

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29 - Health and Safety Requirements.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 01 78 00 - Closeout Submittals.
- .5 Section 23 00 00 - Common Work Results for HVAC.
- .6 Section 23 05 05 - Installation of Pipework.
- .7 Section 23 05 23.01 - Valves - Bronze.
- .8 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

### 1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).
    - .1 ANSI/ASME B16.15-2013, Cast Bronze Threaded Fittings, Classes 125 and 250.
    - .2 ANSI/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 B16.24-2016, 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 A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
    - .2 ASTM B88M-16, Standard Specification for Seamless Copper Water Tube (Metric).
  - .3 Department of Justice Canada (Jus).
    - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
  - .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
    - .1 Material Safety Data Sheets (MSDS).
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- .5 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
  - .1 MSS-SP-67-17, Butterfly Valves.
  - .2 MSS-SP-70-11, Cast Iron Gate Valves, Flanged and Threaded Ends.
  - .3 MSS-SP-71-11, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
  - .4 MSS-SP-80-13, Bronze Gate, Globe, Angle and Check Valves.
- .6 National Research Council (NRC)/Institute for Research in Construction.
  - .1 NRCC 38728, National Plumbing Code of Canada (NPC) - 2015.
- .7 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

### 1.3 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.

### 1.4 HEALTH AND SAFETY

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

### 1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## 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.
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## 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: 95/5 tin copper alloy.
- .4 Teflon tape: for threaded joints.
- .5 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F492, 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 NPS 2 and under, screwed:
  - .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.

## 2.5 BALL VALVES

- .1 NPS 2 and under, screwed:
    - .1 Class 150.
    - .2 Bronze body, chrome plated brass or stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle as specified Section 23 05 23.01 - Valves - Bronze.
  - .2 NPS 2 and under, soldered:
    - .1 To ANSI/ASME B16.18, Class 150.
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.2 Bronze body, chrome plated brass or stainless steel 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 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 ANSI standards.
- .4 Install CWS piping below and away 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.

#### 3.2 VALVES

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

#### 3.3 PRESSURE TESTS

- .1 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.

#### 3.4 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 air chambers, expansion compensators are installed properly.
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### 3.5 DISINFECTION

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

### 3.6 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.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
  - .1 Ensure that air is eliminated.
  - .2 Check to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
  - .3 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

### 3.7 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 Verify performance of temperature controls.
  - .3 Verify compliance with safety and health requirements.
  - .4 Confirm water quality consistent with supply standards, verifying that no residuals remain as a result of flushing and/or cleaning.

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 ASTM International Inc.
  - .1 ASTM B 32-08(R2014), Standard Specification for Solder Metal.
  - .2 ASTM B 306-13, Standard Specification for Copper Drainage Tube (DWV).
  - .3 ASTM C 564-14, 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 CAN/CSA-B70-12, Cast Iron Soil Pipe, Fittings and Means of Joining.
  - .3 CAN/CSA-B125.3-12, Plumbing Fittings.

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and datasheets for adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

### 1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## PART 2 - PRODUCTS

### 2.1 COPPER TUBE AND FITTINGS

- .1 Above ground Type DWV to: ASTM B 306.
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- .1 Fittings.
  - .1 Cast brass: to CAN/CSA-B125.3.
  - .2 Wrought copper: to CAN/CSA-B125.3.
- .2 Solder: lead free, tin-antimony or silver, to ASTM B 32.

## 2.2 CAST IRON PIPING AND FITTINGS

- .1 Buried sanitary, storm and vent minimum NPS 3, to: CAN/CSA-B70, with one layer of protective coating of epoxy.
  - .1 Joints:
    - .1 Mechanical joints:
      - .1 Neoprene or butyl rubber compression gaskets: to CAN/CSA-B70. ASTM C564 or
      - .2 Stainless steel clamps.
  - .2 Above ground: 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 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 Pressure test buried systems before backfilling.
  - .2 Hydraulically test to verify grades and freedom from obstructions.
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### 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).

