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**PART 1 GENERAL**

**1.1 SUMMARY**

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

**1.2 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.
- .3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .4 Section 01 78 00 – Closeout Submittals.

**1.3 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
  - .2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA)
  - .1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.
  - .2 AWWA C701, Cold Water Meters-Turbine Type for Customer Service.
  - .3 AWWA C702, Cold Water Meters-Compound Type.
- .3 American National Standards Institute (ANSI)
  - .1 ANSI Z358.1 Emergency eyewash and shower equipment.
- .4 Canadian Standards Association (CSA)
  - .1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.
  - .2 CSA-B356, Water Pressure Reducing Valves for Domestic Water Supply Systems.
- .5 Health Canada/Workplace Hazardous Materials Information Systems (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .6 Plumbing and Drainage Institute (PDI)
  - .1 PDI-G101, Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data.
  - .2 PDI-WH201, Water Hammer Arresters Standard.

## **1.4 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 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 manufacturer's name, type, model, year and capacity.
  - .2 Details of operation, servicing and maintenance.
  - .3 Recommended spare parts list.

## **1.5 QUALITY ASSURANCE**

- .1 Pre-Installation Meetings:
  - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.
    - .1 Verify project requirements.
    - .2 Review installation and substrate conditions.
    - .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 29.06 – Health and Safety Requirements.

## **1.6 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 and 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 materials 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 Department Representative.
- .5 Fold up metal and plastic banding flatten and place in designated area for recycling.

## **1.7 WARRANTY**

- .1 Provide a written guarantee, signed and issued in the name of the owner, against defective materials and workmanship for a period of one (1) year from the date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.1 FLOOR DRAINS**

- .1 Floor drains and trench drains.
  - .1 FD-1: general duty; cast iron body, round adjustable head, 125 mm, sediment basket nickel bronze strainer, integral seepage pan and clamping collar, trap primer connection.
    - .1 Acceptable Product: Zurn ZN-415-B5-P, Jay R. Smith, MIFAB, Blücher, Watts.
  - .2 FD-2: heavy duty; coated cast iron body, heavy duty non-tilting or hinged lacquered cast iron grate, integral seepage pan and clamping collar, trap primer connections, 200 mm diameter, sediment bucket.
    - .1 Acceptable Product: Zurn ZN-536-P-Y, Jay R. Smith, MIFAB, Blücher, Watts.
  - .3 FD-3: combination funnel floor drain; coated cast iron body with integral seepage pan, clamping collar, nickel-bronze adjustable head strainer with integral oval funnel, trap primer connection.
    - .1 Acceptable Product: Zurn ZN-415-BF-P, Jay R. Smith, MIFAB, Blücher, Watts.
  - .4 FD-4: planters; coated cast-iron body with integral seepage pan, clamping collar, vertically adjustable nickel-bronze adjustable head strainer, vandal-proof NPS2 perforated dome and standpipe, stainless steel screen, trap primer connection.
    - .1 Acceptable Product: Zurn ZN-350 C-P, Jay R. Smith, MIFAB, Blücher, Watts.

## 2.2 ROOF DRAINS

- .1 RD-1; Standard coated roof drain with cast iron body 381 mm diameter, with aluminum dome, under-deck clamp to suit roof construction, flashing clamp ring with integral gravel stop.
  - .1 Acceptable Product: Zurn Z-100-C, Jay R. Smith, MIFAB, Watts.
- .2 RD-2: Cornice, sill or canopy drain; cast iron body with 150 mm diameter cast bronze dome or strainer and flashing clamp, under deck clamp.
  - .1 Acceptable Product: Zurn Z-181-C, Jay R. Smith, MIFAB, Watts.
- .3 RD-3: parapet or scupper drain; cast iron body with 303 mm x 305 mm oblique aluminum strainer/grate and flashing clamp.
  - .1 Acceptable Product: Zurn, Z-187, Jay R. Smith, MIFAB, Watts.
- .4 RD-4: inverted roofing system; cast iron body with aluminum dome, under-deck clamp and sump receiver to suit roof construction, with integral gravel stop and stainless steel drainage grid.
  - .1 Acceptable Product: Zurn, Jay R. Smith, MIFAB, Watts.

