

PART 1 - GENERAL

1.1 SUMMARY

- .1 This Section specifies the water distribution piping system, including potable cold, hot and re-circulated hot water piping including associated fittings, and specialties within the building.

1.2 RELATED SECTIONS

- .1 Drawings and general provisions of the Contract, including General and Supplementary Conditions, Section 21 05 01 - Common Work Results-Mechanical applies to work of this section.
- .2 Section 22 30 05 - Domestic Water Heaters
- .3 Section 22 42 03 - Commercial Washroom Fixtures

1.3 REFERENCE DOCUMENTS

- .1 Latest editions of listed standards to govern.
- .2 CSA B137 Series-13 - Thermoplastic pressure piping compendium
- .3 NSF/ANSI 14 - Plastic Piping System Components and Related Materials
- .4 NSF/ANSI 61 - Drinking Water Systems Components - Health Effects

1.4 DEFINITIONS

- .1 Definitions shall be in accordance with local plumbing codes and ASTM F 2389.

1.5 SUBMITTALS

- .1 Material list naming each product to be used identified by manufacturer and product number.

1.6 QUALITY ASSURANCE

- .1 Material shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137 Series-13
- .2 Material shall comply with manufacturers specifications.
- .3 Special Engineered products shall be certified by NSF International as complying with NSF 14.
- .4 Health and Safety: Do construction occupational health and safety in accordance with Division 01 - General Requirements
- .5 Verification: Contractor's verification in accordance with Division 01 - General Requirements.

1.7 DELIVERY STORAGE AND HANDLING

- .1 Deliver store and handle products in accordance with manufacturer's recommendations.

- .2 Replace any damaged or worn equipment / products with new prior to turnover to the Owner.

PART 2 - PRODUCTS

2.1 PIPING AND PIPING PRODUCTS

- .1 Buried: IPEX PUC water service tubing AWWA C903; ASTM F1282; CSA B137.9 and MSF-PW
- .2 Pipe shall be manufactured from: Polyvinyl Chloride to CSA B137.6, NSF-61, CAN/ULC-S102.2, and ASTM F442
- .3 Above ground pipe shall be Uponor PEX-A, or approved alternate.

2.2 FITTINGS

- .1 Fittings shall be manufactured from Polyvinyl Chloride to CSA B137 Series-13, NSF-61, CAN/ULC-S102.2, and ASTM F442
- .2 Fittings shall be Uponor or approved alternate.

2.3 WARRANTY

- .1 Manufacturer shall warrant pipe and fittings for 10 years to be free of defects in materials or workmanship.
- .2 Warranty shall cover labor and material costs of repairing and/or replacing defective materials and repairing any incidental damage caused by failure of the piping system do to defects in materials or workmanship.

2.4 VALVES

- .1 Valves shall be manufactured in accordance with the manufacturers specifications and shall comply with the performance requirements of ASTM F 2389, ASTM F442, CSA B137 Series-13. The valves shall contain no rework or recycled materials except that generated in the manufacturer's own plant of the same specification.
- .2 Valves shall be Uponor, or approved alternate.

2.5 SMOKE AND FIRE RATINGS

- .1 Where indicated on the drawings that a Plenum-rated Piping System is needed, then the pipe shall have a Flame Spread Classification of less than 25 and Smoke Development rating of less than 50.
- .2 Pipe shall be Uponor PEX-A, or approved alternate

2.6 UV PROTECTION

- .1 Where indicated on the drawings that the pipe will be exposed to direct UV light for more than 30 days, it shall be provided with a Factory applied, UV-resistant coating or alternative UV protection.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- .1 Install listed pipe materials and joining methods below in the following applications:
 - .1 Aboveground Polyvinylchloride (PVC) piping in SDR 6, 7.4 or 11 based on the required minimum pressure rating and use temperature.

