Fisheries and Oceans Canada

Gascons (Anse-à-la-Barbe)

For Comments

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Part 1 General

1.1 RELATED REQUIREMENTS

.1 Trenches for electric ducts, including digging, filling, compacting and backfilling materials are explained in section 31 23 33.01 – Excavating, trenching and backfilling. Trenches are built by the Civil discipline.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.10-18, Canadian Construction Code, Chapter V – Electricity, Safety Standard for Electrical Installations

.2 CSA C22.2 No. 65

.3 CAN3-C235-83(C2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V

.2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)

.1 IEEE SP1122-[2000], The Authoritative Dictionary of IEEE Standards Terms, 7th Edition

1.3 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.

1.4 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.

.3 If the specifications and the Code are in contradiction, the Code prevails. However, if superior requirements are indicated on drawings or in specifications, it is then the superior requirements that must be executed.

.4 Language operating requirements: provide identification nameplates and labels for control items in English and French.

.5 Use one nameplate or label for each language.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit the following data sheets or shop-drawings for checking:

.1 PVC ducts;

.2 Plugs and inlets for cable;

.3 Lamps;

.4 Poles;

.5 Services stations;

.6 «C» shape support for connection terminal;

.7 «U» shape support;

.8 Retaining device for cable and conduit;

.9 Electric cables;

.10 Cable connector.

.3 Product Data: submit WHMIS MSDS in accordance with 02 81 01 - Hazardous Materials.

.4 Shop drawings

.1 Submit drawings stamped and signed by a professional engineer registered or licensed in Province of Québec, Canada.

.2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.

.3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.

.4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.

.5 Submit drawings and product data to inspection authorities, if the case arises.

.6 If changes are required, notify the Departmental Representative of these changes before they are made.

.5 Quality Control: in accordance with Section 01 45 00 - Quality Control.

.1 Provide CSA certified equipment and material.

.2 Where CSA certified equipment and material are not available, submit such equipment and material to authority having jurisdiction inspection authorities for special approval before delivery to site.

.3 Submit test results of installed electrical systems and instrumentation.

.4 Permits and fees: in accordance with General Conditions of contract.

.5 Submit a certificate of acceptance from authority having jurisdiction upon completion of Work to the Departmental Representative.

1.6 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians, or by a master electrician or a valid contractor holding a license as per the conditions of Québec Province.

.3 Site Meetings: in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Charts.

.4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety.

1.7 DELIVERY STORAGE AND HANDLING

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 SYSTEM START-UP

.1 Provide these services for the start-up period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.9 DOCUMENTS AND PREMISES EXAMINATION

.1 When submitting his price, the Contractor declares that he examined premises and contract documents, and that he obtained all required information. Adjustments on work-site might be required. It is the Contractor’s responsibility to validate the state of premises.

.2 He also acknowledges that the documents cannot contain, and that is impossible they contain a description or mention of all required accessories necessary for the complete accomplishment of Work.

.3 No supplement will be admitted for omissions or mistakes due to the fact the Contractor did not do a sufficient examination of documents and/or premises.

1.10 SUPPLY, INSTALLATION AND CONNECTION OF MATERIALS

.1 All materials shown on drawings or mentioned in specifications are supplied, installed and connected by the Contractor. Therefore, if nothing is mentioned in relation to supply, installation or connection for one or more materials, it is understood that they are the Contractor's responsibility. Special cases, where supply and/or installation and/or connections are another contractor's responsibility are specified.

.2 Sole terms as « supply », « supplies », « install », « installation », « place » or « replace » have the same significance as the following text group: supply, install, connect, check, configure, program and start-up.

.3 As well as supplying materials, labour and tools necessary to the materials complete installation must also be supplied.

.4 All not specifically mentioned small materials, but still necessary to obtain complete systems in compliance with specifications, must be provided, installed and connected by the Contractor.

1.11 COSTS BREAKDOWN

.1 On the first site-meeting, supply a cost breakdown of electric works requiring the Departmental Representative approval.

1.12 SCHEDULE

.1 This division will provide the Contractor with information necessary to prepare the critical routing table.

