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 220523 – GENERAL-DUTY VALVES FOR PLUMBING PIPING

1. GENERAL
   * + 1. DESCRIPTION
          1. This section describes valves, balancing valves, pressure-reducing valves, specialty valves, safety shutoff valves, pressure relief/bypass valves, and water relief valves.
       2. RELATED WORK SPECIFIED ELSEWHERE
          1. Section 220553, Identification for Plumbing Piping and Equipment
       3. REFERENCES
          1. ANSI: American National Standards Institute

ANSI Z21.15: Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves

ANSI Z21.80: Line Pressure Regulators

* + - * 1. ASME: American Society of Mechanical Engineers

ASME B16.44: Manually Operated Metallic Gas Valves for Use in House Piping Systems Up to 5 psi

ASME BPVC Section IV: Rules for Construction of Heating Boilers

* + - * 1. CGA: Compressed Gas Association

CGA 91-002

* + - * 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 use or need of a downstream-flange.
          5. Valves at insulated piping: Valves shall have 2-inch steam extensions and the following features:

Gate Valves: Rising-stem type.

Ball Valves: Shall have extended operating handle of non-thermal-conductive materials, 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 extensions.

Butterfly valves: Shall have extended necks.

* + - 1. GATE VALVES
         1. Acceptable Manufacturers: Crane, Hammond, Apollo, Nibco, 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.
      2. GLOBE VALVES
         1. Acceptable Manufacturers: Crane, Hammond, Apollo, Nibco, 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. Iron Globe: Iron body, bronze-mounted, flanged, OS and Y pattern, bronze disc, 125 psi SWP, 200 psi CWP Nibco F-718-B.
      3. CHECK VALVES
         1. Acceptable Manufacturers:

Swing Check: Crane, Hammond, Apollo, Nibco, or equal.

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

* + - * 1. Horizontal Bronze Swing Check: Bronze body, bronze-mounted, screwed, TFE disc, 150 psi SWP, 300 psi CWP, Nibco T-443-Y. With soldered ends, Nibco S‑433‑Y.
        2. 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.
        3. Vertical and Silent Check Valves: Iron body, stainless steel spring, wafer 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.
        4. Iron Swing Check with Outside Lever and Weight: Iron body, bronze mounted, flanged, regrinding bronze disc and seat ring, 125 psi SWP, 200 psi CWP, with adjustable outside lever and weight, Nibco F-918-BLW.
      1. BALL VALVES
         1. Acceptable Manufacturers: Hammond, Apollo, Crane, Flow Design, Nibco, 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: Apollo, Hammond, Keystone, Nibco, 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 domestic hot water systems.

Use domestic hot water return balancing valve to balance flow through circulating pump in pumped domestic hot water systems.

* + - 1. BALANCING VALVES
         1. Acceptable Manufacturers: Armstrong, Bell and Gossett, DeZurik, Flow Design Accusetter, Taco, Tour & Andersen, Watts, or equal.
         2. Domestic Hot Water Return: Balanced memory/shutoff valves, bronze body, brass ball, calibrated plate, integral pointer, suitable for tight shut-off, memory stops, soldered ends, 175 psi water, Watts CSB-41.

Use pressure reducing valves (domestic water, primary service) in primary water service to building, arranged typically in two-valve assembly, with smaller valve providing 33% and larger valve providing 67% of total demand. Use pressure reducing valve (domestic water, secondary service) in feed water supply to domestic appliances such as water heater to protect equipment from water hammering within the systems.

* + - 1. PRESSURE REDUCING VALVES
         1. Pressure Reducing Valves (Domestic Water, Primary Service):

Acceptable Manufacturers: Watts ACV 115 Globe, or equal.

Description: Pilot operated control valve, diaphragm actuated, hydraulically operated, with a single moving seat and diaphragm/stem assembly. Flexible, non-wicking, FDA approved, nylon fabric reinforced synthetic elastomer diaphragm shall be integral with this assembly to form a sealed chamber, operating free of drag or wear. The diaphragm shall not be used as a seating surface. This assembly shall have a stem, which is fully guided by separate upper and lower bearings to preclude binding or deflection. When the valve is in the closed position sealing at the seat shall be accomplished by the contact between on edge of a securely retained elastomer quad ring and a smooth seat surface. The seat design shall be removable and not have edges that will induce seal cutting, or wear at low flows. Progressive profile quad ring retainer washer. The valve body and cover shall be of cast iron. An FDA approved epoxy coating shall be applied to the internal and external exposed surfaces of these components after cleaning and degassing. All internal valve components shall be removable and repairable while the valve body remains in the line. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the valve or controls. Valve shall be equipped with a flo-clean strainer mounted in the inlet supply port of the main valve. Valve sizes 4 inches and larger shall be provided with an externally mounted y-strainer for protection of the control circuit and ball valves to isolate the pilot system from the main valve.

Operation: The valve shall maintain a constant downstream pressure regardless of demand fluctuations. The control shall be an adjustable, spring loaded, direct acting, normally open, diaphragm valve designed to permit flow when controlled pressure is less than the spring setting. The control system shall consist of an adjustable opening speed needle valve and adjustable closing speed flow control valve. Valves shall be installed with the stem in a horizontal position.

* + - * 1. Pressure Reducing Valves (Domestic Water, Secondary Service):

Acceptable Manufacturers: Armstrong, Fisher, Watts, or equal.

Description: Bronze body with inlet strainer, 200 psi working pressure, suitable for 200ºF, adjustable range and setpoint.

* + - 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. Gas Cock: Forged brass body, hard chromium plated forged brass ball, threaded, with handle, for 1/2 psi to 5 psi gas use, 400 psi CWP, tested to ANSI Z21.15, CGA 91-002 and ASME B 16.44, Nibco GB-10 or equal.
         3. Gas Pressure Regulator:

Acceptable Manufacturers: Sensus, Equimeter, Fisher, Maxitrol, or equal.