3.2 VALVE APPLICATIONS

- .1 Install gate valves close to main on each branch and riser serving 2 or more plumbing fixtures or equipment connections and where indicated.
- .2 Install gate or ball valves on inlet to each plumbing equipment item, on each supply to each plumbing fixture not having stops on supplies, and elsewhere as indicated.
- .3 Install drain valve at base of each riser, at low points of horizontal runs, and where required to drain water distribution piping system.
- .4 Install swing check valve on discharge side of each pump and elsewhere as indicated.
- .5 Install ball valves in each hot-water circulating loop and discharge side of each pump.

3.3 PIPING INSTALLATIONS

- .1 Install hangers and supports at intervals specified in the applicable Plumbing Code and as recommended by pipe manufacturer.
- .2 Support vertical piping at each floor and as specified in the applicable Plumbing Code.
- .3 Fire stopping shall be provided to both be compatible with the Piping and meet the requirements of ASTM E 814 or ULC S115 , "Fire Tests of Through-Penetration Firestops". Pipe insulations or fire resistive coating shall be removed where the pipe passes through a fire stop and, if required by the firestop manufacturer, for 3 inches beyond the firestop outside of the fire barrier.
- .4 If heat tracing is specified for the piping, it should be installed on the pipe interior or exterior, and it must be suitable for use with plastic piping and self-regulating to ensure the surface temperature of the pipe and fittings will not exceed 70°C (158°F).

3.4 INSPECTING AND CLEANING

- .1 The pipes should be flushed with cold water after finishing the installation. Inspect and test piping systems following procedures of authorities having jurisdiction and as specified by the piping system manufacturer.
- .2 Clean and disinfect water distribution piping following procedures of the authority having jurisdiction.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 22 42 01 - Plumbing Specialties & Accessories
- .2 Section 22 42 03 - Commercial Washroom Fixtures

1.2 REFERENCES

- .1 Latest editions of listed standards to govern.
- .2 ASTM International Inc.
 - .1 ASTM B 32, Standard Specification for Solder Metal.
 - .2 ASTM B 306, Standard Specification for Copper Drainage Tube (DWV).
 - .3 ASTM C 564, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .3 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
 - .2 CAN/CSA-B125.3, Plumbing Fittings

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
- .2 Replace any damaged or worn equipment / products with new prior to turnover to the Owner.

PART 2 - PRODUCTS

2.1 SUSTAINABLE MATERIAL

- .1 Use least toxic sealants, adhesives, sealers and finishes necessary to comply with the requirements of the project

2.2 COPPER TUBE AND FITTINGS

- .1 Above ground sanitary storm and vent Type DWV to: ASTM B 306.
 - .1 Fittings.
 - .1 Cast brass: to CAN/CSA-B125.3.

.2 Wrought copper: to CAN/CSA-B125.3.

.2 Solder: lead free, tin-copper alloy 95:5, type TA, to ASTM B 32.

2.3 CAST IRON PIPING AND FITTINGS

.1 Buried sanitary storm and vent minimum NPS 3, to: CAN/CSA-B70, with one layer of protective coating.

.1 Joints:

.1 Mechanical joints:

.1 Neoprene or butyl rubber compression gaskets: to CAN/CSA-B70 or ASTM C 564.

.2 Stainless steel clamps.

.2 Hub and spigot:

.1 Caulking lead: to CSA B67.

.2 Cold caulking compounds.

.2 Above ground sanitary storm and vent: to CAN/CSA-B70.

.1 Joints:

.1 Mechanical joints:

.1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

.2 Cast iron couplings

.3 Complete with neoprene gaskets and stainless steel bolts and nuts.

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 National Plumbing Code Provincial Plumbing Code and local authority having jurisdiction.

.2 Install with expansion / compensation offsets

3.3 TESTING

.1 Pressure test buried systems before backfilling.

.2 Hydraulically test to verify grades and freedom from obstructions. Monitor levels for a minimum of 24-hours.

