

## 1 General

### 1.1 RELATED SECTIONS

- .1 Section 23 05 00 - Common Work Results for HVAC.
- .2 Section 23 05 15 - Common Installation Requirements for HVAC Pipework.
- .3 Section 23 05 23.01 - Valves - Bronze.
- .4 Section 23 08 16 - Cleaning and Start-up of HVAC Piping Systems.
- .5 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

### 1.2 REFERENCES

- .1 American Society of Mechanical Engineers (ASME).
  - .1 ASME B16.1-, Cast Iron Pipe Flanges and Flanged Fittings.
  - .2 ASME B16.3-, Malleable Iron Threaded Fittings.
  - .3 ASME B16.5-, Pipe Flanges and Flanged Fittings.
  - .4 ASME B16.9-, Factory-Made Wrought Butt welding Fittings.
  - .5 ASME B18.2.1-, Square and Hex Bolts and Screws (Inch Series).
  - .6 ASME B18.2.2-, Square and Hex Nuts (Inch Series).
- .2 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A47/A47M-, Standard Specification for Ferritic Malleable Iron Castings.
  - .2 ASTM A53/A53M-, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless.
  - .3 ASTM A536-, Standard Specification for Ductile Iron Castings.
  - .4 ASTM B61-, Standard Specification for Steam or Valve Bronze Castings.
  - .5 ASTM B62-, Standard Specification for Composition Bronze or Ounce Metal Castings.
  - .6 ASTM E202-, Standard Test Method for Analysis of Ethylene Glycols and Propylene Glycols.
- .3 American Water Works Association (AWWA).
  - .1 AWWA C111-, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 Canadian Standards Association (CSA International).
  - .1 CSA B242-, Groove and Shoulder Type Mechanical Pipe Couplings.
  - .2 CAN/CSA W48-, 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-, Butterfly Valves.
  - .2 MSS-SP-70-, Cast Iron Gate Valves, Flanged and Threaded Ends.
  - .3
  - .4 MSS-SP-71-, Cast Iron Swing Check Valves Flanged and Threaded Ends.
  - .5 MSS-SP-80-, Bronze Gate, Globe, Angle and Check Valves.
  - .6 MSS-SP-85-, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.
- .6 Province of NL Boiler, Pressure Vessel and Compressed Gas Regulations 119/96.

### 1.3 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Product Data: for each type of the following:
    - .1 Pipe materials.
    - .2 Unions and flanges, including gaskets, nuts and bolts.
    - .3 Sleeves and packing.
    - .4 Pressure seal fittings.
    - .5 Valves: include flow and pressure drop curves based on manufacturers

testing for calibrated-orifice balancing valves and automatic flow control valves.

- .6 Air control devices.
- .7 Chemical treatment.
- .8 Hydronic specialties: submit schedule listing type, make, model and model number, size and service for all hydronic specialties.

.2 Closeout Submittals.

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals and include following:
  - .1 Special servicing requirements.

#### 1.4 QUALITY ASSURANCE

- .1 Health and Safety.
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal.
  - .1 Separate waste materials for reuse in accordance with Section 01 74 00 - Cleaning.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
  - .4 Fold up metal banding, flatten and place in designated area for recycling.

#### 1.6 MAINTENANCE

- .1 Extra Materials.
  - .1 Provide following spare parts:
    - .1 Spare Valves: One (1) of each size & type, and one (1) additional valve for each ten (10) valves of a given size and type.
    - .2 Gaskets for flanges: one (1) for every ten (10) flanges.

## 2 Products

### 2.1 PIPE

- .1 Steel pipe: to ASTM A53/A53M, Grade B, as follows:
  - .1 Up to NPS 2: Schedule 40.

### 2.2 JOINTS

- .1 NPS2 and under: screwed fittings with PTFE tape or lead-free pipe dope.
- .2 Flexible couplings to CSA B242 to be used where noted on drawings and on elbows utilized on expansion joints.
- .3 Flanges: plain ASME B16.1 or raised face, slip-on or weld neck to ASME B16.5.
- .4 Orifice flanges: slip-on raised face, 2100 kPa.
- .5 Flange gaskets: to AWWA C111.
- .6 Pipe thread: taper.
- .7 Bolts and nuts: to ASME B18.2.1 and ASME B18.2.2.

### 2.3 FITTINGS

- .1 Screwed fittings: malleable iron, to ASME B16.3, Class 150.
- .2 Pipe flanges and flanged fittings:

- .1 Cast iron: to ASME B16.1, Class 125.
- .2 Steel: to ASME B16.5.
- .3 Butt-welding fittings: steel, to ASME B16.9.
- .4 Unions: malleable iron, to ASTM A47/A47M and ASME B16.3.

## 2.4 VALVES

- .1 Connections:
  - .1 NPS2 and smaller: screwed ends.
- .2 Ball valves:
  - .1 NPS 2 and under: as specified in Section 23 05 23.01 - Valves - Bronze.
- .3 Gate valves: to MSS-SP-70:
  - .1 NPS 2 and under:
    - .1 Mechanical Rooms : Class 125, rising stem, split 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.
- .4 Globe valves: to MSS-SP-80:
  - .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.
- .5 Drain valves: Gate, Class 125, non-rising stem, solid wedge disc, as specified Section 23 05 23.01 - Valves - Bronze.
- .6 Bypass valves on globe valves NPS 8 and larger: NPS 3/4, Globe, with PTFE disc as specified 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.
- .8 Silent check valves:
  - .1 NPS2 and under:
    - .1 As specified Section 23 05 23.01 - Valves - Bronze.
- .9 Combination balancing and shutoff valves NPS 2 and smaller.
  - .1 Body: brass, stainless steel, bronze or a metal ball or y-pattern.
  - .2 Seat: PTFE or a metal
  - .3 End connection: threaded or socket.
  - .4 Pressure gauge connections: integral seals for portable differential pressure meter.
  - .5 Handle style: digital hand wheel, with memory stop to retain set position.
  - .6 CWP rating: minimum 125 PSIG.
  - .7 Maximum operating temperature: 250 deg F.

## 3 Execution

### 3.1 PIPING INSTALLATION

- .1 Install pipework in accordance with Section 23 05 01 - Installation of Pipe Work.
  - .1 Install shutoff duty valves at each branch connection to supply mains and at supply connection to each piece of equipment.
  - .2 Install balancing valves at each branch connection to return main and return pipe of each heating or cooling terminal.

**3.2 CIRCUIT BALANCING VALVES**

- .1 Install flow measuring stations and flow balancing valves as indicated.
- .2 Remove handwheel after installation and when TAB is complete.
- .3 Tape joints in prefabricated insulation on valves installed in chilled water mains.

**3.3 CLEANING, FLUSHING AND START-UP**

- .1 In accordance with Section 23 08 16 - Cleaning and Start-up of HVAC Piping Systems.

**3.4 TESTING**

- .1 Test system in accordance with Section 23 05 00 - Common Work for HVAC. Minimum 1.5 times working pressure on 1000 KPa.
- .2 For glycol systems, retest with propylene glycol to ASTM E202, inhibited, for use in building system after cleaning. Repair leaking joints, fittings or valves.

**3.5 BALANCING**

- .1 Balance water systems to within plus or minus 5 % of design output.
- .2 Refer to Section 23 05 93 - Testing, Adjusting and Balancing for HVAC for applicable procedures.

**3.6 PERFORMANCE VERIFICATION**

- .1 In accordance with Section 23 08 16 - Cleaning and Start-up of HVAC Piping Systems.
- .2 Provide copies of test reports for commissioning manuals.

**END OF SECTION**

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