## PART 1 GENERAL ELECTRICAL WORK

### 1.1 GENERAL

.1 The following summarizes the general scope of the electrical work for the Regional District of Nanaimo Flare Upgrade project. Refer to drawings and specification section for full details of required work. The intent of the contract documents is that all the electrical equipment, labour and services required to upgrade the current land fill gas collection system detailed on the drawings and in the specifications are to be procured and installed by the Contractor.

### 1.2 PLC PANEL

.1 Supply and install new flare control PLC panel. PLC panel to include the following:

.1 PLC CPU, power supply, I/O cards, and HMI.
.2 Pilot lights
.3 E-stop
.4 Circuit breakers
.5 Terminal blocks both fused and unfused.
.6 UPS
.7 AC Filter
.8 Control relays
.9 Wireways
.10 NEMA 4X enclosure
.11 5-port network switch
.12 Convenience receptacles
.13 24VDC power supply
.14 Transducer and new antenna.
.14 Other equipment as specified.

.2 Provide labour and materials to for all electrical connections to PLC panel, including power feed, field instrumentation terminations and communication circuits.

.3 Start-up and commissioning of the PLC panel and associated equipment.

### 1.3 FLARE CONTROL PANEL & FLARE IGNITION PANEL

.1 Supply and install new Flare Control Panel and Flare Ignition Panel.

.2 All interconnections between the Flare Control Panel, Flare Ignition Panel and flare instrumentation. This includes are cable, conduit, connectors, fittings, hangers, supports and junction boxes required for these new circuits. Flare Control Panel field devices include:

.1 Spark generator
.2 Solenoid valves
.3 Thermocouples

.3 Start-up and commissioning of the Flare Control Panel and associated equipment.

## 1.4 INSTRUMENTATION

.1 Existing plant instrumentation to be reused for new installation. Contractor to rewire existing field devices to new PLC panel and provide all wire, conduit, connectors, fittings, hangers support, and junction boxes required for these new circuits. The existing field devices include:

.1 Gas analyzer
.2 Limit switches
.3 Blower RTDs and temperature switches
.4 Temperature transmitters
.5 Pressure transmitters
.6 Flow meters
.7 Level switches
.8 Motor operated valves
.9 Electric valve actuators
.10 All other devices detailed on the P&ID and electrical drawings.

.2 Contractor to recalibrate, reprogram and recommission existing field instrumentation devices.

## 1.5 GROUNDING

.1 Contractor to ensure all new electrical/control panels and field devices are properly bonded.

.2 Ensure that all existing raceways and cable trays that are reused are properly bonded.

## 1.6 AREA CLASSIFICATION

.1 Contractor to comply with wiring practices described in section 18 of the Canadian Electrical Code for all electrical installations located in or pass through hazardous locations. Hazardous location boundaries are identified on drawings E01.

## 1.7 MEASUREMENT AND PAYMENT

.1 Electrical:

.1 Schedule of Prices Item No. 26 00 00/1.
.2 Payment Basis: Lump Sum Price. Includes supply and installation of all works specified in Division 26 specifications, and Electrical Drawings E1 through E13.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

| | | |
|---|---|---|
| .1 | Coordination: | Division 01. |
| .2 | Regulatory Requirements: | Division 01. |
| .3 | Submittals: | Division 01. |
| .4 | Quality Control: | Division 01. |
| .5 | Summary of Work: | Division 01 & 26 00 00. |

### 1.2 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

.1 Submit electronic pdf document electronically by email to the project engineer. Submit one set updated as-built shop drawings on bond paper and include in O & M manual for Owner's records. Submit one set updated as-built shop drawings electronically in pdf format in O & M manual on USB drive.

.2 Submit shop drawings, product data and samples as specified, indicating details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment and materials. Include data on manufacturer’s recommended environmental conditions for equipment affected by temperature and humidity.

.3 Provide wiring, single line and schematic diagrams for electrical control systems and where otherwise applicable. Include wiring drawings or diagrams showing interconnection among work of different Sections.

.4 Shop drawings shall be professional quality CAD drawn.

.5 Cross or block out from manufacturer’s standard product data sheets all data inapplicable or irrelevant to project. Clearly indicate complete product part numbers and options selected.

.6 Where available supply electronic version of shop drawings in AutoCAD version 2013 or greater.

### 1.3 PROJECT RECORD DRAWINGS

.1 Note all changes on a white set of prints and provide two hardcopy sets to the Engineer.

.2 Record actual locations of all pull boxes, feeders, electrical equipment, conduit and wire. Note all sizes.

.3 Record any changes to branch circuit designations. Record actual junction box wiring terminal numbers and terminal block names.

.4 Record changes daily to maintain accuracy. Record drawings may be requested by the engineer for review on a weekly basis.

### 1.4 REGULATORY REQUIREMENTS

.1 Comply with the Canadian Electrical Code 2021, Part 1.

.2 Unless otherwise indicated, all references in the Contract Documents to “Canadian Electrical Code” or “CEC” shall mean the latest edition of the Canadian Electrical Code, Part I, CSA C22.1 and the variations made thereto by BC regulation, which are in force on the date of bid

closing for the Contract.

.3 All electrical products shall be approved by the Canadian Standards Association (CSA) and bear the CSA label. Alternatively, where a product does not bear a CSA label, it shall be approved in wiring by the authority having jurisdiction.

.4 Submit to authority having jurisdiction, inspection and utility company, necessary number of drawings and specifications for examination and approval prior to commencement of electrical work. Pay associated fees. Electrical consultant has not submitted drawings to inspection and supply authorities.

.5 Submit to Consultant, copy of electrical permit obtained from authority having jurisdiction.

## 1.5 CERTIFICATES

.1 If authority having jurisdiction conducts an electrical inspection, submit copy of certificate of acceptance provided by authority having jurisdiction.

## 1.6 REFERENCE DOCUMENTS

.1 Comply with applicable standards of following organizations:
- .1 Electrical and Electronic Manufacturers Association of Canada (EEMAC).
- .2 National Electrical Manufacturers Association. (NEMA)
- .3 Institute of Electrical and Electronic Engineers (IEEE).
- .4 American National Standards Institute (ANSI).
- .5 Canadian Standards Association (CSA).