### 3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 ASTM International Inc.
  - .1 ASTM D 2235-04(2011), Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
  - .2 ASTM D 2564-12, Standard Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-Series B1800-11, Thermoplastic Nonpressure Pipe Compendium - B1800 Series.
- .3 Green Seal Environmental Standards (GSES)
  - .1 Standard GS-36-13, Commercial Adhesives.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and datasheets for piping and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

### 1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
  - .3 Store at temperatures and conditions recommended by manufacturer.
  - .4 Packaging Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
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## PART 2 - PRODUCTS

### 2.1 PIPING AND FITTINGS

- .1 For buried and aboveground DWV piping to:
  - .1 ABS or PVC to CAN/CSA B1800.
- .2 For buried and aboveground Industrial and Oily waste piping to:
  - .1 PVC to CAN/CSA B1800.

### 2.2 JOINTS

- .1 Solvent weld for PVC: to ASTM D 2564.
- .2 Solvent weld for ABS: to ASTM D 2235.

## 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 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 cleanout rods can probe as far as the next cleanout, at least.
- .2 Test to ensure traps are fully and permanently primed.
- .3 Ensure fixtures are properly anchored, connected to system and effectively vented.
- .4 Affix applicable label (storm, sanitary, vent, pump discharge) c/w directional arrows every floor or 4.5 m (whichever is less).

### 3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 ANSI A269-10, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .2 ANSI B16.18-1984, Cast Copper Alloy Solder Joint Pressure Fittings.
- .3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
- .4 ASTM B819, Standard Specifications for Seamless Copper Tube for Medical Gas Systems.
- .5 CGA STANDARD G-4.1, Cleaning Equipment for Oxygen Service.
- .6 AWS Standard A5.8, Specification for Filler Metals for Brazing & Braze Welding/

### 1.2 PRODUCT DATA

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit data for following: valves, wall outlets.

### 1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

## PART 2 - PRODUCTS

### 2.1 PIPING

- .1 High Pressure (1379kPa and higher) Nitrogen gas piping:
    - .1 Ultra-high purity, chemically cleaned, seamless, 316L stainless steel tubing.
    - .2 Marked to indicate size, material, specifications and heat code.
    - .3 Chromatographic grade cleanliness required. Capped/sealed ends, clean room packaged.
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- .4 Size: ½" OD with 0.049" wall thickness, working pressure 3700 psig.
- .5 Tubing shall comply with ASTM G93 and CGA G.4.1.
- .2 Low Pressure (1379k and lower) Piping:
  - .1 Type K copper - hard drawn ASTM B88.
  - .2 System working pressure: 414kPa.

## 2.2 FITTINGS

- .1 Stainless steel 316L, chromatographic grade.
- .2 O-Ring type face seal compression fitting.
- .3 The contractor shall use factory cleaned fittings as specified in CGA standard G-4.1, and sealed to prevent contamination.
- .4 Copper fittings: Wrough Copper ASTM B75.
- .5 Copper tube: Screw, soldered, brazed, grooved.

## 2.3 JOINTS

- .1 Compression fittings.
- .2 Rubber gasket, Latex-free 1.6 mm thick: to AWWA C111.
- .3` Bold, nuts, hex head and washers: to ASTM A 307, Heavy Series.
- .4 Solder: 95/5 tin copper alloy.
- .5 Teflon tape: for threaded joints.
- .6 Grooved coupling: designed with angle bolt pads to provide rigid joints, complete with EPDM flush seal gasket.
- .7 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F 492, complete with thermoplastic liner.

## 2.4 SHUT OFF VALVES

- .1 Stainless steel 316L Quarter turn, diaphragm packless valves. Ultra-high purity.
  - .2 Helium leak tested.
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## 2.5 PIPING SUPPORTS

- .1 Fabricate hangers and supports in accordance with ANSI 31.1 & MSS SP58.
- .2 Steel hangers in contact with copper pipe shall be copper plated or epoxy coated.