## 2.3 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.
  - .1 Acceptable Product: Zurn, Jay R. Smith, MIFAB, Blücher, Watts.
- .2 Access covers:
  - .1 Wall access: face or wall type, or stainless steel square 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.
    - .1 Plugs: bronze with neoprene gasket.
    - .2 Cover for unfinished concrete floors: cast iron round, gasket, vandal-proof screws.
    - .3 Cover for terrazzo finish: polished nickel bronze brass 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.

## 2.4 NON FREEZE WALL HYDRANTS

- .1 Recessed with integral vacuum breaker, integral backflow preventer, NPS ¾ hose outlet, removable operating key, polished bronze finish, encased, non-freeze, anti-siphon, automatic draining, wall clamp, replaceable bronze seat and washer.
- .2 Acceptable Product: Zurn Z-1300-PB-WC, Jay R. Smith, MIFAB, Watts.

## 2.5 WATER HAMMER ARRESTORS

- .1 Stainless steel or copper construction, bellows or piston type: to PDI-WH201.
- .2 Acceptable Product: Zurn, Jay R. Smith, MIFAB, Precision Plumbing Products, Watts.

## 2.6 BACK FLOW PREVENTERS

- .1 To CSA-B64 Series.
- .2 Application: domestic service entrance and fire protection system service entrance.
  - .1 Domestic water:
    - .1 Reduced pressure principle type consisting of a pressure differential relief valve located between two independently operated spring-loaded centre guided check valves.
    - .2 Ductile iron construction with FDA approved fusion epoxy coat inside and out.
    - .3 Compound check.
    - .4 Single access cover.
    - .5 Maximum temperature range: 0.5°C to 60°C.
    - .6 Maximum pressure: 1205 kPa.
    - .7 CSA certified.
    - .8 Acceptable Product: Wilkins Model 375L, Watts, Zurn.
  - .2 Fire protection water:
    - .1 Same as above except without compound check and with FM and ULC approval for fire protection service.
    - .2 Acceptable Product: Wilkins Model 975L, Watts, Zurn.
- .3 Application: install on domestic cold water supply to electrode steam humidifier, emergency eyewash and drench shower.
  - .1 Bronze body construction.
  - .2 Internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs.
  - .3 Seats and discs replaceable in both check modules and the relief valve.

- .4 Assembly to include two resilient seated isolation valves, four resilient seated test cocks, protective wye strainer with 20 mesh screen, union end connections and an air gap drain fitting.
- .5 Reduced pressure zone type backflow preventer.
- .6 Acceptable Product: Watts Series U-009QT-S complete with Watts Series 909AG air gap, Wilkins, Zurn.
- .4 Provide backflow preventer test kit as follows:
  - .1 Maximum working pressure: 1205 kPa.
  - .2 Maximum working temperature: 98.8°C.
  - .3 0-103 kPa and 0-15 psig dual scale pressure gauge with 114 mm diameter face,  $\pm 2\%$  accuracy.
  - .4 Test valves: two (2) ball valves and one (1) needle valve.
  - .5 Hoses: three (3) one (1) metre test hoses with female threaded swivel coupling.
  - .6 Adapters:
    - .1 Three (3) NPS  $\frac{1}{4}$  threaded coupling adapters.
    - .2 Three (3) NPS  $\frac{1}{2}$  x NPS  $\frac{1}{4}$  bushings.
    - .3 Three (3) NPS  $\frac{3}{4}$  x NPS  $\frac{1}{4}$  bushings.
  - .7 400 mm long securing strap.
  - .8 Moisture resistant instruction guide.
  - .9 Light weight, shock resistant molded plastic case with foam inserts.
  - .10 Acceptable Product: Watts No. TK-9A Backflow Preventer Test Kit, Precisions Plumbing Products, MIFAB.

## 2.7 VACUUM BREAKERS

- .1 To CSA-B64 Series.
- .2 Atmospheric vacuum breaker (inlet to domestic hot water tanks):
  - .1 Plain brass body with silicone disc.
  - .2 Suitable for temperatures up to 82°C.
  - .3 Maximum operating pressure: 860 kPa.
  - .4 Size: NPS  $\frac{3}{4}$ .
  - .5 Acceptable Product: Watts Series 288a, Wilkins, Jay R. Smith, MIFAB.
- .3 Hose connection vacuum breaker:
  - .1 NPS  $\frac{3}{4}$  female hose thread inlet, NPS  $\frac{3}{4}$  male hose thread outlet, brass finish.