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 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 that fixtures are properly anchored, connected to system and effectively vented.
- .5 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 22 42 03 - Commercial Washroom Fixtures
- .2 Section 22 42 16 - Commercial Lavatories and Sinks

1.2 REFERENCES

- .1 Latest editions of listed standards to govern.
- .2 ASTM International Inc.
 - .1 ASTM D 2235, Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
 - .2 ASTM D 2564, Standard Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Series B1800, Thermoplastic Nonpressure Pipe Compendium - B1800 Series.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 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.
 - .2 Provide two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 30 - Health and Safety Requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Store at temperatures and conditions recommended by manufacturer.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer: pallets, crates, and packaging materials
- .4 Replace any damaged or worn equipment / products with new prior to turnover to the Owner.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Use least toxic sealants, adhesives, sealers and finishes necessary to comply with the requirements of the project.

2.2 PIPING AND FITTINGS

- .1 For buried and above ground DWV piping to:
 - .1 CAN/CSA B181.1.
 - .2 CAN/CSA B181.2
 - .3 CAN/CSA B182.1
- .2 Standard of Acceptance:
 - .1 IPEX System 15 or approved alternate, where concealed or below slab.
 - .2 IPEX System XFR or approved alternate, where not concealed or below slab.

2.3 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, Provincial Plumbing Code and local authority having jurisdiction.
- .3 Install with expansion / compensation offsets
- .4 Install buried pipe on 150 mm bed of washed clean sand, shaped to accommodate fittings, to line and grade as indicated. Backfill with washed clean sand.
- .5 Install above ground piping parallel and close to walls and ceilings to conserve headroom and space, and to grade as indicated
- .6 All DWV piping for this project shall be run concealed inside the walls, above ceilings, or inside bulkheads except for mechanical rooms and penthouses

3.3 TESTING

- .1 Pressure test buried systems before backfilling.
- .2 Hydraulically test to verify grades and freedom from obstructions. Monitor levels for a minimum of 24-hours.

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 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 RELATED REQUIREMENTS

- .1 Section 22 11 13 Domestic Water Piping-Poly
- .2 Section 22 11 16 Domestic Water Piping - Copper

1.2 REFERENCES

- .1 Latest editions of listed standards to govern.
- .2 American National Standards Institute/Canadian Standards Association (ANSI/CSA)
 - .1 ANSI Z21.10.1/CSA 4.1, Gas Water Heaters - Volume I, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less.
 - .2 ANSI Z21.10.1A/CSA 4.1A, Addenda 1 to ANSI Z21.10.1/CSA 4.1, Gas Water Heaters Volume I, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less.
 - .3 ANSI Z21.10.1b/CSA 4.1b, Addenda 2 to ANSI Z21.10.1/CSA 4.1, Gas Water Heaters - Volume I, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less.
 - .4 ANSI Z21.10.3A/CSA 4.3, Gas Water Heaters - Volume III - Storage Water Heaters, with Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous.
- .3 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.
 - .2 Rating System Addenda for New Construction and Major Renovations LEED Canada-NC Version 1.0-Addendum 2007.
 - .3 LEED Canada-CI Version 1.0-2007, LEED: Green Building Rating System Reference Guide for Commercial Interiors.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
 - .2 CAN/CSA-B139, Installation Code for Oil Burning Equipment.
 - .3 CAN/CSA-B140.0, Oil Burning Equipment: General Requirements.
 - .4 CSA B140.12, Oil-Burning Equipment: Service Water Heaters for Domestic Hot Water, Space Heating, and Swimming Pools.
 - .5 CAN/CSA-C309-M90, Performance Requirements for Glass-Lined Storage Tanks for Household Hot Water Service.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:

- .1 Provide manufacturer's printed product literature and datasheets for domestic water heater, and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop Drawings:
 - .1 Indicate:
 - .1 Equipment, including connections, fittings, control assemblies and ancillaries, identifying factory and field assembled.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Packaging Waste Management: remove for reuse.
- .3 Replace any damaged or worn equipment / products with new prior to turnover to the Owner.

1.5 WARRANTY

- .1 6 year limited tank and parts warranty.

PART 2 - PRODUCTS

2.1 DOMESTIC HOT WATER TANK

- .1 Connections:
 - .1 Cold water inlet.
 - .2 Hot water outlet.
 - .3 Drain.
 - .4 Relief Valve.
 - .5 Inspection Port.
- .2 Recovery Rate and Capacity
 - .1 Refer to plumbing fixture & equipment schedule on drawings.
- .3 Acceptable Manufacturer
 - .1 Rheem PROE30, or approved alternate.