## 1.7 CLEANING

.1 Do the following prior to Acceptance of the Work, as required to remove all construction dust and debris:
- .1 Clean out all cabinets and enclosures with vacuum or compressed air.
- .2 Wipe all insulators with clean, dry rags.
- .3 Clean all luminaries, with vacuum or clean dry rags.

## 1.8 SITE EXAMINATION

.1 Examine the site of work and become familiar with all features and characteristics affecting this work before submitting tender.

.2 No additional compensation will be given for extra work due to existing conditions which such examination should have disclosed.

.3 Report any unsatisfactory conditions prior to tendering which may adversely affect the proper completion of this work.

## 1.9 COORDINATION WITH OTHER DIVISIONS

.1 Examine the drawings and specifications of all Divisions and become fully familiar with their work. Before commencing work, obtain a ruling if any conflict exists, otherwise no additional compensation will be made for any necessary adjustments.

.2 Fully understand the functions of the systems specified and have no doubts with regard to the extent of the contract.

.3 Coordinate with all Divisions installing equipment and services, and ensure that there are no conflicts.

.4 Install anchors, bolts, pipe sleeves, hanger inserts, etc. in ample time to prevent delays.

.5 Lay out the work and arrange the equipment with due regard to architectural, structural and mechanical features. Structural drawings take precedence over electrical drawings regarding location of walls, doors and equipment.

.6 Do not cut structural members or anchor to without approval. Do not weld to any truss or steel members without approval from Owner's Construction Manager.

.7 Examine previously constructed work and identify any conditions which prejudice the proper completion of this work.

## 1.10 LOCATION OF OUTLETS AND LUMINARIES

.1 Electrical drawings are, unless otherwise indicated, drawn to scale and approximate distances and dimensions may be obtained by scaling. Figured dimensions shall govern over scaled dimensions. Where exact dimensions and details are required, refer to Structural drawings.

.2 Outlet and equipment locations shown on the drawings are approximate. Locations may be revised up to 3 meters to suit construction and equipment arrangements without additional cost to the Owner, provided that installation has not been completed.

.3 Maintain luminaire locations wherever possible. Notify the Consultant of conflicts with other services.

.4 Unless otherwise specified or shown, install products in accordance with recommendations and ratings of manufacturers.

## 1.11 SEPARATION OF SERVICES

.1 Maintain separation between electrical wiring system and building piping, ductwork, etc. so that wiring system is isolated (except at approved connections to such systems) to prevent galvanic corrosion.

.2 In particular, contact between dissimilar metals, such as copper and aluminum, in damp or wet location is not permitted.

.3 Do not support wiring from pipes, ductwork, etc.

.4 Coordinate with all other contractors on site.

## 1.12 SEALING OF WALL AND FLOOR OPENINGS

.1 All conduit and cable entries through outside walls of buildings through partition walls separating electrical rooms from other areas, through fire separations and through floors above grade shall be sealed to prevent passage of moisture, dust gases, flame or to maintain pressurization.

.2 Openings shall be sealed when all wiring entries shown on the drawings have been completed.

.3 Sealing material shall be CSA/ULC approved fire resistant and shall not contain any compounds which will chemically affect the wiring jacket or insulating materials. Cable penetrations through fire separations to be sealed. Use 3M “Fire Barrier System”.

**1.13 HOUSEKEEPING PADS**

.1 All floor mounted electrical equipment installed by this Division shall be mounted on concrete housekeeping pads.

.2 Advise the extent of the housekeeping pads required and supply all information and details as to size and locations.

**1.14 DEMOLITION**

.1 Allow for removing and disposing of all existing electrical equipment, no longer needed, from the site, however, the Owner reserves the right to keep selected equipment.

.2 Cutoff all unused existing cables and conduits below grade. Cutoff shall be at the same depth as the horizontal cable run.

.3 Do all demolition work as shown on the drawings and as reasonably required to facilitate all work.

.4 Any existing cables or conduits dug up in error must be promptly repaired. Advise Owner and/or Consultant and repair as required in compliance to splicing standards specified.

.5 Demolition to be done to a schedule agreed to by Kinder Morgan Canada Terminals.

**1.15 TOUCHUP**

.1 Touchup with matching paint any scratches on electrical equipment.

.2 Repair and touch-up any damage to structural and building components caused by carrying out the work.

**1.16 PROTECTION**

.1 Size, depth, and location of existing utilities shown on drawings are for guidance only; completeness and accuracy are not guaranteed.

.2 Prior to commencing any excavation work, establish location of buried services. Clearly mark such locations to prevent disturbance during work. Provide necessary equipment for locating buried services.

.3 Maintain and protect from damage, water, sewer, gas, electric or other utilities encountered.

.4 Obtain direction of Owner of utility and Consultant before moving or otherwise disturbing utility.

.5 Protect existing building, rail lines, equipment, fencing, service poles, wires or paving located within right-of-way or adjoining areas from damage while work is in progress. Repair to Consultant’s satisfaction any damage which may occur.

.6 Whenever shoring, sheeting, timbering and bracing of excavations is required, engage

services of a professional Engineer (Consultant), who is registered in British Columbia, to design and assume responsibility for adequacy of shoring and bracing.

.7 When requested by the Electrical Consultant, submit for review any and all discipline drawings and calculations signed and stamped by the professional Consultant responsible for their preparation.

.8 Maintain unobstructed access to roadways and buildings in the vicinity of the works.

.9 Protect open excavation against flooding and damage from surface water runoff.

.10 Keep excavations dry while work in progress.

.11 Fence off all open excavations for safety.

## 1.17 OPERATION AND MAINTENANCE MANUALS

.1 Provide four copies of manuals in a hard covered expandable 3-ring binder containing all related project information. Also, provide in electronic copy in Microsoft Office 2003 software.

.2 Provide an index, tabs for categories of work or equipment, and minor tabs for individual components. Provide project title, consultant listing, contractors, date on front, title page, and spine.

.3 Utilize clear page protectors for engineered drawings (one drawing per protector).

.4 Include maintenance data, shop drawings, warrantees, test results, and spare parts data and equipment data base.

.5 Names, address, and phone number of suppliers.

.6 Manuals to be submitted for review prior to substantial completion.

.7 Comply with section entitled "Equipment Information Requirements".

## 1.18 SEISMIC REQUIREMENT

.1 Equipment fastenings to be in conformance to local seismic guidelines and regulations.

