

PART 1 - GENERAL**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
 - .1 CSA B79-08 (R2018), Commercial and Residential Drains and Cleanouts.
- .2 National Research Council Canada (NRC)
 - .1 National Plumbing Code of Canada 2015 (NPC).
- .3 Plumbing and Drainage Institute (PDI)
 - .1 PDI-WH201-2010, 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 FLOOR DRAINS**

- .1 Floor Drains and Trench Drains: to CSA B79.
- .2 Type 1: general duty; cast iron body round, adjustable head, sediment basket nickel bronze strainer, integral seepage pan, and clamping collar.

2.2 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 Access Covers:
 - .1 Wall Access: face or wall type, stainless steel, square cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.

2.3 WATER HAMMER ARRESTORS

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

2.4 TRAP SEAL PRIMERS

- .1 Brass, with integral vacuum breaker, NPS 1/2 solder ends, NPS 1/2 drip line connection.

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 (NPC), provincial codes, and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

- .1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required by code, and as indicated.
- .2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .3 Building drain cleanout and stack base cleanouts: line size to maximum NPS 4.

3.4 TRAP SEAL PRIMERS

- .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.

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

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.

2.2 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 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 BALL VALVES

- .1 NPS 2 and under, screwed:
 - .1 Class 150.
 - .2 Bronze, 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, Buna or seat, steel lever handle, with NPT to copper adaptors as specified in 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, Province Plumbing Code and local authority having jurisdiction.
- .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 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.
- .6 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 hours. 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.

3.6 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.

PART 1 - GENERAL**1.1 RELATED REQUIREMENTS**

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

1.2 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM B306-13, Standard Specification for Copper Drainage Tube (DWV).
- .2 CSA Group (CSA)
 - .1 CSA B67-1972 (R1996), Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
 - .2 CAN/CSA-B70-12 (R2016), Cast Iron Soil Pipe, Fittings and Means of Joining.
 - .3 CAN/CSA-B125.3-18, Plumbing Fittings.
- .3 National Research Council Canada (NRC)
 - .1 National Plumbing Code of Canada 2015 (NPC).

PART 2 - PRODUCTS**2.1 COPPER TUBE AND FITTINGS**

- .1 Above ground sanitary and vent Type DWV to: ASTM B306.
 - .1 Fittings.
 - .1 Cast brass: to CAN/CSA-B125.3.
 - .2 Wrought copper: to CAN/CSA-B125.3.
 - .2 Solder: lead free, tin-95:5.

2.2 CAST IRON PIPING AND FITTINGS

- .1 Above ground sanitary and vent: to CAN/CSA-B70.
 - .1 Joints:
 - .1 Hub and spigot:
 - .1 Caulking lead: to CSA B67.
 - .2 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 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 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 (sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

PART 1 - GENERAL**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
 - .1 CAN/CSA C22.2 No.110-94 (R2018), Construction and Test of Electric Storage Tank Water Heaters.
 - .2 CAN/CSA-C191-13 (R2018), 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.
- .2 National Research Council Canada (NRC)
 - .1 National Plumbing Code of Canada 2015 (NPC).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 - PRODUCTS**2.1 ELECTRIC WATER HEATER**

- .1 To CAN/CSA C22.2 No.110, CAN/CSA-C191 and CAN/CSA-C309 for glass-lined storage tanks, with 1 immersion type element, 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, 3 year warranty certificate.

2.2 TRIM AND INSTRUMENTATION

- .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 Thermowell filled with conductive paste for control valve temperature sensor.
- .5 ASME rated temperature and pressure relief valve sized for full capacity of heater control valve, having discharge terminating over floor drain and visible to operators.
- .6 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.

END OF SECTION

PART 1 - GENERAL**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
 - .1 CAN/CSA-B45 Series-02 (R2013), Plumbing Fixtures, (Consists of B45.0, B45.1, B45.2, B45.3, B45.4, B45.5, B45.6, B45.7, B45.8 and B45.9).
 - .2 CSA B125.3-18, Plumbing Fittings.
 - .3 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 Submit 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.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: as indicated.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Water Closets:
 - .1 WC-1: wall-mounted barrier free, exposed flush valve, top spud ultra-low flush, maximum 4.8 litres/flush.
 - .1 Bowl: vitreous china, syphon jet, elongated rim.
- .8 Electronic Water Closet Flush Valves:
 - .1 Barrier-free, stainless steel, electronic, sensor proximity type, activated by infra-red.
 - .2 Sensor: waterproof, with impact-resistant, anti scratch coated plastic lens, sensitivity adjustable from 100 mm to 450 mm.
 - .3 Water conservation: 10 second maximum run time.
 - .4 Controls: interchangeable receptacles for stainless steel sheathed sensor and modular plug-type solenoid connections, 12 VDC, slow-closing commercial solenoids for 860 kPa, 85 degrees C.
 - .5 Transformer: 120/12 VDC, UL and CSA listed, hardwire, box type, sized for up to 8 solenoids.
 - .6 Equipped with manual override button.

- .9 Water Closet Seats:
 - .1 Seat: white, elongated, openfront, moulded solid plastic, cover, stainless steel check hinges, stainless steelinsert post.

- .10 Urinals:
 - .1 U-1: wall-mounted, ultra-low flush, concealed flush valve, back spud.
 - .1 Urinal: vitreous china, washout type, integral flushing rim, extended shields, integral trap, removable stainless steel strainer, back outlet.

