

PART 1 - GENERAL

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| <u>1.1 SHOP DRAWINGS AND
PRODUCT DATA</u> | .1 | Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Indicate: <ul style="list-style-type: none"> .1 Equipment, including connections, fittings, control assemblies and ancillaries. Identify whether factory or field assembled. .2 Wiring and schematic diagrams. .3 Dimensions and recommended installation. .4 Pump performance and efficiency curves. |
| <u>1.2 CLOSEOUT
SUBMITTALS</u> | .1 | Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Procedures. |
| | .2 | Data to include: <ul style="list-style-type: none"> .1 Manufacturers name, type, model year, capacity and serial number. .2 Details of operation, servicing and maintenance. |
| | .3 | Recommended spare parts list with names and addresses. |
| <u>1.3 ACCEPTABLE
MATERIALS</u> | .1 | Where materials are specified by trade name, refer to the Project Specific Instruction to Bidders for procedure to be followed in applying for approval of alternatives. |
| | .2 | All materials shall be low in V.O.C. (Volatile Organic Compound) emissions. |

PART 2 - PRODUCTS

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| <u>2.1 DOMESTIC HOT
WATER CIRCULATING
PUMPS PCR-1</u> | .1 | Capacity: 0.31 L/s against total differential head of 4.5 m/hd. |
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- .2 Construction: closed-coupled, in-line centrifugal, all bronze construction, stainless steel shaft, stainless steel or bronze shaft sleeve, two oil lubricated bronze sleeves or ball bearings. Design for 1207 kPa wp and 105°C continuous service.
- .3 Motor: 187 W, drip-proof, with thermal overload protection.
- .4 25 mm connections; inlet and outlet.
- .4 Supports: provide as recommended by manufacturer.
- .5 Standard of Acceptance: Armstrong Astro 250CI, Bell & Gossett, Letich.

PART 3 - EXECUTION

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| <u>3.1 INSTALLATION</u> | .1 | Make piping and electrical connections to pump and motor assembly and controls as indicated. |
| | .2 | Ensure pump and motor assembly do not support piping. |
| <u>3.2 FIELD QUALITY CONTROL</u> | .1 | Check power supply. |
| | .2 | Check starter protective devices. |
| | .3 | Start up, check for proper and safe operation. |
| | .4 | Check settings and operation of all hand-off-auto selector switch, operating, safety and limit controls, audible and visual alarms, over-temperature and other protective devices. |
| | .5 | Adjust flow from water-cooled bearings. |
| | .6 | Adjust impeller shaft stuffing boxes, packing glands. |

END OF SECTION

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PART 1 - GENERAL

- 1.1 SECTION INCLUDES .1 Materials and installation for copper domestic water service used in the following:
- .1 Hard drawn type "L" copper domestic water and trap primer services inside building.
- 1.2 RELATED SECTIONS .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management & Disposal.
- .3 Section 01 35 29 - Health and Safety Requirements.
- .4 Section 01 78 00 - Closeout Submittals.
- .5 Section 21 05 01 - Mechanical General Requirements.
- .6 Section 23 05 05 - Installation of Pipework.
- .7 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- 1.3 REFERENCES .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).
- .1 ANSI/ASME B16.15-[02], Cast Bronze Threaded Fittings, Classes 125 and 250.
- .2 ANSI/ASME B16.18-[01], Cast Copper Alloy Solder Joint Pressure Fittings.
- .3 ANSI/ASME B16.22-[01], Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- .4 ANSI/ASME B16.24-[01], Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A 307-[03], Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .2 ASTM B 88M-[03], Standard Specification for Seamless Copper Water Tube (Metric).
 - .3 ASTM F 492-[95], Standard Specification for Propylene and Polypropylene (PP) Plastic-Lined Ferrous Metal Pipe and Fittings.
- .3 American Water Works Association (AWWA).
 - .1 AWWA C111-[00], Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 Canadian Standards Association (CSA International).
 - .1 CSA B242-[M1980(R1998)], Groove and Shoulder Type Mechanical Pipe Couplings.
- .5 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .7 Manufacturer's Standardization Society of the Valve and Fittings Industry.
 - .1 MSS-SP-67-[02], Butterfly Valves.
 - .2 MSS-SP-70-[98], Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71-[97], Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - .4 MSS-SP-80-[03], Bronze Gate, Globe, Angle and Check Valves.
- .8 National Research Council (NRC)/Institute for Research in Construction.
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) - [1995].
- .9 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

- 1.4 SUBMITTALS .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data for following: valves.
- .3 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- 1.5 HEALTH AND SAFETY .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.
- 1.6 WASTE MANAGEMENT AND DISPOSAL .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management & Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Separate for reuse and recycling and place in designated containers in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations.
- .6 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

- 2.1 PIPING .1 Domestic hot, cold, trap primer and recirculation systems, within building.
- .1 Above ground: copper tube, hard drawn, type "L": to ASTM B 88M.
- 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.

