

PART 1 - GENERAL

1.1 GENERAL

- .1 This section covers items common to Sections of Divisions 23, 26 and 33. This section supplements requirements of Division 01.

1.2 CODES AND STANDARDS

- .1 Do complete installation in accordance with CSA C22.1-2012 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1-M1987 except where specified otherwise.
- .3 Abbreviations for electrical terms: to CSA Z85- 1983.
- .4 Adhere to DFC Standards, latest editions.
- .5 Adhere to Canadian Electrical Code - current edition.

1.3 CARE, OPERATION AND START-UP

- .1 Instruct Departmental Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.

1.4 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235-83.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

- .2 Pay associated fees.
- .3 Departmental Representative will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
- .4 Notify Departmental Representative of changes required by Electrical Inspection Department prior to making changes.
- .5 Furnish Certificates of Acceptance from Electrical Inspection Department and authorities having jurisdiction on completion of work to Departmental Representative.

#### 1.6 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance with Division 01.
- .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 Electrical Inspection Department.
- .3 Factory assembles control panels and component assemblies.

#### 1.7 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
- .2 Clean and touch up surfaces of shop painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

#### 1.8 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates as follows:

.2 Nameplates:

1. Lamicoid 3 mm thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

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

.3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.

.4 Allow for average of twenty-five (25) letters per nameplate.

.5 Identification to be provided in English.

1.9 TESTING,  
ACCEPTANCE AND  
GUARANTEE

.1 The work of this Contractor shall be tested and installed and any devices not operational shall be remedied immediately. Tests required by local authorities shall be the responsibility of the Contractor. When the work is completed, it shall be tested in its entirety, and shall be in good working order before the Certificate of Acceptance shall be issued.

.2 A written guarantee shall be supplied to Canada by the Contractor covering the prompt making good of any and all defects in material and workmanship for the period of one (1) year from the date of acceptance and the making good of any such defects shall be completely the responsibility of the Contractor.

.3 The Contractor will be responsible for the supply of sufficient power on a temporary basis to allow testing of all equipment and systems. These will be tested in the presence of the Departmental

Representative.

1.10 WIRE  
IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or 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 code: to CSA C22.1.

1.11 CONDUIT AND  
CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	<u>Prime</u>	<u>Auxiliary</u>
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red

1.12 CONDUCTOR  
TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors. Corrosion resistant to salt environment.

1.13 MANUFACTURERS  
AND CSA LABELS

- .1 Visible and legible, after equipment is installed.

1.14 WARNING SIGNS

- .1 As specified and to meet requirements of Electrical Inspection Department and Departmental Representative.
- .2 Use decal signs, minimum size 175 x 250 mm.

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- 1.15 MOUNTING HEIGHTS .1 If mounting height of equipment is not indicated, verify before proceeding with installation.
- .2 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .3 Install electrical equipment at following heights unless indicated otherwise.
1. Pedestal receptacles as indicated on drawing details.
  2. Light fixtures on wooden poles as indicated on drawing details.
  3. Local switches: 1200 mm.
  4. Wall receptacles: 400 mm.
  5. Panelboards: as required by code or as indicated.
  6. Thermostats: 1200 mm.
- 1.16 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.
- 1.17 FIELD QUALITY CONTROL .1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .2 The work of this division to be carried out by a contractor who holds a valid Master Electrical contractor license as issued by the Province that the work is being constructed.

- .3 Conduct and pay for following tests:
    - 1. Power distribution system including phasing, voltage, grounding and load balancing.
    - 2. Circuits originating from branch distribution panels.
    - 3. Lighting and its controls.
    - 4. Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
  - .4 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
  - .5 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 energizing.
  - .6 Carry out tests in presence of Departmental Representative.
  - .7 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
  - .8 Submit test results for Departmental Representative's review.
- 1.18 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
- .1 Submit shop drawings in accordance with Division 01
  - .2 Show on shop drawings details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.
  - .3 Where applicable, include wiring, single

line and schematic diagrams.

