

---

**EXTERIOR CONTAINMENT SYSTEMS**

---

**1. GENERAL**

**1.1 Scope**

.1 The following statement generally describes the scope of work included in this Section:

- .1 Piping and fittings for double walled contained underground drainage piping from new exterior concrete slabs to existing exterior concrete holding tank.

**1.2 Related Work Specified In Other Sections**

.1 Not used.

**1.3 Submittals**

.1 Shop Drawings: Submit Shop Drawings for all products specified in this Section except pipe and fittings unless otherwise stated below. Shop Drawings are to include all components including but not limited to panel layout drawings, wiring diagrams with wire numbers, individual components within panel, motor shop drawing, etc.

.2 Shop Drawings shall be provided for:

.1 Double Containment Piping systems.

.1 Include details of pipe fabrications, prefabricated double containment fitting dimensions, starting and terminating connections.

.2 Submit joint details, and all other pertinent technical data for all piping to be furnished.

.2 Concrete slab drains.

.3 Insulation products.

.3 Test Data: Submit the following test data prior to application for Substantial Performance.

.1 Pipe leakage test sheets as per Section 23 08 01 - Performance Verification Mechanical Piping Systems.

**1.4 Quality Assurance**

.1 The double containment piping system shall be prefabricated.

.2 The system shall be fabricated, installed and tested in accordance with manufacturer's recommendations and as specified herein and shall be suitable for the intended service. Contractors shall have installation training by manufacturer or qualified representative prior to installation. Manufacturer shall have a minimum of five (5) years' experience. Contractor shall not design and/or fabricate the piping system.

**2. PRODUCTS**

---

**EXTERIOR CONTAINMENT SYSTEMS**

---

**2.1 Pipe, Fittings and Joints – Concrete Slab and Drip Tray Drainage**

- .1 Single Wall PVC DWV Piping - within liner contained areas:
  - .1 Schedule 40 PVC carrier piping system.
  - .2 Socket solvent welded, or fusion connections.
  - .3 All fittings shall be by the manufacturer of the piping, and designed for the application.
  - .4 Acceptable Material: IPEX, or approved equivalent in accordance with B7.
- .2 PVC or HPDE Double Containment DWV Piping – beyond liner contained areas:
  - .1 Schedule 40 PVC primary (carrier) piping system supported within a schedule 80 PVC secondary containment housing.
  - .2 Interstitial supporting devices shall be made from Polypropylene Centra-Guide supports and shall be provided within the secondary containment pipe, and shall be designed to allow continuous drainage in the annular space to the drain points.
  - .3 All fittings shall be by the manufacturer of the piping, and designed for the double walled containment application.
  - .4 Acceptable Material: IPEX Guardian double containment piping system, or approved equivalent in accordance with B7.

**2.2 Concrete Slab Drains**

- .1 Square top, heavy duty parking lot drain.
- .2 Epoxy coated cast aluminum body.
- .3 Bottom outlet (for 150 mm).
- .4 Zurn ZAL625-HY or approved equivalent in accordance with B7.

**2.3 Track Drip Trays**

- .1 UV inhibited polyethylene or equivalent non-metallic drip tray system.
- .2 Suitable for steel rail profile with total overall track height of 125 mm (rail height of 113 mm, plus 12 mm tie plate).
- .3 Coverage:
  - .1 Minimum Length: 2700 mm.
  - .2 Width:
    - .1 Between rails: Full coverage.
    - .2 Each side of rails: minimum 650 mm.

---

**EXTERIOR CONTAINMENT SYSTEMS**

---

- .4 Drainage:
  - .1 Integrated inter-pan drainage connections, and main drain outlet connection.
  - .2 Low point side or bottom main system drainage, with integrated connection for minimum 75mm PVC schedule 40 pipe.
- .5 Closed cell EPDM rail to pan gaskets, and for any other gasketed connections.
- .6 UV Inhibited polyethylene or equivalent non-metallic, serrated full coverage gratings.
- .7 All components from single manufacturer.
- .8 Acceptable Material: Ultra-Tech Ultra-Track Pan system.

