Part 1 General

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.3 Shop drawings and product data accompanied by:

- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Points of operation on performance curves.
- .3 Manufacturer to certify current model production.
- .4 Certification of compliance to applicable codes.

.4 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data to include:
  - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
  - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
  - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.6 Approvals:

.1 Submit 1 copy of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.

.2 Make changes as required and re-submit as directed by Departmental Representative.

.7 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems.

.2 Transfer information daily to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Departmental Representative for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.3 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

Part 2 Products

2.1 MATERIALS

.1 Section not used.

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 20- Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers and screens.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

.1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Trial usage to apply to following equipment and systems:

.1 Water heating systems.

.3 to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.5 Instruction duration time requirements as specified in appropriate sections.

3.5 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

PART 1 General

1.1 DEFINITIONS

.1 For purposes of this section:

.1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" - will mean "not concealed" as defined herein.

1.2 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit for approval manufacturer's catalogue literature related to installation, fabrication for pipe, fittings, valves and jointing recommendations.

1.3 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed. Mount sample on 12 mm plywood board. Affix typewritten label beneath sample indicating service.

1.4 MANUFACTURERS' INSTRUCTIONS

.1 Submit manufacturers' installation instructions in accordance with Section 01 33 00 - Submittal Procedures.

.2 Installation instructions to include procedures to be used, installation standards to be achieved.

1.5 QUALIFICATIONS

.1 Installer to be specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.2 Protect from weather, construction traffic.

.3 Protect against damage from any source.

.4 Store at temperatures and conditions required by manufacturer.

PART 2 Products

2.1 FIRE AND SMOKE RATING

.1 In accordance with CAN/ULC-S102.

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity ("k" factor) not to exceed specified values at 24°C mean temperature when tested in accordance with ASTM C335.

.3 TIAC Code A-1: Rigid moulded mineral fiber without factory applied vapour retarder jacket (as scheduled in Part 3 of this section).

.1 Maximum ‘k’ valve at 38˚C mean temperature of 0.035 (SI).

.2 White kraft paper bonded to glass fiber reinforced aluminum foil.

.4 TIAC Code A-3: Rigid moulded mineral fibre with factory applied vapour retarder jacket to CGSB 51-GP-52M (as scheduled in Part 3 of this section).

.1 Maximum ‘k’ valve at 38˚C mean temperature of 0.035 (SI).

.2 White kraft paper bonded to glass fiber reinforced aluminum foil.

.5 TIAC Code A-6: Flexible unicellular tubular elastomer.

.1 Insulation: to ASTM C534..

.2 Maximum "k" factor: 0.27.

.6 Acceptable Material: Knauf, Owens Corning, Johns Manville, Certain Teed, Armstrong.

2.3 INSULATION SECUREMENT

.1 Tape: Self-adhesive, aluminum, plain reinforced, 50 mm wide minimum.

.2 Contact adhesive: Quick setting.

.3 Canvas adhesive: Washable.

.4 Tie wire: 1.5 mm diameter stainless steel.

.5 Bands: Stainless steel, 19 mm wide, 0.5 mm thick.

2.4 CEMENT

.1 Thermal insulating and finishing cement:

.1 Hydraulic setting on mineral wool, to ASTM C449/C449M.

2.5 VAPOUR RETARDER LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

2.6 INDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 OUTDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

.2 Reinforcing fabric: Fibrous glass, untreated 305 g/m2.

2.8 JACKETS

.1 Polyvinyl Chloride (PVC):

- .1 One-piece moulded type and sheet to CAN/CGSB-51.53 with pre-formed shapes as required.
- .2 Colour: white.
- .3 Minimum service temperatures: -20°C.
- .4 Maximum service temperature: 65°C.
- .5 Moisture vapour transmission: 0.02 perm.
- .6 Thickness: 0.5 mm.
- .7 Fastenings:
  - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
  - .2 Tacks.

.2 Canvas:

- .1 220 gm/m2 cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
- .2 Lagging adhesive: Compatible with insulation.

