

ELECTRICAL SPECIFICATIONS

1. GENERAL

1. Supply all labour, equipment, and materials necessary to install complete and operational, the electrical systems described herein and shown on the Drawings. The requirements of this Section are in addition to those contained in the General Conditions and other portions of the Contract Documents.
2. Refer to General Requirements in the Specification.
3. Where the term "Provide" is used it shall be understood to include labour, materials and services necessary to supply and install items or work referred to.

2. DRAWINGS AND SPECIFICATIONS

1. It is the intent of these Drawings and Specifications to provide for an electrical installation complete and in operating condition. The responsibility for supplying and installing all material necessary to accomplish this, except where specifically noted that such work or materials is not included, shall be part of this Section.

3. CODES, PERMITS AND FEES

1. The complete installation shall be in accordance with the current edition of the Canadian Electrical Code (as amended by the Authority Having Jurisdiction), and the bylaws of the city or municipal electrical energy inspection department whose authority covers the area in which the work is being done.
2. Obtain and pay for all permits and licenses required to execute the work.

4. MATERIALS

1. All materials supplied shall be new and of the quality indicated in the Specifications and shall conform to the standards of the CSA and the ULC and approved by these agencies where applicable.
2. In the event that a material specified does not bear CSA and ULC approval, obtain the approval of the local inspection authority, pay all charges levied by the inspection authority and make any modifications required, at no additional expense to the RCMP.

5. EQUIPMENT LOCATIONS

1. Consult with the RCMP and all other subtrades involved to confirm the locations of the various outlets and equipment and cooperate fully to ensure that no conflict arises during the installation.
2. Particular care shall be taken that equipment, outlets, junction boxes or pullboxes will not be obstructed by other structure, equipment, pipes or ducts installed under this general contract by other trades.
3. No extra charge for materials and labour shall be added to the Contract for outlets moved within 10 feet from the location shown on the plans prior to rough-in.

6. GUARANTEES

1. Guarantee all work for one year, following final acceptance. This guarantee shall include all problems caused by improper installation or equipment failure.

7. SITE EXAMINATION

1. Examine the site of work and become familiar with all features and characteristics affecting this work.
2. No additional compensation will be given for extra work due to existing conditions, which such examination should have disclosed.
3. Report to the Project Engineer any unsatisfactory conditions, which may adversely affect the proper completion of this work.

8. RENOVATIONS IN EXISTING BUILDING

1. Remove all existing luminaires, feeders, outlet boxes, switches, receptacles, etc. not required for the renovated layout shown. All equipment removed and not reused shall become the property of the Owner. Unless otherwise noted, all equipment installed in renovated areas shall be new. All wiring shall be installed concealed.
2. Supply and install new breakers where required in existing panels to pick up additional circuits indicated on the drawings. Existing breakers may be reused in new and existing panels wherever possible provided the breakers are in good condition and meet series rating of new and existing panels.

9. SHOP DRAWINGS

1. Prior to delivery of any products to the job site and sufficiently in advance to allow ample time for checking, submit Shop Drawings in PDF format for review of requirements as specified in this Division.
2. Show details, dimensions, construction, size, arrangement, operating clearances, performance characteristics and capacities of products and parts of the work.
3. Manufacture of products shall conform to reviewed Shop Drawings.
4. Where applicable include wiring, single line and schematic diagrams.
5. Include wiring drawings or diagrams showing interconnection with work of other Sections.
6. Keep one complete set of Shop Drawings at the job site during construction.

10. PROJECT RECORD DRAWINGS

1. Before commencing work, obtain two sets of white prints of all drawings pertinent to the work. Keep drawings on site and, daily or weekly as necessary, record in colored pencil all changes, alterations, or additions in runs of conduit, numbers and location of panels, luminaires and devices that may occur during progress of the work.

