP, Nibco T-433-Y. With soldered ends, Nibco S‑433‑Y.
        2. Horizontal Bronze Swing Check, High Pressure: Bronze body, bronze-mounted, screwed, regrinding bronze disc, 300 psi SWP, 1000 psi CWP, Nibco T-473-B.
        3. Horizontal Iron Swing Check: Iron body, bronze-mounted, flanged, regrinding bronze disc and seat ring, 125 psi SWP, 200 psi CWP, Nibco F-918-B.
        4. Vertical and Silent Spring Check Valves: Iron body, stainless steel spring, water type, globe style, to fit class 125 flanges, 200 psi CWP, Nibco W-910-B, with flanged ends, Nibco F-910-B. To fit class 250 flanges, 400 psi CWP, Nibco W-960-B, with flanged ends, Nibco F-960-B.
        5. Bronze Spring Check Valves: Bronze body, stainless steel spring, screwed, PTFE disc, 125 psi SWP, 250 psi CWP, Nibco T-480-Y. With soldered ends, Nibco S-480-Y.
      1. BALL VALVES
         1. Acceptable Manufacturers: Jenkins, Nibco, Apollo, Crane, or equal.
         2. Bronze Ball: Bronze body, brass ball, threaded, with handle, teflon seat, threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing, 600 psi CWP, 150 psi SWP, Nibco T-585-70. With soldered ends, Nibco S-585-70.
      2. BUTTERFLY VALVES
         1. Acceptable Manufacturers: Jenkins, Nibco, Emerson, Victaulic, or equal.
         2. Ductile iron body, aluminum-bronze disc and one-piece stainless steel shaft, copper bushing, with lever handle and locking feature on valves 6 inches and smaller, gear operator on valves 8 inches and larger; treaded lug or grooved end type, EPDM liner or disc, 200 psi CWP, Nibco LD 2000 (lug style), Nibco GD-4765 (grooved ends). Do not use fasteners and pins to attach stem to disc.

Use calibrated balancing valves, 3 inches and smaller and eccentric plug balancing valves 4 inches and larger with water flow meter, in pumped, constant flow, primary, secondary, or tertiary chilled water, and hot water heating systems. Except use flow design accusetter at air terminal units to balance flow through hot water reheat coils in constant flow hot water heating systems.

Do not use balance valves to balance variable flow chilled water and hot water heating systems. Except use automatic flow control valve at unit heaters and cabinet unit heaters and at end of loop in variable flow hot water heating systems to maintain water circulation when 2-way control valves are closed. Variable flow chilled water and hot heating systems, use pressure independent control valves and are inherently self-balancing.

* + - 1. BALANCING VALVES
         1. Acceptable Manufacturers: DeZurik, Bell & Gossett, Armstrong, Taco, Wheatley, Flow Design, Nibco, or equal.
         2. Calibrated: Bronze body, brass ball, differential pressure readout valves with integral checks, calibrated plate, integral pointer, suitable for tight shutoff, memory stops, threaded or soldered ends, 175 psi water, Bell & Gossett CB.
         3. Venturi Balancing Valves: Bronze and brass construction, 400 psi WOG at 250ºF, large ported ball valve with memory stop. Teflon seats and packing, blow-out proof stem and nut, P/T type pressure taps with safety caps, calibrated venture to measure flow rates ± 2 percent, Flow Design Accusetter.
         4. Automatic Flow Control Valves:

Acceptable Manufacturers: Griswold “Flow Con SH,” or pre-bid approved equal.

Provide automatic pressure compensating adjustable flow control valves complete. 125 psig operating pressure.

Factory set and calibrate within 5 percent of indicated water flow rate. Provide taps for measuring of flows with quick disconnect valves. Field adjustable flow rate with adjustable flow control cartridge.

Provide identification tags for each valve indicating type, flow characteristics, etc.

Use pressure reducing valves (closed hydronic system feed) in feed water supply to closed loop chilled water and heating water systems.

* + - 1. PRESSURE REDUCING VALVES
         1. Pressure Reducing Valve (Chilled Water and Heating Water Closed Hydronic System Feed):

Acceptable Manufacturers: Bell & Gossett, Armstrong, Taco, Cash Acme, or equal.

Description: Self-filling type with low inlet pressure check valve, removable strainer, adjustable range, and set point as indicated on the drawings.

Construction: Iron body for steel piping installation, brass body for copper piping installation. All working parts shall be brass.

Size: As shown on the drawings.

