

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 01 00 10 – General Instructions.
- .2 Section 07 52 00 – Modified Bituminous Membrane Roofing.
- .3 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .4 Section 08 11 00 – Metal Doors and Frames
- .5 Section 08 71 00 – Door Hardware
- .6 Section 09 91 13 – Exterior Painting.
- .7 Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment
- .8 Section 23 09 33 - Electric And Electronic Control System for HVAC.
- .9 Section 23 11 13 - Facility Fuel-Oil Piping.
- .10 Section 23 31 13.01 - Metal Ducts Low Pressure to 500 - Pa
- .11 Section 23 32 48 - Acoustical Air Plenums
- .12 Section 23 33 15 - Dampers – Operating
- .13 Section 23 34 00 - HVAC Fans.
- .14 Section 23 37 20 - Louvres, Intakes and Vents.
- .15 Section 23 82 39.01 - Unit Heaters – Electric.
- .16 Section 26 05 00 - Common Work Results for Electrical.
- .17 Section 26 05 49 – Seismic Restraint Systems (SRS).
- .18 Section 26 23 00 - Low Voltage Switchgear.
- .19 Section 26 32 13.01 – Power Generating Diesel.
- .20 Section 26 50 00 – Lighting.
- .21 Section 33 56 13 – Aboveground Fuel Storage Tanks.

**1.2 REFERENCES**

- .1 National Building Code, (NBC) 2010
- .2 Canadian Standards Association (CSA)
  - .1 CSA C22.1-12, Canadian Electrical Code, Part I (22<sup>nd</sup> Edition), Safety Standard for Electrical Installations. ESA OESC-2012, Ontario Electrical Safety Code, 25<sup>th</sup> Edition, Electrical Safety Authority 2012.

- .3 Underwriters' Laboratories Inc. (UL)
  - .1 UL508A-2001, Industrial Control Panels.

### **1.3 SOURCE QUALITY CONTROL**

- .1 Installations in this section are subject to coordination with all trades and with equipment suppliers to ensure that equipment and associated components are installed in accordance with the manufacturers' recommendations and associated contract specifications.
- .2 Throughout the construction of the enclosures, the manufacturer shall arrange and pay all costs associated with independent third party inspections. A written and photographic report shall be submitted. A minimum of six (6) inspections shall be conducted. All reports shall be signed and sealed by a professional engineer certified in the province of Ontario.
- .3 Prior to shipment, arrange for an inspection of the enclosure and associated equipment. Notify departmental representative 14 days in advance of this inspection and review.

### **1.4 DESCRIPTION AND CONFIGURATION**

- .1 The two (2) prefabricated enclosures will be located remotely from the existing building and shall be constructed to house an engine generator including all electrical accessories, fuel tank, fuel piping and electrical distribution switchgear. Refer to drawings for system layout and configuration of the new enclosures and existing generator enclosure.
- .2 Provide free-standing modular enclosures as follows:
  - .1 With a standard modular width, approximately 4.00 m wide.
  - .2 Designed to resist the loads outlined herein.
- .3 The enclosures must be a uniform configuration and have the appearance of a single enclosure when put in place.
- .4 In addition to the new enclosures, the Departmental Representative will supply an existing enclosure that houses an engine generator which will form part of the enclosure assembly.

### **1.5 DESIGN REQUIREMENTS**

- .1 The enclosures shall be designed and fabricated to be connected together to form a single assembly.
- .2 Design members to withstand the following loads and combinations of loads in accordance with NBC within acceptable deflection limitations:
  - .1 Snow load
  - .2 Wind load
  - .3 Earthquake load
  - .4 Self-weight of structure, dead loads including ceilings, roofing including electrical cable conduit, cable tray, mechanical piping and mechanical units.  
**Ensure that the roof structure is designed to carry all suspended electrical and mechanical systems loads.**

- .5 Live loads.
- .3 In addition to uniform live load, design members for full live load on leeward half of building frame and zero live load on windward half.
- .4 Design building enclosure elements to accommodate, by means of expansion joints, movement in wall and structural movements without permanent distortion, damage to infills, racking of joints, breakage of seals, water penetration or glass breakage.
- .5 Design joints between prefab units, including relocated enclosure to be weather tight.
- .6 Design anchorage of enclosure to the new foundation slab in accordance with NBC requirements.
- .7 Completed building: exterior to interior sound attenuation to be not less than STC 40.
- .8 Design, assemble and secure building elements to building frame to ensure stresses in sealants and seals are within sealant manufacturer's recommended maximum.
- .9 Design building assembly to permit easy replacement and disassembly of components.
- .10 Allow for ceiling, piping, conduit and other interior dead loads imposed on the structure.
- .11 Refer to Architectural Drawing A1 for general layouts and configuration.

