

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 21 13.

1.2 SUMMARY

- .1 Section includes:
 - .1 Materials and installation for steel piping, valves and fittings for hydronic systems.
 - .2 Sustainable requirements for construction and verification.
- .2 Related Sections:
 - .1 Division 01 – General Requirements.
 - .2 Section 23 05 05 - Installation of Pipework.
 - .3 Section 23 05 23.01 - Valves - Bronze.
 - .4 Section 23 05 23.02 - Valves - Iron.
 - .5 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
 - .6 Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.

1.3 REFERENCES

- .1 American Society of Mechanical Engineers (ASME):
 - .1 ASME B16.1-98, Cast Iron Pipe Flanges and Flanged Fittings.
 - .2 ASME B16.3-98, Malleable Iron Threaded Fittings.
 - .3 ASME B16.5-03, Pipe Flanges and Flanged Fittings.
 - .4 ASME B16.9-01, Factory-Made Wrought Butt welding Fittings.
 - .5 ASME B18.2.1-03, Square and Hex Bolts and Screws (Inch Series).
 - .6 ASME B18.2.2-87 (R1999), Square and Hex Nuts (Inch Series).
- .2 American Society for Testing and Materials International, (ASTM):
 - .1 ASTM A47/A47M-99, Standard Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A53/A53M-02, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless.
 - .3 ASTM A536-84 (1999) e1, Standard Specification for Ductile Iron Castings.
 - .4 ASTM B61-02, Standard Specification for Steam or Valve Bronze Castings.
 - .5 ASTM B62-02, Standard Specification for Composition Bronze or Ounce Metal Castings.
 - .6 ASTM E202-00, Standard Test Method for Analysis of Ethylene Glycols and Propylene Glycols.
- .3 American Water Works Association (AWWA):
 - .1 AWWA C111-00, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

- .4 Canadian Standards Association (CSA International):
 - .1 CSA B242-M1980 (R1998), Groove and Shoulder Type Mechanical Pipe Couplings.
 - .2 CAN/CSA W48-01, Filler Metals and Allied Materials for Metal Arc Welding (Developed in cooperation with the Canadian Welding Bureau).
- .5 Manufacturer's Standardization of the Valve and Fittings Industry (MSS):
 - .1 MSS-SP-67-025, Butterfly Valves.
 - .2 MSS-SP-70-98, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71-97, Cast Iron Swing Check Valves Flanged and Threaded Ends.
 - .4 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.
 - .5 MSS-SP-85-02, Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Division 01 – General Requirements.
- .2 Closeout Submittals:
 - .1 Provide maintenance data for incorporation into manual specified in Division 01 – General Requirements and include following:
 - .2 Contractor to submit grooved product submittals. Grooved product to be of one manufacture, and must have current CRN #'s.
 - .3 Grooved product Manufacture to supply on site tool and products installation training.

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 HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 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.
 - .4 Fold up metal and plastic banding, flatten and place in designated area for recycling.

1.7 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide following spare parts:

- .1 Valve seats: one for every ten valves, each size. Minimum one.
- .2 Discs: one for every ten valves, each size. Minimum one.
- .3 Stem packing: one for every ten valves, each size. Minimum one.
- .4 Valve handles: two of each size.
- .5 Gaskets for flanges: one for every ten flanges.

Part 2 Products

2.1 PIPE

- .1 Steel pipe: in accordance with ASTM A53/A53M, Grade B, as follows:
 - .1 To NPS8: Schedule 40, unless otherwise noted.

2.2 PIPE JOINTS

- .1 NPS2 and under: screwed fittings with PTFE tape or lead-free pipe dope.
- .2 NPS2-1/2 and over: welding fittings and flanges to CAN/CSA W48.
- .3 Roll grooved: standard rigid coupling to CSA B242:
 - .1 Flexible couplings: Size NPS 2-8; to be used as indicated on drawings.
 - .2 Rigid Couplings: Size NPS 2-8; to be used as standard method of installation; unless otherwise noted.
- .4 Flanges: raised face, weld neck in accordance with AWWA C111.
- .5 Orifice flanges: slip-on raised face, 2100 kPa.
- .6 Flange gaskets: in accordance with AWWA C111.
- .7 Pipe thread: taper.
- .8 Bolts and nuts: in accordance with ASME B18.2.1 and ASME B18.2.2.
- .9 Roll grooved coupling gaskets: type EPDM. (-30° C To + 110°C for continuous operation). Acceptable on hot water in all areas.

2.3 FITTINGS

- .1 Screwed fittings: malleable iron, in accordance with ASME B16.3, Class 150.
- .2 Pipe flanges and flanged fittings:
 - .1 Cast iron: in accordance with ASME B16.1, Class 125.
 - .2 Steel: in accordance with ASME B16.5.
- .3 Butt-welding fittings: steel, in accordance with ASME B16.9.