## 1.19 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Electrical General Requirements — Section 26 00 10.

### 1.2 REFERENCE DOCUMENTS

.1 Canadian Standards Association (CSA)

| | | |
|---|---|---|
| .1 | CSA C22.2 No. 75-08 (R2013) | Thermoplastic-Insulated Wire and Cables |
| .2 | CAN/CSA-C22.2 No 131-07 | Type TECK 90 Cable |
| .3 | CSA C22.2 No. 0.3-09 | Test Methods for Electrical Wires and Cables |
| .4 | CSA C22.2 No. 38-05 | Thermoset-Insulated Wires and Cables |
| .5 | CSA C22.2 No. 188-04 | Splicing Wire Connectors |
| .6 | CSA C22.2 No. 198.2-05 | Sealed Wire Connector Systems |

### 1.3 SUBMITTALS

.1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.

.2 Action Submittals: Provide the following submittals before starting work of this Section:

.1 Product Data: Submit manufacturer's product data for accessories proposed for use on the project before ordering materials for Consultant's review and acceptance.

### 1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: Install materials in accordance with governing standards, requirements of electric utility and Authority Having Jurisdiction.

.2 Certifications; Provide the following during the course of the Work:

.1 Compliance Certification: Provide certificates from manufacturer indicating tested performance requirements required by Authorities Having Jurisdiction and as specified in this Section.

## PART 2 PRODUCTS

### 2.1 WIRE SIZE SCHEDULE

.1 Lighting and Power Circuits: No. 12 AWG minimum, except as noted.
.2 Instrumentation Circuits: As indicated on drawings and schedules.
.3 Feeder Circuits: As indicated on drawings and schedules.
.4 Control Circuits: No. 14 AWG stranded.

## 2.2 BUILDING WIRING

.1 Conductors: solid copper for No. 10 AWG and smaller, stranded copper for No. 8 AWG and larger, or for connections to motors, actuators and other instrumentation and control equipment.

.2 Insulation: RW90 X-link. Except where specifically indicated otherwise.

.3 Insulation Rating: 600V.

## 2.2 INSTRUMENTATION WIRING

.1 Discrete input/output wire:
- .1 Conductor: Copper #14 AWG minimum stranded for instrumentation.
- .2 Configuration: Multi conductor cable as required by drawings.
- .3 Insulation: 300V volt XLPE or SIS insulation.
- .4 CSA - HL and FT4 PVC flame retardant jacket.

.2 Analog signal wire:
- .1 Conductor: Copper #18 AWG minimum stranded for instrumentation.
- .2 Insulation: 300V volt XLPE insulation.
- .3 Configuration: Twisted pair or triads, individually shielded in an armoured, jacketed assembly, number of pairs or triads as per drawings.
- .4 Each pair or triad covered with aluminium/Mylar shield and stranded drain wire.
- .5 Aluminium interlocking armour.
- .6 CSA - HL and FT4 PVC flame retardant jacket.

.4 Thermocouple wire:
- .1 Conductor: #16 solid.
- .2 Insulation: PFA or Glass Braid.
- .3 Sensor type: Type K.
- .4 Temperature rating: 200$^{o}$C max.
- .5 Jacket color: Yellow (ANSI standard).

## 2.3 CABLES

.1 Teck
- .1 Conductor Copper, stranded.
- .2 Insulation: RW90 X-link.
- .3 Rating: 1000V.
- .4 Size: As shown on drawings.
- .5 Configuration: As indicated on drawings.
- .6 Armour: Aluminium interlocking.
- .7 CSA - HL and FT4 black PVC jacket.

.2 Control circuits:
- .1 Conductor: Copper #14 AWG minimum stranded for instrumentation.
- .2 Configuration: Multi conductor cable as required by drawings.
- .3 Insulation: 300V volt XLPE or SIS insulation.
- .4 CSA - HL and FT4 PVC flame retardant jacket.
- .5 Aluminium interlocking armour.

.3 Armoured cable for analog inputs/outputs:

.1 Conductor: Copper #18 AWG minimum stranded for instrumentation.
.2 Insulation: 300V volt XLPE insulation.
.3 Configuration: Twisted pair or triads, individually shielded in an armoured, jacketed assembly, number of pairs or triads as per drawings.
.4 Each pair or triad covered with aluminium/Mylar shield and stranded drain wire.
.5 Aluminium interlocking armour.
.6 CSA - HL and FT4 PVC flame retardant jacket.

## 2.4 CABLE CONNECTORS

.1 Use aluminium weatherproof and dust tight compression teck cable connectors in required sizes.

.2 Explosion proof connectors and seals required to meet minimum Class I, Zone 1 area classification in lab and airlock.

# PART3 EXECUTION

## 3.1 WIRING, GENERAL

.1 Splice only in junction boxes.

.2 Conductor length for parallel circuits shall be identical.

.3 Neatly train and lace conductors inside cabinets, equipment and panelboard using nylon tie-wrap.

.4 Cables outdoors shall enter enclosures from the bottom.

.5 All control and instrumentation cable to have 20% spare conductors.

.6 Teck cables to enter enclosures using sealing ring between teck connector and enclosure.

.7 All wires shall terminate on terminal blocks for control and power circuits at J-boxes, cabinets and PLC's.

.8 Denso tape or paste to be used at all cable connections located outside or in process areas.

.9 Use appropriate connectors, glands and hardware for cable connections in hazardous locations.

## 3.2 WIRING INSTALLATION IN RACEWAYS

.1 Swab raceway system before installing wiring.

.2 Use pulling lubricant for conductors No. 4 AWG and larger.

### 3.3 WIRE CONNECTIONS AND TERMINATIONS

.1 Use insulated spring wire twist-on connectors with plastic caps for conductors No. 10 AWG and smaller for power wiring.

.2 Use one hole barrel lugs for motor connections. Tape uninsulated conductors and connectors with electrical tape to 150% of insulation value of conductor.

.3 Splices for No. 8 and larger shall, except as noted, be made with long barrel compression connectors, such as Burndy 'Hylug'. Use anti-oxidizing compound.

.4 Make waterproof cable splices with 3M splicing kits specifically made for the cable in use and must be suitable for submersion.