## **1.6 PERFORMANCE REQUIREMENTS**

- .1 Maximum deflection for roofing under full specified live load: 1/360 of clear span.
- .2 Maximum deflection for exterior cladding under full specified exterior wind induced loads: 1/180 of clear span.
- .3 Maintain following tolerances for building structure and enclosure elements.
  - .1 Maximum variation from plane or location shown on shop drawings: 1 mm /1 m of length and up to 1 mm/ 5 m maximum.
  - .2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75mm.

## **1.7 MATERIALS AND EQUIPMENT**

- .1 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from the Electrical Safety Authority.

## **1.8 MANUFACTURER'S AND CSA LABELS**

- .1 Labels shall be visible and legible after equipment is installed. Labels shall be bilingual.

## **1.9 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 00 10 – General Instructions.

- .2 Submit shop drawings including all design calculations, stamped and signed by a qualified Professional Engineer registered or licensed in the Province of Ontario for fabricator designed assemblies, components, and connections.
- .3 Indicate plans and grid lines, structural members and connection details, bearing and anchorage details including point loads on the enclosure pad, roof cladding including drainage details, gutters, and downspouts to grade, wall cladding, framed openings, accessories, schedule of materials and finishes, camber and loadings, fasteners and welds. In addition, indicate on plans design loads for roof, walls and overall structure (gravity, wind and seismic loads).
- .4 Clearly indicate:
  - .1 Acoustic performance.
  - .2 Mounting and anchoring requirements.
  - .3 Ventilation requirements and clearances.
  - .4 Connection points for electrical power, control and alarm feed system.
  - .5 Wall, floor and roof construction details.
  - .6 Location of all equipment inside enclosure, i.e. generator, exhaust silencer, fuel day tank, plumbing works, electrical components, etc.
  - .7 Approximate dimensions
  - .8 Door and hardware.
- .5 Indicate detailed description of mechanical, electrical and other systems in Work.
- .6 Describe requirements of other systems of components related to this Work but provided by others
  - .1 Obtain necessary information required to detail this Work including methods of integration and securing.
- .7 Submit erection drawings to Departmental Representative for approval, before construction.
- .8 Indicate erection dimensions and methods.
- .9 Independent third party enclosure construction reports as specified in 1.3 of this section.

#### **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 00 10 – General Instructions.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal all packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

**Part 2 Products****2.1 GENERAL**

- .1 Design and construct the enclosures to support the weight of the equipment they contain. The roof structure of the enclosure must be able to support the weight of the rooftop equipment, and any seismic loads acting on that equipment. Reinforce the roof as required.

**2.2 FLOOR**

- .1 The floor of the enclosure shall be stainless steel plate.
- .2 The flooring shall be constructed to ensure containment of a minimum of 1000 L of leaked fluids including at doorways exiting prefab unit locations.
- .3 The floor shall provide a solid, continuous, flat, spring free and skid resistant walking surface.
- .4 The floor structure shall provide all necessary support members required to secure equipment and to address seismic requirements in accordance with the NBC.
- .5 Insulation under the floor shall be protected against damage with steel, steel to be treated with rust inhibitor and painted to eliminate corrosion.
- .6 Ensure floor joint between units are properly sealed from the elements, as well as maintaining air barrier, joint to allow for movement.
- .7 Provide floor penetration cut-out in switchgear enclosure to accommodate installation of feeder conduits to new distribution switchboard. Once enclosure is in place, all openings in the floor shall be sealed with metal plates and insulated to maintain the floor integrity.

**2.3 WALLS**

- .1 Exterior panels: 1.5mm (16 gauge) pre painted galvanized steel ribbed wall cladding, from the manufacturers standard profiles. Include closures, gaskets, caulking and flashing fasteners to effect a weathertight installation. The pre-painted cladding colours shall be from manufacturers standard range of colours. Final color selection to be coordinated with Departmental Representative.
- .2 Interior panels: 0.7 mm (22 gauge) perforated hot dipped galvanized steel wall cladding with 13 mm raised vertical stiffener ribs spaced at 150 mm o.c.
- .3 All structural members shall be sized and positioned to adequately support the imposed loads in the area.
- .4 Wall construction shall be framed with 1.5mm (16 gauge) galvanized steel vertical channels at maximum 600 mm centres.
- .5 Ensure Wall joint between units are properly sealed from the elements, as well as maintaining air barrier, joint to allow for movement. Refer to Section 07 62 00 –Sheet Metal Flashing and Trim.

