

**Part 1 General**

**1.1 GENERAL REQUIREMENTS**

- .1 The Contractor shall be responsible to carry out all the Work set out or referred to in this Section 23 05 23 02.

**1.2 SUMMARY**

- .1 Section Includes:
  - .1 Valves, gate, globe, and check.
- .2 Sustainable requirements for construction and verification.
- .3 Related Sections:
  - .1 Division 01 – General Requirements.
  - .2 Section 23 05 05 - Installation of Pipework.

**1.3 REFERENCES**

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME):
  - .1 ANSI/ASME B16.1-1998, Cast Iron Pipe Flanges and Flanged Fittings.
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM A49-01, Specification for Heat-Treated Carbon Steel Joint Bars.
  - .2 ASTM A126-95 (2001), Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
  - .3 ASTM B61-93, Specification for Steam or Valve Bronze Castings.
  - .4 ASTM B62-93, Specification for Composition Bronze or Ounce Metal Castings.
  - .5 ASTM B85-03, Specification for Aluminum-Alloy Die Castings.
  - .6 ASTM B209-04, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
  - .1 MSS SP-70-1998, Cast Iron Gate Valves, Flanged and Threaded Ends.
  - .2 MSS SP-71-1997, Grey Iron Swing Check Valves, Flanged and Threaded Ends.
  - .3 MSS SP-82-1992, Valve Pressure Testing Methods.
  - .4 MSS SP-85-2002, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

**1.4 SUBMITTALS**

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets:
  - .1 Submit shop drawings and product data in accordance with Division 01 – General Requirements.

.2 Submit data for valves specified in this section.

.3 Closeout Submittals:

.1 Submit maintenance data for incorporation into manual specified in Division 01 – General Requirements.

## **1.5 QUALITY ASSURANCE**

.1 Health and Safety:

.1 Construction occupational health and safety in accordance with Division 01 – General Requirements.

## **1.6 DELIVERY STORAGE AND DISPOSAL**

.1 Waste Management and Disposal:

.1 Separate and recycle waste materials in accordance with Division 01 – General Requirements.

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

## **1.7 MAINTENANCE**

.1 Extra Materials:

.1 Furnish following spare parts:

.1 Valve seats: one for every 10 valves each size, minimum 1.

.2 Discs: one for every 10 valves, each size. Minimum 1.

.3 Stem packing: one for every 10 valves, each size. Minimum 1.

.4 Valve handles: 2 of each size.

.5 Gaskets for flanges: one for every 10 flanged joints.

## **Part 2 Products**

### **2.1 MATERIAL**

.1 Sustainable Requirements:

.1 Materials and resources in accordance with Division 01 – General Requirements.

.2 Valves:

.1 Except for specialty valves, to be of single manufacturer.

.3 Standard specifications:

.1 Gate valves: MSS SP-70.

.2 Globe valves: MSS SP-85.

.3 Check valves: MSS SP-71.

.4 Requirements common to valves, unless specified otherwise:

.1 Body, bonnet: cast iron in accordance with ASTM B209 Class B.

- .2 Connections: flanged ends with 2 mm raised face with serrated finish to ANSI B16.1.
  - .3 Inspection and pressure testing: in accordance with MSS SP-82.
  - .4 Bonnet gasket: non-asbestos.
  - .5 Stem: to have precision-machined Acme or 60 degrees V threads, top screwed for handwheel nut.
  - .6 Stuffing box: non-galling two-piece ball-jointed packing gland, gland bolts and nuts.
  - .7 Gland packing: non-asbestos.
  - .8 Handwheel: Die-cast aluminum alloy in accordance with ASTM B85 or malleable iron to ASTM A49. Nut of bronze in accordance with ASTM B62.
  - .9 Identification tag: with catalogue number, size and other pertinent data.
- .5 All products to have CRN registration numbers.

## 2.2 GATE VALVES

- .1 NPS 2 1/2 - 8, non rising stem, inside screw, bronze trim, solid wedge disc:
- .1 Body and multiple-bolted bonnet: with bosses in body and bonnet for taps and drains, full length disc guides designed to ensure correct re-assembly. Class 125.
  - .2 Disc: solid offset taper wedge, bronze in accordance with ASTM B62.
  - .3 Seat rings: renewable bronze in accordance with ASTM B62, screwed into body.
  - .4 Stem: bronze to ASTM B62.
  - .5 Disc: solid offset taper wedge, cast iron in accordance with ASTM A126 Class B, secured to wrought steel stem.
  - .6 Seat: Integral with body.
  - .7 Stem: wrought steel.
  - .8 Operator: Handwheel.
- .2 NPS 2 1/2 - 8, outside screw and yoke (OS&Y), bronze trim, solid wedge disc:
- .1 Body and multiple-bolted bonnet: with bosses in body and bonnet for taps and drains, full length disc guides designed to ensure correct re-assembly, yoke, yoke hub, yoke sleeve and nut. Class 125.
  - .2 Disc: solid offset taper wedge, bronze to ASTM B62 up to NPS 3, cast iron with bronze disc rings on other sizes, secured to stem through integral forged T-head disc-stem connection.
  - .3 Seat rings: renewable bronze screwed into body.
  - .4 Stem: nickel-plated steel.
  - .5 Disc: solid offset taper all-cast iron, secured to stem through integral forged T-head disc-stem connection.
  - .6 Seat rings: integral with body.
  - .7 Stem: nickel-plated steel.
  - .8 Pressure-lubricated operating mechanism.
  - .9 Operator: Handwheel.