.3 Aluminum:

- .1 To ASTM B209.
- .2 Thickness: 0.50 mm sheet.
- .3 Finish: Stucco embossed.
- .4 Joining: Longitudinal and circumferential slip joints with 50 mm laps.
- .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
- .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.

2.9 WEATHERPROOF CAULKING FOR JACKETS INSTALLED OUTDOORS

.1 Caulking to: Section 07 92 10 - Joint Sealers.

PART 3 Execution

3.1 PRE- INSTALLATION REQUIREMENT

.1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.

.2 Surfaces to be clean, dry, free from foreign material.

3.2 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturers instructions and this specification.

.3 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Hangers, supports to be outside vapour retarder jacket.

.5 Supports, Hangers:

.1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.3 INSTALLATION OF ELASTOMERIC INSULATION

.1 Insulation to remain dry at all times. Overlaps to manufacturers instructions. Ensure tight joints.

.2 Provide vapour retarder as recommended by manufacturer.

3.4 PIPING INSULATION SCHEDULES

.1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.

.2 TIAC Code: A-1.

.1 Securements: SS Wire Bands Tape at 300 mm oc.

.2 Seals: lap seal adhesive, lagging adhesive.

.3 Installation: TIAC Code 1501-H.

.3 TIAC Code: A-3.

.1 Securements: SS Wire at 300 mm oc.

.2 Seals: VR lap seal adhesive, VR lagging adhesive.

.3 Installation: TIAC Code: 1501-C.

.4 TIAC Code: A-6.

.1 Insulation securements: as listed by Manufacturer..

.2 Seals: lap seal adhesive, lagging adhesive.

.5 Thickness of insulation to be as listed in following table.

.1 Run-outs to individual units and equipment not exceeding 4000 mm long.

.2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	Temp °C	TIAC code	Pipe sizes (NPS) and insulation thickness (mm)					
			Run out	to 1	1 1/4 to 2	2 1/2 to 4	5 to 6	8 & over
Domestic HWS		A-1	25	25	25	38	38	38
Domestic CWS		A-3	25	25	25	25	25	25
Sanitary Sewer Vent (See Note 1)		A-3				25	25	
Note 1	Insulate sanitary sewer vent piping from cold air terminus continuously through cold interior building areas and to 2 m into warm building area.							

.6 Finishes:

.1 Exposed indoors: Canvas, Aluminum or PVC jacket.

.2 Exposed in mechanical rooms: Canvas, Aluminum or PVC jacket.

.3 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.

.4 Outdoors: Water-proof Aluminum jacket.

.5 Finish attachments: SS bands, at 150 mm oc. Seals: wing.

.6 Installation: To appropriate TIAC code CRF/1 through CPF/5.

END OF SECTION

PART 1 General

1.1 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit data for following: valves.

1.2 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 Domestic hot and cold systems within building.

.1 Above ground: copper tube, hard drawn, type L: to ASTM B88.

2.2 FITTINGS

.1 Bronze pipe flanges and flanged fittings, Class 150 and 300: to ANSI/ASME B16.24.

.2 Cast bronze threaded fittings, Class 125 and 250: 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.

.5 NPS2.5 and larger: roll grooved to CSA B242.

2.3 JOINTS

.1 Rubber gaskets, 1.6 mm thick: to ANSI/AWWA C111/A21.11.

.2 Bolts, nuts, hex head and washers: to ASTM A307, 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 20 10 07 Mechanical - General Valves - Bronze.

.2 Acceptable material: Crane, Toyo, MAS.

.2 NPS2 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 20 10 07 - Valves - Bronze.

.2 Acceptable material: Crane, Toyo, MAS.

2.5 BALL VALVES

.1 NPS2 and under, screwed:

.1 Class 150.

.2 Bronze body, chrome plated brass ball, PTFE Teflon adjustable packing, brass gland and PTFE Teflon seat, steel lever handle as specified Section 20 10 07 Mechanical- General Valves - Bronze.

.3 Acceptable material: Crane, Toyo, MAS.

.2 NPS2 and under, soldered:

.1 To ANSI/ASME B16.18, Class 150.