**2.4 ROOF AND CEILING**

- .1 The exterior roof sheets: factory preformed galvanized steel sheets from manufacturers standard profiles. Finish shall be grey.
- .2 The roof sheets shall provide a watertight system including relevant slope so that the exterior surface drains. Refer to Architectural drawings for details.
- .3 The roof shall have a shallow, single pitch and the overhangs shall be minimized so as not to interfere with lifting and placing of the unit by crane.
- .4 The roof structure shall be adequate to support the snow loads, roof assemblies - electrical conduit, mechanical piping and any buckling loads that would be encountered during lifting and transporting of the enclosure.
- .5 Ensure Roof joints between units are properly sealed from the elements, as well as maintaining air barrier, joint to allow for movement.

**2.5 INSULATION AND INTERIOR SHEETS**

- .1 The walls, roof and floor shall be insulated in conformance with the requirements of the National Building Code.

**2.6 DOORS**

- .1 Refer to Section 08 11 00 - Metal Doors and Frames and Section 08 71 00 Door Hardware.
- .2 Galvanized 1.5mm (16 gauge) sheet steel covering, zinc coated, with polystyrene type insulation complete with 1 ½ hour ULC fire protection rating.
- .3 2 mm ( 14 gauge) galvanized pressed steel frame complete with 1 ½ hour ULC fire protection rating.
- .4 Doors complete with hardware as detailed on the Hardware Schedule. . For all hardware requirements refer to Door, Hardware Schedule.
- .5 Door sizes: refer to Door Schedule.
- .6 All doors installed between prefab units are to be installed in a way to contain leaked fluids as well as to allow for movement of structures as required.

**2.7 AIR INTAKE AND DISCHARGE ASSEMBLIES**

- .1 Provide sufficient air flow to meet the ventilation requirements of the generator.
- .2 Include modulating dampers to maintain the preset room temperatures where equipment is operating or not.
- .3 Provide means to prevent ingress of birds.
- .4 Provide means to prevent the entrapment of either wind or snow.
- .5 Refer to Section 23 37 20 - Louvres, Intakes and Vents for description of materials.

**2.8 EXHAUST FANS**

- .1 The new enclosures shall be equipped with exhaust fan complete with motorized damper, electrical actuator and fixed louver complete with bird screen. Refer to Section 23 09 33 - Electric And Electronic Control System for HVAC, Section 23 33 15 Dampers – Operating, Section 23 34 00 - HVAC Fans and Section 23 37 20 - Louvres, Intakes and Vents.

**2.9 HEATING**

- .1 Refer to Section 23 82 39.01 - Unit Heaters – Electric.
- .2 The enclosure shall be equipped with electric heat.
- .3 Refer to drawings for details and location of heating.

**2.10 FINISHES**

- .1 Refer to Section 09 91 13 - Exterior Painting.
- .2 All exterior hardware shall be rust proof material.
- .3 All soffits, fascia, gutters and other trim shall be of the same material and colour as the exterior wall cladding.
- .4 The wall cladding and all components not constructed from pre-painted stock, such as structural base, door, and frames shall have rust proof finish to match the walls.
- .5 The interior floor shall be stainless steel plate.
- .6 The underside of the base shall be protected against corrosion.
- .7 Provide 4 litres of paint for touch up.

**2.11 SIGNS**

- .1 Provide a lamicoïd plate identifying the room content.
- .2 Plates sized to suit.
- .3 Letters 38 mm high, colour white: plate colour: black.
- .4 Attach to door with permanent screw fasteners.

**2.12 WORKMANSHIP**

- .1 Manufacture and construct equipment free from blemishes, defects, burrs and sharp edges; accuracy of dimensions and marking of parts and assemblies; thoroughness of welding, brazing, painting and wiring, alignment of parts and tightness of assembly screws and bolts.
- .2 Accurately fit and rigidly frame together joints, corners and mitres.
  - .1 Match components carefully to produce continuity of line and design.
  - .2 Make joints and connections toward exterior weathertight.

- .3 Provide hairline joints for materials in contact.
- .4 Coordinate location of visible joints.

**Part 3 Execution**

**3.1 GENERAL**

- .1 The complete systems shall be factory assembled, wired, completed and ready for factory acceptance testing after assembly.
- .2 Delivery to site upon successful factory acceptance test.
- .3 Deliver the enclosures complete with all equipment as complete units.

**3.2 INSTALLATION**

- .1 Locate enclosures as indicated on drawings.
- .2 Connect power circuit, control circuits from the building and required electrical equipment as indicated on drawings.
- .3 Set enclosure level on existing structural platform and securely anchor.
- .4 New completed structures and joints between prefabricated "Walk-In Enclosures" shall be site tested by third party representative to ensure weather tightness, provide report and documentation certified by a qualified Building Envelope Inspector approved by Departmental Representative. Testing cost shall be by the supplier of the work of this section.

**END OF SECTION**