- .4 Include wiring drawings or diagrams showing interconnection with work of other divisions are required.
- .5 Each shop drawing shall be stamped and signed by the Contractor before submitting, stating that he has checked the drawings against the requirements as called for in the contract documents, and also in the case here the equipment attached to or connects to other equipment, that it has been properly coordinated with this equipment, whether supplied under the Electrical Division or under other Divisions.
- .6 Each shop drawing for non-catalogue items shall be prepared specifically for this project. If brochures are submitted for catalogue items, the brochures shall be marked definitely indicating the item or items to be supplied.
- .7 Work shall not be proceeded until final review of shop drawings are received by the Contractor.
- .8 Shop Drawing Review is for general compliance with contract documents. No responsibility is assumed by the Departmental Representative for correctness of dimensions or details. Corrections or comments made on the shop drawings during the Departmental Representative 's review do not relieve the Contractor from compliance with the requirements of the drawings and specifications.

1.19 OPERATION AND  
MAINTENANCE DATA

- .1 Submit operation and maintenance data in accordance with Division 01.
- .2 Include in manuals information based on following requirements:

1. Operation and maintenance instructions to be sufficiently detailed with respect to design elements, construction features and component function and maintenance requirements, to permit effective startup. Operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
2. Technical data to be in the form of approved shop drawings, project data, supplemented by bulletins, component illustrations, exploded views technical descriptions of items, and parts lists. Advertising of sales literature will not be accepted.
3. Provide wiring and schematic diagrams and performance curves.
4. Include names and addresses of local suppliers for all items included in maintenance manuals.
5. Material to be in English.

#### 1.20 MATERIAL SPECIFIED

.1 Where substitutions are to be submitted for materials bearing the clause "or approved equal", approval of the substitute item must be submitted to the Departmental Representative at least TEN DAYS PRIOR to the closing date of the tender. The proposed substitution shall show product name, complete specification and be equal to, or better than the named item. No increase in the tender price shall be made for such a substitution should it be accepted. Accepted equals will be listed in an addendum seven days prior to the Trade closing date.

.2 Where additional manufacturers are named under Articles entitled "Approved Manufacturers", the choice of which of the manufacturers named in reference to a particular article is to be used, shall be the Contractors.

.3 Materials or product specified without the clauses "or approved equal" or "approved manufacturers" shall be supplied as specified

and no proposed substitution will be considered.

.4 Where approvals are granted for the use of other equipment any and all changes or additions required for the installation or operation of the approved equipment will be made by the Contractor at his own expense and no claims will be approved for any such changes, notwithstanding approval of shop drawings. Equipment that is accepted and installed and then does not perform as represented by original submitted data shall be replaced by the Contractor with equipment as specified, at no charge to the Canada.

1.21 QUALIFICATIONS  
OF WORKERS

.1 Qualified trades people shall be used for all disciplines of the electrical work required for this project.

1.22 EXAMINATION OF  
OTHER WORK

.1 This Division requires the examination of the material and work of all other Divisions upon which the work of this Section depends for proper completion. Any defect in work, levels, or materials, shall be reported to the Departmental Representative. The work of this Division shall not commence until such defects have been corrected.

1.23 DRAWINGS,  
CHANGES  
ACCESSIBILITY

.1 The drawings shall be considered to show the general character and scope of the work and not the exact details of the installation.

.2 The installation shall be completed with all supports and accessories required for a complete operative and satisfactory installation.

.3 The location, arrangement and connection of equipment and material as shown on the drawings represents a close approximation to the intent and requirements of the Contract.

.4 The right is reserved by the Departmental Representative to make reasonable changes

required to accommodate conditions arising during the progress of the work. Such changes shall be done at no extra cost to Canada, unless the location, arrangement or connection is more than 1.5 m from that shown.

.5 Actual location of existing services shall be verified in the field where necessary before work is commenced.

.6 Changes and modifications necessary to ensure co-ordination and to avoid interference or conflicts with other trades, or to accommodate existing conditions, shall be made at no extra cost to Canada.

1.24 AS-BUILT  
DRAWINGS

.1 The Departmental Representative will provide the Contractor with two (2) extra sets of white prints on which the Contractor shall clearly mark as the job progresses all changes and deviations from that shown on Contract drawings. On completion, forward to the Departmental Representative two (2) sets of drawings indicating all such changes and deviations.

1.25 CONTRIBUTION  
IN AID

.1 Contractor shall include all contribution in aid expenses incurred by power utility company in contract price. Consult with power company prior to bidding for amount carried. Advise Departmental Representative if cost is not available.

PART 2 - PRODUCTS

NOT APPLICABLE TO THIS SECTION

PART 3 - EXECUTION

NOT APPLICABLE TO THIS SECTION