

**PART 1 - GENERAL****1.1 REFERENCE STANDARDS**

- .1 National Research Council Canada (NRC)
  - .1 National Plumbing Code of Canada 2015 (NPC).
- .2 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 CLEANOUTS**

- .1 Cleanout Plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.

**2.2 WATER HAMMER ARRESTORS**

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

**PART 3 - EXECUTION****3.1 INSTALLATION**

- .1 Install in accordance with National Plumbing Code of Canada (NPC).
- .2 Install in accordance with manufacturer's instructions and as specified.

**3.2 CLEANOUTS**

- .1 Bring cleanouts to wall or finished floor unless serviceable from below floor.

**3.3 WATER HAMMER ARRESTORS**

- .1 Install on branch supplies to fixtures or group of fixtures where indicated.

**3.4 TRAP SEAL PRIMERS**

- .1 Install for floor drains and elsewhere, as indicated.

END OF SECTION

**PART 1 - GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Section 23 05 15 - Common Installation Requirements for HVAC Pipework.
- .2 Section 23 05 23.01 - Valves - Bronze.

**1.2 REFERENCE STANDARDS**

- .1 American Society of Mechanical Engineers International (ASME)
  - .1 ASME B16.15-2018, Cast Copper Alloy Threaded Fittings, Classes 125 and 250.
  - .2 ASME B16.18-2018, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ASME B16.22-2018, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4 ASME B16.24-2016, Cast Copper Alloy Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2 ASTM International (ASTM)
  - .1 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2 ASTM B88M-18, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 American Water Works Association (AWWA)
  - .1 AWWA C111/A21.11-17, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 CSA Group (CSA)
  - .1 CAN/CSA-B137.5-13, Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications.
- .5 National Research Council Canada (NRC)
  - .1 National Plumbing Code of Canada (NPC) 2015.

**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:
    - .1 Copper tube, hard drawn, type L: to ASTM B88M.
    - .2 PEX Piping to CAN/CSA B137.5.

**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: Lead free.
- .4 Teflon tape: for threaded joints.
- .5 NPS 1½ and smaller: PEX fittings to CAN/CSA B137.5.

## **2.4 BALL VALVES**

- .1 NPS 2 and under, screwed:
  - .1 Class 150.
  - .2 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE, Buna or TFE seat, steel lever handle as specified Section 23 05 23.01 - Valves - Bronze.
- .2 NPS 2 and under, soldered:
  - .1 To ASME B16.18, Class 150.
  - .2 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors 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 Province Plumbing Code.
- .2 Install pipe work in accordance with Section 23 05 15 - Common Installation Requirements for HVAC Pipework, supplemented as specified herein.
- .3 Assemble piping using fittings manufactured to ANSI and Standard Council of Canada (SCC) 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.
- .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 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.

### **3.3 PRESSURE TESTS**

- .1 Conform to requirements of Section 23 05 15 - Common Installation Requirements for HVAC Pipework.
- .2 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.

### **3.4 FLUSHING AND CLEANING**

- .1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean to Federal potable water guidelines. Let system flush for additional 2 hours, 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 pressure booster systems are operating properly.
- .4 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 Departmental Representative approval.

END OF SECTION

**PART 1 - GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Section 23 05 15 - Common installation requirements for HVAC pipework.

**1.2 REFERENCE STANDARDS**

- .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 B1800-18, Thermoplastic Nonpressure Piping Compendium.
- .3 National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).
  - .2 National Plumbing Code of Canada 2015 (NPC).
- .4 Underwriters Laboratories of Canada (ULC)
  - .1 ULC S102.2, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.
  - .2 ULC S115-11, Standard Method of Fire Tests of Firestop Systems.

**1.3 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 NBC 3.2.6 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 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.
  - .3 Acceptable material: IPEX System XFR 15/50 PVC-DWV.
- .2 Firestopping Devices:
  - .1 All combustible pipe penetrations shall comply with the requirements described in the NBC. 3.1.9.4. and provide a firestop system that has been Tested and Listed to the test Standard 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.
- .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 15 - Common installation requirements for HVAC pipework.
- .2 Install in accordance with National Plumbing Code, Provincial Plumbing Code and local authority having jurisdiction.

#### **3.3 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 cleanout rods can probe as far as the next cleanout, at least.
- .2 Test to ensure traps are fully and permanently primed.
- .3 Storm water drainage:
  - .1 Verify domes are secure.
  - .2 Ensure weirs are correctly sized and installed correctly.
  - .3 Verify provisions for movement of roof system.
- .4 Ensure fixtures are properly anchored, connected to system and effectively vented.

- .5 Affix applicable label (storm, sanitary, vent, pump discharge) c/w directional arrows every floor or 4.5 m (whichever is less).

END OF SECTION

**PART 1 - GENERAL****1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 CAN/CSA-B45 Series-02(R2013), Plumbing Fixtures.
  - .2 CSA B125-01, Plumbing Fittings.
  - .3 CSA B125.3-18, Plumbing Fittings.
  - .4 CAN/CSA-B651-18, Accessible Design for the Built Environment.
- .2 National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).

**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 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 S1: double compartment, non-ledge back:
    - .1 From 1.0 mm thick type 302 stainless steel, self-rimming, undercoated, clamps. Overall sizes: 790 x 520 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.
- .8 Fixture piping:
  - .1 Hot and cold water supplies to each fixture:
    - .1 Chrome plated flexible supply pipes each with screwdriver stop, reducers, escutcheon.
  - .2 Waste:
    - .1 Brass P trap with clean out on each fixture not having integral trap.
    - .2 Chrome plated in all exposed places.



**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 Wall-hung fixtures: as indicated, measured from finished floor.
  - .3 Physically handicapped: to comply with most stringent of either NBC or CAN/CSA-B651.

**3.3 ADJUSTING**

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
  - .1 Adjust water flow rate to design flow rates.
  - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .3 Checks:
  - .1 Aerators: operation, cleanliness.
  - .2 Vacuum breakers, backflow preventers: operation under all conditions.
  - .3 Wash fountains: operation of flow-actuating devices.
- .4 Thermostatic controls:
  - .1 Verify temperature settings, operation of control, limit and safety controls.

END OF SECTION