## 2.8 PRESSURE REGULATORS

- .1 Capacity: as indicated.
  - .1 Inlet pressure: 1034 kPa.

- .2 Outlet pressure: 413 kPa.
- .3 Capacity: as indicated.
- .2 Up to NPS1-1/2 bronze bodies, screwed: to ASTM B62, strainer and stainless steel strainer screen.
- .3 NPS2 and over, semi-steel bodies, Class 125, flanged: to ASTM A126, Class B, strainer.
- .4 Semi-steel spring chambers with bronze trim.

## **2.9 BACKWATER VALVES**

- .1 Coated extra heavy cast iron body with bronze seat, bronze flapper and threaded cover.
- .2 Access:
  - .1 Surface access.
  - .2 Concrete access pit with steel cover, as indicated.

## **2.10 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.

## **2.11 WATER MAKE-UP ASSEMBLY**

- .1 Complete with backflow preventer, pressure gauge on inlet and outlet, pressure reducing valve to CSA B356, pressure relief valve on low pressure side and gate valves on inlet and outlet, strainer.

## **2.12 WATER METERS**

- .1 Displacement type to AWWA C700, Turbine type to AWWA C701, Compound type to AWWA C702.
- .2 Capacity: flow rate, pressure drop, pipe connections as indicated.
- .3 Accessories: remote readout device, pulse output or 4-20 mA current output.

## **2.13 TRAP SEAL PRIMERS**

- .1 Pressure drop actuated:
  - .1 Brass body construction with inlet opening of ½ male NPT and outlet opening of female ½ NPT.
  - .2 Provide complete with four-hole view built-in air gap to prevent any backflow from trap being fed into the water supply.
  - .3 Provide removable inlet filter screen.
  - .4 Capacity to serve up to four (4) floor drains.

- .5 Provide complete with trap seal primer distribution unit as follows:
  - .1 Brass body construction.
  - .2 ½ NPT inlet connection.
  - .3 Four (4) 3/8 FPT brass nipple outlet connections.
  - .4 Four (4) 6 mm diameter vent holes in lid to provide air gap and backflow protection.
- .6 Acceptable Product: MIFAB MR-500 trap seal primer complete with MIFAB MI-DU series distribution unit, Precision Plumbing Products, Zurn.
- .2 Up to 12 floor drains: Electronic trap priming manifold with:
  - .1 Vacuum breaker
  - .2 Pre-set 24 hour time clock
  - .3 Manual override switch
  - .4 120V solenoid valve
  - .5 120V or 3 wire connection.
  - .6 NPS ¾ inlet connection.
  - .7 Calibrated manifold.
  - .8 Water hammer arrestor
  - .9 Mounted in steel cabinet
  - .10 Compression outlet fittings
  - .11 Inlet shut off valve
  - .12 Supplies minimum 59 ml @ 138 kPa.
- .3 Trap guard:
  - .1 All elastomeric normally closed trap guard device utilizes a normally closed seal to prevent evaporation of the trap seal and to protect against sewer gases from backing up into habitable areas. It opens with fluid flow and allows liquid drainage to flow through into the building drain.

## **2.14 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, tapped blowoff and plug.
- .3 NPS2½ and over, cast iron body, flanged ends, with bolted cap, tapped blow off connection with bronze ball valve.

## **2.15 GREASE INTERCEPTORS**

- .1 Dura coated interior and exterior fabricated steel low type grease interceptors rated as indicated with grease holding capacity as indicated. Unit shall be supplied complete with internal air relief bypass, bronze cleanout plug and trap seal with removable combination pressure equalizer/flow diffusing baffles, gasketed secured cover.

- .2 Provide optional enzyme port in cover.
- .3 Provide internal or external flow control for field installation. External flow control with orifice sized to suit rated flow as outlined above. External flow control to have inlet/outlet connections as indicated.
- .4 Supply grease interceptor with one (1) year supply of poly-enzyme.
- .5 Grease interceptor shall carry the PDI label.
- .6 Acceptable Product: Zurn Low Profile Grease Interceptor size as indicated, Jay R. Smith, MIFAB, Watts.

