
PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Valves cast iron, gate, globe, and check.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .3 Section 01 78 00 – Closeout Submittals.
- .4 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, Cast Iron Pipe Flanges and Flanged Fittings.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 49, Specification for Heat-Treated Carbon Steel Joint Bars.
 - .2 ASTM A 126, Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - .3 ASTM B 61, Specification for Steam or Valve Bronze Castings.
 - .4 ASTM B 62 – Specification for Composition Bronze or Ounce Metal Castings.
 - .5 ASTM B 85, Specification for Aluminum-Alloy Die Castings.
 - .6 ASTM B 209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
 - .1 MSS SP-67, Butterfly Valves.
 - .2 MSS SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS SP-71, Grey Iron Swing Check Valves, Flanged and Threaded Ends
 - .4 MSS SP-82, Valve Pressure Testing Methods
 - .5 MSS SP-85, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.

- .2 Product Data: submit WHMIS MSDS – Material Safety Data Sheets in accordance with Section 02 62 00.01 – Hazardous Materials.
 - .1 Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Submit data for valves specified this section.
- .3 Closeout Submittals
 - .1 Submit maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.5 DELIVERY, STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
 - .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.

1.6 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 Except for specialty valves, to be of single manufacturer.
- .2 Standard specifications:
 - .1 Gate valves: MSS SP-70.
 - .2 Globe valves: MSS SP-85.
 - .3 Check valves: MSS SP-71.
- .3 Requirements common to valves, unless specified otherwise:
 - .1 Body, bonnet: cast iron to ASTM B209 Class B.
 - .2 Connections: flanged ends, plain face, to ANSI B16.1.

- .3 Inspection and pressure testing: to MSS SP-82.
- .4 Bonnet gasket: non-asbestos.
- .5 Stem: to have precision-machined Acme or 60°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 to ASTM B85 or malleable iron to ASTM A49. Nut of bronze to ASTM B62.
- .9 Identification tag: with catalogue number, size, other pertinent data.
- .4 All products to have Canadian Registration Numbers (CRN).
- .5 Bronze trim for steam, water, air or glycol service, iron trim for oil, gas or gasoline.
- .6 Acceptable Product: Crane, Jenkins, Milwaukee, Newman Hattersley, Kitz, M.A. Stewart, NIBCO.

2.2 GATE VALVES

- .1 NPS 2 1/2 - 8, non rising stem, inside screw, bronze or iron 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 Bronze Trim:
 - .1 Disc: Solid offset taper wedge, bronze to ASTM B62.
 - .2 Seat rings: renewable bronze to ASTM B62, screwed into body.
 - .3 Stem: bronze to ASTM B62.
 - .3 Iron Trim:
 - .1 Disc: Solid offset taper wedge, cast iron to ASTM A126 Class B, secured to wrought steel stem.
 - .2 Seat: Integral with body.
 - .3 Stem: wrought steel.
 - .4 Operator: Handwheel
- .2 NPS 10 - 24, non rising stem, inside crew, bronze or iron trim, solid wedge disc:
 - .1 Body and multiple-bolted bonnet: cast iron to ASTM A126 Class B for sizes up to NPS 14, Class C for sizes NPS 16 and over, with bosses in body and bonnet for taps and drains, full length disc guides designed to ensure correct re-assembly, body tie ribs between bonnet and end flanges.
 - .2 Pressure ratings: Class 125.
 - .3 Bronze Trim:
 - .1 Disc: Solid offset taper wedge, with bronze rings to ASTM B62 rolled into cast iron disc, secured to stem.

- .2 Seat rings: renewable bronze to ASTM B62 screwed into body.
 - .3 Stem: bronze to ASTM B62.
 - .4 Iron Trim:
 - .1 Disc: Solid offset taper wedge, cast iron secured to stem.
 - .2 Seat: integral with body up to NPS 14, renewable nodular iron on other sizes.
 - .3 Stem: wrought steel.
 - .4 Operator: Handwheel
- .3 NPS 2 1/2-8, outside screw and yoke (OS&Y), bronze or iron 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 Bronze Trim:
 - .1 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.
 - .2 Seat rings: renewable bronze screwed into body.
 - .3 Stem: manganese-bronze.
 - .3 Iron Trim:
 - .1 Disc: Solid offset taper all-cast iron, secured to stem through integral forged T-head disc-stem connection.
 - .2 Seat rings: integral with body.
 - .3 Stem: nickel-plated steel for iron trim.
 - .4 Pressure-lubricated operating mechanism.
 - .5 Operator: Handwheel.
- .4 NPS 10 - 24, outside screw and yoke (OS&Y), bronze or iron trim, solid wedge disc:
 - .1 Body and multiple-bolted bonnet: NPS 10 - 14: cast iron to ASTM A126 Class B; NPS 16 - 24: cast iron to ASTM A126 Class C. With bosses in body and bonnet for taps and drains, full length disc guides designed to ensure correct re-assembly, body tie ribs between bonnet and end flanges, yoke, yoke hub, yoke sleeve and nut.
 - .2 Pressure ratings: Class 125.
 - .1 NPS 10-12: WP = 1.4 MPa CWP
 - .2 NPS 14-24: WP = 1.03 MPa CWP
 - .3 Bronze Trim
 - .1 Disc: Solid offset taper wedge, bronze disc rings to ASTM B62 rolled into cast iron disc, secured to stem through integral forged T-head disc-stem connection.
 - .2 Seat rings: renewable bronze to ASTM B62 screwed into body.
 - .3 Stem: manganese-bronze.