.2 Bronze body, chrome plated brass ball, PTFE Teflon adjustable packing, brass gland and PTFE Teflon seat, steel lever handle, with NPT to copper adaptors as specified Section 20 10 07 Mechanical- General Valves - Bronze..

.3 Acceptable material: Crane, Toyo, MAS.

PART 3 Execution

3.1 INSTALLATION

.1 Install in accordance with Canadian Plumbing Code and local authority having jurisdiction.

.2 Assemble piping using fittings manufactured to ANSI standards.

.3 Install CWS piping away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.

.4 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 butterfly or ball valves.

3.3 PRESSURE TESTS

.1 Conform to requirements of Section 20 05 00 Mechanical- General Requirements.

.2 Test pressure: greater of 1 1/2 times maximum system operating pressure or 860 kPa.

3.4 FLUSHING AND CLEANING

.1 Flush entire system for 2 h.

3.5 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that air chambers, expansion compensators are installed properly.

3.6 PERFORMANCE VERIFICATION (PV)

.1 Timing:

.1 After pressure and leakage tests and disinfection completed, and certificate of completion has been issued by authority having jurisdiction.

.2 Procedures:

.1 Verify that flow rate and pressure meet Design Criteria.

.2 TAB HWC in accordance with Section 23 05 93 HVAC - Testing Adjusting and Balancing (TAB).

.3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

.4 Verify performance of temperature controls.

.5 Verify compliance with safety and health requirements.

.6 Check for proper operation of water hammer arrestors. Run each outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor. Repeat for outlets and flush valves.

END OF SECTION

PART 1 General

1.1 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

PART 2 Products

2.1 PIPING AND FITTINGS

.1 DWV piping to:

.1 CSA-B181.2.

.2 Do not use standard PVC-DWV for sections of piping located in a space used for movement of return air. Pipe and fittings shall be formulated for flame spread of 0 and Smoke Developed of 35. No field applied coatings will be acceptable except where used to recoat piping joints.

.1 Acceptable product: IPEX XFR

2.2 JOINTS

.1 Solvent weld for PVC: to ASTM D2564.

.2 Transition couplings. To be completed.

PART 3 Execution

3.1 INSTALLATION

.1 Install in accordance with Canadian Plumbing Code an local authority having jurisdiction.

.2 Where pipe or fittings are located within a space to be used for transport of return air, provide treated system to meet Flame Spread of 0 and Smoke Developed of 35 when tested to CAN/ULC S102.2. Only field joints may be coated in field. Provide all pipe and fittings of factory treated material. Install according to Manufacturers certified procedures, using compatible solvent cement and primer.

3.2 TESTING

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

3.3 PERFORMANCE VERIFICATION (PV)

.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 (sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 2.4 m (whichever is less).

END OF SECTION

PART 1 General

1.1 SHOP DRAWINGS

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate, for all fixtures and trim:

.1 Dimensions, construction details and materials, roughing-in dimensions, performance.

1.2 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, capacity.

.2 Details of operation, servicing and maintenance.

.3 List of recommended spare parts.

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. Quantities shown on Mechanical drawings may not be reduced.

.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 Sinks

.1 S-1: Standard type, single compartment, stainless steel

.1 Fixture: Single compartment with faucet ledge, 20 ga. Type 302 18-8 stainless steel. Self rimming. Bowl dimensions: 16 in (f/b) x 18 in (w) x 8 in (deep). Drilled to match faucet.

.1 Acceptable product: Kindred LBS 6808-1

.2 Faucet: Heavy duty cast brass with polished chrome plating. Two handle, 8 in centres with 8 in tubular spout, vandal resistant aerator (1.5gpm) and 3 in lever handles. Ceramic cartridges.

.1 Acceptable product: Delta Commercial 26C3233

.3 Trim: Basket strainer drain fitting with cast brass trap complete with union nut connection and clean out.

.2 S-2: Standard type, Janitor mop sink, single compartment, floor type.