### 3.4 ARMOURED CABLE TERMINATIONS (TECK)

.1 Ground at supply end only for single conductor cables.

.2 Use non-metallic connector terminating plates.

.3 Space cables to provide free air ampacity. Do not exceed fill capacity of trays.

.4 Provide mechanical protection where cables exit from the ground.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 GENERAL

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

### 4.2 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Electrical General Requirements — Section 26 00 10

### 1.2 REFERENCE DOCUMENTS

.1 Canadian Standards Association (CSA)

- .1 CSA C22.2 No. 0.4-04 Bonding Electrical Equipment (Protective Grounding)
- .2 CSA C22.2 No. 41-07 Grounding and Bonding Equipment

### 1.3 SUBMITTALS

.1 Provide required information in accordance with Section 01 33 00 – Submittals.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

- .1 Product Data: Submit manufacturer's product data for accessories proposed for use on the project before ordering materials for Consultant's review and acceptance.

### 1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: Install materials in accordance with governing standards, requirements of electric utility and Authority Having Jurisdiction.

.2 Certifications; Provide the following during the course of the Work:

- .1 Compliance Certification: Provide certificates from manufacturer indicating tested performance requirements required by Authorities Having Jurisdiction and as specified in this Section.

## PART 2 PRODUCTS

### 2.1 MATERIALS

.1 Grounding and Bonding Equipment: to CSA C22.2 No. 41 –and as follows:

- .1 Grounding and Bonding Conductors: Green insulated RW90 or THHW sized as per the CEC unless otherwise stated.
- .2 Ground lugs and fittings: Copper, compression type.

## PART 3 EXECUTION

### 3.1 INSTALLATION

.1 Comply with requirements of CSA C22.2 No. 04-04 (R2013) and Canadian Electrical Code.

.2 Protect exposed ground conductors from mechanical injury.

.3 Make cable to cable connections using compression connectors such as Burndy "Hylug".

.4 Use compression connectors for ground connection to equipment provided with lugs.

.5 Do not solder joints. If not noted specifically otherwise, use mechanical connectors approved

for the purpose.

.6 Install insulated bonding wire in flexible metal conduit connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw.

.7 All contact surfaces must be cleaned to bright metal prior to making ground connections. Finished connections to be coated with glyptol (or approved equivalent) and then wrapped with Scotch 88 tape or equivalent. Resistance testing is performed and accepted.

.8 Install separate green insulated ground conductor in conduit runs installed in concrete which is subject to moisture penetration and underground.

.9 Install separate insulated ground conductor full length of all cable tray installation, bond ground conductor to each section of cable tray with approved grounding connector.

.10 Install bonding conductor in all underground raceways.

**3.2 EQUIPMENT GROUNDING / BONDING**

.1 Install a green insulated conductor in all feeders, receptacle and equipment circuits.

.2 Install grounding / bonding for non-electrical equipment as noted in CEC Section 10.

.3 Use green insulated grounding conductors in conduit for the following:

.1 Gas Piping: .....No. 6

.2 Cable Trays .....No. 6

.3 Building Steel Structure .....No. 6

.4 Low Voltage / Communication Raceways: .....No. 6

.5 Mechanical Piping: .....No. 6

.6 Process Piping: .....No. 6

.4 Bond all structural steel to system grid using cable tray system ground conductors.

**PART 4 MEASUREMENT AND PAYMENT**

**4.1 GENERAL**

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

**4.2 MEASUREMENT AND PAYMENT**

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Electrical General Requirements — Section 26 00 10

## PART 2 PRODUCTS

### 2.1 SUPPORTING DEVICES

.1 Provide aluminum metal brackets, frames, plates, hinges, clamps and related types of supporting devices and support systems adequate for weight of equipment and raceways, including wiring which they carry.

.2 Straps: Aluminum.

.3 Channels: 42 x 42mm aluminum, other sizes as required.

.4 Rod Hangers: 9mm, all-thread rod aluminum.

.5 All Fastening Accessories: Aluminum.

.6 P-clamps: Aluminum.

.7 As manufactured by B-Line, Pilgram, Electrotray, Canstrut, Unistrut.

.8 Screws, bolts, fasteners: non-corrosive type.

## PART 3 EXECUTION

### 3.1 INSTALLATION

.1 Install supporting devices to maintain headroom, neat mechanical appearance and to support equipment loads required.

.2 Except where otherwise indicated, support equipment, conduit and cables using clips, spring loaded bolts, or cable clamps designed as accessories to base channel members. Channels to be surface mounted or trapeze hung as required.

.3 Support exposed conduit and conduit installed in space above suspended ceilings and in crawl spaces using hangers, clamps or clips. Support conduit on each side of bends and on spacing in accordance with Canadian Electrical Code.

.4 Where three or more conduits run parallel, install conduit on conduit racks. Size conduit racks to provide 50% spare capacity.

.5 Do not fasten supports to piping, ductwork, mechanical equipment or conduit.

.6 Do not use shot driven pins.

.7 Install surface mounted cabinets and panelboards with minimum or four anchors.

.8 Coordinate installation of all conduit and cable between electrical and automation subtrades to insure that a uniform looking installation is achieved, with specified spare capacities throughout.

.9 Increase channel size and hanger rod to suit specified loads.

.10 Do not cut, drill, weld or damage any structural steel members. Weld fastenings to structure as noted or use bolts.

.11 Ty-raps where used to be black heavy duty type for exterior use. Use ty-raps for attaching Teck cables and ground to tray.

.12 All screws and bolts shall be non-corrosive type.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 GENERAL

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

### 4.2 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Electrical General Requirements — Section 26 00 10

### 1.2 REFERENCE DOCUMENTS

.1 Canadian Standards Association (CSA)

| | | |
|---|---|---|
| .1 | CAN/CSA C22.2 No. 18.1 (R2022) | Outlet Boxes, Conduit Boxes, and Fittings |
| .2 | CSA C22.2 No. 40-(R2017) | Cutout, Junction and Pull Boxes |
| .3 | CAN/CSA C22.2 No. 85 (R2018) | Rigid PVC Boxes and Fittings |
| .4 | CAN/CSA C22.2 No.30 (R2020) | |

## PART 2 PRODUCTS

### 2.1 METAL OUTLET BOXES

.1 Outlet Boxes: to CSA C22.2 No. 18.1 and as follows:

.1 Aluminum, factory threaded hubs complete with gasketted aluminum device covers.