.4 Unions: malleable iron, in accordance with ASTM A47/A47M and ASME B16.3.

.5 Fittings for roll grooved piping: malleable iron in accordance with ASTM A47/A47M.

2.4 VALVES

.1 Connections:

.1 NPS2 and smaller: screwed ends.

.2 NPS2-1/2 and larger: Flanged ends or rolled grooved.

.2 Gate valves: to MSS-SP-80 Application: Isolating equipment, control valves, pipelines:

.1 NPS2 and under:

.1 Mechanical Rooms: Class 125, rising stem, wedge disc, as specified Section 23 05 23.01 - Valves - Bronze.

.2 Elsewhere: Class 125, non-rising stem, solid wedge disc, as specified Section 23 05 23.01 - Valves - Bronze.

.2 NPS2-1/2 and over:

.1 Mechanical Rooms: rising stem, wedge disc, lead free bronze trim, as specified Section 23 05 23.02 - Valves - Iron.

.2 Elsewhere: Non-rising stem, solid wedge disc, lead free bronze trim, as specified Section 23 05 23.02 - Valves - Iron.

.3 Butterfly valves: to MSS-SP-67 Application: Isolating cells or section of multiple component equipment (e.g. multi-section coils, multi-cell cooling towers):

.1 NPS2-1/2 and over: Lug type or Grooved ends.

.4 Globe valves: to MSS-SP-80 Application: Throttling, flow control, emergency bypass.

.1 NPS2 and under:

.1 Mechanical Rooms: with PTFE disc, as specified Section 23 05 23.01 - Valves - Bronze.

.2 Elsewhere: Globe, with composition disc, as specified Section 23 05 23.01 - Valves - Bronze.

.2 NPS2-1/2 and over:

.1 With composition bronze disc, lead free bronze trim, as specified Section 23 05 23.02 - Valves - Iron.

.5 Balancing, for TAB:

.1 General:

.1 Y style globe valve, designed to provide precise flow measurements and control.

.2 Valve shall provide multi-turn, 360° adjustment with micrometer type indicators located on the valve handwheel.

.3 Valves shall have a minimum of five full 360° handwheel turns. 90° 'circuit-setter' style ball valves are not acceptable.

- .4 Valve handle shall have hidden memory feature, which will provide a means for locking the valve position after the system is balanced.
- .2 NPS2 and under:
 - .1 Valves shall be furnished with precision machined Venturi built into the valve body to provide highly accurate flow measurement and flow balancing. The Venturi shall have two, 6mm threaded brass metering ports with check valves and gasketed caps located on the inlet side of the valve.
 - .2 Valves shall be furnished with flow smoothing fins downstream of the valve seat and integral to the forged valve body to make the flow more laminar.
 - .3 The valve body, stem and plug shall be brass.
 - .4 The handwheel shall be high-strength resin.
- .6 Drain valves: Full port bronze ball valve type, as specified in Section 23 05 23.01 - Valves - Bronze.
- .7 Swing check valves: to MSS-SP-71:
 - .1 NPS2 and under:
 - .1 Class 125, swing, with composition disc, as specified Section 23 05 23.01 - Valves - Bronze.
 - .2 NPS2-1/2 and over:
 - .1 Flanged or Grooved ends: as specified Section 23 05 23.02 - Valves - Iron.
- .8 Silent check valves:
 - .1 NPS2 and under:
 - .1 As specified Section 23 05 23.01 - Valves - Bronze.
 - .2 NPS2-1/2 and over:
 - .1 Flanged or Grooved ends: as specified Section 23 05 23.02 - Valves - Iron.
- .9 Ball valves:
 - .1 NPS2 and under: as specified Section 23 05 23.01 - Valves - Bronze.

2.5 STRAINER

- .1 NPS 1/2 to 2: bronze body to ASTM B62, screwed connections, Y pattern.
- .2 Blowdown connection: NPS 1.
- .3 Screen: brass with 1.19 mm perforations.
- .4 Working pressure: 860 kPa.

Part 3 Execution

3.1 PIPING INSTALLATION

- .1 Install pipework in accordance with Section 23 05 05 - Installation of Pipe Work.

3.2 CIRCUIT BALANCING VALVES

- .1 Install flow measuring stations and flow balancing valves as indicated.
- .2 Lock set screws to final balanced position.
- .3 Tape joints in prefabricated insulation on valves installed in chilled water mains.

3.3 STRAINER

- .1 Install strainer upstream of all control valves and as indicated.

3.4 CLEANING, FLUSHING AND START-UP

- .1 In accordance with Division 01 – General Requirements.

END OF SECTION