2.3 JOINTS

.1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.

.2 Bolts, nuts, hex head and washers: to ASTM A 307, heavy series.

.3 Solder: Less than 0.2% lead.

.4 Teflon tape: for threaded joints.

.5 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F 492, complete with thermoplastic liner.

2.4 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 as specified Section 23 05 23.01 - Valves - Bronze.
 - .2 Acceptable materials: Crane Fig. 1342, Jenkins, Newman, Hattersly.

2.5 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 Teflon seat, steel lever handle with valve stem extensions on cold piping, as specified Section 23 05 23.01 - Valves - Bronze.
 - .3 Acceptable materials: Kitz Number 58, Newman Hattersley, Apollo.
- .2 NPS 2 and under, soldered:
- .1 To ANSI/ASME B16.18, Class 150.
 - .2 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE Teflon seat, steel lever handle with valve stem extensions on cold piping, with NPT to copper adaptors as specified Section 23 05 23.01 - Valves - Bronze.
 - .3 Acceptable materials: Kitz Number 59, Newman Hattersley, Apollo.

PART 3 - EXECUTION

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| <u>3.1 INSTALLATION</u> | .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. |
| | .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. |
| <u>3.2 VALVES</u> | .1 | Isolate equipment, fixtures and branches with ball valves. |
| <u>3.3 PRESSURE TESTS</u> | .1 | Conform to requirements of Section 21 05 01 - Mechanical General Requirements. |
| | .2 | Test pressure: greater of 1 ½ times maximum system operating pressure or 860 kPa. |
| <u>3.4 FLUSHING AND CLEANING</u> | .1 | Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw sample off longest run. Submit to testing laboratory to verify that system is clean Federal potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing. |
| <u>3.5 PRE-START-UP INSPECTIONS</u> | .1 | Systems to be complete, prior to flushing, testing and start-up. |
| | .2 | Verify that system can be completely drained. |
| | .3 | Ensure that expansion compensators are installed properly. |
| <u>3.6 DISINFECTION</u> | .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.

3.7 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.
 - .4 Water treatment systems operational.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
 - .1 Establish circulation and ensure that air is eliminated.
 - .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
 - .3 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.
- .4 Rectify start-up deficiencies.

3.8 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 that flow rate and pressure meet Design Criteria.
 - .2 TAB HWC in accordance with Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
 - .3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
 - .4 Sterilize HWS and HWC systems for Legionella control.
 - .5 Verify performance of temperature controls.
 - .6 Verify compliance with safety and health requirements.

- .7 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 recharge air chambers. Repeat for outlets and flush valves.
- .8 Confirm water quality consistent with supply standards, verifying that no residuals remain as a result of flushing and/or cleaning.

END OF SECTION

PART 1 - GENERAL

- 1.1 SUMMARY .1 Section Includes:
- .1 The installation of drainage waste and vent piping.
 - .2 Sustainable requirements for construction and verification.
 - .3 Related Sections:
 - .1 Section 01 74 21 - Construction/Demolition Waste Management & Disposal.
 - .2 Section 01 35 29 - Health and Safety Requirements.
- 1.2 REFERENCES .1 American Society for Testing and Materials International, (ASTM).
- .1 ASTM B 32-[03], Specification for Solder Metal.
 - .2 ASTM B 306-[02], Specification for Copper Drainage Tube (DWV).
 - .3 ASTM C 564-[03a], 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 CAN/CSA-B70-[02], Cast Iron Soil Pipe, Fittings and Means of Joining.
 - .3 CAN/CSA-B125-[01], Plumbing Fittings.

PART 2 - PRODUCTS

- 2.1 COPPER TUBE AND FITTINGS .1 Above ground sanitary and vent up to 2", Type DWV copper to: ASTM B 306.
- .1 Fittings.
 - .1 Cast brass: to CAN/CSA-B125.
 - .2 Wrought copper: to CAN/CSA-B125.
 - .2 Solder: Less than 0.2% lead.

- 2.2 CAST IRON PIPING .1 Buried sanitary and vent minimum NPS 4 cast
AND FITTINGS iron, to: CAN/CSA-B70, with one layer of
protective coating of asphalt.
- .1 Joints.
 - .1 Mechanical joints.
 - .1 Neoprene or butyl rubber
compression gaskets: to
ASTM C 564 or CAN/CSA-B70.
 - .2 Stainless steel clamps.
 - .2 Hub and spigot.
 - .1 Caulking lead: to CSA B67.
 - .2 Cold caulking compounds.
 - .2 Above ground sanitary and vent 2½" and
above: 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 INSTALLATION .1 In accordance with Section 23 05 05 -
Installation of Pipework.
- .2 Install in accordance with Canadian
Plumbing Code and local authority having
jurisdiction.
 - .3 Install buried pipe on 150 mm bed of clean
washed sand, shaped to accommodate hubs and
fittings, to line and grade, minimum 1%,
unless otherwise indicated. Backfill with
150 mm of clean washed sand. Refer to
Section 31 23 10 - Excavating, Trenching
and Backfilling for backfill material
description.
 - .4 Install above ground piping parallel and
close to walls and ceilings to conserve
headroom and space, and to grade as
indicated.
 - .5 Test in accordance with Section 21 05 01 -
Mechanical General Requirements.

.6 Connect condensate drainage as indicated.

3.2 TESTING

.1 Pressure test buried systems before backfilling.

.2 Hydraulically test to verify grades and freedom from obstructions.

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, etc.) c/w directional arrows every floor or 4.5 m, whichever is less.

END OF SECTION

PART 1 - GENERAL

- 1.1 SUMMARY .1 Section Includes:
- .1 The supply and installation of Plumbing Fixtures and Trim.
 - .2 Related Sections:
 - .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 01 35 29 - Health and Safety Requirements.
 - .3 Section 01 78 00 - Closeout Submittals.
- 1.2 REFERENCES .1 Canadian Standards Association (CSA International).
- .1 CAN/CSA-B45 Series-[02], Plumbing Fixtures.
 - .2 CAN/CSA-B125-[01], Plumbing Fittings.
 - .3 CAN/CSA-B651-[95(R2001)], Barrier-Free Design.
- 1.3 SUBMITTALS .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
 - .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Indicate, for all fixtures and trim:
 - .1 Dimensions, construction details, roughing-in dimensions.
 - .3 Closeout Submittals:
 - .1 Submit maintenance data in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing, maintenance.
 - .3 List of recommended spare parts.

- 1.4 QUALITY ASSURANCE .1 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

PART 2 - PRODUCTS

- 2.1 MANUFACTURED UNIT .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 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 Mop sinks - MS-1:
 - .1 Sink: Terrazzo, 305 mm high undrilled integral back. Size: 610 x 610 x 305mm, 152mm drop at threshold with stainless steel cap, cast brass drain with stainless steel strainer, 3 NPS outlet.
 - .2 Supply fitting: with built-in elevated vacuum breaker, lever handles, escutcheons, union inlets, heavy cast brass spout with pail hook, aerator, brace to wall, integral stop valves, 914mm long rubber hose and wall hook, vinyl bumper guard, mop hanger, stainless steel backsplash panel, two sides. Provide accessories to limit maximum flow rate to 8.35 l/minute at 413 kPa.
 - .3 Standard of acceptance:
 - .1 Mop Sink: Stern Williams HL2010, Fiat.
 - .2 Trim: Chicago 897-XK-317VP, Delta, Zurn.