### 2.2 PULL AND JUNCTION BOXES

.1 Pull and Junction Boxes: to CSA C22.2 No. 40 and as follows:

.1 Material: Aluminum.

.2 Covers: Screw-on.

.3 Barriers: Where indicated.

### 2.3 EXPLOSION PROOF JUNCTION BOXES

.1 Pull and Junction Boxes: to CSA C22.2 No. 30 and as follows:

.1 Material: Aluminum.

.2 Covers: Screw-on.

.3 Barriers: Where indicated.

## PART 3 EXECUTION

### 3.1 OUTLET BOX INSTALLATION

.1 Provide boxes where indicated and as required for:

- .1 Splices.
- .2 Taps.
- .3 Wire pulling.
- .4 Equipment.
- .5 Device location.

.2 Install boxes surface mounted, except as noted.

.3 Except where otherwise indicated, install boxes for vertical mounting of devices.

### 3.2 LOCATION OF WALL OUTLET BOXES

.1 Outlets are indicated on drawings schematically. Consider locations indicated as approximate. Verify locations prior to rough-in.

.2 Confirm size and location of equipment supplied and installed under other sections, prior to rough-in.

.3 Except where otherwise indicated, mount boxes as following heights:

- .1 Local Switches: .....1200 mm
- .2 Receptacles:
  - a) General .....300 mm

.4 Measure mounting height from finished floor to centre line of device.

.5 Consultant reserves the right to change location of outlet prior to installation with no charge in Contract Price, provided that distance does not exceed 3m from originally indicated location.

.6 Surface boxes shall be cast in the required numbers of gangs.

.7 Do not use sectional boxes.

.8 Use NEMA Type 4X, rain-tight, corrosion resistant, dust-tight fiberglass boxes, or as specifically noted otherwise throughout.

.9 Use explosion proof junction boxes in all hazardous locations.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 GENERAL

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

### 4.2 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Electrical General Requirements — Section 26 00 10

### 1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1 Wire and Cable: Section 26 05 13.
.2 Hangers and Supports: Section 26 05 29.
.3 Boxes and Fittings: Section 26 05 33.
.4 Cable Trays, Wireways and Surface Raceways: Section 26 05 36.

### 1.3 REFERENCE DOCUMENTS

.1 CANADIAN STANDARDS ASSOCIATION (CSA)

.1 CSA C22.2 No.45-(R2018) Rigid Metal Conduit

.2 CSA C22.2 No.83-(R2022) Electrical Metallic Tubing

### 1.4 COORDINATION

.1 Coordinate with other work including wire and cable, boxes and fittings and panel work, as necessary to interface installation of conduit with other work.

.2 Ensure that integrity of the fire rated element is maintained where conduits pass through fire rated walls, floors, and ceilings.

## PART 2 PRODUCTS

### 2.1 CONDUIT - GENERAL

.1 Provide conduit of types and sizes indicated. Refer to Conduit Installation Schedule at end of Section.

.2 Where sizes are not indicated, select proper sizes to suit intended use, fulfill wiring requirements, and comply with Canadian Electrical Code (CEC).

.3 Minimum conduit size is 19 mm.

### 2.2 METAL CONDUIT AND TUBING

.1 Rigid Metal Conduit:

.1 Rigid Aluminum Conduit.

.2 Fitting: aluminum boxes with gasketted covers in damp locations, connection complete with insulated bushings. Explosion proof fittings and seals to be used when conduit crosses a hazardous area.

**2.3 NON-METALLIC CONDUIT**

.1 Type DB2 PVC Duct.

.2 Rigid PVC (Unplasticized) Conduit: schedule 40 type.

.3 Fittings: Threaded male or female solvent weld connectors and solvent weld couplings, as supplied by conduit manufacturer.

.4 Solvent: as recommended by conduit manufacturer.

**PART 3 EXECUTION**

**3.1 INSTALLATION OF CONDUIT - GENERAL**

.1 Where conduit is run exposed, run parallel to building lines. Where conduits are grouped (two or more) space evenly, make bends concentric and mount on Unistrut racks.

.2 Lay out conduit to avoid interference with other work. Maintain a minimum clearance of 150mm from steam or hot water piping, vents, etc.

.3 Metal conduit installations in concrete pours: Tie down conduit to prevent shifting. All joints are to be made up tight to ensure ground continuity.

.4 Do not place conduit in concrete slabs in which slab thickness is less than four times conduit diameter. Place conduits larger than this size under floor. Conduits to have minimum 25mm concrete cover.

.5 Organize conduit in slabs to minimize cross-overs. Obtain approval and minimum concrete cover required from structural engineer prior to installing conduits in slabs.

.6 Provide underground warning tapes 300mm below grade above all underground conduits. Tape shall be red, 50mm wide, metallic detectable type.

.7 Where aluminum conduit is required to be bent, do not heat, and do not bend conduit in such a way as to reduce pipe cross section area at any point. Radii of bends shall be as per CEC.

.8 For all runs of conduit, do not include more than equivalent of 4 quarter bends. Provide conduit fittings, pull boxes and junction boxes where necessary. Pulling elbows shall not be used except by special permission.

.9 Where possible, install conduits so that they are not trapped, cap turned up conduits to prevent the entrance of dirt or moisture during construction. Swab out conduit and thoroughly clean internally before wires and cables are pulled.

.10 Take extreme care in reaming ends of all conduit to ensure a smooth interior finish heat that will not damage the insulation of the wires.

.11 Ensure electrical continuity in all conduit systems.

.12 Where conduits pass through walls, they shall be grouped and installed through openings.

After all conduits shown on the drawings are installed, wall openings shall be closed with material compatible with the wall construction.

.13 Provide necessary flashing and pitch pockets, making watertight joints where conduits pass through roof or watertight membranes.

.14 Install an equipment ground wire in all conduits in slab on grade and underground.

.16 Provide mechanical protection for conduits where they exit the ground.

**3.2 INSTALLATION OF METAL CONDUIT AND TUBING**

.1 Field-bend conduit with benders designed for purpose so as not to distort nor vary internal diameter.

.2 Avoid use of dissimilar metals throughout system to eliminate possibility of electrolysis. Where dissimilar metals are in contact, coat surfaces with corrosion inhibiting compound before assembling.

**3.3 INSTALLATION OF RIGID METAL CONDUIT**

.1 Cut conduit straight, properly ream, cut threads and brush threads clean.

.2 Fasten conduit terminations in sheet metal enclosures with two locknuts and terminate with bushing. Install locknuts inside and outside enclosure.

.3 Use explosion proof connectors and seals when conduit crosses through hazardous locations.

**3.4 INSTALLATION OF EXPOSED AND SEMI-CONCEALED CONDUIT**

.1 Comply with the following when installing conduit exposed in service areas, unfinished areas, finished areas, and in accessible spaces behind ceilings, walls and floors:

.1 Install conduit to conserve headroom and cause minimum interference in spaces through which conduit passes.

.2 Install conduit so as not to interfere with ceiling inserts, luminaries or ventilation ducts or outlets.

.3 Alter routing to avoid structural obstructions, keeping crossovers to a minimum.

.4 Install exposed conduit and extensions from concealed conduit systems neatly, parallel with, or at right angles to walls and structural members.

**3.5 INSTALLATION OF CONDUIT IN CONCRETE SLABS**

.1 Place conduit between bottom reinforcing steel and top reinforcing steel.

.2 Separate conduit by not less than diameter of largest conduit to ensure proper concrete bond.

.3 Ensure minimum 20mm concrete cover.

### 3.6 CONDUIT INSTALLATION SCHEDULE

.1 Provide conduit types for applications indicated, except where otherwise required by CEC:

| Conduit Type | Application |
|---|---|
| .1 Rigid Aluminum: | .1 Exposed area subject to damage or abuse. |
| | .2 Use in exterior areas and in process areas. |
| | .3 Hazardous locations |
| .2 Rigid PVC Duct: | .1 Direct buried. |
| .3 EMT | .1 Interior areas |

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 GENERAL

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

### 4.2 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Electrical General Requirements — Section 26 00 10

### 1.2 RELATED SECTIONS

.1 Electrical General Requirements — Section 26 00 10

.2 Submittals — Division 01

## PART 2 PRODUCTS

### 2.1 IDENTIFICATION MATERIALS

.1 Lamacoid Nameplates Sizes: 3mm thick plastic engraving sheet, white face, black core, mechanically attached, sizes as follows unless otherwise specified:

.1 Size 1: 12mm high with 5mm high letters.
.2 Size 2: 20mm high with 8mm high letters.
.3 Size 3: 25mm high with 12mm high letters.

.2 Wire Identification materials: Use one of the following:

.1 Heat shrink sleeves, blank.
.2 See item 3.5.

## PART 3 EXECUTION

### 3.1 NAMEPLATE IDENTIFICATION OF EQUIPMENT

.1 Identify equipment and control components with lamacoid nameplates, as indicated on drawings.

### 3.2 PANELBOARD DIRECTORIES

.1 Identify loads controlled by each overcurrent protective device in each panelboard, by means of a typewritten panelboard directory.

### 3.3 IDENTIFICATION OF PULL AND JUNCTION BOXES

.1 Identify pull and junction boxes over 100mm size as follows:

.1 Use boxes which are pre-finished in coded colours, or spray paint inside and outside of boxes prior to installation, in coded colours designating voltage or system.

.2 Apply size 2 lamacoid nameplate to cover each box. Identify system name. Where sequence identification is required, identify system name and number.

.3 Identify pull and junction boxes.

.4 Apply permanent identifying markings directly to box covers designating voltage or system using indelible black ink.

## 3.4 COLOR IDENTIFICATION OF WIRING

.1 Identify No. 4/0 AWG wiring and smaller by continuous insulation colour.

.2 Identify wiring larger than No. 4/0 AWG by continuous insulation colour or by colour banding tape applied at each end and at splices.

.3 Identify 120/208 volt and 347/600 volt systems using different wire colours.

.4 Identify each power and control conductor with the complete circuit conductor number at both ends except that on control conductors terminating on motor starter terminals, omit the “service number” portion of the conductor number where it is the same as the starter service number.

.5 Maintain phase sequence and colour coding throughout.

.6 Color code to CSA C22.1 and as listed below or as shown on drawings. For the purpose of color coding, the drawings take precedence over the specifications.

.1 Power wiring, phase A-B-C from left to right: red-black-blue

.2 120 VAC control power: black for hot, white for neutral

.3 VDC control: red for positive, black for negative

.4 Analog signal: white for positive, black for negative

.5 Intrinsically safe wiring: blue

.7 Use colour coded conductors in communication cables, matched throughout system.

## 3.5 WIRE IDENTIFICATION

.1 Use heat-shrinkable identification sleeves for conductors size No. 10AWG and smaller. Machine print identifying letters and numbers, minimum 3mm high, on sleeves with permanent black ink. Use white tubing sleeves, sized to fit the conductor insulation diameter.

.2 Make printed characters permanent, heat-shrink process.

.3 Provide the required heat-shrink and printing equipment, complete with software where applicable on site until plant commissioning is completed.

.4 Where ‘ring’ or ‘fork’ type terminals are used, extend sleeve over crimp-on-base after installation of terminal and heat-shrink in place.

.5 Each individual wire to be identified at all terminations including but not limited to J-boxes, equipment cabinets, panels, devices, PLC, etc.

## 3.6 CABLE AND CONDUIT IDENTIFICATION

.1 Provide a lamacoid identification tag for each end of each cable and conduit. Provide tags for all cables including temporary use cables. Use the Owner’s existing numbering system throughout.

.2 Use stainless steel tags/nameplates outdoors and plastic inside building. Fasten nameplates and tags with nylon ty-rap.

.3 Provide power cable tags at each end from branch circuit device to field device. Tag cable, not the device. Tag to note field device number.

.4 Labelling/Tagging is generally comprised of the following identification:

.1 Each piece of equipment to have a unique name.

.2 Refer to drawings for identification numbers for wires, cables, and equipment.

.3 Install wire tags on each control conductor; this to be a unique number that specifically identifies the control conductor (type to be heat shrink sleeve type; type written)

## 3.7 TAGGING DRAWINGS

.1 Adhere to naming convention used in drawings.

## 3.8 RECEPTACLE LABELLING

.1 Provide lamacoid nameplate on each receptacle coverplate to note panel and circuit number.