## **2.16 ACID DILUTION DEVICES**

- .1 Chemical dilution tank:
  - .1 Chemical dilution tanks to be constructed of seamless natural linear low density polyethylene resins. Tank to have uniform wall thickness and be free of any stresses.
  - .2 Tanks to be provided complete with side inlet/outlet connections.
  - .3 Tanks to be supplied with side plumbing vent connection.
  - .4 Each tank inlet/outlet to accept connection to corrosion resistant drainage piping system utilizing threaded male adaptor and mechanical joint connections.
  - .5 Tanks to be provided with bolted cover complete with vapour tight cover gasket pre-cut to cover bolt hole pattern.
  - .6 Connections: as indicated.
  - .7 Size (total volume, not effective volume):
    - .1 As indicated.
  - .8 Dilution tank overall height and diameter to be as follows:
    - .1 As indicated.
  - .9 Dilution tank inlet/outlet location on tank will be field determined by Contractor after rough-in of chemical resistant waste piping.
  - .10 Acceptable Product: Watts PH Pro, PEGAS, Town and Country.
- .2 Chemical dilution tank sediment interceptor:
  - .1 Chemical dilution tank sediment interceptors to be constructed of seamless natural linear low density polyethylene resins. Tanks to have uniform thickness and be free of any stresses.
  - .2 Tanks to be provided complete with side inlet/outlet connections.
  - .3 Tanks to be supplied without plumbing vent connection.
  - .4 Each tank inlet/outlet to accept connection to corrosion resistant drainage piping system utilizing male threaded adaptor and mechanical joint connections.
  - .5 Tanks to be provided complete with bolted cover complete with vapour tight cover gasket pre-cut to cover bolt hole pattern.

- .6 Connections: as indicated.
- .7 Sizes (total tank volume, not solids retained in basket):
  - .1 Capacity: as indicated.
- .8 Sediment interceptor overall height and diameter as indicated.
- .9 Sediment interceptor inlet/outlet location on tank wall to be field determined by Contractor after rough-in of chemical resistant waste piping.
- .10 Sediment interceptor to be fully recessed in pre-formed concrete pit constructed by the General Contractor. The General Contractor is to be responsible to supply cover over pit to accommodate pedestrian traffic.
- .11 Sediment interceptor solids baskets shall consist of a perforated polyethylene liner with 4.7 mm diameter perforations.
- .12 The General Contractor to be responsible to fabricate and install steel frame structure to support sediment interceptor if required to facilitate connection to dilution tank at proper invert.
- .13 Acceptable Product: Watts PH Pro Sediment Interceptor, PEGAS, Town and Country.

**2.17 COMBINATION EMERGENCY DRENCH SHOWER/EYEWASH UNIT  
(BARRIER FREE)**

- .1 Bowl: 254 mm diameter corrosion resistant stainless steel bowl.
- .2 Shower head: 254 mm diameter corrosion resistant stainless steel shower head.
- .3 Pipe and fittings: galvanized steel with protective yellow safety coating.
- .4 Operation:
  - .1 Shower: pull rod with triangular handle.
  - .2 Eyewash: large, highly visible push handle.
- .5 Pipe and fittings: NPS 1¼ galvanized steel.
- .6 Water supply: NPS 1¼.
- .7 Shower valve: chrome-plated NPS 1 stay-open ball valve.
- .8 Eyewash valve: chrome-plated NPS ½ stay-open ball valve.
- .9 Eyewash spray head assembly: chrome-plated brass spray head assembly with twin, soft flow, eyewash heads and protective sprayhead covers. Integral flow control to ensure safe, steady flow under varying water supply conditions.
- .10 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "**EMERGENCY DRENCH SHOWER/EYEWASH UNIT**".
- .11 Location: as indicated.

- .12 Acceptable Product: Bradley Model S19-310BF, HAWS, Guardian.