Description: Cast iron body complying with ANSI 125-pound construction standard, aluminum orifice, molded BUNA-N soft seat, BUNA-N diaphragm, internal relief valve.

Water Column Description, 2 PSI to Inches: Cast aluminum body complying with ANSI Z21.80, maximum inlet pressure of 2 psi, aluminum orifice, molded BUNA-N soft seat, BUNA-N diaphragm, ball check vent limiting device.

Water Column Description, 5 PSI to 2 PSI: Cast aluminum body complying with ANSI Z21.80, aluminum orifice, molded BUNA-N soft seat, BUNA-N diaphragm. Inlet pressure of 5 psi, regulator shall be rated at 60 psi inlet pressure under abnormal conditions without damage to internal regulator components.

* + - * 1. Gauge Cocks: Brass, tee handle, male to female, 200 psi working pressure, 1/4-inch, Apollo 41 series, or equal.

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

* + - 1. WATER RELIEF VALVES
         1. Acceptable Manufacturers: Armstrong, B&G, Cash Acme, Consolidated Kunkle, 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 BPVC code, size in accordance with the manufacturer’s recommendations based on code, setting as indicated, Kunkle Fig. 137.

Use safety relief valve (natural gas) and low pressure cutoff valve (natural gas) in main service to building. Use emergency gas shutoff valve, interfaced with kitchen exhaust hood fire suppression system, to shut off gas supply to kitchen appliances.

* + - 1. NATURAL GAS SAFETY RELIEF VALVES
         1. Safety Relief Valve (Natural Gas):

Acceptable Manufacturers: Equimeter, or equal.

Description: Inline type safety relief valve. Soft-seated valve is exposed to line pressure and under normal conditions is held closed with a spring. When line pressure increases sufficiently to overcome the closing force, the relief valve opens to discharge the gas. The relief valve automatically closes after the pressure returns to normal.

Valve shall be heavy duty cast iron construction, weatherproof, watertight, flanged ANSI 125 PSI connections, Equimeter Series 257S. Coordinate maximum flow of gas regulators (which are part of the PSI meter set assembly provided by NW Natural) in order to determine maximum possible flow of safety relief valve. Coordinate with NW Natural for initial and final relief pressure setpoints for the safety relief valve.

* + - * 1. Low Pressure Cutoff Valve (Natural Gas):

Acceptable Manufacturers: Maxitrol, or equal.

Description: Inline type shutoff valve. Automatic shutoff occurs when a preselected decreased pressure condition occurs. Normal line pressure acts on a diaphragm. When a predetermined under pressure condition exists, the pin holding the latch lever is lifted, releasing the valve disc and closing the valve. Manual reset required.

Valve shall be heavy duty cast iron construction, weatherproof, watertight, flanged ANSI 125 PSI connections, Maxitrol Model 1400.

* + - * 1. Emergency Gas Shutoff: Cast steel, normally closed, manually opened, electrically held open, automatic closing upon power interruption, Maxon Series 808-CP, or equal.

1. EXECUTION
   * + 1. INSTALLATION
          1. Provide valves at connections to equipment where shown or 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, domestic hot and cold water, industrial cold water.

Bronze gate.

Bronze swing check.

Ball valve.

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

Iron gate.

Iron swing check.

Butterfly.

* + - * 1. Calibrated balancing valves 3 inches and smaller, on domestic hot water where indicated on the drawings.
        2. Check valves on vertical discharge of sump pumps, and sewerage ejector pumps, iron swing check with outside weight and lever. Mount in piping at 45-degree angle.
        3. Provide gauge cock for all pressure gauges.
        4. In Natural Gas Piping:

Gas cock.

Gas pressure regulator.

* + - 1. DRAIN VALVES AND MANUAL AIR VENTS
         1. Install at high points, low points, and as shown on the drawings, for proper venting and draining of hydronic systems.
         2. Insulate valves in cold water systems to prevent condensation.
      2. VALVE IDENTIFICATION
         1. Identify valves to indicate their function and system served.
      3. CHAIN OPERATORS
         1. Gate 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. WATER PRESSURE REDUCING VALVE ASSEMBLY (DOMESTIC WATER, PRIMARY SERVICE)
         1. Install where indicated and in accordance with the manufacturer’s instructions.
         2. Two valve assembly with smaller valve approximately 33 percent of the total larger valve approximately 67 percent of the total demand. See schedule on drawings for GPM flow rates and pressure settings of valves.
      5. WATER PRESSURE REDUCING VALVES (DOMESTIC WATER, SECONDARY SERVICE)
         1. Install where indicated and in accordance with the manufacturer’s instructions.
         2. Provide dielectric union and bronze ball shut-off valve immediately upstream.
      6. 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.
      7. PRESSURE RELIEVE/BYPASS VALVES
         1. Install where indicated and in accordance with the manufacturer’s instructions. Adjust to required pressure to maintain required flow rates throughout system.
      8. SAFETY RELIEF VALVE (NATURAL GAS)
         1. Install outdoors in accordance with manufacturer’s instructions.
         2. Provide ridged discharge stack with suitable protective cap from the relief valve outlet of the valve. Terminate stack at a location and height above grade as approved by code.
      9. LOW PRESSURE CUTOFF VALVE (NATURAL GAS)
         1. Install in accordance with the manufacturer’s instructions.
      10. EMERGENCY GAS SHUTOFF VALVE
          1. Interface with kitchen exhaust hood control panel. Gas shutoff shall occur prior to discharge of kitchen exhaust hood fire suppression system.

END OF SECTION 220523