1.13 COORDINATION AND EXECUTION

.1 The Contractor must coordinate his works with other jobs. To this end, consulting drawings, as well as the superintendent of works in order to determine which job has priority. No supplement is accepted to undo and redo works to give priority to another job.

Part 2 Product

2.1 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements.

.2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to the site and submit such approval as described in PART 1 - SUBMITTALS.

.3 Factory-assembled control panels and component assemblies.

.4 Recognized product:

.1 Means the indicated article identified by a catalogue number is entirely in accordance with requirements of output, material quality and execution.

.5 Materials origin:

.1 The Departmental Representative can require materials certificates of origin and source.

.6 Materials ordering:

.1 On request, supply the Departmental Representative with ordered materials and equipment list, suppliers and sub-contractors names as well as the delivery date of all these materials.

.2 Each order is conditional upon shop-drawings acceptance by the Departmental Representative, and the Contractor must indicate it on orders.

.7 Manufacturer’s recommendations:

.1 Unless otherwise specified, all devices are installed, connected and started-up in compliance with the manufacturer’s instructions and recommendations.

.2 When drawings do not show required accessories details or connections to do to install a device, these accessories and connectors are a part of the contract as if it was specifically mentioned.

2.2 WARNING SIGNS

.1 Warning signs: in accordance with the Departmental Representative requirements.

2.3 WIRING TERMINATIONS

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

2.4 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates as follows :

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet melamine, black face, white core, lettering accurately aligned and engraved into core mechanically attached with self-tapping SST 316 screws.

.2 Sizes as follows:

Nameplate sizes			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

.2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.

.3 Wording on nameplates and labels are subject to the Departmental Representative's approval prior to manufacture.

.4 Allow for a minimum of twenty-five (25) letters per nameplate and label.

.5 Nameplates for terminal cabinets and junction boxes are to indicate the system and/or voltage characteristics.

.6 Disconnects, starters and contactors: indicate controlled equipment, disconnects, starters or contactors and control panel numbers along with circuit(s) in use.

.7 Transformers: indicate capacity, primary and secondary voltages.

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 color coding throughout.

.3 Colour coding: to CSA C22.1.

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

2.6 CONDUIT AND CABLES IDENTIFICATION

.1 The Contractor shall ensure colors comply with the site's standards.

.2 Colour code conduits, boxes and metallic sheathed cables.

.3 Paint around junction and pull boxes installed in the service space, in accordance with the site's color standards, but not the lid. On those junction boxes lids, identify the wiring going through all circuits with a large indelible marker pen.

.4 Code with plastic tape or paint placed on points where conduit or cable enters walls, ceilings, or floors, and at 15 m intervals.

.5 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

2.7 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

2.8 BARRICADES FOR PUBLIC SAFETY

.1 Barricades to control public access are a similar to INLINE, IN-301 or Blockader, Sonco or the equivalent.

Part 3 Execution

3.1 INSTALLATION

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

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

3.2 NAMEPLATES AND LABELS

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

3.3 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

3.4 COORDINATION OF PROTECTIVE DEVICES

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

3.5 TESTS AND TEMPORARY USE

.1 Check the resistance-to-ground value prior to power-on.

.2 The Departmental Representative can test equipment before temporary approval and in order to check them. These tests do not constitute an acceptance of equipment. Equipment acceptance or all other works executed on work-site validity starts from the certificate's emission date from the Departmental Representative.

.3 Prior to temporary use of equipment by the sub-contractor or the Contractor, the Departmental Representative approval is required.

.4 Prior to temporary acceptance, all equipment must be cleaned and repaired in order to bring them back to their original state.

3.6 FIELD QUALITY CONTROL

.1 Conduct following tests in accordance with Section 01 45 00 – Control.

.1 Power distribution system, including phasing, voltage and grounding.

.2 Circuits originating from branch distribution panels.

.3 Lighting and its control.

.4 Insulation resistance testing:

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance-to-ground before applying power.

.2 Ensure not to dissimulate works or material as pipe, box, etc., without obtaining first the Departmental Representative’s approbation.