- .8 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: 521 x 508 x 180mm.
 - .2 Trim: Two handle, 203mm centerset, solid brass body construction, ceramic $\frac{1}{4}$ turn cartridge, 203mm swing cast brass spout, vandal resistant 1.9 LPM flow rate, metal index buttons, 102mm long wrist blade handle with vandal resistant screw.
 - .3 Point of use mechanical water mixing valve, bronze body, temperature adjusting dial, 3/8 NPS compression fittings, high temperature thermostatic limit stop with auto reset, integral checks, temperature range from full cold to 46°C, complete with recessed box for mounting under counter.
 - .4 Waste fitting: integral stainless steel basket strainer/stopper, tailpiece, cast brass P-trap with cleanout.
 - .5 Standard of acceptance:
 - .1 Sink: Franke LBS6807-1/3, Novanni.
 - .2 Trim: Chicago 1100-L8-E2805-5-317-SK, Delta, Zurn, Moen, American Standard.
 - .2 S-2: double compartment, ledge back:
 - .1 From 1.0 mm thick type 302 stainless steel, self-rimming, undercoated, clamps. Overall sizes: 520 x 790 x 180mm.
 - .2 Trim: Trim: Two handle, 203mm centerset, solid brass body construction, ceramic $\frac{1}{4}$ turn cartridge, 203mm swing cast brass spout, vandal resistant 1.9 LPM flow rate metal index buttons, 102mm long wrist blade handle with vandal resistant screw.

- .3 Point of use mechanical water mixing valve, bronze body, temperature adjusting dial, 3/8 NPS compression fittings, high temperature thermostatic limit stop with auto reset, integral checks, temperature range from full cold to 46°C, complete with recessed box for mounting under counter.
- .4 Waste fitting: integral stainless steel basket strainer/stopper, tailpiece, cast brass P-trap with cleanout.
- .5 Standard of Acceptance:
 - .1 Sink: Franke LBD 6407-1/3
 - .2 Trim: Chicago 1100-L8-E2805-5-317-SK, Delta, Zurn, Moen, American Standard.
- .9 Water Closets:
 - .1 WC-1: floor-mounted, flush tank.
 - .1 Bowl: vitreous china, syphon jet, elongated, anti-microbial surface rim, close-coupled combination, bowl and bolt caps.
 - .2 Closet tank: vitreous china with tank liner, piston action acceleration flush valve, pilot valve, water control valve without float for quiet refill, factory set to 6.0 litres/flush.
 - .3 Standard of Acceptance: American Standard Champion 4 018.504.020, Crane, Gerber, Zurn.
 - .2 Water Closet Seats.
 - .1 Seat: white, elongated, open front, moulded solid plastic, less cover, stainless steel check hinges, stainless steel insert post.
 - .2 Standard of Acceptance: Centoco, model 500 STS CCSS001, Benke, Olsenite.

- .10 Urinal:
 - .1 UR-1: wall mounted, ultra-low flush, exposed flush valve, top spud.
 - .1 Urinal: vitreous china, washout type, integral flushing rim, extended shields, integral trap, removable stainless steel strainer, back outlet.
 - .2 Standard of Acceptance: American Standard Washbrook Flowise 6590.001, Zurn, Kohler.
- .11 Urinal Electronic Flush Valves:
 - .1 Surface mounted, controlled by infra-red occupancy detector.
 - .1 Exposed flush valve, chrome plated, 1.9 Lpf factory set flow, quiet action diaphragm type, courtesy flush override button, vacuum breaker, time delay.
 - .2 Transformer: 120/24 VAC Class 2, 50A UL and CSA listed, hardware box type.
 - .3 Standard of Acceptance: Sloan 186-0.5ES-S-CP, Zurn, Delta.
- .12 Washroom Lavatories:
 - .1 L-1: Wall-hung:
 - .1 Vitreous china, with splash lip, soap depressions, supply openings on 100 mm centres, overflow, complete with semi-pedestal P-trap cover. Size: 559 x 540 x 165mm.
 - .2 Colour: White.
 - .3 Standard of Acceptance: American Standard Murro 0954.000/0059.020, Crane, Kohler.
- .13 Washroom Lavatory Trim:
 - .1 Chrome plated solid brass 100mm centerset, ceramic $\frac{1}{4}$ turn cartridge with vandal resistant 8.3 Lpm operator, metal index buttons 60mm long lever handles and vandal resistant screw.
 - .2 Standard of Acceptance: Chicago 802-VCP-XK-ERXP-390VP, Delta, Moen, American Standard.