.1 Fixture: Single compartment floor mounted janitor mop sink of pressure molded plastic complete with stainless steel drain body. Bowl dimensions: 24 in (f/b) x 24 in (w) x 10 in (deep). Fixture shall be complete with flat stainless steel strainer, vinyl bumper guard on exposed edges and stainless steel wall guard on wall sides. 24 in wall mount mop bracket.

.1 Acceptable product: Fiat MSB-2424, 889-CC, E-77-AA, 1453 B8, MSG 2424.

.2 Faucet: Heavy duty cast brass with rough chrome finish. Two handle, 8 in centres, pail hook, inline vacuum breaker, hose-end spout and wall brace. Include heavy duty 48 in long hose c/w hanger bracket.

.1 Acceptable product: Delta Commercial 28C2383

.8 Lavatory Basins

.1 L-1: Barrier Free,

.1 Fixture: Vitreous china wall hung-white. Ledge back with front overflow. Drilled for 4 in centres faucet and concealed arm carrier. Bowel dimensions: ~10 in (f/b) x ~ 16 in (w) x ~6 in (deep).

.1 Acceptable product: Contrac Chelsea 4640BHW

.2 Faucet: Heavy duty cast brass with polished chrome plate. Two handle, 4 in centres, vandal resistant aerator (1.5gpm) aerator and 4 in blade handles. Ceramic cartridges.

.1 Acceptable product: Delta Commercial 21C133.

.3 Carrier: Concealed arm, floor supported carrier with steel uprights c/w welded feet, cast iron adjustable headers, concealed arms with fixtures locking devices and alignment truss. Note that top of upright shall be fastened into wall structure.

.1 Acceptable product: Zurn Z1231.

.4 Drainage: Offset open grid strainer, cast brass chrome plated with overflow holes. Cast brass chrome plated p-trap with cleanout plug. Cover trap, offset and water supplies with preformed vinyl covered insulation guard, white in color.

.1 Acceptable product: Delta Commercial 33T290, 33T311 with Truebro Handi-Lav-Guard

.9

.1 WC-1: Standard Type, Flush tank, Floor mounted, Barrier free

.1 Fixture: White vitreous china elongated bowl flush tank water closet. Siphon action with 3 in flush valve and 1Gpf operation. Fully glazed 2 in trapway with 2 in ball pass. 17 in high rim with 8 in x 6 ½ in water surface.

.1 Acceptable product: Contrac CLEO 5721BOY

.2 Seat: White heavy duty plastic open front and cover for elongated bowl. Stainless steel hinge posts, pintels and hardware. Stainless steel fasteners.

.1 Acceptable product: Centoco 820STSS

.10 Fixture Piping

.1 Water supplies

.1 Chrome plated flexible copper supply pipes with screw driver ball valve style stops and chrome escutcheons.

.2 Waste

.1 Chrome plated brass p-trap with cleanout with chrome escutcheon.

PART 3 Execution

3.1 INSTALLATION

.1 Mounting heights:

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

.2 Wall-hung fixtures: as indicated, measured from finished floor.

.3 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651.

3.2 ADJUSTING

.1 Conform to water use requirements specified in this section.

.2 Adjustments

.1 Adjust water flow rate to design flow rates.

.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

.3 Checks

.1 Aerators: operation, cleanliness.

.2 Vacuum breakers, backflow preventers: operation under all conditions.

.3 Wash fountains: operation of flow-actuating devices.

END OF SECTION

PART 1 General

1.1 SUBMITTALS

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 For shop drawings, indicate dimensions, construction details and materials.

.3 For product data, indicate dimensions, construction details and materials for items specified herein.

1.2 CLOSEOUT SUBMITTALS

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

.2 Data to include:

.1 Description of plumbing specialties and accessories, giving manufacturers name, type, model and capacity.

.2 Details of operation, servicing and maintenance.

.3 Recommended spare parts list.

PART 2 Products

2.1 FLOOR DRAINS

.1 Floor drains: to CSA B79.

.2 Type FD-1: general duty, cast iron body, extra heavy duty nickel bronze strainer, integral seepage pan and trap primer tapping.