.2 Mechanically attached.

.3 Letters to be 3 mm high.

| Equipment | Color | Nameplate Identification | Nameplate Size |
|---|---|---|---|
| Panelboards | Grey | Panelboard designation. | 2 |
| Manual Motor Starters | N/A | Load controlled and mnemonics. | 1 |
| On/Off Switches | N/A | Load controlled. | 1 |
| Disconnect Switches<br>Magnetic Motor Starters and Contactors | Grey | Voltage and Equipment controlled and mnemonics | 2 |
| Wireways | N/A | Voltage system designation. | 2 |
| Line Voltage Cabinets and Enclosures | Grey | Designation and voltage | 2 |
| Low Voltage Cabinets | Grey | Cabinet designation of system. | 1 |

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 GENERAL

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

### 4.2 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 General

### 1.1 INTENT

.1 This Section specifies general requirements common to all starting and testing of electrical equipment and systems. Read this Section in conjunction with related Sections which specify specific portions of electrical starting and testing work.

.2 Except where otherwise specified, arrange and pay for the testing and related requirements specified in this and related Sections.

.3 If test results do not conform with applicable requirements, repair, replace, or adjust or balance equipment and systems. Repeat testing as necessary until acceptable results are achieved.

### 1.2 RELATED REQUIREMENTS

.1 Electrical Operation and Maintenance Manuals: Section 26 01 11.
.2 Electrical Starting and Testing by Contractor: Section 26 08 20..

### 1.3 SUBMITTALS

.1 Submit to the Owner a list of equipment and instruments which will be used in starting, testing, balancing and adjusting electrical equipment. The Minster may require changes to the proposed equipment and instruments.

### 1.4 STARTING AND TESTING - GENERAL

.1 Prior to testing ensure all electrical equipment is cleaned and free of dust.

.2 After testing, protect equipment subject to dust from construction activities.

.3 Notify Owner when starting and testing of all systems has been completed.

.4 Do not conceal or cover equipment until inspected, tested and approved by Owner.

.5 Assume all liabilities associated with starting, testing and balancing procedures.

.6 Assume all costs associated with starting, testing, adjusting and balancing, including supply of testing equipment and witnessing of factory testing by Contractor and Owner.

### 1.5 WITNESSING OF STARTING AND TESTING

.1 Prior to starting and testing of electrical equipment or systems, prepare a schedule of all tests specified. Review schedule with Owner.

.2 Provide sufficient notice (minimum three days) prior to commencing tests requiring witnessing by Owner.

.3 Owner or Owner's Performance Testing Agent may witness all or any portion of testing and starting procedures performed by Contractor or Contractor's Testing Agent.

.4 Contractor shall be present for all tests specified in Section 26 08 30.

## 1.6 MANUFACTURER'S STARTING RECOMMENDATIONS

.1 Prior to starting equipment or systems, obtain and review manufacturer's installation, operation and starting instructions. Read in conjunction with procedures specified in Section 26 08 .

.2 Use manufacturer's and supplier's starting personnel where required to maintain validity of manufacturer's warranty. Confirm with manufacturer that all testing specified in this Section and Sections 26 08 20 will not void any warranties.

.3 Compare installation to manufacturer's published data and record discrepancies. Modify procedures detrimental to equipment performance prior to starting equipment.

## 1.7 REFERENCE DOCUMENTS

.1 Perform tests in accordance with:

.1 These Contract Documents.
.2 Requirements of authorities having jurisdiction.
.3 Manufacturer's published instructions.
.4 Applicable CSA, IEEE, IPCEA, EEMAC, NEMA, NETA and ASTM standards.

.2 If requirements of any of the foregoing conflict, notify Owner before proceeding with tests and obtain clarification.

## 1.8 CONTRACTOR AND MANUFACTURER REPORTS

.1 Log and tabulate test results on appropriate test report forms provided by the Owner.

.2 Submit completed test report forms immediately after tests are performed.

.1 Record all data gathered on site on approved test report forms.
.2 Note any damage, missing parts or incomplete work on test form.
.3 Record date of corrected deficiencies on form.
.4 Arrange for Owner to initial completed test report forms prior to the end of the work day that information is gathered. Provide the Owner with one photo copy of each completed test report form.
.5 Maintain one photocopy on site of all data taken during starting and testing period.
.6 Maintain one copy of all final starting, testing, balancing and adjusting reports on site up to interim acceptance of the work for reference purposes.

.3 Arrange for manufacturer to submit copies of all production test records for production tests required by EEMAC and CSA standards for manufactured electrical equipment to the Owner prior to shipping.

.4 Arrange for manufacturer to submit brief step-by-step description of entire starting procedure to allow Owner to repeat starting at any time.

## 1.9 CORRECTION OF DEFICIENCIES

.1 Correct all contract deficiencies found during electrical starting and testing of equipment and systems and Owner's performance verification.

**1.10 COORDINATION**

.1 Coordinate starting of electrical equipment and systems with testing and demonstration and instruction of:

.1 Electrical equipment and systems specified in Division 26.

.2 Where any equipment or systems requires testing prior to starting, ensure that such work has been completed prior to starting of electrical equipment and systems.

**1.11 IMPLEMENTATION**

.1 Except where otherwise specified, perform all testing and related requirements specified herein prior to Interim Acceptance of the Work.

**1.12 SCHEDULING**

.1 Provide a contractor start-up schedule as specified in Division 01.

**PART 2 Products**

**2.1 TEST EQUIPMENT**

.1 Provide all equipment and tools necessary to perform testing specified and as otherwise required.

**PART 3 Execution**

Not Used

**PART 4 MEASUREMENT AND PAYMENT**

**4.1 GENERAL**

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

**4.2 MEASUREMENT AND PAYMENT**

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Electrical Testing — Section 26 08 10

### 1.2 GENERAL REQUIREMENTS

.1 Function test all system on the project but not limited to systems noted in this section.

## PART 2 PRODUCTS

2.1 Not Used.

## PART 3 EXECUTION

### 3.1 BASIC ELECTRICAL START-UP AND TESTING

.1 Energizing Main Electrical System

.1 Prior to energizing any new or modified electrical system:

.1 Verify supply authority voltage and phase rotation.