- .3 Point of use mechanical water mixing valve, bronze body, temperature adjusting dial, 3/8 NPS compression fittings, high temperature thermostatic limit stop with auto reset, integral checks, temperature range from full cold to 46°C, complete with recessed box for mounting under counter.
- .14 Refrigerated water coolers:
 - .1 DF-1: Wall mounted, bi-level filtered cooler with bottle filling station on upper level, anti-microbial finish, laminar flow.
 - .1 Refrigeration system: packaged hermetic HFC134a unit with pre-cooler, insulated double wall chiller, storage tank, air-cooled condenser, thermostatically controlled.
 - .2 30 l/h of 10°C at 33°C ambient and 27°C inlet water.
 - .3 Bottle filling unit shall include an electronic sensor for no-touch activation and automatic 30 second shut-off timer shall provide 4.1 Lpm flow rate with laminar flow.
 - .4 Cooler shall have push bar activation and water efficient bubbler.
 - .5 Standard of Acceptance: Elkay EZH20 LZSTL8W SLK, Oasis, Sunrok.
- .15 Fixture piping:
 - .1 Hot and cold water supplies to each fixture:
 - .1 Chrome finished polished brass, commercial duty ¼ turn ball valve angle stops, ½ NPS 1.0 inlet and 127mm long horizontal extension tubes, combination vandal proof loose key handle, escutcheon and flexible copper riser.
 - .2 Waste:
 - .1 Brass P trap with clean out on each fixture not having integral trap.
 - .2 Chrome plated in all exposed places.

- .16 Chair carriers:
 - .1 Factory manufactured floor-mounted carrier systems for all wall-mounted fixtures.

PART 3 - EXECUTION

- 3.1 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.
- 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 urinal flush timing mechanisms.
 - .4 Automatic flush valves for urinals: set controls to prevent unnecessary flush cycles during silent hours.
 - .3 Checks:
 - .1 Aerators: operation, cleanliness.
 - .2 Vacuum breakers, backflow preventers: operation under all conditions.
 - .3 Refrigerated water coolers: operation, temperature settings.
 - .4 Water closets, urinals: flushing action.
 - .4 Thermostatic controls:
 - .1 Verify temperature settings, operation of control, limit and safety controls.

END OF SECTION

PART 1 - GENERAL

- 1.1 SUMMARY .1 Section Includes:
- .1 Materials and installation for plumbing specialties and accessories.
 - .2 Sustainable requirements for construction and verification.
- .2 Related Sections:
- .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 01 35 29 - Health and Safety Requirements.
 - .3 Section 01 78 00 - Closeout Submittals.
- 1.2 REFERENCES .1 American Society for Testing and Materials International (ASTM).
- .1 ASTM A 126-[95(2001)], Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - .2 ASTM B 62-[02], Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA).
- .1 AWWA C700-[02], Cold Water Meters-Displacement Type, Bronze Main Case.
 - .2 AWWA C701-[02], Cold Water Meters-Turbine Type for Customer Service.
 - .3 AWWA C702-1-[01], Cold Water Meters-Compound Type.
- .3 Canadian Standards Association (CSA International).
- .1 CSA-B64 Series-[01], Backflow Preventers and Vacuum Breakers.
 - .2 CSA-B79-[94(R2000)], Floor, Area and Shower Drains, and Cleanouts for Residential Construction.
 - .3 CSA-B356-[00], Water Pressure Reducing Valves for Domestic Water Supply Systems.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
- .1 Material Safety Data Sheets (MSDS).

- .5 Plumbing and Drainage Institute (PDI).
 - .1 PDI-G101-[96], Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data.
 - .2 PDI-WH201-[92], Water Hammer Arresters Standard.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.
 - .2 Indicate dimensions, construction details and materials for specified items.
- .3 Shop Drawings:
 - .1 Submit shop drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions, construction and assembly details and accessories.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Instructions: submit manufacturer's installation instructions.
- .6 Manufacturers' Field Reports: manufacturers' field reports specified.
- .7 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals, include:
 - .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 QUALITY ASSURANCE .1 Pre-Installation Meetings:
- .1 Convene pre-installation meeting one (1) week prior to beginning work of this Section and on-site installations in accordance with Section 01 14 10 - Scheduling and Management of Work.
 - .1 Verify project requirements.
 - .2 Review installation.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
 - .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.
- 1.5 DELIVERY, STORAGE AND HANDLING .1 Waste Management and Disposal:
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management & Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental representative.
 - .5 Fold up metal and plastic banding, flatten and place in designated area for recycling.

