1. GENERAL

1.01 SECTION INCLUDES

.1 Conduit and equipment supports.

.2 Anchors and fasteners.

1.02 REFERENCES

.1 CSA C22.1:21, Canadian Electrical Code, Part 1 (25th Edition), Safety Standard for Electrical Installations.

.2 Ontario Electrical Safety Code (28th edition/2021).

.3 CECA - Canadian Electrical Contractors Association.

1.03 CLOSEOUT SUBMITTALS

.1 Submit the following in the Operation and Maintenance Manual for products used over the course of the project:

.1 Product Data: Provide manufacturer's catalogue data for fastening systems.

.2 Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

1.04 REGULATORY REQUIREMENTS

.1 Provide products listed and classified by Canadian Standards as suitable for purpose specified and shown.

2. PRODUCTS

2.01 MANUFACTURERS

.1 B-line by Eaton.

.2 Burndy Canada Ltd. (Hubbell).

.3 Erico Caddy.

.4 E. Myatt & Co. Inc.

.5 Hilti Canada.

.6 Thomas & Betts.

.7 Unistrut.

2.02 GENERAL

.1 All supporting devices, strut channel, threaded rod, anchors, etc. to be used shall be of the "hot dipped" galvanized type. Electrogalvanized components will not be accepted.

.2 Materials and Finishes: Provide adequate corrosion resistance.

.3 Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.

.4 Anchors and Fasteners:

.1 Concrete Structural Elements: Use expansion anchor sand preset inserts.

.2 Steel Structural Elements: Use beam clamps and welded fasteners.

.3 Concrete Surfaces: Use self-drilling anchors and expansion anchors.

.4 Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.

.5 Solid Masonry Walls: Use expansion anchors and preset inserts.

.6 Sheet Metal: Use sheet metal screws.

.7 Wood Elements: Use wood screws.

2.03 ANCHORS AND HANGERS

.1 Hangers for electrical conduit shall be galvanized after fabrication.

.2 Perforated strapping: not permitted.

2.04 INSERTS

.1 Use only factory-made threaded or toggle type.

.2 Where inserts cannot be placed, use factory-made expansion shields for light weights, where approved by the Consultant.

.3 Do not use powder-activated tools except with the written permission of the Consultant.

2.05 SLEEVES

.1 Through interior walls, use standard weight steel pipes, conduit, or 18 gauge galvanized steel. Cut flush with finished surfaces. Check room finish schedules.

.2 Through exterior walls above grade, floors, and roof use standard weight steel pipes, machine cut, flush with finished surface inside and to suit flashing outside.

.3 Through exterior walls below grade, water-proofed floors, and other water-proof walls, use heavy weight cast iron pipes, machine cut. Extend sleeves 100 mm (4 in) above finished floors, and cut flush with underside of floor.

2.06 STEEL CHANNEL

.1 Description: Painted steel.

2.07 SUPPORTS

.1 Steel supports in wet or dry locations to be galvanized after fabrication.

.2 Where galvanized members are bolted together use cadmium plated bolts.

.3 For hanger rods use minimum 10 mm (3/8 in) diameter steel threaded rod. Use clevis type attachment.

.4 Provide minimum 100 mm (4 in) high concrete bases for all floor mounted equipment.

2.08 SUPPORTS AND BASES

.1 Submit proposed method of attachment of hangers and beam clamps, to cellular steel deck for approval before proceeding with Work.

.2 Supply and erect special structural Work required for the installation of electrical equipment. Provide anchor bolts and other fastenings unless noted otherwise. Mount equipment required to be suspended above floor level, where details are not shown, on a frame or platform bracketed from the wall or suspended from the ceiling. Carry supports to either the ceiling or the floor, or both as required, at locations where, because wall thickness is inadequate, it is not permitted to use such brackets.

.3 Electrical panels, switches or other electrical equipment shall be complete with suitable bases or mounting brackets.

.4 Provide channel or other metal supports where necessary, to adequately support lighting fixtures. Do not use wood unless wood forms part of the building structure.

.5 Support hangers, in general, from inserts in concrete construction or from building structural steel beams, using beam clamps. Provide additional angle or channel steel members, required between beams for supporting conduits and cables.

.6 Provide any additional supports required from existing concrete construction for any piping or equipment, by drilling same and installing expansion bolt cinch anchors.

.7 Do not use explosive drive pins in any section of Work without obtaining prior approval.

2.09 [THREADED ROD COVERS]

.1 Protect cable from abrasion caused by contact with threaded rod.

.2 To meet UL 94V-0 specifications.

.3 Colour: Black.

.4 Manufacturers:

.1 Panduit TRC18FR-X20Y.

.2 Approved equal.

2.10 STACKED TRANSFORMER SUPPORTS

.1 Stacking of transformers is only allowed if all other options have been exhausted due to lack of space. Stacking is only applicable to floor mount applications and is not allowed for ceiling or wall mount configurations. Stacking shall comply with the following requirements:

.1 The transformer stacked on top is the same size or smaller than the transformer below.

