

**PART 1 - GENERAL**

- 1.1 RELATED REQUIREMENTS** .1 Section 23 05 05 - Installation of Pipework
- 1.2 REFERENCES** .1 American Society of Mechanical Engineers International (ASME)
- .1 ASME B16.15-2011, Cast Copper Alloy Threaded Fittings: Classes 125 and 250
  - .2 ASME B16.18-2012, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ANSI/ASME B16.22-2013, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4 ANSI/ASME B16.24-2011, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2 ASTM International Inc.
- .1 ASTM A307-12, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2 ASTM B88M-09, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 American Water Works Association (AWWA)
- .1 AWWA C111/A21.11-12, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
- .1 MSS-SP-80-2013, Bronze Gate, Globe, Angle and Check Valves.
- .5 National Research Council Canada (NRCC)
- .1 NRCC NPCC-2010, National Plumbing Code of Canada 2010.

**PART 2 - PRODUCTS**

- 2.1 PIPING** .1 Domestic hot, cold and recirculation systems, within building.
- .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.
- 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.
  - .5 NPS 2 and larger: ANSI/ASME B16.18 or ANSI/ASME B16.22.
  - .6 NPS 1½ and smaller: wrought copper to ANSI/ASME B16.22.

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- 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 lead free solder.
- .4 Teflon tape: for threaded joints.
- .5 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.
- 2.4 GLOBE VALVES .1 NPS 2 and under, soldered:
- .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc, screwed over bonnet.
- .2 Lockshield handles for balancing purposes.
- 2.5 SWING CHECK VALVES .1 NPS 2 and under, soldered:
- .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat.
- 2.6 BALL VALVES .1 NPS 2 and under, soldered:
- .1 To ANSI/ASME B16.18, Class 150.
- .2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors.

### **PART 3 - EXECUTION**

- 3.1 APPLICATION .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- 3.2 INSTALLATION .1 Install in accordance with National Plumbing Code and local authority having jurisdiction.
- .2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .3 Assemble piping using fittings manufactured to ANSI standards.
- .4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.
- .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
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3.2 INSTALLATION  
(Cont'd)

- .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.

3.3 VALVES

- .1 Isolate equipment, fixtures and branches with ball valves.
- .2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

**PART 1 - GENERAL**

- 1.1 REFERENCES** .1 ASTM International Inc.  
.1 ASTM B306-13, Standard Specification for Copper Drainage Tube (DWV).  
.2 ASTM C564-12, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .2 Canadian Standards Association (CSA International).  
.1 CSA B67-1972(R1996), Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.  
.2 CSA-B70-12, Cast Iron Soil Pipe, Fittings and Means of Joining.  
.3 CSA-B125.3-12, Plumbing Fittings.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS** .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

**PART 2 - PRODUCTS**

- 2.1 COPPER TUBE AND FITTINGS** .1 Above ground vent Type DWV to: ASTM B306.  
.1 Fittings.  
.1 Cast brass: to CSA-B125.3.  
.2 Wrought copper: to CSA-B125.3.  
.2 Solder: tin-lead, 50:50, type 50A.
- 2.2 CAST IRON PIPING AND FITTINGS** .1 Buried sanitary and vent minimum NPS 3, to: CSA-B70, with one layer of protective coating.  
.1 Joints:  
.1 Mechanical joints:  
.1 Neoprene or butyl rubber compression gaskets: to CSA-B70, ASTM C564.  
.2 Stainless steel clamps.  
.2 Hub and spigot:  
.1 Caulking lead: to CSA B67.  
.2 Cold caulking compounds.
- .2 Above ground sanitary: to CAN/CSA-B70.  
.1 Joints:  
.1 Mechanical joints:  
.1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

**PART 3 - EXECUTION**

- 3.1 APPLICATION .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- 3.2 INSTALLATION .1 Install in accordance with National Plumbing Code and local authority having jurisdiction.
- 3.3 TESTING .1 Pressure test buried systems before backfilling.  
.2 Hydraulically test to verify grades and freedom from obstructions.
- 3.4 PERFORMANCE VERIFICATION .1 Cleanouts:  
.1 Ensure accessible and that access doors are correctly located.  
.2 Open, cover with linseed oil and re-seal.  
.3 Verify that cleanout rods can probe as far as the next cleanout, at least.  
.2 Test to ensure traps are fully and permanently primed.  
.3 Ensure that fixtures are properly anchored, connected to system and effectively vented.  
.4 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

**PART 1 - GENERAL**

- 1.1 REFERENCES**
- .1 ASTM International
    - .1 ASTM B62-09, Standard Specification for Composition Bronze or Ounce Metal Castings.
  - .2 American Water Works Association (AWWA)
    - .1 AWWA C701-12, Standard for Cold Water Meters-Turbine Type for Customer Service.
  - .3 CSA International
    - .1 CSA-B64 Series-11, Backflow Preventers and Vacuum Breakers.
    - .2 CSA B79-08, Commercial and Residential Drains and Cleanouts.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS**
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- 1.3 CLOSEOUT SUBMITTALS**
- .1 Operation and Maintenance Data: submit operation and maintenance data for plumbing specialties and accessories for incorporation into manual.
    - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year and capacity.
    - .2 Details of operation, servicing and maintenance.
    - .3 Recommended spare parts list.
- 1.4 DELIVERY, STORAGE AND HANDLING**
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

