

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 21 05 01 - Common Work Results for Mechanical.
.2 Section 23 05 23.01 - Valves - Bronze.
- 1.2 REFERENCES .1 American Society of Mechanical Engineers International (ASME)
.1 ASME B16.15-2013, Cast Bronze Threaded Fittings, Classes 125 and 250.
.2 ASME B16.18-2012, Cast Copper Alloy Solder Joint Pressure Fittings.
.3 ASME B16.22-2013, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
.4 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-13, 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 National Research Council (NRC)/Institute for Research in Construction
.1 NRCC 38728, National Plumbing Code of Canada (NPC) - 1995.
- 1.3 ACTION AND INFORMATIONAL SUBMITTALS .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

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.
- 2.2 FITTINGS .1 Bronze pipe flanges and flanged fittings, Class 150: to ASME B16.24.
.2 Cast bronze threaded fittings, Class 125: to ASME B16.15.
.3 Cast copper, solder type: to ASME B16.18.
.4 Wrought copper and copper alloy, solder type: to 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 lead free solder.
- .4 Teflon tape: for threaded joints.
- .5 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

- 2.4 BALL VALVES .1 As specified Section 23 05 23.01 - Valves - Bronze.

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 NPC 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 ASME 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.

- 3.3 VALVES .1 Isolate equipment, fixtures and branches with ball valves.

- 3.4 PRESSURE TESTS .1 Conform to requirements of Section 21 05 01 - Common Work Results for Mechanical.
- .2 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.

- 3.5 DISINFECTION .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction.

PART 1 - GENERAL

- 1.1 REFERENCES**
- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D2564-12, Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
 - .2 Canadian Standards Association (CSA)
 - .1 CSA B1800-11, Thermoplastic Nonpressure Piping Compendium (Consists of B181.0, B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .3 National Research Council Canada (NRCC)
 - .1 NRCC NBCC-2010, National Building Code of Canada 2010.
 - .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC S102.2-10, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.
 - .2 CAN/ULC S115-11, Standard Method of Fire Tests of Firestop Systems.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS**
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 - PRODUCTS

- 2.1 PIPING AND FITTINGS**
- .1 Fire & smoke resistant coated DWV PVC (Polyvinyl Chloride) piping & fittings:
 - .1 Application: Above grade sanitary, storm & vent piping & fittings where combustible piping is permitted including High-rise applications and within ceiling plenums.
 - .2 Pipe and Fittings: Drain, waste and vent pipe and fittings shall be certified to CSA B181.2 and when used in noncombustible construction, high-rise buildings and air plenums, they shall be tested and listed in accordance with CAN/ULC S102.2 and clearly marked with the certification logo indicating a flame-spread rating not exceeding 25 and a smoke-developed classification not exceeding 50.
 - .2 Firestopping Devices:
 - .1 All combustible pipe penetrations shall comply with the requirements described in the NBC and provide a firestop system that has been Tested and Listed to the test Standard CAN/ULC S115 with a pressure differential of 50 Pa. In addition, the manufacturer shall provide a documentation confirming compliance with the Listed system.
 - .3 Solvent Welding:
 - .1 Solvent cements shall be CSA certified and meet the requirements of ASTM D2564. One-step cement may be used for sizes from NPS 40 to 150. Two-step cement must be used in conjunction with primer on larger pipe sizes. Proper solvent cementing procedures must be followed at all times.
 - .2 The manufacturer, shall be consulted prior to installation for proper solvent welding procedures and proper solvent cement requirements.

**2.1 PIPING AND
FITTINGS**
(Cont'd)

- .4 Expansion/Contraction:
 - .1 Compensation shall be made to accommodate expansion/contraction on the drainage system. It is recommended that there be compensation on every second floor for the vertical piping system. Consult pipe system manufacturer for specific details regarding approved compensation methods.
- .5 Compatibility:
 - .1 To ensure compatibility, performance and material quality, all pipe and fitting drainage system shall be produced by the same manufacturer.
- .6 Quality Control:
 - .1 The manufacturer of the pipe and fitting system shall be contacted prior to the installation to obtain precise installation instructions. Site meetings shall be arranged and include, the Contractor, Manufacturer and Building Inspector.