**2.18 EMERGENCY EYEWASH AND COMBINATION EMERGENCY DRENCH  
SHOWER/EYEWASH THERMOSTATIC MIXING VALVE**

- .1 To ANSI Z358.1.
- .2 Liquid-filled thermal motor and piston control mechanism with positive shut-off of hot water when cold water supply is lost to prevent scalding.
- .3 Valve shall allow cold water flow in the event of loss or interruption of the hot water supply or thermostatic failure.
- .4 Vandal-resistant temperature adjustment.
- .5 Rough bronze finish.
- .6 Temperature range: 18°C to 35°C.
- .7 Accuracy:  $\pm 1.67^\circ\text{C}$ .
- .8 Maximum operating pressure: 860 kPa.
- .9 Maximum inlet temperature: 82°C.
- .10 Provide complete with dial thermometer.
- .11 Check stops on inlet of hot/cold.
- .12 Provide complete with 18 gauge surface mounted stainless steel enclosure. Dimension of enclosure to be 610 mm high x 578 mm wide x 165 mm deep.
- .13 Capacity: 98.5 L/min at 310 kPa differential pressure with a cold flow bypass capacity of 50.0 L/min at 310 kPa differential pressure.
- .14 Application: emergency fixtures as indicated.
- .15 Acceptable Product: Bradley S19-2100-SS, Powers, HAWS, Guardian.

**2.19 EMERGENCY EYEWASH THERMOSTATIC MIXING VALVE**

- .1 Same as thermostatic mixing valve specified in Item 2.18 except for the following:
- .1 Wall enclosure dimensions to be 318 mm high x 279 mm wide x 165 mm deep.
- .2 Capacity: 35.6 L/min at 310 kPa differential pressure with a cold flow bypass capacity of 25.7 L/min at 310 kPa differential pressure.
- .2 Acceptable Product: Bradley S19-2000-SS, Powers, Haws, Guardian, Lawler.

**2.20 EMERGENCY EYEWASH FIXTURE - PEDESTAL MOUNTED (BARRIER FREE)**

- .1 Application: as indicated.
- .2 Bowl: 254 mm diameter corrosion resistant stainless steel bowl.
- .3 Face spring ring: chrome plated circular spray ring to provide supplemental face spray. Provide complete with flow control to ensure adequate flow from eyewash nozzles and face spray ring.
- .4 Spray Head Assembly: Chrome plated brass spray head assembly with twin, soft flow, eye wash heads and protective spray head covers. The integral flow control shall ensure safe, steady flow under varying water supply conditions.
- .5 Valve: chrome plated brass, NPS ½ stay-open ball valve.
- .6 Operation: hand operated by a large, highly visible safety yellow PVC push handle.
- .7 Waste: Dome type strainer and NPS 1 ¼ drain fitting furnished.
- .8 Water Supply: NPS ½.
- .9 Pipe and fittings: galvanized steel with protective yellow safety coating.
- .10 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "**EMERGENCY EYEWASH FOUNTAIN**".
- .11 Acceptable Product: Bradley Model S19-210BF complete with options indicated, HAWS, Guardian.

**2.21 PIPE WALL AND FLOOR PENETRATION SEAL**

- .1 Application:
  - .1 Pipes penetrating exterior concrete walls below grade and concrete floors on grade.
- .2 Seal material to be EPDM.
- .3 Pressure plates to be glass-reinforced plastic.
- .4 Bolts and nuts to be stainless steel 18-8.
- .5 Suitable temperature range to be -40°C to 121°C.
- .6 Wall sleeves to be Schedule 40 black iron pipe. Sleeves in exterior walls to be galvanized.
- .7 Floor sleeves to be Schedule 40 black iron pipe.

- .8 Wall and floor sleeves to be sufficiently long to mount flush with interior and exterior walls and flush with finished floor of slab-on-grade floors, 50 mm above floor, for floors above grade.
- .9 Acceptable Product: Metraseal MS Series, Link Seal.

## **2.22 DOMESTIC CLOTHES WASHER SUPPLY FITTING**

- .1 To control both hot and cold water simultaneously.
- .2 "Finger-tip" lever operation.
- .3 Bronze body construction with NPT ½ copper connections and satin chrome finish.
- .4 Provide complete with mini water hammer arrestor on hot and cold.
- .5 Mount in 300 mm x 300 mm x 100 mm deep stainless steel valve box, 16 gauge, #4 finish. Provide less access door and complete with back in box.
- .6 Acceptable Product: Watts Duo-Cloz Model No. 2-M2-SC complete with Watts Model No. 05-H mini water hammer arrestor on hot and cold and entire assembly mounted in a MIFAB Model MI-VB stainless steel valve box, Precision Plumbing Products, MIFAB.