**2.4 Impermeable Secondary Containment Liner**

- .1 Coverage as indicated on the drawings.
- .2 Polyester 254g/sq.m.
- .3 Thickness: Minimum 1.0 mm nominal.
- .4 Low Temperature Rating, to ASTM D2136: -40°C or colder.
- .5 Bursting Strength: Minimum: 200 N
- .6 Hydrostatic Resistance, ASTM D751 Procedure A: 0.50 MPa or better
- .7 Blocking Resistance, ASTM D751 (82C): #2 rating.
- .8 Acceptable Material: Titan Petrogard VII or approved equivalent in accordance with B7.

**2.5 Monitoring Well for Containment Liner Basin**

- .1 As indicated on the Drawings.
- .2 PVC Schedule 40 monitoring well casing and fittings, nominal 100 mm pipe size.
- .3 Lower screening to be: 0.5mm slots on 6.35mm centers in all four quadrants of the pipe, or approved equivalent in accordance with B7, complete with bottom cap/plug and filter wrap to prevent soil particle infiltration.
- .4 Minimum screening/slotted pipe length: 300 mm.
- .5 Top 200 mm PVC or cast iron "manway" fitting suitable for installation in concrete slab.
- .6 Liquid tight compression fit top cap/plug.
  - .1 Removable without tools.
  - .2 Buna N or approved compression member.

---

**EXTERIOR CONTAINMENT SYSTEMS**

---

- .3 Top permanently marked indicating "CAUTION DO NOT FILL – MONITORING WELL" or equivalent wording.
- .7 Acceptable Material: Franklin Fueling Systems Model 800-4K Monitoring Well Package, or approved equivalent in accordance with B7.

**3. EXECUTION**

**3.1 Piping Installation Requirements**

- .1 Tracer Wire For non-metallic underground pipe: Prior to backfilling, secure light coloured plastic insulated #14 gge TW solid copper wire to the top of all buried PVC pipe secured to the top of the pipe with plastic type ties for the entire length of the pipe for pipe location tracing purposes.
- .2 Install and slope underground drainage piping to inverts or slopes indicated on the Drawings to facilitate straight and true gradients between the points shown. Verify available slopes before installing the pipes.
- .3 Install, clean and test system according to manufacturer's instructions.

**3.2 Installation of Drains**

- .1 Install according to manufacturer's recommendations for the type of installation.
- .2 Temporarily plug drains during construction procedures. Remove plugs during final clean-up work and demonstrate free and clear operation of each drain. Replace any damaged grates.

**3.3 Impermeable Liner**

- .1 Install according to manufacturer's instructions.
- .2 Installation by or under direct supervision of manufacturer trained representative.
- .3 Test according to ASTM - D4437 – Standard Practice For Non-Destructive Testing For Determining The Integrity Of Seams Used In Joining Flexible Polymeric Sheet Geomembranes.

**3.4 Cleaning**

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

**END OF SECTION**

---

**PIPE INSULATION AND HEAT TRACING SYSTEM**

---

**1. GENERAL**

**1.1 Scope**

.1 The following statement generally describes the scope of work included in this Section:

.1 Heat tracing and insulation for exterior drain piping.

**1.2 Related Work Specified In Other Sections**

.1 Not used.

**1.3 Submittals**

.1 Shop Drawings: Submit Shop Drawings for all products specified in this Section except pipe and fittings unless otherwise stated below. Shop Drawings are to include all components including but not limited to panel layout drawings, wiring diagrams with wire numbers, individual components within panel, motor shop drawing, etc.

.2 Shop Drawings shall be provided for:

.1 Heat Tracing System.

.2 Insulation Products.

.3 Test Data: Submit the following test data prior to application for Substantial Performance.

.1 Pipe leakage test sheets as per Section 22 05 00 - Common Work Results for Plumbing.

**1.4 Quality Assurance**

.1 Manufacturer shall have a minimum of five (5) years' experience with the product line.

**2. PRODUCTS**

**2.1 Heat Tracing**

.1 Heat tracing for single wall and double wall PVC drainage pipe serving the drip tray and concrete slab as shown on the Drawings.

