

2018-06-08

PART 1 - GENERAL

1.1 GENERAL
REQUIREMENTS

- .1 All work shall be done in accordance with the latest edition of the Canadian Electrical Code and/or local inspection authorities. The electrical contractor shall obtain all permits and inspections required by law, ordinances, rules and regulations of public authorities having jurisdiction of this district and shall obtain certificates on such inspections and submit same and pay all charges in connection therewith.
- .2 Where contractor is unsure of work to be performed, he shall request direction from Departmental Representative prior to proceeding with work.
- .3 Whenever it is proposed to make a change or changes in the design, agreement or type of equipment called for in this specification, the electrical contractor shall estimate the cost of same and submit in triplicate detailed itemized estimates of the costs of all apparatus, materials and labour entering into the change or substitution.
- .4 The general contractor shall perform all cutting, patching and painting necessary for proper installation of work and shall repair any damage done employing only the services of skilled workmen. The electrical contractor shall, upon request, provide all such necessary detail and information to acquaint the general contractor with the scope of particulars of cuttings, painting and patching relevant to his work.
- .5 All equipment and exposed non-current carrying metal, conduits and parts to be permanently and effectively grounded to meet minimum requirements of the CEC Section 10 and as indicated on drawings and further specified. Standards set either by drawings or specifications which are above those covered

1.1 GENERAL REQUIREMENTS (Cont'd) .5 (Cont'd)
by the CEC Section 10 are not be reduced under any circumstances.

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 C22.1-15, Canadian Electrical Code, Part 1 (23rd Edition), Safety Standard for Electrical Installations.

1.3 ACTION AND INFORMATIONAL SUBMITTALS .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
.3 Shop drawings:
.1 Submit drawings stamped and signed by the contractor registered or licensed in the Province of Newfoundland and Labrador, Canada.
.4 Certificates:
.1 Provide CSA certified equipment and material.
.2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for 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.

2018-06-08

1.3 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .4 Certificates: (Cont'd)
 - .5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .5 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.4 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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 dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

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.

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| <u>2.1 DESIGN
REQUIREMENTS
(Cont'd)</u> | .3 | Language operating requirements: provide identification nameplates and labels for control items in English. |
| <u>2.2 MATERIALS AND
EQUIPMENT</u> | .1 | Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements. |
| <u>2.3 ELECTRIC
MOTORS, EQUIPMENT
AND CONTROLS</u> | .1 | Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated. |
| | .2 | Control wiring and conduit: Control Devices conduit, wiring and connections below 50 V which are as specified in mechanical sections and as shown on mechanical drawings. |
| <u>2.4 WARNING SIGNS</u> | .1 | Warning Signs: in accordance with requirements of Departmental Representative. |
| | .2 | Decal signs, minimum size 175 x 250 mm. |
| <u>2.5 WIRING
TERMINATIONS</u> | .1 | Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors. |
| <u>2.6 EQUIPMENT
IDENTIFICATION</u> | .1 | Identify electrical equipment with nameplates and labels as follows:
.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet black face, white core, lettering accurately aligned and engraved into core permanently attached to equipment.
.2 Where new nameplates are required on equipment that already have nameplates, the new shall match the existing.
.3 Sizes as follows: |
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2018-06-08

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 to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Nameplates for disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets and pull boxes: indicate system and voltage.

2.7 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.

2.8 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.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green

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.
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2018-06-08

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| <u>3.1 EXAMINATION
(Cont'd)</u> | .1 | (Cont'd)
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative. |
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| <u>3.2 INSTALLATION</u> | .1 | Do complete installation in accordance with CSA C22.1 except where specified otherwise. |
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| <u>3.3 NAMEPLATES AND
LABELS</u> | .1 | Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed. |
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| <u>3.4 CO-ORDINATION
OF PROTECTIVE
DEVICES</u> | .1 | Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings. |
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| <u>3.5 FIELD QUALITY
CONTROL</u> | .1 | Conduct following tests in accordance with Section 01 45 00 - Quality Control.
.1 Circuits originating from branch distribution panels.
.2 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
.3 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. |
| | .2 | Carry out tests in presence of Departmental Representative. |
| | .3 | Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project. |
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