## **2.23 TEMPERED WATER ASSEMBLY**

- .1 Quantity: as indicated
- .2 Hi/Lo combination assembly mounted in wall mounted (surface) stainless steel cabinet.
- .3 Capacity:
  - .1 High capacity: as indicated @ 310 kPa differential pressure (maximum flow).
  - .2 Low capacity: as indicated @ 34 kPa differential pressure (minimum flow).
- .4 Provide check stops on hot/cold water inlet to each valve.
- .5 Provide a pressure regulating valve that responds to varying flow requirements.
- .6 Each tempered water valve to be thermostatic mixing type with liquid filled thermostatic motors that sense and control water temperature.
- .7 Assembly shall be capable of maintaining water temperature to within 8°C above setpoint within the range of 4°C to 71°C.
- .8 Valves to be bronze body.
- .9 Valves to be ASSE and CSA approved.
- .10 Provide pressure gauges on inlet/outlet of high capacity valve.

- .11 Provide dial thermometer at discharge of tempered water assembly.
- .12 Acceptable Product: Powers Hydroguard Simmons, RADA Mechanical Products Ltd. Or approved equal.

**2.24 POTABLE WATER THERMAL EXPANSION TANK**

- .1 Quantity: as indicated.
- .2 Application: absorb expanded water from domestic hot water tanks because of the inability to expand back into the Town potable water system due to the presence of a backflow preventer on the incoming water supply to the building.
- .3 ASME Section VIII construction and label.
- .4 FDA approved butyl bladder.
- .5 1NPT stainless steel system connection.
- .6 Standard tire air charging valve connection.
- .7 1033 kPa maximum working pressure.
- .8 Vertical tank, floor mounted.
- .9 Dimensions: as indicated.
- .10 Tank volume: as indicated.
- .11 Acceptance volume: as indicated.
- .12 Red primer exterior finish.
- .13 Air pre-charge to be adjusted in field by the Mechanical Contractor to equal the residual cold water pressure on the discharge side of the pressure reducing valve on the domestic water service entrance by the Mechanical Contractor.
- .14 Acceptable Product: ExpanFlex, Amtrol, Taco, S. A. Armstrong, Bell and Gossett.

**2.25 COMBINATION EMERGENCY DRENCH SHOWER/EYEWASH UNIT FLOW SWITCH ALARM SYSTEM**

- .1 Suitable for connection to drench shower with NPS 1-1/2 inlet piping rated for a flow of 1.89 L/s.
- .2 System to be fully grounded and electrically insulated from water piping for safety.
- .3 Power supply: 120/1/60 with 0.5 amp current draw.

- .4 Electrical connection: Pre-wired 1800 mm long multiple conductor, quick connect, waterproof cable for easy connection to the alarm assembly.
- .5 Flow Switch: UL listed and CSA approved. Watertight and completely assembled for easy hook-up to alarm assembly.
- .6 Strobe light: UL Listed and CSA approved. Light intensity to be 258,000 maximum effective candella on horizontal axis. Safety amber-colored glass complete with dust cover. All solid state components with no moving parts for maintenance-free operation.
- .7 Audible Horn: UL listed, externally adjustable from 78-103 decibels at 3.0 meters. Horn designed to sound away from the injured person.
- .8 On/Off Switch: Enables horn to be turned off while the strobe light continues to flash and the water flows.
- .9 Provide complete with one (1) year warranty.
- .10 Acceptable Product: Bradley Model S19-320, HAWS, Guardian.

## **2.26 EMERGENCY EYEWASH FLOW SWITCH ALARM SYSTEM**

- .1 Suitable for connection to emergency eyewash with NPS ½ inlet piping rated for a flow of 0.32 L/s.
- .2 Alarm horn and strobe light to be wall-mounted above and to side of emergency eyewash. Ensure audible horn points away from injured person.
- .3 Construction: Same as Item 2.25, except flow switch sized as per Item 2.26.1 above.
- .4 Acceptable Product: Bradley Model S19-320A, HAWS, Guardian.

## **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 Canadian Plumbing Code , and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

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### **3.3 CLEANOUTS**

- .1 In addition to those required by code, and as indicated, install at base of soil and waste stacks, and rainwater leaders.
- .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.

### **3.4 NON FREEZE WALL HYDRANTS**

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

### **3.5 WATER HAMMER ARRESTORS**

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

### **3.6 BACK FLOW PREVENTORS**

- .1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.
  - .1 Reduced pressure type where backflow would constitute a health hazard.
  - .2 Double check type where backflow would constitute a nuisance or be aesthetically objectionable or material which would not constitute a health hazard.
- .2 Pipe discharge to terminate over nearest drain and or service sink.

### **3.7 BACKWATER VALVES**

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

### **3.8 HOSE BIBBS AND SEDIMENT FAUCETS**

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

### **3.9 TRAP SEAL PRIMERS**

- .1 Install for floor drains and elsewhere, as indicated.
- .2 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Department Representative.
- .3 Install Type K soft copper tubing to floor drain.

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**3.10 STRAINERS**

- .1 Install with sufficient room to remove basket.

**3.11 GREASE INTERCEPTORS**

- .1 Install with sufficient space, as indicated, for ease of maintenance.

**3.12 WATER METERS**

- .1 Install water meter provided by local water authority.
- .2 Install water meter as indicated.

**3.13 WATER MAKE-UP ASSEMBLY**

- .1 Install on valved bypass.
- .2 Pipe discharge from relief valve to nearest floor drain.

**3.14 CHEMICAL DILUTION TANK**

- .1 Install with sufficient space, as indicated, for ease of maintenance.

**3.15 CHEMICAL DILUTION TANK SEDIMENT INTERCEPTOR**

- .1 Install with sufficient space, as indicated, for ease of maintenance.

**3.16 START-UP AND COMMISSIONING**

- .1 General:
  - .1 In accordance with Section 01 91 13 - General Commissioning (Cx)  
Requirements: supplemented as specified herein.
- .2 Timing: Start-up only after:
  - .1 Pressure tests have been completed.
  - .2 Disinfection procedures have been completed.
  - .3 Water treatment systems operational.
- .3 Provide continuous supervision during start-up.

**3.17 TESTING AND ADJUSTING**

- .1 General:
  - .1 In accordance with Section 01 91 13 - General Commissioning (Cx)  
Requirements: supplemented as specified herein.

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- .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 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, removeability of strainer.
    - .5 Clean out baskets.
  - .6 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.
  - .7 Roof drains:
    - .1 Check location at low points in roof.
    - .2 Check security, removeability of dome.
    - .3 Adjust weirs to suit actual roof slopes, meet requirements of design.
    - .4 Clean out sumps.
    - .5 Verify provisions for movement of roof systems.
  - .8 Access doors:
    - .1 Verify size and location relative to items to be accessed.
  - .9 Cleanouts:
    - .1 Verify covers are gas-tight, secure, yet readily removable.
  - .10 Water hammer arrestors:
    - .1 Verify proper installation of correct type of water hammer arrester.
  - .11 Wall, Ground hydrants:

- .1 Verify complete drainage, freeze protection.
- .2 Verify operation of vacuum breakers.
- .12 Pressure regulators, PRV assemblies:
  - .1 Adjust settings to suit locations, flow rates, pressure conditions.
- .13 Strainers:
  - .1 Clean out repeatedly until clear.
  - .2 Verify accessibility of cleanout plug and basket.
  - .3 Verify that cleanout plug does not leak.
- .14 Grease interceptors:
  - .1 Activate, using manufacturer's recommended procedures and materials.
- .15 Hose bibbs, sediment faucets:
  - .1 Verify operation and at all low points.
- .16 Hydronic system water Make-up Assembly:
  - .1 Verify operation.

- .17 Water meters:
  - .1 Verify calibration certificate.
- .18 Dilution Tank:
  - .1 Install as per manufacturer's instructions.
  - .2 Fill with limestone chips.
- .19 Tempered water assemblies:
  - .1 Verify operation of Hi/Lo tempered water assemblies at both high and low flow conditions.
  - .2 Verify proper discharge temperature setpoint for all tempered water assemblies including those serving emergency fixtures.
- .20 Commissioning Reports:
  - .1 Requirements: supplemented as specified herein.
- .21 Training:
  - .1 Requirements: supplemented as specified herein.
  - .2 Demonstrate full compliance with Design Criteria.

**END OF SECTION**