- .11 Urinal Electronic Flush Valves:
 - .1 Concealed, controlled by infra-red occupancy detector.
 - .1 Complete with removable filter, 9 second time delay, flush time adjustable from 0-8 seconds, factory set at 4.5 seconds, 0.5 L flush/cycle maximum.
 - .2 Sensor adjustable from 50-1220 mm, factory set to 860 mm.
 - .3 Solenoid valve: 12 VDC slow-closing type for 60 kPa (minimum), 1000 kPa (maximum), 85 degrees C with manual over-ride, adjustable flow control.
 - .4 Transformer: 120/12 VDC UL and CSA listed, box type.

- .12 Washroom Lavatories:
 - .1 L-1: counter top:
 - .1 Porcelain-on-steel, self-rimming, with front overflow, soap depressions, gasket, swivel clamps, semi-oval bowl, supply openings on 200 mm centres. Sizes: 475 x 400 mm outside, 400 x 250 mm nominal inside.
 - .2 L-2: wall-hung, for handicapped.
 - .1 Vitreous china, low shelf, with integral back, contoured front, shallow front basin, front overflow, soap depressions, supply openings on 299 mm centres, concealed supports. Sizes: 675 x 500 mm.

- .13 Washroom Lavatory Electronic Trim:
 - .1 Barrier-free electronic faucet:
 - .1 Infra-red motion sensor activated by hand motion in lavatory.
 - .2 Sensor: waterproof, deck-mounted, with impact-resistant plastic lens and anti-scratch coating, spout, sensitivity adjustable from 100 mm to 450 mm.
 - .3 Water conservation: 0-60, 30 second maximum run time.
 - .4 Controls: vandal-proof, interchangeable receptacles for stainless steel sheathed sensor and modular plug-type solenoid connections, 12 VDC slow-closing commercial solenoids for 860 kPa, 85 degrees C.
 - .5 Transformer: 120/12 VDC Class 2, UL and CSA listed, hard wire type, sized for up to 8 solenoids.
 - .6 Spout: Chrome plated, with integral flow control aerator rated at 8.35 l/minute at 413 kPa maximum.
 - .7 Under-counter temperatures mixing controls.

- .14 Fixture Piping:
 - .1 Hot and cold water supplies to fixtures:
 - .1 Chrome plated flexible supply pipes with screwdriverstop, reducers, escutcheon.
 - .2 Waste:
 - .1 Brass P trap with clean out on fixtures not having integral trap.
 - .2 Chrome plated in exposed places.

- .15 Waste:
 - .1 Cast brass adjustable style P-trap with cleanout on each fixture not having integral trap.
 - .2 Chrome plated in all exposed places.

- .3 Sink and lavatory heavy gauge P-traps shall be cast brass adjustable style with 17 ga. seamless brass wall bend. Attachment nuts shall be brass, no zinc allowed. P-traps to be removable/union type or to include cleanout.
 - .4 Lavatory strainers shall be chrome plated cast brass with 17 ga. seamless brass tailpiece.
 - .5 All barrier-free lavatories and sinks shall have chrome plated offset tail piece in addition to P-trap with cleanout. Insulate P-trap and hot & cold water pipes with pre-formed & finished surface insulation. Armaflex insulation and tape not acceptable.
- .16 Chair Carriers:
- .1 Factory manufactured floor-mounted carrier systems for wall-mounted fixtures.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Mounting heights:
 - .1 Barrier-free: to most stringent NBC & CSA B651.

3.2 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 Adjust flush valves to suit actual site conditions.
 - .4 Adjust urinal flush timing mechanisms.
 - .5 Set controls of automatic flush valves for WCs and urinals to prevent unnecessary flush cycles.
- .3 Checks:
 - .1 Water closets, urinals: flushing action.
 - .2 Aerators: operation, cleanliness.
 - .3 Vacuum breakers, backflow preventers: operation under all conditions.
- .4 Thermostatic controls:
 - .1 Verify temperature settings, operation of control, limit and safety controls.

END OF SECTION

PART 1 - GENERAL**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
 - .1 CAN/CSA-B45 Series-02 (R2013), Plumbing Fixtures.
 - .2 CAN/CSA-B125.3-18, Plumbing Fittings.
- .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 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: double compartment barrier-free, ledge back:
 - .1 From 1.0 mm thick type 302 stainless steel, self-rimming, undercoated, clamps. Overall sizes: 790 x 520 x 125 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.
- .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.
- .9 Waste:
 - .1 Cast brass adjustable style P-trap with cleanout on each fixture not having integral trap.
 - .2 Chrome plated in all exposed places.

- .3 Sink and lavatory heavy gauge P-traps shall be cast brass adjustable style with 17 ga. seamless brass wall bend. Attachment nuts shall be brass, no zinc allowed. P-traps to be removable/union type or to include cleanout.
 - .4 Lavatory strainers shall be chrome plated cast brass with 17 ga. seamless brass tailpiece.
 - .5 All barrier-free lavatories and sinks shall have chrome plated offset tail piece in addition to P-trap with cleanout. Insulate P-trap and hot & cold water pipes with pre-formed & finished surface insulation. Armaflex insulation and tape not acceptable.
- .10 Chair carriers:
- .1 Factory manufactured floor-mounted carrier systems for all wall-mounted fixtures.

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 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