

SECTION 22 05 23  
GENERAL-DUTY VALVES FOR PLUMBING PIPING

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section describes the requirements for general-duty and specialty purpose valves for domestic water and systems.
- B. A complete listing of all acronyms and abbreviations are included in Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.

**1.2 RELATED WORK**

- A. Section 01 00 00, GENERAL REQUIREMENTS.
- B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- C. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.

**1.3 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Sanitary Engineering (ASSE):
  - 1001-2008.....Performance Requirements for Atmospheric Type Vacuum Breakers
  - 1003-2009.....Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems
  - 1011-2004.....Performance Requirements for Hose Connection Vacuum Breakers
  - 1013-2011.....Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers
  - 1015-2011.....Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies
  - 1017-2009.....Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems

- 1020-2004.....Performance Requirements for Pressure Vacuum  
Breaker Assembly
- 1035-2008.....Performance Requirements for Laboratory Faucet  
Backflow Preventers
- 1062-2005 -----Temperature actuated Flow Reduction (TAFR)  
valves for individual fixture fittings.
- 1069-2005 ----- Performance Requirements for Automatic  
Temperature Control Mixing Valves
- 1070-2004.....Performance Requirements for Water Temperature  
Limiting Devices
- 1071-2012.....Performance Requirements for Temperature  
Actuated Mixing Valves for Plumbed Emergency  
Equipment
- D. American Society for Testing and Materials (ASTM):
- A126-2004(R2009).....Standard Specification for Gray Iron Castings  
for Valves, Flanges, and Pipe Fittings
- A276-2013a.....Standard Specification for Stainless Steel Bars  
and Shapes
- A536-1984(R2009).....Standard Specification for Ductile Iron  
Castings
- B62-2009.....Standard Specification for Composition Bronze  
or Ounce Metal Castings
- B584-2013.....Standard Specification for Copper Alloy Sand  
Castings for General Applications
- E. International Code Council (ICC):
- IPC-2012.....International Plumbing Code
- F. Manufacturers Standardization Society of the Valve and Fittings  
Industry, Inc. (MSS):
- SP-25-2008.....Standard Marking Systems for Valves, Fittings,  
Flanges and Unions
- SP-67-2011.....Butterfly Valves
- SP-70-2011.....Gray Iron Gate Valves, Flanged and Threaded  
Ends
- SP-71-2011.....Gray Iron Swing Check Valves, Flanged and  
Threaded Ends
- SP-80-2013.....Bronze Gate, Globe, Angle, and Check Valves

SP-85-2011.....Gray Iron Globe & Angle Valves, Flanged and  
Threaded Ends

SP-110-2010.....Ball Valves Threaded, Socket-Welding, Solder  
Joint, Grooved and Flared Ends

G. National Environmental Balancing Bureau (NEBB):

7th Edition 2005                      Procedural Standards for Testing, Adjusting,  
Balancing of Environmental Systems

H. NSF International (NSF):

61-2012.....Drinking Water System Components - Health  
Effects

372-2011.....Drinking Water System Components - Lead Content

I. University of Southern California Foundation for Cross Connection  
Control and Hydraulic Research (USC FCCCHR):

9th Edition.....Manual of Cross-Connection Control

**1.4 SUBMITTALS**

A. Submittals, including number of required copies, shall be submitted in  
accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and  
SAMPLES.

B. Information and material submitted under this section shall be marked  
"SUBMITTED UNDER SECTION 22 05 23-1, GENERAL-DUTY AND SPECIALITY VALVES  
FOR PLUMBING PIPING", with applicable paragraph identification.

C. Manufacturer's Literature and Data Including: Full item description and  
optional features and accessories. Include dimensions, weights,  
materials, applications, standard compliance, model numbers, size, and  
capacity.

1. Ball Valves.
2. Gate Valves.
3. Check Valves.
4. Globe Valves.

D. Test and Balance reports for balancing valves.

E. Complete operating and maintenance manuals including wiring diagrams,  
technical data sheets and information for ordering replaceable parts:

1. Include complete list indicating all components of the systems.
2. Include complete diagrams of the internal wiring for each item of  
equipment, where applicable.

3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.
4. Piping diagrams of thermostatic mixing valves to be installed.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Valves shall be prepared for shipping as follows:
  1. Protect internal parts against rust and corrosion.
  2. Protect threads, flange faces, grooves, and weld ends.
  3. Set angle, gate, and globe valves closed to prevent rattling.
  4. Set ball and plug valves open to minimize exposure of functional surfaces.
  5. Set butterfly valves closed or slightly open.
  6. Block check valves in either closed or open position.
- B. Valves shall be prepared for storage as follows:
  1. Maintain valve end protection.
  2. Store valves indoors and maintain at higher than ambient dew point temperature.