11. MAINTENANCE MANUALS

1. Before requesting final certificate, submit PDF format copies of the maintenance manual as specified in Division 1 this Division.
2. Include in the manuals information based on the following requirements:
 1. Operation and maintenance instructions to be sufficiently detailed with respect to design elements, construction features, component function, operation procedures/sequences and maintenance requirements to permit effective operation, maintenance, repair, modification, extension and expansion of any portion or feature of the installation.
 2. Technical data to be in form of approved Shop Drawings, supplemented by bulletins, technical descriptions of items, and parts lists. Advertising of sales literature will not be acceptable.
 3. Provide wiring and schematic diagrams and performance curves where necessary.
 4. Include names and addresses of nearest supplier for all items included in the maintenance manuals.
 5. Include copies of the manufacturer's published literature, certified performance data, shop and "as-built" drawings and parts lists.
 6. Provide manual and seminar with Owner's forces to ensure proper operation of building prior to Substantial Performance.

12. DISTRIBUTION

1. Existing panels are Schneider Type NQ complete with breakers to meet series rating. Provide typewritten circuit directories, protected by a clear plastic cover. Identify all circuits with actual usage, including locations for all loads.

13. GROUNDING

1. Provide bonding to all metal equipment, metallic waste water system, gas piping and building structure as required by Code.

14. DISCONNECT SWITCHES

1. Supply and install disconnect switches as indicated and as required by Code. Disconnect switches shall be equal to Schneider Type General Duty or Heavy Duty (weatherproof) where noted. Bryant 30000/40000/60000 series motor starters without overload protection may be used for loads rated 30/40/60A or less.
2. Provide auxiliary contacts in elevator drive unit disconnect switch for safety interlock by elevator installer.

15. WIRING METHODS

1. All wiring shall be copper unless indicated otherwise.
2. Feeder conductors from service equipment to panelboards to be sized for maximum voltage drop of 2%.
3. Branch circuit wiring shall be min. #12 AWG 90C rated in EMT. AC-90 may be used where permitted by Code. Where wire size is not indicated, ampacity must match or exceed that of protective device.
4. Feeders shall be 90C rated wire in EMT. Teck 90 cables may be used where permitted by Code, unless specifically noted otherwise.

5. Branch circuit wire sizes indicated on any equipment schedules are rated on 90C. Where equipment is marked with a maximum conductor termination temperature then wire size to be revised as per 4-006 of CEC.
6. Wiring penetrating any horizontal or vertical assembly required to have a fire-resistance rating shall be in accordance with the local building code. Conduits or cables shall be tightly fitted and fire stopped where necessary to maintain fire rating, as follows:
 1. For penetrations through a Fire Separation wall provide a firestop system with a "F" Rating as determined by ULC or cUL as indicated below:

Fire Resistance Rating of Separation	Required ULC of cUL "F" Rating of Firestopping Assembly
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

2. For combustible penetrations through a Fire Separation provide a firestop system with an "F" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated. Combustible cables and raceways shall be max. 25 mm diameter.
3. For penetrations through a Fire Wall or horizontal Fire Separation provide a firestop system with a "FT" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.
4. Install firestop materials in accordance with ULC Fire Resistance Directory or UL Products Certified for Canada (cUL) Directory.
5. Comply with manufacturer's instructions for installation of through-penetration materials.
 1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 2. Protect materials from damage on surfaces subjected to traffic.

16. BASIC METHODS

1. Install wiring continuously within raceways or cables; splices will be permitted only at outlets and junction boxes. Sufficient slack shall be left at these points to permit proper connection of luminaires, devices, equipment, etc.
2. All wiring shall be run concealed in ceiling, walls or floor wherever possible. Any exposed conduits or cables shall be run parallel to or at right angles to building lines and in a neat manner.
3. Install pull boxes in the locations shown on the Drawings and as further required by the Canadian Electrical Code. Pull boxes shall be located in inconspicuous, accessible spaces.