## 2.6 PRESSURE REGULATOR

- .1 Dual-stage high purity stainless steel 316L pressure regulator.
- .2 All 316L SS body and diaphragm, metal to metal seals, Teflon seat, no-lube model
- .3 2" Inlet and delivery pressure gauges.
  - .1 0-700 kPa scale for delivery pressure gauge.
  - .2 0 - 27,500 kPa scale for inlet pressure gauge
- .4 c/w outlet diaphragm valve.
- .5 ¼" Compression tube connections.
- .6 Maximum inlet pressure 20,000 kPa, Model 3813.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- .1 The contractor shall comply with provincial regulations and hold necessary certificates.
  - .2 The contractor shall pay for, and obtain any necessary permits.
  - .3 Tools used for cutting and reaming medical gas lines shall be kept free of oil or grease.
  - .4 A visual inspection of all components and tools on sites shall confirm the absence of visible oil and particle matter.
  - .5 Assemble all piping using fittings manufactured to ANSI standards.
  - .6 Install tubing close to building structure to minimize furring, conserve headroom and space. Group exposed piping and run parallel to walls.
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- .7 Final connections to equipment will be done by equipment manufacturer representative.

### 3.2 PIPING SUPPORTS

- .1 Piping Spacing and supports shall be as noted in Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

### 3.3 SHUT-OFF VALVES

- .1 Each branch shall be equipped with an isolation valve at the point of connection to the main.

### 3.4 PRESSURE TESTS

- .1 Pressure test for 4 hours minimum at 1100kPa, with outlets closed and with Nitrogen gas tanks isolated from system. Pressure drop not to exceed 10 kPa.
- .2 Submit report on Nitrogen system confirming testing complete, outstanding deficiencies corrected and system is ready for use.

### 3.5 DISINFECTION

- .1 Cleaning: blow out piping to clean interior thoroughly of oil and foreign matter.
- .2 Check entire installation is approved by authority having jurisdiction.

## PART 1 - GENERAL

### 1.1 SUMMARY

- .1 Section Includes:
  - .1 Materials and installation for plumbing specialties and accessories.
- .2 Related Sections:
  - .1 Section 01 33 00 - Submittal Procedures
  - .2 Section 01 78 00 - Closeout Submittals
  - .3 Section 01 91 13 - General Commissioning (Cx) Requirements.

### 1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM).
  - .1 ASTM A 126-04(2014), Specification for Gray Iron Castings or Valves, Flanges and Pipe Fittings.
  - .2 ASTM B620-15, Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA).
  - .1 AWWA C700-15, Cold Water Meters-Displacement Type, Bronze Main Case.
  - .2 AWWA C701-15, Cold Water Meters-Turbine Type for Customer Service.
  - .3 AWWA C702-1-15, Cold Water Meters-Compound Type.
- .3 Canadian Standards Association (CSA International).
  - .1 CSA-B64 Series-11, Backflow Preventers and Vacuum Breakers.
  - .2 CSA-B79-08(R2013), Floor, Area and Shower Drains, and Cleanouts for Residential Construction.
  - .3 CSA-B356-10(R2015), Water Pressure Reducing Valves for Domestic Water Supply Systems.
- .4 Plumbing and Drainage Institute (PDI).
  - .1 PDI-WH201-92, Water Hammer Arresters Standard.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Product Data:
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- .1 Submit manufacturer's printed product literature, specifications and data sheet 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.
- .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: manufacturer's 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 WASTE MANAGEMENT & DISPOSAL

- .1 Collect, separate and recycle all site generated waste materials in accordance with Section 01 74 21 Construction Waste Management.

### PART 2 - PRODUCTS

#### 2.1 VACUUM BREAKERS

- .1 Breakers: to CSA-B64 Series, vacuum breaker atmospheric hose connection laboratory faucet intermediate.