- .4 Iron Trim:
 - .1 Disc: Solid offset taper all-cast iron, secured to stem through integral forged T-head disc-stem connection.
 - .2 Seat: integral with body up to NPS 14, renewable nodular iron on other sizes.
 - .3 Stem: nickel-plated steel.
- .5 Pressure-lubricated operating mechanism.
- .6 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 to ANSI B16.1 and ULC C-262 (B).
 - .4 Bonnet bushing, yoke sleeve: bronze, to FM requirements.
 - .5 Packing gland: bronze.
 - .6 Stem: manganese bronze. Diameter to ULC C-262 (B).
 - .7 Stuffing box dimensions, gland bolt diameter: to 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, Milwood undercut on NPS 3 - 12.
 - .11 Pressure rating:
 - .1 NPS 2-1/2 - 12: 1.7 MPa CWP
 - .2 NPS 14: 1.2 MPa CWP
 - .12 Operator: Handwheel.

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-yolk gasket: non-asbestos.
 - .4 Disc: bronze to ASTM B 62, fully guided from bottom, securely yet freely connected to stem for swivel action and accurate engagement with disc.
 - .5 Seat ring: renewable, regrindable, screwed into body.
 - .6 Stem: bronze to ASTM B 62.
 - .7 Operator: handwheel.

2.5 BYPASSES FOR GATE AND GLOBE VALVES

- .1 Locations: on valves as indicated.
- .2 Position of bypass valve on main valves: spindle uprights or parallel position.
- .3 Size of bypass valve:
 - .1 Main valve up to NPS 8: NPS 3/4.
 - .2 Main valve NPS 10 and over: NPS 1.
- .4 Type of bypass valves:
 - .1 On gate valve: globe, with composition disc, trim, to Section 23 05 23.01 – Valves – Bronze. Pressure rating to match main valve.
 - .2 On globe valve: globe, with composition disc, bronze trim, to Section 23 05 23.01 - Valves – Bronze. Pressure rating to match main valve.

2.6 VALVE OPERATORS

- .1 Install valve operators as follows:
 - .1 Handwheel: on valves except as specified.
 - .2 Handwheel with chain operators: on valves installed more than 2400 mm above floor in boiler rooms and mechanical equipment rooms.

2.7 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 to ASTM A126 Class B.
 - .2 NPS 18 and over: cast iron to 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 Bronze Trim
 - .1 Disc: Rotating for extended life.
 - .1 Up to NPS 6: bronze to ASTM B 62.
 - .2 NPS 8 and over: bronze-faced cast iron.
 - .2 Seat rings: renewable bronze to ASTM B62 screwed into body.
 - .3 Hinge pin, bushings: renewable bronze to ASTM B62.
 - .4 Iron Trim
 - .1 Disc: A126 Class B, secured to stem, rotating for extended life.
 - .2 Seat: cast iron, integral with body.

- .3 Hinge pin: exelloy; bushings: malleable iron.
- .5 Identification tag: fastened to cover.
- .6 Hinge: galvanized malleable iron.
- .2 Swing check valves, NPS 2 1/2 - 8 Class 250:
 - .1 Body and bolted cover: cast iron to ASTM A126 Class B with tapped and plugged opening on each side for hinge pin.
 - .2 Flanged ends: 2 mm raised face with serrated finish.
 - .3 Rating: 1.7 mPa steam; 3.4 mPa CWP.
 - .4 Disc: Rotating for extended life.
 - .1 Up to NPS 3: bronze to ASTM B61.
 - .2 NPS 4 - 8: Iron faced with ASTM B61 bronze.
 - .5 Seat rings: renewable bronze to ASTM B61, screwed into body.
 - .6 Hinge pin, bushings: renewable, bronze to ASTM B61.
 - .7 Hinge: galvanized malleable iron.
 - .8 Identification tag: fastened to cover.

2.8 SILENT CHECK VALVES

- .1 Body: malleable iron or ductile iron with integral seat.
- .2 Pressure rating: Class 125, WP = 860 kPa.
- .3 Connections: grooved ends or flanged.
- .4 Disc: bronze or stainless steel renewable rotating disc.
- .5 Seat: renewable, EPDM.
- .6 Stainless steel spring, heavy duty.
- .7 Grooved end check valves.

2.9 GROOVED END BUTTERFLY VALVES

- .1 Butterfly valves: to MSS-SP-67. Application: Isolating cells or section of multiple component equipment (eg. multi-section coils, multi-cell cooling towers).
 - .1 NPS2 and over: Grooved ends.
 - .2 2068 kPa WOG 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 operator NPS6 and over.

2.10 ACCEPTABLE MATERIAL:

- .1 Jenkins, Crane, Wath, Newman Hathersley, Milwaukee, Conbraco, Kitz, Red White, M. A. Stewart, Nibco, Victaulic.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install rising stem valves in upright position with stem above horizontal. Ensure sufficient room for valve stem in fully open position.
- .2 Grooved end valves to be supplied by the same manufacture of the grooved fittings.
- .3 Grooved end valves to be installed in accordance with the manufacturer's written installation instructions. Grooved ends to be clean and free from indentations and projections. Gaskets to be verified as suitable for the intended service prior to installation. Gaskets to be molded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative to 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 to periodically visit the jobsite and review installation. Contractor to remove and replace any joints deemed improperly installed.

3.2 COMMISSIONING

- .1 As part of commissioning activities, develop schedule of valves and record thereon identifier, location, service, purchase order number and date, manufacturer, identification data specified above.

END OF SECTION