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 In accordance with Section 23 05 05 - Installation of Pipework.
- .2 Install in accordance with National Plumbing Code and local authority having jurisdiction.

3.3 TESTING

- .1 Hydraulically test to verify grades and freedom from obstructions.

PART 1 - GENERAL

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| <u>1.1 REFERENCES</u> | .1 | Canadian Standards Association (CSA International) |
| | .1 | CAN/CSA C22.2 No. 110-94(R2014), Construction and Test of Electric Storage Tank Water Heaters. |
| | .2 | CAN/CSA C191-13, Performance of Electric Storage Tank Water Heaters for Household Service. |
| | .3 | CAN/CSA C309-M90(R2014), Performance Requirements for Glass-Lined Storage Tanks for Household Hot Water Service. |

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| <u>1.2 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Provide submittals in accordance with Section 01 33 00 - Submittal Procedures. |
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| <u>1.3 CLOSEOUT SUBMITTALS</u> | .1 | Provide maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals. |
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PART 2 - PRODUCTS

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| <u>2.1 ELECTRIC WATER HEATER</u> | .1 | To CAN/CSA C22.2 No. 110, CAN/CSA-C191 and CAN/CSA-C309 for glass-lined storage tanks, with 1 immersion type elements, 1500 W each, and surface mounted or immersion type adjustable thermostats. |
| | .2 | Tank: 23 L, glass lined steel, 400 mm diameter x 575 mm high, 50 mm mineral wool or fibreglass insulation, enamelled steel jacket, 3year warranty certificate. |

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| <u>2.2 TRIM AND INSTRUMENTATION</u> | .1 | Drain valve: NPS 1 with hose end. |
| | .2 | Thermometer: 100 mm dial type with red pointer and thermowell filled with conductive paste. |
| | .3 | Pressure gauge: 75 mm dial type with red pointer, syphon, and shut-off cock. |
| | .4 | ASME rated temperature and pressure relief valve sized for full capacity of heater , having discharge terminating over floor drain and visible to operators. |
| | .5 | Magnesium anodes adequate for 20 years of operation and located for easy replacement. |

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 manufacturer's recommendations and authority having jurisdiction.

PART 1 - GENERAL

- 1.1 REFERENCES .1 Plumbing and Drainage Institute (PDI)
.1 PDI-WH201-R2010, Water Hammer Arresters Standard.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 - PRODUCTS

- 2.1 WATER HAMMER ARRESTORS .1 Stainless steel or copper construction, bellows or piston type: to PDI-WH201.

PART 3 - EXECUTION

- 3.1 MANUFACTURER'S INSTRUCTIONS .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.
- 3.2 INSTALLATION .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.
- 3.3 WATER HAMMER ARRESTORS .1 Install on branch supplies to fixtures or group of fixtures.
- 3.4 TESTING AND ADJUSTING .1 Cleanouts:
.1 Verify covers are gas-tight, secure, yet readily removable.
.2 Water hammer arrestors:
.1 Verify proper installation of correct type of water hammer arrester.

PART 1 - GENERAL

- 1.1 REFERENCES .1 Canadian Standards Association (CSA International)
- .1 CAN/CSA-B45 Series-02(R2013), Plumbing Fixtures.
 - .2 CAN/CSA-B125.3-12, Plumbing Fittings.
 - .3 CAN/CSA-B651-12, Accessible Design for the Built Environment.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 - PRODUCTS

- 2.1 MANUFACTURED UNITS .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.
 - .3 Exposed plumbing brass to be chrome plated.
 - .4 Number, locations: architectural drawings to govern.
 - .5 Fixtures to be product of one manufacturer.
 - .6 Trim to be product of one manufacturer.
 - .7 Stainless steel counter-top sinks.
 - .1 S-1: single compartment, ledge-back.
 - .1 From 1.0 mm thick type 302 stainless steel, self-rimming, undercoated, clamps. Overall sizes: 520 x 510 x 180 mm.
 - .2 Trim: chrome plated brass, with swing spout, aerator, single lever handle, washerless controls, accessories to limit maximum flow rate to 8.35 litres/minute at 413 kPa, spray fitting.
 - .3 Waste fitting: integral stainless steel basket strainer/stopper, tailpiece, cast brass P-trap with cleanout.

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 Mounting heights:
 - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
 - .2 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA-B651.