#### 2.2 HOSE BIBBS AND SEDIMENT FAUCETS

- .1 Bronze construction complete with integral back flow preventer, hose thread spout, replaceable composition disc, and chrome plated in finished areas.
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- .2 Provide hose bibs with separate hot and cold water inlets for manual operated temperature controls where indicated on plans.

## 2.3 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 NPS2 1/2 and over, cast iron body, flanged ends, with bolted cap.

## 2.4 REVERSE OSMOSIS SYSTEM

- .1 4 stage reverse osmosis system.
  - .2 Pre-filters 10" five micron spun polypropylene sediment cartridges and post filter 10" five micron spun polypropylene sediment cartridges and post filter 10" activated carbon cartridge.
  - .3 Reverse osmosis (RO) membrane providing 99% total dissolved solids rejection. RO membrane nominally rated for a least 189 liters per day.
  - .4 Automatic shut-off valve.
  - .5 Quick connect fittings.
  - .6 14.4 liter pressurized storage tank supplied by RO system manufacturer.
  - .7 Distilled Water Faucet:
    - .1 Deckmount pure water faucet complete with 6 serration hose end.
    - .2 Faucet to be made form chemically inert materials to keep distilled water pure.
    - .3 Chrome finish.
    - .4 Gooseneck spout with 9.5 mm I.P.S. brass pipe, with inert lining tygon tubing. Gooseneck shall have 152 mm diameter bend.
    - .5 Forged brass turret with vndal resistant locking pins to prevent damage to mounting surface.
    - .6 Valve diaphragm and entire waterway in inert tygon material with a celcon union inlet connection prevent contact of water with metal components.
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#### 2.4 FOOD WASTE DISPOSER

- .1 120 volt single phase 0.746 kWmotor
- .2 Power supply plug.
- .3 3 stages of grinding.
- .4 on/off control via wall switch.
- .5 Grind chamber capacity 1.2 liters.

### 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 or
- .2 Install in accordance with manufacturer's instructions and as specified.

#### 3.3 HOSE BIBBS AND SEDIMENT FAUCETS

- .1 Install at bottom of risers, at low points to drain systems,

#### 3.4 STRAINERS

- .1 Install with sufficient room to remove basket.

#### 3.5 START-UP

- .1 General:
    - .1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements.
  - .2 Timing: start-up only after:
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- .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.

### 3.6 TESTING AND ADJUSTING

- .1 General:
  - .1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements.
- .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 Access doors:
  - .1 Verify size and location relative to items to be accessed.
- .6 Strainers:
  - .1 Clean out repeatedly until clear.
  - .2 Verify accessibility of cleanout plug and basket.
  - .3 Verify that cleanout plug does not leak.
- .7 Commissioning Reports:
  - .1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements.
- .8 Training:
  - .1 Demonstrate full compliance with Design Criteria.

## PART 1 - GENERAL

### 1.1 SUMMARY

- .1 Section Includes:
  - .1 The Supply and Installation of Commercial Lavatories and Sinks.
- .2 Related Sections:
  - .1 Section 01 33 00 - Submittal Procedures
  - .2 Section 01 78 00 - Closeout Submittals

### 1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-B45S1-04(R2013), Plumbing Fixtures
  - .2 CAN/CSA-B125-01, Plumbing Fittings
  - .3 CAN/CSA-B651-04(R2010), Barrier-Free Design

### 1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Indicate fixtures and trim:
  - .1 Dimensions, construction details, roughing-in dimensions.
- .4 Closeout Submittals:
  - .1 Provide maintenance data including monitoring requirements for incorporation into manuals specified in 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 WASTE MANAGEMENT & DISPOSAL

- .1 Collect, separate and recycle all site generated waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
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- .2 Ensure the following forms, included at the end of Section 01 74 21 - Construction/Demolition Waste Management and Disposal, are completed and submitted to the Construction Manager.
  - .1 Waste Audit (WA) Sheet - Schedule A
  - .2 Waste Tracking Form - Schedule B
- .3 Coordinate all work related to Section 01 74 21 - Construction/Demolition Waste Management and Disposal with Construction Manager.