2.2 DOMESTIC HOT WATER EXPANSION TANKS

- .1 Steel Pressure Tank; Polypropylene liner, butyl diaphragm, brass fitting.
- .2 Acceptable Manufacturer:
 - .1 Watts PLT (12 gallon)- Domestic hot water heater
 - .2 Watts PLT (5 gallon) - Domestic water entrance

2.3 TRIM AND INSTRUMENTATION

- .1 Drain valve.
- .2 Thermometer.
- .3 Pressure gauge.
- .4 ASME rated temperature and pressure relief valve sized for full capacity of heater, having discharge terminating over floor drain and visible to operators.

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.
- .2 Provide structural steel for horizontal mounted tanks.
- .3 Provide insulation between tank and supports.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's factory trained, certified Engineer to start up and commission DHW heaters.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for plumbing specialties and accessories.

1.2 REFERENCES

- .1 Latest editions of listed standards to govern.
- .2 American Society for Testing and Materials International (ASTM).
 - .1 ASTM A 126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - .2 ASTM B 62, Specification for Composition Bronze or Ounce Metal Castings.
- .3 Canadian Standards Association (CSA International).
 - .1 CSA-B64 Series-01, Backflow Preventers and Vacuum Breakers.
 - .2 CSA-B79, Floor, Area and Shower Drains, and Cleanouts for Residential Construction.
 - .3 CSA-B356, 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-WH201, Water Hammer Arresters Standard.

1.3 SUBMITTALS

- .1 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.
- .2 Shop Drawings:
 - .1 Submit shop drawings for all materials and equipment specified in Part 2 - Products.
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .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 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, Store, and handle products in accordance with manufacturer's recommendations.
- .2 Replace any damaged or worn equipment / products with new prior to turnover to the Owner.

PART 2 - PRODUCTS

2.1 EQUIPMENT CLARIFICATION

- .1 The information provided in the following sections of this specification for equipment and plumbing fixtures are generic descriptions and may not necessarily reflect the actual type, model, or performance required for this project. The contractor is requested to refer to equipment and plumbing fixture schedules shown on drawings, for more detailed information pertaining to products required for installation on this project.
- .2 Number and locations: Architectural drawings to govern.

2.2 FLOOR DRAINS

- .1 Floor Drains: to CSA B79.
- .2 Type FD-1: Floor Drain; Dura-Coated cast iron body with no-hub bottom outlet (size as shown on drawings), adjustable 5" (127 mm) "Type B" polished nickel bronze round strainer, integral trap primer connection, vandal proof secured top.
 - .1 Acceptable Manufacturer: Zurn, Jay R Smith, Mifab, Watts
- .3 Type FFD-1: Funnel Floor Drain (FFD); Dura-Coated cast iron body with no-hub bottom outlet (size as shown on drawings), polished nickel-bronze adjustable "Type BF" round strainer with integral open throat oval funnel, integral trap primer connection.
 - .1 Acceptable Manufacturer: Zurn, Jay R Smith, Mifab, Watts
- .4 This contractor shall be present during the pouring of all concrete slabs and installation of all flooring in order to make any necessary adjustments of floor drain heights to account for variances in the final floor level. This contractor shall ensure that all floor drain heights are adjusted such that they account for the level of the finished floor including all final flooring materials.

2.3 CLEANOUTS

- .1 As required by national plumbing code.
- .2 Cleanout Plugs: heavy cast iron male ferrule with brass screws and ABS plug. Sealing-caulked lead seat or neoprene gasket.
- .3 Access Covers:

- .1 Wall Access: face or wall type, polished nickel bronze or square cover with flush head securing screws, beveled edge frame complete with anchoring lugs.
- .2 Acceptable Manufacturer: Zurn, Jay R Smith, Mifab, Watts
- .3 Floor Access: round cast iron body and frame adjustable to finished floor with the following options:
 - .1 Plugs: ABS with neoprene gasket.
 - .2 Cover for Unfinished Concrete Floors: Scoriated nickel bronze round top with gasket and vandal-proof screws.
 - .3 Cover for Finished Floor: Scoriated polished bronze top with gasket and vandal-proof locking screws.
 - .4 Acceptable Manufacturer: Zurn, Jay R Smith, Mifab, Watts
- .4 This contractor shall be present during the pouring of all concrete slabs and installation of all flooring in order to make any necessary adjustments of floor cleanout heights to account for variances in the final floor level. This contractor shall ensure that all cleanouts heights are adjusted such that they account for the level of the finished floor including all final flooring materials.

2.4 WALL HYDRANTS

- .1 HB-1: Encased, non-freeze, flush wall hydrant with bronze casing, all bronze interior parts, non-turning operating rod with free floating compression closure valve, replaceable bronze seat and seat washer, and combination 3/4" male straight IP inlet. Nickel bronze box and hinged cover with operating key lock and "WATER" cast on cover, cylinder lock.
 - .1 Acceptable Manufacturer: Zurn, Jay R Smith, Mifab, Watts

2.5 WATER HAMMER ARRESTORS

- .1 Stainless Steel construction, 3/4 inch (19 mm) male IPS inlet, bellows type: to PDI-WH201.
 - .1 Acceptable Manufacturer: Precision Plumbing Products, Watts, Wilkins, or approved alternate.

2.6 BACK FLOW PREVENTERS

- .1 BFP-1: Reduced pressure type back flow preventer to CSA-B64 Series, application as indicated, size as indicated.
 - .1 Acceptable Manufacturer: Wilkins, Zurn or approved alternate.

2.7 VACUUM BREAKERS

- .1 Breakers: to CSA-B64 Series, vacuum breaker atmospheric.
 - .1 Acceptable Manufacturer: Watts, Wilkins, Chicago Faucets, or approved equal.

2.8 PRESSURE REGULATORS

- .1 Up to NPS1-1/2 bronze bodies, screwed: to ASTM B 62.
- .2 Semi-steel spring chambers with bronze trim.
- .3 Acceptable Manufacturer: Conbraco or approved alternate.

2.9 BACKWATER VALVES

- .1 Dura-Coated cast iron body with polished nickel bronze top, hub inlet and offset spigot outlet, automatic PVC flapper type backwater valve with O-ring, complete with non-adjustable floor cleanout with dura-coated cast iron body, gas and watertight ABS tapered plug and round scoriated secured cover and frame.
 - .1 Acceptable Manufacturer: Zurn, Jay R Smith, Mifab, Watts

2.10 TRAP SEAL PRIMERS

- .1 24V solenoid valve, c/w air gap fitting, EMCS for operation on timed sequence.
- .2 For up to 4 drains, provide distribution unit c/w air gap fitting, refer to detail on drawings
 - .1 Acceptable Manufacturer: Precision Plumbing Products, Watts, Mifab, or approved equal

2.11 STRAINERS

- .1 860 kPa, Y type with 20 mesh, monel, bronze or stainless steel removable screen.
- .2 NPS 2 and under, bronze body, screwed ends, with brass cap.
- .3 NPS 2-1/2 and over, cast iron body, flanged ends, with bolted cap.
- .4 Armstrong F4SC, Watts 777 Series or approved equal.

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

3.3 NON-FREEZE WALL HYDRANTS

- .1 Install 600 mm above finished grade, unless otherwise indicated.

3.4 WATER HAMMER ARRESTORS

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

3.5 BACK FLOW PREVENTERS

- .1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.
- .2 Exact location of BFP to be determined on site with Engineer.
- .3 Pipe discharge to terminate over hub drains installed in wall cabinets as shown on drawings. .
- .4 All backflow preventers to be accessible.

3.6 BACKWATER VALVES

- .1 Install in main sewer lines where indicated.
- .2 Install in access pit as indicated.

3.7 TRAP SEAL PRIMERS

- .1 Install for floor drains and elsewhere, as indicated.
- .2 Install on cold water.
- .3 Install Pex-A tubing to all floor drains.

