

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Submittal Procedures: Section 01 33 00
- .2 Closeout Submittals: Section 01 78 00
- .3 Mechanical General Requirements: Section 23 05 00
- .4 Insulation of PIPework: Section 23 05 05

1.2 REFERENCES

- .1 ASME B16.18-12, Cast Copper Alloy Solder Joint Pressure Fittings.
- .2 ASME B16.22-13, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
- .3 ASME B16.24-2011, Bronze Pipe Flanges and Fittings, Class 150 and 300.
- .4 ASME B16.15-13, Cast Bronze Threaded Fittings, Classes 125 and 250.
- .5 ASTM B32-08(R2014), Specification for Solder Metal.
- .6 ASTM B75-11, Specification for Seamless Copper Tube.
- .7 ASTM B88M-14, Specification for Seamless Copper Water Tube (Metric).
- .8 MSS SP-80-2013, Bronze Gate, Globe, Angle and Check Valves.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00.
- .2 Submit data for following: valves.

1.4 MAINTENANCE
DATA

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00.

PART 2 - PRODUCTS

2.1 PIPING

- .1 Domestic Cold Water (DCW); Domestic Hot Water (DHW); Domestic Hot Water Recirc. (DHWR); Trap Primer Piping (TP).
 - .1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.
 - .2 Buried and embedded: copper tube, soft annealed, type K: to ASTM B88M, in long lengths and with no buried joints. "PEX", CSA

approved potable water piping with no joints may be used under slab.

2.2 FITTINGS

- .1 Bronze pipe flanges and flanged fittings, Class 150 and 300: to ANSI B16.24.
- .2 Cast bronze threaded fittings, Class 125 and 250: to ANSI/ASME B16.15.
- .3 Cast copper, solder type: to ANSI B16.18. (Lead-free).
- .4 Wrought copper and copper alloy, solder type: to ANSI B16.22.
- .5 Piping NPS 2-1/2 and over: roll groove copper fittings to ASTM B75, alloy C12200. Victaulic "No-Sweat".
- .6 Mechanically formed tee connections may be used on 25mm and above water pipe and where the branch line connection to the branch main is at least one (1) pipe size smaller than the branch main.

2.3 JOINTS

- .1 Rubber gaskets, 3 mm thick: to ANSI/AWWA C111/A21.11.
- .2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
- .3 Solder/brazing: tin-antimony 95- 5: to ASTM B32, or tin-silver 94-6. (Lead free.)
- .4 Teflon tape: for threaded joints.
- .5 Piping NPS 2-1/2 and over: roll groove couplings with ductile or malleable iron housings, grade E EPDM flush seal gaskets and heat treated carbon steel bolts/nuts to ASTM A183. Victaulic "No- Sweat".
- .6 Dielectric unions between dissimilar metals to ASTM F492, complete with thermoplastic liner.

2.4 GATE VALVES

- .1 NPS 2-1/2 and over, flanged:
 - .1 Non-rising stem: to MSS SP-70, Class 125, 125 psig, full faced, flanged ends, cast-iron body, bronze trim, bolted bonnet.
 - .2 Acceptable Material: Crane 461, Jenkins 452; Kitz 72; Hattersley 501; Toyo 421A; Milwaukee Valve Company.

2.5 GLOBE VALVES

- .1 NPS 2 and under, soldered:
 - .1 To MSS SP-80, Class 125, 862 kPa, bronze body, renewable composition disc, screwed over bonnet.
 - .2 Lockshield handles: as indicated.
 - .3 Acceptable Material: Crane 1310; Jenkins 106 BPJ; Kitz 10; Hattersley A51M; Toyo; Milwaukee Valve Company.