.2 Cables:

.1 Megger test all motor feeder cables and document test results.

.2 Megger test all distribution feeder cables.

.3 Load Balance Testing:

.1 perform load tests with as many loads on as possible.

.2 If load unbalance exceeds 15%, reconnect circuits to balance loads. Revise panelboard directories and wiring identification accordingly.

.3 Test load balance on all feeders at distribution points, and panelboards.

.4 Voltage Testing and Adjusting:

.1 Measure three phase and single phase voltage at service entry points, transformer secondaries and at main distribution points. Record voltage for no less than four hours during normal working hours after facility is completed and loaded.

.2 Adjust transformer tap settings to compensate for undervoltage and overvoltage conditions, if directed to do so by the Engineer.

.5 Starting Motors:

.1 Prior to starting motors:

.1 Confirm motor nameplate data with motor starter heater overloads.

.2 Verify phase rotation.

.3 Ensure disconnects are installed.

.4 Confirm labeling of motors, disconnects and starters.

.2 Measure and record full load amp readings for all motors. Fill in all blanks in attached motor identification sheet for new and reconnected motors.

.6 Wiring Devices:

.1 Polarity test all receptacles.

.2 Function test all devices.

.2 Calibrate all field instrumentation. Follow manufacturer's recommended procedures.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 GENERAL

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

### 4.2 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 QUALITY ASSURANCE

.1 Electrical General Requirements — Section 26 00 10

### 1.2 SOURCE OF SUPPLY

.1 All cabinets and enclosures shall be by a single manufacturer.

.2 Cabinets to be similar in design, appearance and to have the same latches.

### 1.3 COORDINATION

.1 Coordinate size and depth of cabinets and enclosures with systems specified in other sections, which require enclosures and as specified.

## PART 2 PRODUCTS

### 2.1 INTERIOR CABINETS AND ENCLOSURES (NON-HAZARDOUS LOCATIONS)

.1 Material: Steel
.2 Finish: painted (powder coated).
.3 Covers: hinged, gasketted.
.4 Hinges: continuous type.
.5 Latches: single point key lock and catch assembly.
.6 Interior back plates.
.7 NEMA 1A.

### 2.2 EXTERIOR CABINETS AND ENCLOSURES (NON-HAZARDOUS LOCATIONS)

.1 Material: Fiberglass or stainless steel
.2 Finish: painted (powder coated).
.3 covers: hinged, gasketted.
.4 Hinges: continuous type.
.5 Latches: single point key lock and catch assembly.
.6 Interior back plates.
.7 NEMA 4X.

### 2.3 CABINETS AND ENCLOSURES FOR HAZARDOUS

.1 Material: Steel
.2 Finish: painted (powder coated).
.3 covers: Bolted, sealed.
.4 Hinges: N/A.
.5 Latches: N/A.
.6 Interior back plates.
.7 Rating: Refer to area classification drawing.

## PART 3 EXECUTION

### 3.1 INSTALLATION

.1 Install cabinets to noted locations.

.2 Terminal blocks sized for 20% spare.

.3 For type and areas of usage see Section 26 05 33, Boxes and Fittings.

.4 Install lamacoid nameplates on all enclosures.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 GENERAL

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

### 4.2 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**

## PART 1 GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Electrical General Requirements — Section 26 00 10

### 1.2 SOURCE OF SUPPLY

.1 Each of the following shall be by a single manufacturer.

.1 All Switches

.2 All Receptacles

.3 All Plates

### 1.3 COORDINATION

.1 Coordinate installation of wiring devices and cover plates with site painting and finishing work.

## PART 2 PRODUCTS

### 2.1 LINE VOLTAGE SWITCHES

.1 Switches: to CSA C22.2 No. 111-1956 and as follows:

.1 Rating: except where otherwise indicated or specified, 15A, 120V, full load rated for fluorescent and tungsten.

.2 Operation: Toggle, quiet action.

.3 Specification grade.

.4 Features:

.1 Totally enclosed, 2 piece phenolic case.

.2 Large silver cadmium oxide contacts.

.3 Rust resistance continuous steel mounting strip.

.4 Captive mounting screws.

.5 Large head terminal screws.

.6 Ivory finish.

### 2.2 RECEPTACLES

.1 General Purpose Receptacles: to CSA C22.2 No. 42-M1984 and as follows:

.1 Rating: 15A, 125V except where otherwise indicated.

.2 Configuration: 2 pole, 3 wire grounding, EEMAC 5-15R duplex.

.3 Features:

.1 Ground terminal and poles connected to continuous mounting yoke.

.2 Wiring terminals, 2 per side.

.3 Split feed operation, nylon face.

.4 Double wipe heavy phosphor bronze contacts.

.5 Industrial grade.

.6 Hubbell No 5252, Leviton, Pass & Seymour, Arrow-Hart, G.E., Daniel Woodhead, Bryant.

.2 Ground Fault Circuit Interrupter Receptacles: same as general purpose receptacles, except for the following features:

.1 Solid state ground fault sensing and signaling.

.2 5 milliamperes ground fault trip level.

.3 Feed through type.

## 2.3 COVER PLATES

.1 Weatherproof: Aluminum with reinforcing ribs, double flip lids, resilient rubber or closed cell foam urethane gasket, four mounting screws.

# PART 3 EXECUTION

## 3.1 INSTALLATION, GENERAL

.1 Install wiring devices as indicated and in accordance with manufacturers written instructions.

.2 Install wiring devices only in electrical boxes which are clean.

.3 Install devices and cover plates flush and level.

.4 See drawings for specific receptacle configuration type.

## 3.2 COVER PLATE INSTALLATION SCHEDULE

.1 Use weatherproof plates for exterior wiring devices. Use cast covers with hinged lids.

.2 Provide lamacoid name plates on each receptacle coverplates to note panel and circuit designation.

## 3.3 REPLACEMENTS

.1 Replace all wiring devices and cover plates damaged during construction.

# PART 4 MEASUREMENT AND PAYMENT

## 4.1 GENERAL

.1 Section 01 29 00 - Payment Procedures: Requirements for project measurement and payment.

## 4.2 MEASUREMENT AND PAYMENT

.1 No separate payment will be made for work under this Section.

.2 Payment for the works specified in this section to be included in Schedule of Prices Item No. 26 00 00/1.

**END OF SECTION**