Part 1 - General

1.1 RELATED REQUIRMENTS

.1 Section 01 10 10 – General Instructions.

1.2 REFERENCES

.1 Definitions:

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

.2 Reference Standards:

.1 CSA Group

.1 CSA C22.1, Canadian Electrical Code, Part 1 (latest Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2, Canadian Electrical Code, Part 2 (latest Edition), General Requirements.

.3 Abbreviations for electrical terms: to CSA Z85-1983.

.4 Do underground systems in accordance with CSA C22.3 No.1-M1979 except where specified otherwise.

.2 National Building Code of Canada including supplement NFPA30, Flammable and Combustible Liquids, latest edition;

.3 NFPA30A, Automotive and Marine Service Stations, latest edition;

.4 National Fire Code of Canada (NFC), latest edition.

.5 Code, Statute, regulation, By-Law standards provided having most stringent requirements shall apply.

.6 Provincial and Municipal Codes and Regulations.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop drawings:

.1 Submit electrical shop drawings for:

.1 electrical contactor and emergency stop button

.2 submersible pump controller

.3 start/stop pushbuttons

.4 fuel-dispensing position select switch

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data to be incorporation into manual.

.1 Post instructions where directed.

.2 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.3 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

Part 2 - Products

2.1 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

2.2 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment in accordance with the drawings and tender documents.

.2 Equipment and material to be CSA certified. Where CSA certified material or equipment is not available, obtain special approval from Departmental Representative before delivery to site.

2.3 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.4 EQUIPMENT IDENTIFICATION

.1 Provide materials and equipment in accordance with the drawings and tender documents.

.2 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 Departmental Representative.

2.5 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numbered, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

2.6 CONDUIT AND CABLE IDENTIFICAION

.1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.

.2 Maintain separation of all intrinsically safe circuit conductor from other conductors in accordance with C22.1 and manufacturers recommendations.

2.7 FINISHES

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

Part 3 - Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.1 except where specified otherwise.

3.3 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.4 CONDUIT AND CABLE INSTALLAITON

.1 Install conduit and sleeves prior to pouring of concrete.

.1 Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.

.2 Maintain separation of all intrinsically safe circuit conductor from other conductors in accordance with C22.1-02 and manufacturers recommendations.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.6 FIELD QUALITY CONTROL

.1 Load Balance:

.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 - General

1.1 RELATED REQUIRMENTS

.1 Section 26 05 21 – Wire and Cables.

.2 Section 26 05 31 – Splitters, Junction Boxes, Pull Boxes and Cabinets.

1.2 REFERENCES

.1 CSA International

.1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.

.2 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)

.1 EEMAC 1Y-2, 1961, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

.3 National Electrical Manufacturers Association (NEMA)

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wire and box connectors from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.5 Divert unused wiring materials from landfill to metal recycling facility as approved by Consultant.

Part 2 – Products

2.1 MATERIALS

.1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper or aluminum sized to fit conductors as required.

.2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit conductors 10 AWG or less.

.3 bushing stud connectors: to EEMAC 1Y-2, NEMA to consist of:

.1 Connector body and stud clamp for stranded conductors.

.2 Clamp for stranded copper conductors.

.3 Sized for conductors as indicated.

.4 Clamps or connectors for armoured cable, as required to: CAN/CSA-C22.2 No.18.

Part 3 - Execution

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

.3 install fixture type connectors and tighten. Replace insulating cap.

.4 Install bushing stud connectors in accordance with EEMAC 1Y-2, NEMA.

END OF SECTION

Part 1 - General

1.1 RELATED REQUIRMENTS

.1 Section 26 05 20 - Wire and Box Connectors (1-1000V).

Part 2 – Products

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size 12 AWG, except as noted.

.2 Copper conductors: size as indicated, with 600V insulation oil and gas resistant, nylon, TWN75, THHN and THWN only.

2.2 TECK 90 CABLE

.1 Cable: in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Outdoor. Above grade only from new wiring trough at fuel-dispensing area to solenoid, dispenser, card reader and light.

.3 Cable: to CAN/CSA-C22.2 No. 131.

.4 Conductors:

.1 Grounding conductor: copper.

.2 Circuit conductors: copper, size as indicated.

.5 Insulation:

.1 Chemically cross-linked thermosetting polyethylene rated type RW90, 600 V.

.6 Inner jacket: polyvinyl chloride material.

.7 Armour: interlocking aluminum.

.8 Overall covering: polyvinyl chloride material.

.9 Fastenings:

.1 One hole malleable steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.

.10 Connectors:

.1 Watertight, explosion-proof approved for TECK cable.

.11 Coating (inside dispenser sump):

.1 Petroleum resistant, shrink jacket.

2.3 CONTROL CABLES

.1 Cables to have oil and gas resistant insulation.

.2 For 4 #18SH cable use Belden #89418 or equal.

.3 For 9/C #22SH cable use Belden #83559 or equal.

Part 3 - Execution

3.1 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

3.2 INSTALLATION OF TECK 90 CABLE (0-1000V)

.1 Install cables.

.2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors.

3.3 INSTALLATION OF CONTORL CABLES

.1 Install control/communications cables in conduit.

.2 Ground control/communications cable shield, or tape off shield as indicated so as not to be in contact with grounded metal.

END OF SECTION

Part 1 - General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1, Canadian Electrical Code, Part 1, 20th Edition.

Part 2 – Products

2.1 SPLITTERS

.1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.

.3 At least three spare terminals on each set of lugs in splitters less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Welded steel construction with screw-on flat covers for surface mounting.

.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

.3 Explosion proof as required for the hazardous area at the fuel-dispensing area.

Part 3 - Execution

3.1 SPLITTER INSTALLATION

.1 Mount plumb, true and square to building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Install terminal block as indicated in Type T cabinets.

.3 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.3 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00 - Common Work Results for Electrical.

END OF SECTION

Part 1 - General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.

.2 CSA C22.2 No. 45, Rigid Metal Conduit.

.3 CSA C22.2 No. 83, Electrical Metallic Tubing.

Part 2 – Products

2.1 CABLES AND REELS

.1 Not Used.

2.2 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83 with couplings.

2.3 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller.

.1 Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 3 m on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.

.1 Set-screws are not acceptable.

.4 Explosion proof fittings complete with sealing compound as required in hazardous areas at the fuel dispensing area and where conduits from the fuel dispensing area enter the building.

2.5 FISH CORD

.1 Polypropylene.

Part 3 - Execution

3.1 MANUFACTURE'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in unfinished areas.

.3 Use rigid hot dipped galvanized steel threaded conduit underground, on building exterior surfaces, and for all work associated with the fuel system and fuel area.

.4 Use electrical metallic tubing (EMT) indoors.

.5 Install conduit sealing fitting in hazardous areas. Fill with compound.

.6 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its diameter.

.7 Mechanically bend steel over 19 mm dia.

.8 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.9 Install fish cord in empty conduits.

.10 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.11 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Run conduits in flanged portion of structural steel.

.3 Group conduits wherever possible on channels.

.4 Do not pass conduits through structural members except as indicated.

3.4 CONCEALED CONDUITS

.1 Not used.

3.5 CONDUITS UNDERGROUND

.1 Note used.

3.6 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION