

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for domestic water service used in the following:
 - .1 Hard drawn copper domestic hot and cold water services inside the building.
 - .2 Isolation valves and check valves for domestic water service.

1.2 RELATED SECTIONS

- .1 Section 21 05 01 - Common Work Results - Mechanical.
- .2 Section 23 05 05 - Installation of Pipework.
- .3 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

1.3 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).
 - .1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
 - .2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - .4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
 - .1 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.
- .4 National Research Council (NRC)/Institute for Research in Construction.
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC).

1.4 SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in Section 21 05 01 - Common Work Results - Mechanical.

Part 2 Products

2.1 PIPING

- .1 Domestic hot, cold and recirculation systems.

- .1 Above ground: copper tube, hard drawn, Type L: to ASTM B88M.
- .2 Buried or embedded: copper tube, soft annealed, Type K: to ASTM B88M, in long lengths and with no buried joints or concealed joints.

2.2 FITTINGS

- .1 Bronze pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.
- .2 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.
- .3 Cast copper, solder type: to ANSI/ASME B16.18.
- .4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

2.3 JOINTS

- .1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.
- .2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
- .3 Solder: 95/5 silver solder Alloy Grade E (lead & antimony free).
- .4 Teflon tape: for threaded joints.
- .5 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F492, complete with thermoplastic liner.

2.4 GATE VALVES

- .1 NPS 2 and under, soldered:
 - .1 Non-rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc, suitable for potable water use.
 - .2 Acceptable Material: Toyo Fig 281A, Kitz 41 or approved equivalent in accordance with B6.
- .2 NPS 2 and under, screwed:
 - .1 Non-rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc.
 - .2 Acceptable Material: Toyo Fig 280A, Kitz 41 or approved equivalent in accordance with B6.

2.5 BALL VALVES

- .1 NPS 2.5 and under, screwed:
 - .1 Class 150.
 - .2 600 pound.
 - .3 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle.

- .4 Acceptable Material: Toyo Fig 5044A, Kitz 58 or approved equivalent in accordance with B6.
- .2 NPS 2.5 and under, soldered:
 - .1 To ANSI/ASME B16.18, Class 150.
 - .2 600 pound.
 - .3 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors.
 - .4 Acceptable Material: Toyo Fig 5049A, Kitz 59 or approved equivalent in accordance with B6..

2.6 CHECK VALVES

- .1 NPS 2.5 and under, screwed:
 - .1 Class 125.
 - .2 Bronze body, cap and disc, integral seat, swing type, Y-pattern, screwed cap.
 - .3 Acceptable Material: Toyo Fig 236 or approved equivalent in accordance with B6.
- .2 NPS 2.5 and under, soldered:
 - .1 Class 125.
 - .2 Bronze body, cap and disc, integral seat, swing type, Y-pattern, screwed cap.
 - .3 Acceptable Material: Toyo 237 or approved equivalent in accordance with B6.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with NPC and local authority having jurisdiction.
- .2 Cut piping and/or tubing square, ream and clean tubing and tube ends, clean recesses of fitting and assemble without binding.
- .3 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .4 Assemble piping using fittings manufactured to ANSI standards.
- .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
- .6 Buried tubing:
 - .1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.
 - .2 Bend tubing without crimping or constriction. No buried fittings or joints.
- .7 Provide trap primers for all floor drains.

3.2 VALVES

- .1 Isolate all equipment, and all branches with ball valves.
- .2 Isolate fixtures with gate valves or angle stops.

3.3 PRESSURE TESTS

- .1 Conform to requirements of Section 21 05 01 - Common Work Results for Mechanical.
- .2 Test pressure: greater of 1.5 times maximum system operating pressure or 860 kPa, whichever is less.

3.4 FLUSHING AND CLEANING

- .1 Domestic water system:
 - .1 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean to Provincial potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing.

3.5 PRE-START-UP INSPECTIONS

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.
- .3 Ensure that air chambers, expansion compensators are installed properly.

3.6 DISINFECTION

- .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction.
- .2 Upon completion, provide laboratory test reports on water quality for Contract Administrator approval.

3.7 START-UP

- .1 Timing: Start up after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Certificate of static completion has been issued.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
 - .1 Establish circulation and ensure that air is eliminated.
 - .2 Bring HWS storage tank up to design temperature slowly.

- .3 Monitor piping DHW and DCW piping systems for freedom of movement, pipe expansion as designed.
- .4 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

END OF SECTION