

HYDRONIC SYSTEMS: STEEL

1. GENERAL

1.1 Summary

- .1 Section Includes.
 - .1 Materials and installation for steel piping, valves and fittings for hydronic systems in building services piping.
- .2 Related Sections.
 - .1 Section 23 05 00 - Common Work Results for HVAC.
 - .2 Section 23 05 17 - Pipe Welding.
 - .3 Section 23 05 05 - Installation of Pipework.
 - .4 Section 23 05 23.01 - Valves - Bronze.
 - .5 Section 23 05 23.02 - Valves - Cast Iron.
 - .6 Section 23 05 83 Balancing
 - .7 Section 23 05 93 - Testing.
 - .8 Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.
 - .9 Section 23 08 01 - Performance Verification of Mechanical Piping.

1.2 References

- .1 American Society of Mechanical Engineers (ASME).
 - .1 ASME B16.1-10, Cast Iron Pipe Flanges and Flanged Fittings.
 - .2 ASME B16.3-11, Malleable Iron Threaded Fittings.
 - .3 ASME B16.5-09, Pipe Flanges and Flanged Fittings.
 - .4 ASME B16.9-07, Factory-Made Wrought Buttwelding Fittings.
 - .5 ASME B18.2.1-10, Square and Hex Bolts and Screws (Inch Series).
 - .6 ASME B18.2.2-10, Square and Hex Nuts (Inch Series).
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A 47/A 47M-99(R2009), Standard Specification for Ferritic Malleable Iron Castings.

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- .2 ASTM A 53/A 53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless.
- .3 ASTM A 536-84(2009), Standard Specification for Ductile Iron Castings.
- .4 ASTM B 61-08, Standard Specification for Steam or Valve Bronze Castings.
- .5 ASTM B 62-09, Standard Specification for Composition Bronze or Ounce Metal Castings.
- .6 ASTM E 202-10, Standard Test Method for Analysis of Ethylene Glycols and Propylene Glycols.
- .3 American Water Works Association (AWWA).
 - .1 AWWA C111-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 Canadian Standards Association (CSA).
 - .1 CSA B242-2005, Groove and Shoulder Type Mechanical Pipe Couplings.
 - .2 CAN/CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
- .5 Manufacturer's Standardization of the Valve and Fittings Industry (MSS).
 - .1 MSS-SP-67-02, Butterfly Valves.
 - .2 MSS-SP-70-06, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71-05, Cast Iron Swing Check Valves Flanged and Threaded Ends.
 - .4 MSS-SP-80-08, Bronze Gate, Globe, Angle and Check Valves.
 - .5 MSS-SP-85-02, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.3 Submittals

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .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 Maintenance

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

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- .1 Gaskets for flanges: one for every ten flanges.

2. PRODUCTS

2.1 Pipe

- .1 Steel pipe: to ASTM A53/A53M, Grade B , as follows:
 - .1 To DN300: Schedule 40.

2.2 Pipe Joints

- .1 DN50 and under: screwed fittings with PTFE tape or lead-free pipe dope.
- .2 DN65 and over: welding fittings and flanges to CAN/CSA W48.
- .3 Flanges: plain or raised face,weld neck to AWWA C111.
- .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 A 47/A 47M and ASME B16.3.

3. EXECUTION

3.1 Piping Installation

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

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.

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- .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 02 - Cleaning and Start-Up of Mechanical Piping Systems.

3.4 Testing

- .1 Test system in accordance with Section 23 05 00 - Common Work Results for HVAC and Section 23 05 93 - Testing.

3.5 Balancing

- .1 Balance water systems to within plus or minus 5 % of design output.
- .2 Refer to Section 23 05 83 - Balancing for applicable procedures.

3.6 Performance Verification

- .1 In accordance with Section 23 08 01 - Performance Verification of Mechanical Piping.

END OF SECTION