**PART 2 - PRODUCTS**

- 2.1 FLOOR DRAINS**
- .1 Floor Drains and Trench Drains: to CSA B79.
  - .2 FD-1: heavy duty; cast iron body round, adjustable head, sediment basket nickel bronze cast strainer, integral seepage pan, and clamping collar, 75 mm outlet.
  - .3 FD-2: 305 mm x 305 mm x 152 mm deep cast iron sanitary floor sink with porcelain enamel coated interior, loose set porcelain enamel coated cast iron half grate, for acceptance of indirect condensate drainage from various steam equipment.
- 2.2 BACK FLOW PREVENTERS**
- .1 Preventers: to CSA-B64 Series, reduced pressure principle type.
  - .2 BFP-01: 25 mm, bronze body, internal relief valve with removable stainless steel seat, ball valve test cocks, compact design, stainless steel cover bolts, replaceable polymer

<u>2.2 BACK FLOW PREVENTERS (Cont'd)</u>	.2	BFP-01:(Cont'd) deck seats, quarter turn ball valves with bronze strainer, air gap for drain line. Reduced pressure principle type.
<u>2.3 VACUUM BREAKERS</u>	1	Breakers: to CSA-B64 Series, vacuum breaker hose connection.
<u>2.4 PRESSURE REGULATORS</u>	.1	Capacity: as indicated.
	.1	Inlet pressure: 1034 kPa.
	.2	Outlet pressure: 413 kPa.
	.2	Up to NPS 1-1/2 bronze bodies, screwed: to ASTM B62.
	.3	Semi-steel spring chambers with bronze trim.
<u>2.5 HOSE BIBBS AND SEDIMENT FAUCETS</u>	.1	Bronze construction complete with integral back flow preventer, hose thread spout, replaceable composition disc, and chrome plated in finished areas.
<u>2.6 WATER METERS</u>	.1	Turbine type to AWWA C701 to 0.03 L/s and 0.15 L/s.
	.2	Remote readout to EMCS.
<u>2.7 TRAP SEAL PRIMERS</u>	.1	Brass, with integral vacuum breaker, NPS 1/2 solder ends, NPS 1/2 drip line connection.
<u>2.8 STRAINERS</u>	.1	860 kPa, Y type with 20 mesh, monel, bronze or stainless steel removable screen.
	.2	NPS 2 and under, bronze body, screwed ends, with brass cap.

### **PART 3 - EXECUTION**

<u>3.1 EXAMINATION</u>	.1	Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for plumbing specialties and accessories installation in accordance with manufacturer's written instructions.
	.1	Inform Departmental Representative of unacceptable conditions immediately upon discovery.
	.2	Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

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<u>3.2 MANUFACTURER'S INSTRUCTIONS</u>	.1	Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.
<u>3.3 INSTALLATION</u>	.1	Install in accordance with National Plumbing Code of Canada, and local authority having jurisdiction.
	.2	Install in accordance with manufacturer's instructions and as specified.
<u>3.4 BACK FLOW PREVENTERS</u>	.1	Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.
	.2	Pipe discharge to terminate over nearest drain.
<u>3.5 HOSE BIBBS AND SEDIMENT FAUCETS</u>	.1	Install at bottom of risers, at low points to drain systems, and as indicated.
<u>3.6 TRAP SEAL PRIMERS</u>	.1	Install for floor drains and elsewhere, as indicated.
	.2	Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Departmental Representative.
	.3	Install soft copper tubing to floor drain.
<u>3.7 STRAINERS</u>	.1	Install with sufficient room to remove basket for maintenance.
<u>3.8 WATER METERS</u>	.1	Install water meter as indicated.
	.2	Provide wiring back to containerized boiler plant and EMCS.
<u>3.9 TESTING AND ADJUSTING</u>	.1	General: .1 Test and adjust plumbing specialties and accessories in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: General Requirements, supplemented as specified.
	.2	Floor drains: .1 Verify operation of trap seal primer. .2 Prime, using trap primer. Adjust flow rate to suit site conditions. .3 Check operations of flushing features. .4 Check security, accessibility, removability of strainer. .5 Clean out baskets.

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3.9 TESTING AND  
ADJUSTING  
(Cont'd)

- .3 Vacuum breakers, backflow preventers, backwater valves:
  - .1 Test tightness, accessibility for O&M of cover and of valve.
  - .2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.
  - .3 Verify visibility of discharge from open ports.
- .4 Pressure regulators, PRV assemblies:
  - .1 Adjust settings to suit locations, flow rates, pressure conditions.
- .5 Strainers:
  - .1 Clean out repeatedly until clear.
  - .2 Verify accessibility of cleanout plug and basket.
  - .3 Verify that cleanout plug does not leak.
- .6 Hose bibbs, sediment faucets:
  - .1 Verify that flow and pressure meet design criteria.
  - .2 Check for leaks, replace compression washer if required.
- .7 Water meters:
  - .1 Verify location and accessibility.
  - .2 Test meter reading accuracy.