17. WIRING DEVICES

1. Receptacles shall be specification grade, 15A, decorator style. Provide 20A receptacles where indicated. All receptacles shall be white, unless otherwise noted.
2. Wiring devices and coverplates shall be of one manufacturer; Bryant, G.E., Hubbell, Leviton or P & S.
3. All cover plates shall be stainless steel in finished areas.
4. Ground fault circuit interrupting (GFI) duplex receptacles shall be specification grade complete with LED indicator light.

18. MECHANICAL AND OTHER EQUIPMENT

1. Provide wiring, connections, starters, disconnects and controls for mechanical equipment and for other equipment supplied and installed by others. All wiring to mechanical equipment shall be copper.
2. Provide flexible connections to mechanical equipment for vibration isolation. NMD-90 may be used for connections to ceiling mounted exhaust fans where permitted by Code. Connections to equipment roof mounted or in other damp or wet locations shall be liquid-tight.
3. In general, all control wiring will be by the Contractor responsible for the equipment being installed unless otherwise noted. Where 120 volt power is required for this equipment, wiring to the equipment terminals is the work of the Electrical Contractor. Electrical contractor to coordinate with General contractor for all electrically powered equipment not provided by Electrical contractor.
4. Refer to the Mechanical Drawings and Specifications to confirm electric characteristics and controls for all mechanical equipment and systems.

5. Receptacles for maintenance of equipment located on roof shall be protected by GFCI, supplied by a circuit dedicated to these outlets, CSA 5-20R configuration, located within 7.5m of equipment, located not less than 750mm above finished roof and protected from mechanical damage as per local electric code.

19. FIRE ALARM SYSTEM

1. Modify the existing fire alarm system as shown on the Drawings. All components shall be UL and CSA listed, and shall be installed in conformance with CAN/ULC-S524-M.
2. Duct type smoke detectors shall be Edwards 6264C series complete with mounting base, housing and sampling tube. Position a minimum of six duct widths from any upstream bends, obstructions or duct geometry changes.
3. Wiring shall be run in EMT. AC-90, NMD-90 and FAS105 fire alarm cable with 105°C flame retardant PVC red jacket may be used where permitted by Code. Wiring sizes shall be in accordance with manufacturer's recommendations.
4. Following completion of the fire alarm installation, arrange with the manufacturer's representative for inspection and operational tests of each system component in conformance with CAN/ULC-S537-M. On completion of inspection issue to the Owner and to the Engineer:
 1. A copy of the inspecting technician's report.
 2. A "Certificate of Verification".
 3. Proof of liability insurance for the inspection.Include all costs for inspection and testing.

20. NAMEPLATES

1. Provide and install laminated plastic nameplates with engraved letters to identify the following:
 1. Motor Starters
 2. Disconnect SwitchesNameplates/labels shall give either the designated name of the equipment (Panel A) or its function (Starter for Fan Coil Unit FC-1, Lighting Control, Exhaust Fan Switch, etc.).

21. FIELD REVIEWS

1. Call the Engineer for field reviews at the following stages of construction:
 1. Rough-in.
 2. Substantial completion.
 3. Completion of deficiencies (if applicable).
2. Provide three working days' notice for all reviews.
3. Failure to inform the Engineer of construction progress as described above may result in the Engineer being unable to issue an Assurance of Professional Field Review and Compliance (Schedule 'C') to the Building Authority, which is required prior to occupancy.

22. SUBSTANTIAL COMPLETION

1. Prior to requesting substantial completion inspection, the following items must be complete:
 1. Fire alarm verification certificate and technician's test report must be submitted.
 2. Certificate of Acceptance from Electrical Inspection Department must be submitted
 3. Project Record Drawings must be submitted to Engineer for review and updating.
 4. Maintenance manuals must be submitted to Engineer for review.
 5. All outlets must have coverplates installed.
 6. Continuity of fire separations at electrical penetrations must be complete.
2. If any of the above items have not been completed at the time of substantial completion inspection, and the letter of "Assurance of Professional Field Review and Compliance" cannot be issued, any costs for subsequent inspections will be charged to the Electrical Contractor.