## 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 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 Stainless Steel Counter-Top Sinks
  - .1 SS-1: 1 and 1/2 compartment, ledge-back.
    - .1 From 0.9 mm thick type 304 stainless steel, self-rimming, undercoated, clamps. Overall sizes: 790 x 520 mm. Main compartment: 460 x 410 x 200 mm. Secondary compartment: 250 x 410 x 175 mm.
    - .1 Standard of Acceptance: Franke Kindred LBS6808-1/3 less ledge-back, Novanni AMI 10171.
    - .2 Trim:
      - .1 203 mm center deckmount faucet.
      - .2 Two handle.
      - .3 Cast brass underbody.
      - .4 Chrome plated stainless steel cover plate.
      - .5 Polished chrome plated finish.
      - .6 Heavy duty brass compression structures, ceramic not acceptable.
      - .7 90%flow with first 1/4 turn of operation, 1800 turn.
      - .8 Positive shutoff even in poor water conditions.

- .9 203 mm wall form swing spout.
- .10 Flow control aerator 5.7 L/min. vandal resistant.
- .11 102 mm blade handles-sanitary hoods-metal-color indexed-vandal resistant screws.
- .12 Standard of Acceptance: Delta 26T3134, Zurn Z871G4-17F.
- .3 Waste fitting: integral stainless steel basket strainer/stopper, tailpiece, cast brass P-trap with cleanout.
- .4 Shut off valves underneath counter.
- .2 SS-2: Stainless steel double compartment counter-top sink
  - .1 Refer to Section 11 40 00 - Food Service Equipment.
    - .1 Trim:
      - .1 203 mm three hole mount escutcheon.
      - .2 Two-function wand; aerated stream or spray.
      - .3 Cast brass underbody.
      - .4 Chrome plated stainless steel cover plate.
      - .5 Polish chrome plated finish.
      - .6 Heavy duty brass compression structures, ceramic not acceptable.
      - .7 Positive shutoff even in poor water conditions.
      - .8 Flow control aerator 5.7 L/min. vandal resistant.
      - .9 Two-function wand; aerated stream or spray hoods-metal-color indexed-vandal resistant screws.
      - .10 Standard of Acceptance: Delta 9659-DST, MOEN 5923, American Standard 4433350.
    - .2 Waste fitting: integral stainless steel basket strainer/stopper, tailpiece, cast brass P-trap with cleanout.
    - .3 Shut off valves underneath counter.
- .3 SS-3: Stainless steel double compartment drop-in sink
  - .1 Refer to Section 11 40 00 - Food Service Equipment.
    - .1 Trim:
      - .1 203 mm three hole mount escutcheon.
      - .2 Two-function wand; aerated stream or spray.
      - .3 Cast brass underbody.
      - .4 Chrome plated stainless steel cover plate.
      - .5 Polish chrome plated finish.
      - .6 Heavy duty brass compression structures, ceramic not acceptable.
      - .7 Positive shutoff even in poor water conditions.
      - .8 Flow control aerator 5.7 L/min. vandal resistant.

- .9 Two-function want; aerated stream or spray goods-metal-color indexed-vandal resistant screws.
- .10 Standard of Acceptance: Delta 9659-DST, MOEN 5923, American Standard 4433350.
- .2 Waste fitting: integral stainless steel basket strainer/stopper, tailpiece, cast brass P-trap with cleanout.
- .3 Shut off valves underneath counter.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- .1 Mounting heights:
  - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.

#### 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.
- .4 Thermostatic controls:
  - .1 Verify temperature settings, operation of control, limit and safety controls.