3.8 STRAINERS

- .1 Install with sufficient room to remove basket.

3.9 START-UP

- .1 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.

3.10 CLEANOUTS

- .1 Install cleanouts at base of soil and waste stacks, at locations required by code, and as indicated.
- .2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .3 All cleanouts are to be accessible and covered by an access door or floor cleanout cover.

3.11 TESTING AND ADJUSTING

- .1 Application tolerances:
 - .1 Pressure at fixtures: +/- 70 kPa.
 - .2 Flow rate at fixtures: +/- 20%.
- .2 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.
- .3 Floor drains:
 - .1 Verify operation of trap seal primer.
 - .2 Prime, using trap primer. Adjust flow rate to suit site conditions.
 - .3 Check operations of flushing features.
 - .4 Check security, accessibility, removability of strainer.
- .4 Vacuum breakers, backflow preventers, backwater valves:
 - .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.
- .5 Access doors:
 - .1 Verify size and location relative to items to be accessed.
- .6 Cleanouts:
 - .1 Verify covers are gas-tight, secure, yet readily removable.
- .7 Water hammer arrestors:
 - .1 Verify proper installation of correct type of water hammer arrester.
- .8 Wall, Ground hydrants:
 - .1 Verify complete drainage, freeze protection.
 - .2 Verify operation of vacuum breakers.
- .9 Pressure regulators, PRV assemblies:
 - .1 Adjust settings to suit locations, flow rates, pressure conditions.
- .10 Strainers:
 - .1 Clean out repeatedly until clear.
 - .2 Verify accessibility of cleanout plug and basket.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 22 11 13 - Domestic Water Piping - Poly
- .2 Section 22 11 16 - Domestic Water Piping: Copper
- .3 Section 22 13 17 - Drainage Waste and Vent Piping: Cast Iron and Copper
- .4 Section 22 13 18 - Drainage Waste and Vent Piping: Plastic

1.2 REFERENCES

- .1 Latest editions of listed standards to govern.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-B45 Series-02, Plumbing Fixtures.
 - .2 CAN/CSA-B125.3, Plumbing Fittings.
 - .3 CAN/CSA-B651, Accessible Design for the Built Environment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Plumbing contractor shall refer to Plumbing Drawings and Plumbing Fixture Schedules for selected plumbing fixtures and trim.
 - .2 Provide manufacturer's printed product literature and datasheets for washroom fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Indicate fixtures and trim:
 - .1 Dimensions, construction details, roughing-in dimensions.
 - .2 Factory-set water consumption per flush at recommended pressure.
 - .3 For water closets: minimum pressure required for flushing.
- .3 Shop Drawings:
 - .1 Provide as required by submittal section

1.4 CLOSEOUT SUBMITTALS

- .1 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.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with manufacturer's written instructions.

- .2 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
- .3 Replace any damaged or worn equipment / products with new prior to turnover to the Owner.

PART 2 - PRODUCTS

- .1 Refer to plumbing fixture schedule on drawings.

2.1 FIXTURE PIPING

- .1 Hot and cold water supplies to fixtures:
 - .1 Chrome plated flexible supply pipes with 1/4 turn ceramic disk stops, reducers, escutcheon.
- .2 Waste:
 - .1 Brass P trap with clean out on fixtures not having integral trap or unless otherwise specified.
 - .2 Chrome plated in exposed places.

2.2 FIXTURE SUPPLY FITTINGS

- .1 1/4 turn ceramic disc loose key supply fittings, chrome plated. Supply fittings to be equipped with moderators designed to produce laminar flow to eliminate aeration of water.

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 Caulk around water closets to floors / walls hung lavatories to walls with mildew resistant silicone sealant, white in color, and tooled to smooth bead .
 - .2 Connect fixtures complete with supplies and drains, trapped, supported level and square. Hot water faucets shall be on left. Fixtures on outside walls to have supplies from floor; other fixtures to be served from wall. Wall hung fixtures to be securely and firmly mounted.

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 Adjust flush valves to suit actual site conditions.

.3 Checks:

.1 Water closets: 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