* + - 1. SPECIALTY VALVES
         1. Drain Valves and Manual Air Vents: Bronze ball valve, garden hose end, brass cap and chain 3/4-inch size, bronze cast body, chrome-plated full port ball, threaded with handle, Teflon seat, threaded body, packnut design (no threaded stem designs allowed) with adjustable stem packing, 600 psi CWP, Nibco T-585-70-HC, or equal.
         2. Gauge Cocks: Brass, tee handle, male to female, 200 psi working pressure, 1/4-inch, Conbraco 41 series, or pre-bid approved equal.

Use water relief valves in closed hydronic systems to prevent over-pressurization of system due to thermal expansion.

* + - 1. WATER RELIEF VALVES (CLOSED HYDRONIC SYSTEMS)
         1. Acceptable Manufacturers: Kunkle, Bell & Gossett, Armstrong, Cash Acme, or equal.
         2. Description: Bronze or steel body, stainless steel or bronze trim, pressure settings to 160 psi at 250ºF, in accordance with Section IV of ASME code, size in accordance with the manufacturer’s recommendations based on code, setting as indicated, Kunkle Models 19, 20, and 200.
         3. For use on closed loop hydronic systems to prevent over pressurization of the system due to thermal expansion.
      2. MODULATING CONTROL VALVES
         1. Pressure-independent and pressure-dependent motorized control valves as specified under Section 230900.

1. EXECUTION
   * + 1. INSTALLATION
          1. Provide valves at connections to equipment where shown on the drawings or where required for equipment isolation.
          2. Install all valves accessible and same size as connected piping.
          3. Provide separate support for valves where necessary.
          4. Grooved type valve end connections may be used in lieu of flanged on services where mechanical pipe couplings and fittings are specified.
          5. Provide drain valves in all low points in the piping system, at coils and equipment and as indicated.
       2. APPLIED LOCATIONS
          1. In piping 2 inches and smaller, chilled water, heating water, and industrial cold water.

Bronze gate.

Bronze globe.

Bronze swing check. If pump discharge, use spring check.

Ball valve.

* + - * 1. In piping 2 inches and smaller, high pressure steam, low pressure steam, condensate, and pumped condensate.

Iron gate, high pressure, steam.

Bronze globe, high pressure.

Bronze swing check, high pressure.

Bronze spring check and condensate pump discharge.

* + - * 1. In piping 2 1/2 inches and larger, chilled water, heating water, and industrial cold water.

Iron gate.

Iron globe.

Iron swing check. If pump discharge, use spring check.

Butterfly.

* + - * 1. In piping 2 1/2 inches and larger, high pressure steam, low pressure steam, high pressure condensate, and pumped condensate.

Iron gate, high pressure.

Iron globe, high pressure.

Iron swing check.

Silent spring check valve and condensate pump discharge.

* + - * 1. Calibrated balancing valves 3 inches and smaller, on constant flow chilled water and hot water heating where indicated on the drawings.
        2. Venturi Balancing Valve: In constant flow hot water heating systems at air terminal units.
        3. Eccentric plug valves 4 inches and larger, in constant flow chilled and hot water heating systems. Provide water flow meter at all eccentric plug valves where indicated on the drawings.
        4. Provide gauge cock for all pressure gauges.
        5. Automatic Flow Control Valves:

Install in piping loops to unit heaters, cabinet unit heaters, finned tube radiators and other heating devices where hot water flow through unit is controlled by pressure dependent, 2-position, motorized control valves.

Install in piping loops where indicated on the drawings and in accordance with manufacturer’s recommendations to limit maximum flow in loops to the design flow indicated on the drawings.

* + - 1. DRAIN VALVES AND MANUAL AIR VENTS
         1. Install at high points, low points, and where shown on the drawings, for proper venting and draining of hydronic systems.
         2. Insulate valves in chilled water systems to prevent condensation.
      2. VALVE IDENTIFICATION
         1. Identify valves to indicate their function and system served. See Section 230553.
      3. CHAIN OPERATORS
         1. All valves in equipment rooms or fan rooms used for equipment or coil isolation and more than 8 feet above floor shall be installed with stem horizontal and equipped with chain wheels and chains extending to 6 feet above floor.
      4. PRESSURE REDUCING VALVE (CLOSED LOOP HYDRONIC SYSTEM FEED)
         1. Install where indicated and in accordance with the manufacturer’s recommendations with 3-valve bypass.
      5. WATER RELIEF VALVES
         1. Water Relief Valves: Install where indicated and in accordance with the manufacturer’s instructions. Pipe discharge to nearest floor drain using Schedule 40 steel pipe.

END OF SECTION 230523