.2 The OESC clearance requirements for each individual transformer is satisfied.

.3 The ambient temperature must not exceed 30°C.

.2 Strut channel structure to support transformers shown on Drawings to be stacked above another transformer.

.3 Provide sheet metal heat diversion shield between stacked transformers. Install shield at an angle as not to trap heat.

2.11 CONCRETE BASES AND HOUSEKEEPING PADS

.1 Provide concrete bases of dimensions where indicated, but not less than 100 mm (4 in) larger in both directions than supported unit, and 100 mm (4 in) high, and so anchors will be a minimum of 10 bolt diameters from edge of the base. Chamfer edges.

.2 Use 20 MPa (3000 psi) 28 day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 – Concrete.

.3 Install dowel rods to connect concrete bases to concrete floor. Unless otherwise indicated, install dowel rods on 450 mm (18 in) centres around full perimeter of base.

.4 Anchor equipment to concrete base.

.5 Provide a housekeeping pad for floor mounted equipment, including but not limited to the following:

.1 Transformers.

.2 Switchgear and switchboards.

.3 Distribution panelboards.

.4 Engine Generators.

.5 Uninterruptible Power Supplies and batteries.

.6 Transfer Switches.

2.12 CONCRETE ANCHORS

.1 Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

.2 Drilled expansion anchors for anchors set in concrete block or poured concrete after the concrete has set. Size the insert and number of anchors so that the maximum load per anchor does not exceed the manufacturer's recommendation.

.3 U-channel concrete inserts shall be 12 gauge steel 1-5/8 in square with insert anchors 1 3/8 in long and 100 mm (4 in) on centre.

.4 Install anchor bolts to elevations required for proper attachment to supported equipment.

2.13 PLYWOOD EQUIPMENT BOARDS

.1 Plywood Equipment Boards: preservative treated, and kiln dried; thickness as indicated, or if not indicated, not less than 19 mm (3/4 in) deep. Provide marine grade plywood where subject to moisture conditions.

.2 Paint plywood board white, or to match adjacent finishes. Leave the fire-retardant label unpainted for verification by the Consultant and by Authority Having Jurisdiction (AHJ).

.3 Unless otherwise noted, boards shall be painted with two coats of good grade weatherproof flat gray non-conductive fire-retardant paint on all sides and edges (prior to mounting) and plumbed in a true vertical position. Provide nominal 13 mm (1/2 in) rustproof spacers between back of plywood and wall. Cut, fit, and place plywood equipment boards accurately in location, alignment, and elevation to support and anchor electrical materials and equipment. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members. Attach to substrates as required to support applied loads. Maintain at least 100 mm (4 in) from bottom of plywood equipment boards and the finished floor surface.

.4 Unless directed otherwise in field, plywood equipment boards shall be 2440 mm (8 ft) high by 19 mm (3/4 in) deep by length shown on drawings (as dimensioned or as scaled) or length as required to accommodate equipment if not indicated on drawings. Unless directed otherwise in field, provide plywood equipment boards for all indoor surface mounted panelboards and systems "head-end" equipment for all applications where located in mechanical or electrical rooms/areas and only where specifically shown on drawings for all other applications.

3. EXECUTION

3.01 INSTALLATION

.1 Obtain permission from the Consultant before drilling or cutting structural members.

.2 Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

.3 Install surface-mounted cabinets and panelboards with minimum of four anchors.

.4 In wet and damp locations use steel channel supports to stand cabinets and panelboards 25 mm (1 in) off wall.

.5 Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

.6 Provide inserts, sleeves, equipment supports and hangers, sealing of sleeves and openings, as required for all electrical work. Ensure that the load onto structures does not exceed the maximum loading per square metre as shown on Structural Drawings or as directed by the Consultant.

.7 Provide insets, holes, anchor bolts and sleeves in time when walls, floors, and roof are erected.

.8 Place insets only in structural members and not in the finishing material.

.9 Secure all supports and hangers to the structure unless noted otherwise.

.10 Suspend hanger rods from approved concrete inserts and from beam clamps. Obtain Consultant's approval before welding to steel structural members.

.11 Secure supports to precast concrete members to inserts originally cast into the members or by rods passing between the members and connected to a steel plate bearing.

.12 Sealing of Sleeves and Openings to Maintain Fire Rating

.1 Use Dow-Corning #3-6548 'Silicone RTV' foam, Thomas & Betts "Flamesafe' firestopsystem, Electrovert 'Flameseal" firestop putty, or approved equal materials installed in accordance with the manufacturer's specifications and recommendations.

.2 Submit data sheets for review prior to installation.

.13 Supports

.1 All conduits, panels, etc. to be securely and adequately supported.

.2 Where more than three conduits run together, conduit racks to be used.

.3 Single runs of conduit to be supported by galvanized conduit straps or ring bolt type hangers. Tie wire or perforated metal strap hangers will NOT be accepted.

End of Section