.1 Cable:

.1 CSA Certified for use on plastic pipe. The manufacturer will be required to provide documentation of same.

.2 Provide two installed systems running the full length of the pipe.

.1 One cable to be wired to the controller

.2 One cable is to be labelled as spare and terminated in an electrical box adjacent to the controller with a label saying "spare heat trace".

---

**PIPE INSULATION AND HEAT TRACING SYSTEM**

---

- .2 Self-regulating heat tracing cable, with rated output of 16 watts per meter.
- .3 Power: 110 volt single phase,.
- .4 Acceptable Material: Raychem/Pentair XL Trace or approved equivalent in accordance with B7.
- .5 Controller:
  - .1 Electronic, ambient air temperature sensing.
  - .2 Adjustable Setpoint: 0°C to 25°C or broader.
  - .3 Dead band: maximum 1.8°C at 0°C
  - .4 Manufacturer approved for heat tracing cable and installation.
- .6 Acceptable Material: Raychem/Pentair DigiTrace EC-TS or approved equivalent in accordance with B7.

**2.2 Insulation:**

- .1 Rigid insulation installed in box configuration around the drainage piping.
- .2 Shall conform to CAN/ULC S701 Type 4, extruded polystyrene foam.
- .3 The insulation shall have a minimum compressive strength of 415 kPa (60 psi).
- .4 Acceptable Material: Dow Highload Styrofoam or approved equivalent in accordance with B7.

**3. EXECUTION**

**3.1 Heat Trace Cable and Controllers**

- .1 Installation of Heat Trace Cable
  - .1 Install heat trace cable as noted on the Drawings.
  - .2 Install heat tracing cable according to circuit length and geometry on approved Shop Drawings. Installation of cable shall conform to the manufacturer's instructions and the applicable requirements of the Canadian Electrical Code (CEC). Under no circumstances should the length of pull exceed the maximum recommended by the manufacturer.
  - .3 Written approval of the manufacturer shall be provided in regard to the installation and testing (as outlined herein) of all heat trace cable.
  - .4 Splicing, branching and terminating of heating cable shall be performed using approved specialized heat shrink kits specifically designed for that purpose and meeting the requirements of the manufacturer.
  - .5 Install approved end seal kits at cable circuit ends as per the manufacturer's instructions.

---

**PIPE INSULATION AND HEAT TRACING SYSTEM**

---

- .6 On/off sensors shall be installed during construction. Location of sensor must be identified on Shop Drawings and consistent with Purchaser's Drawings of typical hook-up. Must be installed at location representative of ambient temperature on circuit.
- .7 Heat trace cable and electrical appurtenances shall be installed in such a manner as to maintain the integrity of and prevent damage to the pipe, insulation, and the cable itself and its appurtenances.
- .8 To facilitate future connections, the Contractor is to provide sufficient length of heat trace cable and thermistor wire in his installations to enable a complete and functional connection.
  - .1 Additional heat trace cable shall be coiled up below ground at the termination of the piping and covered with a sheet of plywood to protect cable during future excavation. Do not backfill until approved by the Contract Administrator.
- .2 Testing
  - .1 Test each circuit of sufficient voltage to confirm whether the circuit will function in its intended manner and is without deficiency.
  - .2 Each circuit shall be checked before, during, and after installation and the results recorded.
  - .3 All testing shall be witnessed by the Contract Administrator.
  - .4 Should the resistance drop be in excess of that recommended by the manufacturer of the cable, the Contractor shall determine the cause, rectify same, and re-test the circuit.
- .3 Records for the Heat Trace Installation
  - .1 The Contractor shall provide the Contract Administrator the following records with respect to the construction of the heat trace system and its related controllers.
  - .2 A Drawing of the completed installation showing the location of all terminations, splices, etc. in sufficient detail and of sufficient accuracy for the Purchaser to locate these features in the future. All terminations, splices, etc. shall be tied to a readily identifiable surface feature such as a hydrant, valve, or building face.
  - .3 A record of each circuit in the heat trace system complete with the appropriate data on circuit length, cable type, and tabulated results of all testing.

**3.2 Cleaning**

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

**END OF SECTION**