.3 Carry out tests in presence of the Departmental Representative.

.4 Provide instruments, meters, equipment and personnel required to run tests during the project and at its conclusion.

3.7 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting (save for stainless steel).

3.8 PROTECTION OF THE PUBLIC AND THIRD PARTIES

.1 During construction, protect exposed or live material to ensure personnel safety.

.2 Enclose and mark all live parts with the words «live circuit 120 volts» (or the appropriate voltage) in French and English.

.3 Provide temporary doors to close rooms containing power distribution equipment. Keep these doors locked unless an electrician provides direct supervision.

.4 The general contractor must strictly follow all provincial or municipal regulations regarding the health and safety of the public and third parties.

.5 Provide warning signs, as required by the Departmental Representative and the appropriate inspection agency.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Disassembly work

.1 Disassembly work includes disconnecting, removing, recovering and storing existing electrical materials to de reused and/or returned to the owner.

.2 Demolition work

.1 Demolition work includes all site removal and evacuation work, existing equipment and/or electrical materials not reused and/or recovered by the owner.

1.2 COORDINATION

.1 Coordinate power interruptions with the owner and, if applicable, the distributor Hydro-Québec.

Part 2 Products

2.1 EXISTING MATERIALS REINSTALLED

.1 Prior installing existing reused electrical equipment, clean, test and recondition electrical equipment. Replace all missing and/or defective parts.

.2 Close all open knockouts of existing reused equipment.

Part 3 Execution

3.1 DISASSEMBLY WORK

.1 All disassembly work of existing electrical equipment to be reused, must be performed by the electrical contractor in coordination with other specialties and under the responsibility of the general contractor.

.2 Prior to disassembly of existing electrical equipment to be recovered, it shall be the responsibility of the electrical contractor to inspect the equipment and report in writing to the departemental representative any breakages and / or defects found. Failure to do so, the equipment will be considered in perfect condition and any breakage or defect found later must be repaired at the expense of the electrical.

.3 The recovered electrical equipment shall be temporarily stored by the electrical contractor, who will therefore take full responsibility for it. No additional costs will be allowed for the replacement of missing and / or damaged equipment during the period in which the equipment was stored.

.4 When reinstalling existing recovered electrical equipment, the electrical contractor shall provide all required mounting brackets and other mounting hardware for a complete and functioning installation.

.5 Redo the identification of existing electrical equipment recovered and reinstalled as indicated on the drawings.

3.2 DEMOLITION WORK

.1 Work prior the demolition

.1 Prior the demolition of existing electrical equipment, the electrical contractor shall perform the following preliminary work:

.1 Power off arterials supplying electrical equipment subject to demolition work.

.2 Disconnect, from existing circuits removed, existing equipment conserved and ensure electrical continuity from existing circuits conserved or reconnect them from a new circuit from an existing electrical panel.

.3 Disassemble existing equipment for reuse and/or recovery.

.2 Demolition Work

.1 All demolition work will be carried out by the electrical contractor in coordination with the other specialties and under the responsibility of the general contractor.

.2 Existing electrical equipment to be disconnected or removed are not indicated in an exhaustive manner to the drawings, it is the responsibility of the electrical subcontractor to conduct a site visit to properly assess the scope of the demolition work of his specialty.

.3 Provide for the removal of all existing non-reused electrical equipment such as street lights, power outlets, switches, switchboards, etc., as indicated on the plan.

.4 In general, existing electrical equipment removed and not reused will become the property of the electrical contractor and must be removed from the site. However, give to the departemental representative the existing appliances identified as materials recovered by it.

.5 When an existing electrical appliance is removed, its existing electrical supply, wires and conduits, must be dismantled to the electrical panel from which the power supply comes, if no other existing appliance conserved is supplied by this artery or until the first existing device conserved and powered by this artery.

.6 Redo the wiring of existing circuits that have been cut by demolition or drilling of existing surfaces.

.7 Redo the electrical continuity of the existing outlets and / or appliances conserved and reconnect existing circuits from existing or new panel boards by adding the required circuit breakers.