.1 Acceptable material: Mifab F1100 (5)-7

.3 Type FFD-1: general duty funnel floor drain, cast iron body, nickel bronze adjustable strainer head and grate with 4in round funnel.

.1 Acceptable material: Mifab F1100-EF

2.2 CLEANOUTS

.1 Access covers:

.1 Floor access: round cast iron body and frame with secured heavy duty nickel bronze top and with body as specified for Type FD-1 Floor drain and solid gasketted top.:

.1 Plugs: bolted bronze with neoprene gasket.

.2 Cover for all floor types: nickel bronze heavy duty round 12mm thick scoriated cover, gasket, vandal-proof screws.

.1 Acceptable material: Mifab F1230-WF + C1100-RC.

2.3 BACK FLOW PREVENTERS

.1 All backflow prevention device installations shall conform to the requirements of CANCSA-B61.10-94 'Manual for the Selection, Installation, Maintenance, and Field Testing of Backflow Prevention Devices'.

.2 Double Check Valve Assemble (DCVA)

.1 DCVA shall consist of two internally loaded check valves, two ball type isolation valves and one y-strainer.

.2 Unit shall be constructed with bronze body, stainless steel springs and fasteners with replaceable resilient rubber seats and top mounted test cocks.

.3 Provide top access for maintenance and repair.

.4 Maximum working pressure: 175 psig.

.5 Temperature range: 33°F – 180°F.

.6 Acceptable material: Apollo 4A-11X-A2F

2.4 THERMAL EXPANSION TANKS

.1 Steel pressure tank with baked on epoxy coating, butyl diaphragm. Pre-charged, adjustable in field. Approved for potable water service.

.2 Tank capacity: 2.1 gallons

.3 Expansion capacity: 1.6 gallons

.4 Acceptable Product: Watts PLT-5

2.5 TRAP SEAL PRIMER

.1 Pressure drop activated trap seal primer shall be brass constructed complete with removable filter screen.

.1 Acceptable product: MR-500

PART 3 Execution

3.1 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.

3.2 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.

3.3 WATER HAMMER ARRESTORS

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

3.4 BACK FLOW PREVENTORS

.1 All backflow preventers shall be installed in readily accessible locations for testing and maintenance.

.2 BFP's shall be installed level and oriented along building lines. All BFP's shall be installed within 1.5m above floor except where noted on drawing.

.3 Upon completion of installation, retain services of Registered Testing Contractor to perform initial testing as set out in CAN/CSA-B64.10-94. Provide written test results prior to Substantial Performance.

3.5 THERMAL EXPANSION TANKS

.1 Install tanks in horizontal or vertical up position. Do not install in vertical down orientation.

.2 Support tank independently from structure.

3.6 TRAP SEAL PRIMER

.1 Install for floor drains and elsewhere, as indicated.

.2 Install PEX tubing to floor drain. Pipe shall be installed in continuous lengths embedded in concrete floor.

3.7 START-UP

.1 General:

.1 In accordance with Section 20 10 02 - Commissioning: General Requirements, supplemented as specified herein.

.2 Timing: Start-up only after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Certificate of static completion has been issued.

.4 Water treatment systems operational.

.3 Provide continuous supervision during start-up.

3.8 TESTING AND ADJUSTING

.1 General:

.1 In accordance with Section 20 10 02 - Commissioning: General Requirements, supplemented as specified herein.

.2 Timing:

.1 After start-up deficiencies rectified.

.2 After certificate of completion has been issued by authority having jurisdiction.

.3 Application tolerances:

.1 Flow rate at fixtures: +/- 10%.

.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:

.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 Cleanouts:

.1 Verify covers are gas-tight, secure, yet readily removeable.

.8 Commissioning Reports:

.1 In accordance with Section 20 10 02 - Commissioning: Reports, supplemented as specified herein.

.9 Training:

.1 In accordance with Section 20 10 02 - Commissioning: Training of O&M Personnel, supplemented as specified herein.

.2 Demonstrate full compliance with Design Criteria.

END OF SECTION