### **PART 2 - PRODUCTS**

#### **2.1 VALVES, GENERAL**

- A. Asbestos packing and gaskets are prohibited.
- B. Bronze valves shall be made with dezincification resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc shall not be permitted.
- C. Valves in insulated piping shall have 50 mm or DN50 (2 inch) stem extensions and extended handles of non-thermal conductive material that allows operating the valve without breaking the vapor seal or disturbing the insulation. Memory stops shall be fully adjustable after insulation is applied.
- D. Exposed Valves over 65 mm or DN65 (2-1/2 inches) installed at an elevation over 3.6 m (12 feet) shall have a chain-wheel attachment to valve hand-wheel, stem, or other actuator.
- E. All valves used to supply potable water shall meet the requirements of NSF 61 and NSF 372.
- F. Bio-Based Materials: For products designated by the USDA's Bio-Preferred Program, provide products that meet or exceed USDA recommendations for bio-based content, so long as products meet all performance requirements in this specifications section.

## 2.2 SHUT-OFF VALVES

### A. Cold, Hot and Re-circulating Hot Water:

1. 50 mm or DN50 (2 inches) and smaller: Ball, MSS SP-110, Ball valve shall be full port three piece or two piece with a union design with adjustable stem package. Threaded stem designs are not allowed. The ball valve shall have a SWP rating of 1035 kPa (150 psig) and a CWP rating of 4138 kPa (600 psig). The body material shall be Bronze ASTM B584, Alloy C844. The ends shall be non-lead solder.
2. Less than 100 mm DN100 (4 inches): Butterfly shall have an iron body with EPDM seal and aluminum bronze disc. The butterfly valve shall meet MSS SP-67, type I standard. The butterfly valve shall have a SWP rating of 1380 kPa (200 psig). The valve design shall be lug type suitable for bidirectional dead-end service at rated pressure. The body material shall meet ASTM A536, ductile iron.
3. 100 mm DN100 (4 inches) and larger:
  - a. Class 125, OS&Y, Cast Iron Gate Valve. The gate valve shall meet MSS SP-70 type I standard. The gate valve shall have a CWP rating of 1380 kPa (200 psig). The valve materials shall meet ASTM A126, grey iron with bolted bonnet, flanged ends, bronze trim, and positive-seal resilient solid wedge disc. The gate valve shall be gear operated for sizes under 200 mm or DN200 (8 inches) and crank operated for sizes 200 mm or DN200 (8 inches) and above.
  - b. Single flange, ductile iron butterfly valves: The single flanged butterfly valve shall meet the MSS SP-67 standard. The butterfly valve shall have a CWP rating of 1380 kPa (200 psig). The butterfly valve shall be lug type, suitable for bidirectional dead-end service at rated pressure without use of downstream flange. The body material shall comply with ASTM A536 ductile iron. The seat shall be EPDM with stainless steel disc and stem.
  - c. Grooved end, ductile iron butterfly valves. The grooved butterfly valve shall meet the MSS SP-67 standard. The grooved butterfly valve shall have a CWP rating of 1380 kPa (200 psig). The valve materials shall be epoxy coated ductile iron conforming to ASTM A536 with two piece stainless steel stem, //Buna-N//EPDM// encapsulated ductile iron disc, and EPDM seal. The butterfly valve shall be gear operated.

- B. Reagent Grade Water: Valves for reagent grade, reverse osmosis, or deionized water service shall be ball type of same material as used for pipe.

### **2.3 BALANCING VALVES**

- A. Hot Water Re-circulating, 75 mm or DN75 (3 inches) and smaller manual balancing valve shall be of bronze body, brass ball construction with glass and carbon filled TFE seat rings and designed for positive shutoff. The manual balancing valve shall have differential pressure read-out ports across the valve seat area. The read out ports shall be fitting with internal EPT inserts and check valves. The valve body shall have 8 mm or DN8 NPT (1/4 inch NPT) tapped drain and purge port. The valves shall have memory stops that allow the valve to close for service and then reopened to set point without disturbing the balance position. All valves shall have calibrated nameplates to assure specific valve settings.
- B. Larger than 75 mm or DN75 (3 inches): Manual balancing valves shall be of heavy duty cast iron flanged construction with 861 kPa (125 psig) flange connections. The flanged manual balancing valves shall have either a brass ball with glass and carbon filled TFE seal rings or fitted with a bronze seat, replaceable bronze disc with EPDM seal insert and stainless steel stem. The design pressure shall be 1200 kPa (175 psig) at 121 degrees C (250 degrees F).

### **2.4 CHECK VALVES**

- A. 75 mm or DN75 (3 inches) and smaller shall be Class 125, bronze swing check valves with non-metallic disc suitable for type of service. The check valve shall meet MSS SP-80 Type 4 standard. The check valve shall have a CWP rating of 1380 kPa (200 psig). The check valve shall have a Y pattern horizontal body design with bronze body material conforming to ASTM B62, solder joints, and PTFE or TFE disc.
- B. 100 mm or DN100 (4 inches) and larger:
  - 1. Check valves shall be Class 125, iron swing check valve with lever and weight closure control. The check valve shall meet MSS SP-71 Type I standard. The check valve shall have a CWP rating of 1380 kPa (200 psig). The check valve shall have a clear or full waterway body design with gray iron body material conforming to ASTM A126, bolted bonnet, flanged ends, bronze trim.

2. All check valves on the discharge side of submersible sump pumps shall have factory installed exterior level and weight with sufficient weight to prevent the check valve from hammering against the seat when the sump pump stops.

## **2.5 GLOBE VALVES**

- A. 75 mm or DN75 (3 inches) or smaller: Class 150, bronze globe valve with non-metallic disc. The globe valve shall meet MSS SP-80, Type 2 standard. The globe valve shall have a CWP rating of 2070 kPa (300 psig). The valve material shall be bronze with integral seal and union ring bonnet conforming to ASTM B62 with solder ends, copper-silicon bronze stem, PTFE or TFE disc, and malleable iron hand wheel.
- B. Larger than 75 mm or DN75 (3 inches): Similar to above, except with cast iron body and bronze trim, Class 125, iron globe valve. The globe valve shall meet MSS SP-85, Type 1 standard. The globe valve shall have a CWP rating of 1380 kPa (200 psig). The valve material shall be gray iron with bolted bonnet conforming to ASTM A126 with flanged ends, bronze trim, and malleable iron handwheel.

## **2.6 THERMOSTATIC MIXING VALVES**

- A. Thermostatic Mixing Valves shall comply with the following general performance requirements:
  1. Shall meet ASSE requirements for water temperature control.
  2. The body shall be cast bronze or brass with corrosion resistant internal parts preventing scale and biofilm build-up. Provide chrome-plated finish in exposed areas.
  3. No special tool shall be required for temperature adjustment, maintenance, replacing parts and disinfecting operations.
  4. Valve shall be able to be placed in various positions without making temperature adjustment or reading difficult.
  5. Valve finish shall be chrome plated in exposed areas.
  6. Valve shall allow easy temperature adjustments to allow hot water circulation. Internal parts shall be able to withstand disinfecting operations of chemical and thermal treatment of water temperatures up to 82°C (180°F) for 30 minutes or 50 mg/L (50 ppm) chlorine residual concentration for 24 hours.
  7. Parts shall be easily removed or replaced without dismantling the valves, for easy scale removal and disinfecting of parts.

8. Valve shall have a manual adjustable temperature control with locking mechanism to prevent tampering by end user. Outlet temperature shall be visible to ensure outlet temperature does not exceed specified limits, particularly after thermal eradication procedures.
9. Provide mixing valves with integral check valves with screens and stop valves.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Valve interior shall be examined for cleanliness, freedom from foreign matter, and corrosion. Special packing materials shall be removed, such as blocks, used to prevent disc movement during shipping and handling.
- B. Valves shall be operated in positions from fully open to fully closed. Guides and seats shall be examined and made accessible by such operations.
- C. Threads on valve and mating pipe shall be examined for form and cleanliness.
- D. Mating flange faces shall be examined for conditions that might cause leakage. Bolting shall be checked for proper size, length, and material. Gaskets shall be verified for proper size and that its material composition is suitable for service and free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

#### **3.2 INSTALLATION**

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Valves shall be located for easy access and shall be provide with separate support. Valves shall be accessible with access doors when installed inside partitions or above hard ceilings.
- C. Valves shall be installed in horizontal piping with stem at or above center of pipe.
- D. Valves shall be installed in a position to allow full stem movement.
- F. Check valves shall be installed for proper direction of flow and as follows:
  1. Swing Check Valves: In horizontal position with hinge pin level and on top of valve.



- J. Install temperature-actuated water mixing valves with check stops or shutoff valves on inlets.
- K. If an installation is unsatisfactory to the COR, the Contractor shall correct the installation at no cost to the Government.

### **3.3 LABELING AND IDENTIFYING**

- A. Provide Valve Tags.

### **3.4 ADJUSTING**

- A. Valve packing shall be adjusted or replaced after piping systems have been tested and put into service but before final adjusting and balancing. Valves shall be replaced if persistent leaking occurs.
- B. Set field-adjustable flow set points of balancing valves and record data. Ensure recorded data represents actual measured or observed conditions. Permanently mark settings of valves and other adjustment devices allowing settings to be restored. Set and lock memory stops. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- C. Set field-adjustable temperature set points of temperature-actuated Water flow mixing valves
- D. Testing and adjusting of System mixing and balancing valves shall be performed by Mechanical Contractor, where required. A final settings and flow report shall be submitted to the VA Contracting Officer's Representative (COR).

### **3.6 DEMONSTRATION AND TRAINING**

- A. Provide services of manufacturer's technical representative for four hours to instruct VA Personnel in operation and maintenance of the system.

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