.8 When required, disconnect and move electrical equipment to allow work of other specialties and reconnect at the end of work.

.9 Provide for the sealing of openings left in existing walls and / or floors during the demolition and / or dismantling of existing electrical artery. In fireproof walls and / or floors, use an intumescent sealer.

.10 During demolition work, in a building that remains occupied, be sure to keep the fire alarm system in function at all times. In areas affected by the work, replace temporarily and for the duration of the work, the smoke detectors by thermal detectors. At the end of the work, reinstall the smoke detectors where they were before the start of work or as indicated on the drawings.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical

.2 Section 26 05 21 – Wires and Cables (0-1000V)

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International):

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

.2 CSA C22.2 No.65, Wire Connectors

.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 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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

Part 2 Products

2.1 MATERIALS

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

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

.3 Clamps or connectors for armoured cable, flexible conduit, non-metallic sheathed 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 a coat of zinc joint compound on aluminum conductors prior to installation of connectors.

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

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical

.2 Section 26 05 34 - Conduits, conduit fastenings and conduit fittings.

1.2 PRODUCT DATA

.1 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.

1.3 DELIVERY STORAGE AND HANDLING

.1 Packaging Waste Management: remove for reuse by manufacturer of pallets, crates, padding, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, for 600 V, insulation of cross-linked thermosetting polyethylene material rated RWU90 XLPE, jacketed.

2.2 TECK 90 CABLE

.1 Teck 90 cable to: CAN/CSA-C22.2 no 131.

.2 Conductors:

.1 Grounding conductor: copper.

.2 Circuit conductors: copper, size as indicated.

.3 Insulation:

.1 Cross-linked polyethylene XLPE.

.2 Rating: 600 V for circuits of less than 600 V and 1000 V for circuits of 600 V and more.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: flexible interlocking aluminum tape.

.6 Overall covering: thermoplastic polyvinyl chloride, compliant to applicable Building Code classification for this project.

.7 Fastenings:

.1 Unless otherwise specified on drawings, one-hole aluminum straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.

.2 Channel type supports for two or more cables.

.3 Threaded-rods: 6 mm diameter to support suspended channels.

.8 Connectors:

.1 Watertight approved for TECK cable, in accordance with indications on drawings.

2.3 CABLES SOOW

.1 Temporary power-supply cables used to connect the wharf to pontoons must be SOOW, as indicated on drawings.

.2 Connectors

.1 Watertight approved and compliant with SOOW cables, as indicated on drawings.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform tests using the appropriate method to site conditions and to approval of the Departmental Representative and local authority having jurisdiction over installations.

.3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

.1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V)].

.2 Cable Colour Coding: to Section 26 05 00 Common Work Results for Electrical.

.3 Conductor length for parallel feeders to be identical.

.4 In enclosures, horizontal or vertical wiring and attach with fasteners for nylon cables with blocking and tightening device.

.5 Group and fasten by separated circuits in distribution panel.

.6 Use Teck cable in damp or wet premises and in aggressive environment.

.7 Use Teck cable for outdoors.

.8 Use SOOW cables to temporarily connect the wharf to pontoons in accordance with instructions on drawings.

.9 Install wires in accordance with instructions.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

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

.2 Surface and lighting fixture raceways in accordance with Section 26 50 00 - Lighting.

3.4 INSTALLATION OF TECK 90 CABLE

.1 Group cables wherever possible on channels.

.2 Install cables, securely supported by straps and suspended straps.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International).

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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

Part 2 Products

2.1 EQUIPMENT

.1 Grounding conductors: bare stranded copper.

.2 Insulated grounding conductors: green, type RWU.

Part 3 Execution

3.1 INSTALLATION GENERAL

.1 Generally, all conductors shall include ground continuity conductors, unless a cable including this is already installed (ex.: TECK 90).

.2 Metallic channels, cable racks, sleeves or metallic shields for cables shall be linked to the ground by ground continuity.

.3 When metallic electric tubes (EMT type) are used, install ground conductors inside those tubes.