## **2.3 UNDERWRITERS APPROVED GATE VALVE**

- .1 NPS 2 1/2 - 14, OS&Y:
  - .1 Approvals: UL and FM approved for fire service.
  - .2 UL and FM Label: on valve yoke.
  - .3 Body, Bonnet: cast iron to ASTM A126 Class B. Wall thicknesses in accordance with ANSI B16.1 and ULC 262 (B).
  - .4 Bonnet bushing, yoke sleeve: bronze, in accordance with FM requirements.
  - .5 Packing gland: bronze.
  - .6 Stem: manganese bronze. Diameter in accordance with ULC C-262 (B).
  - .7 Stuffing box dimensions, gland bolt diameter: in accordance with ULC C-262 (B).
  - .8 Bosses for bypass valve, drain: on NPS 4 and over.
  - .9 Disc: solid taper wedge. Up to NPS 3: bronze. NPS 4 and over: cast iron with bronze disc rings.
  - .10 Disc seat ring: self-aligning, Millwood undercut on NPS 3 - 12.
  - .11 Pressure rating:
    - .1 NPS 2-1/2 - 12: 1.7 Mpa CWP.
    - .2 NPS 14-1.2: 1.2 MPa CWP.
  - .12 Operator: handwheel.
  - .13 Bypass: complete with union and NPS globe valve as Section 23 05 23.01 - Valves - Bronze.

## **2.4 GLOBE VALVES**

- .1 NPS 2 1/2 - 10, OSY:
  - .1 Body: with multiple-bolted bonnet.
  - .2 WP: 860 kPa steam, 1.4 MPa CWP.
  - .3 Bonnet-yoke gasket: non-asbestos.
  - .4 Disc: bronze in accordance with ASTM B62, fully guided from bottom, securely yet freely connected to stem for swivel action and accurate engagement with disc.
  - .5 Seat ring: renewable, re-grindable and screwed into body.
  - .6 Stem: bronze in accordance with ASTM B62.
  - .7 Operator: Handwheel.

## **2.5 VALVE OPERATORS**

- .1 Install valve operators as follows: Actuators: To Division 25, EMCS.

## **2.6 CHECK VALVES**

- .1 Swing check valves, Class 125:
  - .1 Body and bolted cover: with tapped and plugged opening on each side for hinge pin. Flanged ends: plain faced with smooth finish.
    - .1 Up to NPS 16: cast iron in accordance with ASTM A126 Class B.
    - .2 NPS 18 and over: cast iron in accordance with ASTM A126 Class C.

- .2 Ratings:
  - .1 NPS 2 1/2 - 12: 860 kPa steam; 1.4 MPa CWP.
  - .2 NPS 14 - 16: 860 kPa steam; 1.03 MPa CWP.
  - .3 NPS 18 and over: 1.03 MPa CWP.
- .3 Disc: rotating for extended life.
  - .1 Up to NPS 6: bronze in accordance with ASTM B 62.
  - .2 NPS 8 and over: bronze-faced cast iron.
- .4 Seat rings: renewable bronze in accordance with ASTM B62 screwed into body.
- .5 Hinge pin, bushings: renewable bronze to ASTM B62.
- .6 Disc: A126 Class B, secured to stem, rotating for extended life.
- .7 Seat: cast iron, integral with body.
- .8 Hinge pin: exelloy; bushings: malleable iron.
- .9 Identification tag: fastened to cover.
- .10 Hinge: galvanized malleable iron.

## **2.7 SILENT CHECK VALVES**

- .1 Construction:
  - .1 Body: malleable with integral seat.
  - .2 Pressure rating: class 125, WP = 860 kPa.
  - .3 Connections: grooved ends.
  - .4 Disc: bronze renewable rotating disc.
  - .5 Seat: renewable, EPDM.
  - .6 Stainless steel spring, heavy duty.

## **2.8 GROOVED END BUTTERFLY VALVES**

- .1 Butterfly valves: in accordance with MSS-SP-67 Application: Isolating cells or section of multiple component equipment (e.g. multi-section coils, multi-cell cooling towers):
  - .1 NPS2" and over: Grooved ends.
  - .2 300 Psi WOG / 2068 kPa and be both bi-directional and dead end service capable to full rated pressure. Ductile iron body with blow –out proof stainless steel stems and nickel coated ductile iron disc. Seat shall be "EPDM" and have a full 360\* continuous contact with the seating surface.
  - .3 Valve Operators: (Lever) or (Gear).

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install rising stem valves in upright position with stem above horizontal.
- .2 Grooved end valves are acceptable on the hydronic system piping greater than NPS 2-1/2 and up to 82.2°C (180°F).

- .3 Grooved end valves to be supplied by the same manufacture of the grooved fittings.
- .4 Grooved end “valves” shall be installed in accordance with the manufacturer’s written installation instructions. Grooved ends shall be clean and free from indentations, projections. Gaskets shall be verified as suitable for the intended service prior to installation. Gaskets shall be moulded and produced by the coupling manufacturer. The grooved coupling manufacturer’s factory trained representative shall provide on-site training for Contractor’s field personnel in the use of grooving tools, application of groove, and installation of grooved joint products. The manufacturer’s representative shall periodically visit the jobsite and review installation. Contractor shall remove and replace any joints deemed by the Engineer to be improperly installed.

### **3.2 VERIFICATION**

- .1 Verification requirements in accordance with Division 01 – General Requirements, include:
  - .1 Materials and resources.
  - .2 Storage and collection of recyclables.
  - .3 Construction waste management.
  - .4 Resource reuse.
  - .5 Local/regional materials.
  - .6 Low-emitting materials.

END OF SECTION