2.6 SWING CHECK
VALVES

- .2 NPS 2 and under, screwed:
 - .1 To MSS SP-80, Class 125, 862 kPa, bronze body, screwed over bonnet, renewable composition disc.
 - .2 Lockshield handles: as indicated.
 - .3 Acceptable Material: Crane 14½ P; Jenkins; Kitz; Hattersley; Toyo; Milwaukee Valve Company.
- .1 NPS 2 and under, soldered:
 - .1 To MSS SP-80, Class 125, 862 kPa, bronze body, bronze swing disc, screw in cap, re-grindable
 - .2 Acceptable Material: Crane 1342; Jenkins 4093; Hattersley A61SE; Toyo 237; Milwaukee Valve Company.
- .2 NPS 2 and under, screwed:
 - .1 To MSS SP-80, Class 125, 862 kPa, bronze body, bronze swing disc, screw in cap, re-grindable seat.
 - .2 Acceptable Material: Crane 37; Jenkins 4092; Hattersley A60AT; Toyo 236; Milwaukee Valve Company.
- .3 NPS 2-1/2 and over; flanged:
 - .1 To MSS SP-71, class 125, 862 kPa, cast iron body, flat flanges faces, renewable seat, bronze disc, bolted cap.
 - .2 Acceptable Material: Crane 373; Jenkins 587J; Hattersley A60AT; Toyo 236; Milwaukee Valve Company.

2.7 BALL VALVES

- .1 NPS 2 and under, screwed:
 - .1 To ANSI B16.18, Class 150, 1034 kPa.
 - .2 Bronze body, stainless steel ball, PTFE Teflon adjustable packing, brass gland and PTFE Teflon Buna N seat, steel lever handle.
 - .3 Acceptable Material: Crane Capri, Jenkins 901FJ Toyo 5044A, Kitz; Milwaukee Valve Company.
- .2 NPS 2 and under, soldered:
 - .1 To ANSI B16.18, Class 150, 1034 kPa.
 - .2 Bronze body, chrome plated brass stainless steel ball, PTFE Teflon adjustable packing, brass gland and PTFE Teflon Buna N seat, steel lever handle, with NPT to copper adaptors.
 - .3 Acceptable Material: Crane Capri, Jenkins 902FJ, Toyo 5049A, Milwaukee Valve Company; Kitz.
- .3 NPS 2-1/2 and over, roll groove:
 - .1 Bronze body, Class 150, 1034 kPa, with bronze trim, grade E EPDM coating bonded to ductile iron disc, enamelled two position detent handle.
 - .2 Acceptable Material: Victaulic series 608.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install in accordance with the 2010 Canadian Plumbing Code and the local authority having jurisdiction.
- .2 Cut square, ream and clean tubing and tube ends, clean recesses of fittings and assemble without binding.
- .3 Assemble all piping using fittings manufactured to ANSI standards.
- .4 Install tubing close to building structure to minimize furring, conserve headroom and space. Group exposed piping and run parallel to walls.
- .5 Connect to fixtures and equipment in accordance with manufacturers 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. Minimize use of fittings.
- .7 Provide union nuts at all faucets. Do not directly solder faucets to supplies.
- .8 Test piping systems in accordance with Section 23 05 00.

3.2 VALVES

- .1 Isolate equipment, fixtures and branches with ball valves and as indicated. Use ball valves for shut-off applications on piping up to and including NPS 2.

3.3 DISINFECTION

- .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction. After testing, provide acceptable water quality test report to the Departmental Representative for approval.

3.4 PRESSURE TESTS

- .1 Conform to requirements of Section 23 05 05.
- .2 Test pressure: greater of 1.5 times maximum system operating pressure or 860 kPa.

**3.5 PRE-START-UP
INSPECTIONS**

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

properly.

3.6 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 confirm air is eliminated.
 - .2 Check pressurization to confirm proper operation and to prevent water hammer, flashing and/or cavitation.
 - .3 Bring HWS storage tank up to design temperature slowly.
 - .4 Monitor piping DHWS piping systems for freedom of movement, pipe expansion as designed.
 - .5 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

3.7 PERFORMANCE VERIFICATION

- .1 Timing:
 - .1 After pressure and leakage tests and disinfection completed, and certificate of completion has been issued by authority having jurisdiction.
- .2 Procedures:
 - .1 Verify flow rate and pressure meet Design Criteria.
 - .2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
 - .3 Sterilize DHWS systems for Legionella control.
 - .4 Verify performance of temperature controls.
 - .5 Verify compliance with safety and health requirements.
 - .6 Check for proper operation of water hammer arrestors. Run one (1) outlet for 10 seconds, then shut off water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.
 - .7 Confirm water quality consistent with supply standards, verifying that no residuals remain as a result of flushing and/or cleaning.
- .3 Reports:
 - .1 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

END OF SECTION