.4 Protect exposed grounding conductors from mechanical injury.

.5 Use mechanical connectors for grounding connections to equipment provided with lugs.

.6 Soldered joints not permitted.

3.2 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list: duct systems, distribution panels and outdoor lighting.

3.3 FIELD QUALITY CONTRL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of the Departmental Representative.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-10, Canadian Construction Code, Chapter V – Electricity, Safety Standard for Electrical Installations

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.1 Shop drawings: Submit drawings stamped and signed by a professional engineer registered or licensed in Province of Québec, Canada.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 SUPPORT CHANNELS

.1 U shape, galvanised-steel supports to be suspended.

Part 3 Execution

3.1 INSTALLATION

.1 Secure equipment to poured concrete with expandable inserts.

.2 Support conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.3 Suspended support systems:

.1 Support individual cable or conduit runs with 6 mm dia. threaded rods and spring clips.

.2 Support 2 or more cables or conduits on channels supported by 6 mm dia. threaded rod hangers where direct fastening to building construction is impractical

.4 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.5 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.6 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.7 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of the Departmental Representative.

.8 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical

.2 Section 26 05 34 – Conduits, Conduits Fastenings and Conduits Fittings.

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International)

.1 CSA C22.10-18, Québec Construction Code, Chapter V, Electricity Canadian Electrical Code.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Québec, Canada.

1.4 DELIVERY STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Product

2.1 SPLITTERS

.1 Splitters to: ACNOR C22.2, number 76.

.2 Terminations: connection blocks to match required size and number of incoming and outgoing conductors as indicated.

.3 Spare Terminals: minimum three spare terminals on each connection or lug block sized less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Junction and pull boxes and cabinets: to ACNOR C22.2, number 40.

.2 All apparent outdoor boxes shall be in stainless steel 316 and NEMA 4X.

.3 Covers Surface Mounted: screw-on turned edge covers.

Part 3 Execution

3.1 SPLITTER BOXES INSTALLATION

.1 Mount splitter boxes, as indicated, plumb, true and square to the existing lines.

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

3.2 JUNCTION AND PULL BOXES INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

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

.3 Everywhere, cabinets are supported apart from conduits or electrical cables.

3.3 IDENTIFICATION

.1 When indicated on drawings, identify equipment to Section 26 05 00- Common Work Results for Electrical.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical

1.2 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. 211.2, Rigid PVC (Unplasticized) Conduit.

.4 CAN/CSA C22.2 No. 227.3, Non-metallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.

.3 Quality assurance submittals:

.1 Test reports: submit certified test reports.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Instructions: submit manufacturer's installation instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

Part 2 Products

2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, threaded galvanized hot-dipped steel and stainless steel in accordance with instructions on drawings.

.2 Rigid PVC conduit: to CSA C22.2 No. 211.2.

.3 Flexible PVC conduit: to CAN/CSA-C22.2 No. 227.3.

2.2 CONDUITS FASTENING

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

.2 Two hole steel straps, in galvanised steel, for conduits larger than 50 mm.

2.3 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits, unless otherwise specified on drawings.

.3 Watertight connectors and couplings for EMT:

.1 Set-screws are not acceptable.

2.4 FISH CORD

.1 Polypropylene.

Part 3 Execution

3.1 MANUFACTURER’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 Use appropriate conduit type and install as indicated on drawings. Conduits diameter shall be 21 mm, minimum.

.2 Bend conduit cold:

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

.3 Mechanically bend steel conduit over 19 mm diameter.

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

.5 Install fish cord in empty conduits.

.6 Remove and replace blocked conduit sections.

.1 Do not use liquids to clean out conduits.

.7 Dry-out conduits before installing wire.

3.3 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel.

.2 Protect conduits from damage where they stub out of concrete.

.3 Install sleeves where conduits pass through slab or wall, according to instructions on drawings.

.4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed, in accordance with instructions on drawings.

.1 Use cold mastic between sleeve and conduit.

.5 Conduits in slabs: minimum slab thickness 4 times conduit diameter.

.6 Encase conduits completely in concrete with minimum 25 mm concrete cover.

