

SECTION 16050 - BASIC METHODS AND REQUIREMENTS (ELECTRICAL)**PART 1 – GENERAL****1.1 RELATED WORK**

- 1.1.1 This specification to be read in conjunction with Bid Documents and drawings.
- 1.1.2 Furnish and install electrical wiring, systems, equipment and accessories in accordance with the bid documents.
- 1.1.3 Electrical service entrance equipment (arrangements for temporary and permanent connections to the power company's system) shall conform to the power company's requirements. Coordinate fuses, circuit breakers and relays with the power company's system, and obtain power company approval for sizes and settings of these devices.
- 1.1.4 Wiring ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways accordingly sized. Aluminum conductors are prohibited.

1.2 APPLICABLE SPECIFICATIONS

- 1.2.1 While not identified and specified by number in this document, Contractor will comply with all requirements of Division 26, C.S.A. Electrical Bulletins, and all Provincial and local laws, rules, ordinances and codes.
- 1.2.2 Electrical installation shall be in accordance with the current edition of the Canadian Electrical Code, Provincial and other codes, rules and regulations. Supply material and labour required to meet the requirements of these codes, rules and regulations even though the work is not shown on the drawings or mentioned in the specifications. Where the electrical installation calls for better quality materials or construction than the minimum requirements of these codes, rules and regulations, the electrical installation shall be as described in the bid documents.
- 1.2.3 Electrical installation shall be in accordance with the requirements of the electrical supply authority and the local inspection authority.

1.3 PERMITS, INSPECTIONS AND TESTING

- 1.3.1 The Contract Administrator will obtain and pay for all applicable Local Authority and electrical supply authority approvals and permits.
- 1.3.2 Contractor will make changes required to secure Local Authority and/or electrical supply authority approval without extra cost. Where conflicting requirements occur, comply with the most stringent regulation. Note that requirements shown or specified may exceed minimum standards set by Local Authorities.
- 1.3.3 Note that Site reviews by the Contract Administrator are for the purpose of determining in general if the Work is proceeding in accordance with the Contract Documents, and to endeavour to guard the City against defects and deficiencies, and not to superintend the execution of the Work, which is the Contractor's responsibility.

1.4 TEST STANDARDS

- 1.4.1 All materials and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet CSA and/or UL standards where test standards have been established. Equipment and materials which are not covered by CSA or UL standards will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no

nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as NEMA, or ANSI. Evidence of compliance shall include certified test reports and definitive shop drawings.

1.5 MATERIALS

1.5.1 All materials shall be new and C.S.A. approved.

1.6 EQUIPMENT PROTECTION

1.6.1 Equipment and materials shall be protected during shipment and storage against physical damage, dirt, moisture, cold and rain:

1.6.2 During installation, enclosures, equipment, controls, controllers, circuit protective devices, and other like items, shall be protected against entry of foreign matter; and be vacuum cleaned both inside and outside before testing, operating and (if required) repainting.

1.6.3 Damaged equipment shall be, as determined by the Contract Administrator, placed in first class operating condition or be returned to the source of supply for repair or replacement.

1.6.4 Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal in accordance with B6.

1.6.5 Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

1.7 WORK PERFORMANCE

1.7.1 All electrical work must comply with the requirements of CEC, NFPA 70E, and all applicable local and provincial codes. All Work performed shall meet or exceed Public Works, Building Services Design Guidelines and Workplace Safety and Health Act standards.

1.7.2 Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished in this manner for the required work, the following requirements are mandatory:

1.7.3 Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.

1.7.4 Electricians must wear personal protective equipment while working on energized systems in accordance with NFPA 70E.

1.7.5 Before initiating any work, a job specific work plan must be developed by the Contractor. The work plan must include procedures to be used on and near the live electrical equipment, barriers to be installed, safety equipment to be used and exit pathways.

1.7.6 New work shall be installed and connected to existing work neatly and carefully. Disturbed or damaged work shall be replaced or repaired to its prior conditions.

1.7.7 Contractor shall be responsible for any damage caused the City by improperly carrying out this Contract.

1.7.8 Grounding shall be in accordance with the latest edition of the Canadian Electrical Code.

1.7.9 Electrical installation, including electrical equipment supplied, installed or connected, shall be tested in the presence of the Contract Administrator on completion of the Work.

1.8 EQUIPMENT IDENTIFICATION

- 1.8.1 In addition to the requirements of the CEC, install an identification sign which clearly indicates information required for use and maintenance of items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.
- 1.8.2 Nameplates shall be laminated phenolic resin with a white core with engraved lettering, a minimum of 12 mm (1/2 inch) high. Secure nameplates with screws. Nameplates that are furnished by manufacturer as a standard catalog item, or where other method of identification is herein specified, are exceptions. Nameplate colour and wording shall be as per E3.2 of the Bid Documents.

1.9 DELIVERY AND STORAGE

- 1.9.1 Check and do not deliver finished equipment to the job site until secure weatherproof dry storage is available.

1.10 SPECIAL CLEANING

- 1.10.1 Maintain tidiness, and at completion remove protective paper, labels, etc. and tools and waste materials. Leave Work area clean and in perfect operating condition.
- 1.10.2 At the end of construction, all systems shall be left ready for operation.

1.11 MAINTENANCE AND OPERATING INSTRUCTIONS

- 1.11.1 Contractor shall provide by Total Performance date four (4) sets of all brochures or literature supplied by manufacturers of each piece of equipment, including the following, and bind into seven sets with hardback covers, and deliver to the Contract Administrator:
- (a) Complete list of all electrical equipment supplied and installed under this Contract, including description, make, type, voltage, amperage, serial number and lists of repair and replacement parts, with names and addresses of suppliers;
 - (b) Correct installation procedure;
 - (c) Manufacturer's recommended operating and maintenance instructions;
- 1.11.2 Instruct the Contract Administrator's designated employees in proper care, operation, use and maintenance of all systems and equipment, and provide general explanatory literature required and start up supervision and instructions. Upon completion of instructions, forward to the Contract Administrator a letter indicating person(s) instructed and dates that the instruction took place. If in the Contract Administrator's opinion this is not done satisfactorily, the Contract Administrator may direct such instruction and charge all costs involved to the Contractor.
- 1.11.3 Include in the front of each manual a maintenance schedule, showing equipment name and location, type and frequency of required maintenance with referral to manufacturer's maintenance sheets.

1.12 EQUIPMENT INSTALLATION

- 1.12.1 Electrical drawings do not show architectural, structural and mechanical features. Take information involving dimensions of building from Site measurement.
- 1.12.2 Assume full responsibility for layout of own Work and for any damage caused to property of others through improper location or poor workmanship.

- 1.12.3 Where Work is to be done in existing buildings, accurately survey, provide for avoidance of damage and interference to existing Work and rectify any such damage due to Contractor's Work.

1.13 ABBREVIATIONS

C.E.C.	Canadian Electrical Code
C.E.M.A.	Canadian Electrical Manufacturer's Association
C.S.A.	Canadian Standards Association
N.E.M.A.	National Electrical Manufacturer's Association
O.H.S.A.	Occupational Health and Safety Association
U.L.C.	Underwriter's Laboratories of Canada