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 Access Covers:
 - .1 Wall Access: face or wall type, stainless steel square or round cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.
 - .2 Floor Access: round cast iron body and frame with adjustable secured nickel bronze top and:
 - .1 Plugs: bolted bronze with neoprene gasket.
 - .2 Cover for Unfinished Concrete Floors: nickel bronze round, gasket, vandal-proof screws.
 - .3 Cover for Terrazzo Finish: polished nickel bronze with recessed cover for filling with terrazzo, vandal-proof locking screws.
 - .4 Cover for Tile and Linoleum Floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal-proof locking screws.
 - .5 Cover for Carpeted Floors: polished nickel bronze with deep flange cover for carpet infill, complete with carpet retainer vandal-proof locking screws.
- 2.2 BACK FLOW PREVENTERS
 - .1 Preventers: to CSA-B64 Series, application as indicated, reduced pressure principle type preventer with intermediate atmospheric vent and air gap.
 - .2 Acceptable materials: Watts 909.
- 2.3 TRAP SEAL PRIMERS
 - .1 Normally closed, slow opening, suitable for 120V/1 phase operation.
 - .2 Standard of Acceptance: Asco 822193.
- 2.4 STRAINERS
 - .1 860 kPa, Y type with 20 mesh, monel, bronze or stainless steel removable screen.
 - .2 NPS2 and under, bronze body, screwed ends, with brass cap.
 - .3 Acceptable materials: Watts 77F, Crane 9881/2, Armstrong FHSC.

PART 3 - EXECUTION

<u>3.1 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>3.2 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>3.3 CLEANOUTS</u>	.1	Install cleanouts at base of soil and waste stacks, at locations required 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 NPS4.
<u>3.4 WATER HAMMER ARRESTORS</u>	.1	Install on branch supplies to fixtures or group of fixtures.
<u>3.5 BACK FLOW PREVENTORS</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 and/or service sink.
<u>3.6 HOSE BIBBS AND SEDIMENT FAUCETS</u>	.1	Install at bottom of risers, at low points to drain systems, and as indicated.
<u>3.7 TRAP SEAL PRIMERS</u>	.1	Install for floor drains and elsewhere, as indicated.
	.2	Install on existing trap primer water supply.
	.3	Install ball valve on each service to balance flow.
	.4	Install soft copper tubing to floor drain without joints under floor.

- 3.8 STRAINERS .1 Install with sufficient room to remove basket.
- 3.9 START-UP .1 General:
.1 In accordance with Section 01 91 13 - General Commissioning Requirements: General Requirements, supplemented as specified herein.
.2 Timing: start-up only after:
.1 Pressure tests have been completed.
.2 Disinfection procedures have been completed.
.3 Certificate of static completion has been issued.
.4 Water treatment systems operational.
.3 Provide continuous supervision during start-up.
- 3.10 TESTING AND ADJUSTING .1 General:
.1 In accordance with Section 01 91 13 - General Commissioning Requirements: General Requirements, supplemented as specified.
.2 Timing:
.1 After start-up deficiencies rectified.
.2 After certificate of completion has been issued by authority having jurisdiction.
.3 Application tolerances:
.1 Pressure at fixtures: +/- 70 kPa.
.2 Flow rate at fixtures: +/- 20%.
.4 Adjustments:
.1 Verify that flow rate and pressure meet design criteria.
.2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.
.5 Vacuum breakers, backflow preventers:
.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.
- .6 Access doors:
 - .1 Verify size and location relative to items to be accessed.
- .7 Cleanouts:
 - .1 Verify covers are gas-tight, secure, yet readily removable.
- .8 Water hammer arrestors:
 - .1 Verify proper installation of correct type of water hammer arrester.
- .9 Strainers:
 - .1 Clean out repeatedly until clear.
 - .2 Verify accessibility of cleanout plug and basket.
 - .3 Verify that cleanout plug does not leak.
- .10 Commissioning Reports:
 - .1 In accordance with Section 01 91 13 - General Commissioning Requirements: Reports, supplemented as specified.
- .11 Training:
 - .1 In accordance with Section 01 91 13 - General Commissioning Requirements: Training of O&M Personnel, supplemented as specified.
 - .2 Demonstrate full compliance with Design Criteria.

END OF SECTION