.7 Organize conduits in slab to minimize cross-overs.

3.4 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Waterproof joints (except for PCV) with heavy coat of bituminous paint.

.3 Install a red identification-warning tape, with a French and English description of the warning corresponding to the underground electric line. Bury midway from the ground to the wirings.

3.5 EMPTY CONDUITS

.1 The Contractor must supply and install all empty conduits, boxes with their accessories, as shown on drawings.

.2 Also, after an appropriate cleaning, he must install in all empty conduits of more than 3 m a fish cord of polypropylene, 4,76 mm thick.

.3 All empty conduits not ending in a box must be equipped at its end with a treaded accessory, specially designed to ensure cables protection when they are pulled.

3.6 CLEANING

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

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical

.2 Section 26 05 21 – Wires and Cables (0-1000 V)

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International)

.2 Insulated Cable Engineers Association, Inc. (ICEA))

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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

.3 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIAL

.1 Red indicator polyester tape of at least 50 mm wide.

Part 3 Execution

3.1 CABLE INSTALLATION IN DUCTS

.1 Install cables as indicated in ducts.

.1 Do not pull spliced cables inside ducts.

.2 Install multiple cables in duct simultaneously.

.3 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

.4 To facilitate matching of colour coded multi-conductor control cables reel off in same direction during installation.

.5 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.

.6 After installation of cables, seal duct ends with duct sealing compound.

.7 Supply and bury mid-way between ducts and surface indicator tape, warning in French and English an electrical line is buried.

3.2 FIELD QUALITY

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Perform tests using qualified personnel. Provide necessary instruments and equipment.

.3 Check phase rotation and identify each phase conductor of each feeder.

.4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.

.5 Pre-acceptance tests.

.1 After installing cable, but before splicing and terminating, perform insulation resistance test with a 1000 V megger on each phase conductor.

.2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.

.6 Acceptance Tests:

.1 Ensure that terminations and accessory equipment are disconnected.

.2 Ground shields, ground wires, metallic armour and conductors not under test.

.3 High Potential (Hipot) Testing.

.1 Conduct hipot testing in accordance with the manufacturer's recommendations.

.7 Provide the Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test.

.8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International).

.2 Underwriters' Laboratories of Canada (ULC).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.1 Manufacturer's Instructions: Submit written installation instructions provided by the manufacturer, including any indication of special handling, application and cleaning procedures.

1.5 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: remove for reuse and return, by manufacturer, of packaging materials, in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Divert unused metal materials from landfill to metal recycling facility.

.5 Disposal and recycling of fluorescent lamps as per local regulations.

.6 Disposal of old PCB filled ballasts.

Part 2 Products

2.1 LIGHTING

.1 Drawings identify new lights to supply and install.

.2 Drivers for «LED» devices must be approved for outdoor use. Operating range between -40°C and 40°C.

2.2 STEEL POLES

.1 Steel poles designed for underground power and having the following characteristics:

.1 Poles to be mounted on concrete base without transformer base.

.2 Pole type: one-piece square.

.3 Straight pole, with perforations for lamp.

.4 18 inches handhole above base with welded reinforcement frame and bolted cover for electrical connections. Dimensions: 3 in x 6 in.

.5 Four steel anchor bolts, 1in x 33 in, with shims and nuts.

.6 The base of the poles shall be covered with a square base cover.

.7 Finishing shall be the same colour as the lamp.

.8 Grounding terminal.

.9 As indicated on the plans.

Part 3 Execution

3.1 INSTALLATION

.1 Lighting must be installed only when works that could damage or soil them are completed.

3.2 WIRING

.1 Connect luminaires to lighting circuits:

.1 Install flexible or rigid conduit for luminaires as indicated.

3.3 LIGHTING ALIGNMENT

.1 Align luminaires mounted in continuous rows to form straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to the wharf grid lines.

3.4 CLEANING

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

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.5 TESTS

.1 Accomplish tests in accordance with Section 26 05 00 – Common Work Results for Electrical

.2 Check lighting and replace defective components.

END OF SECTION