

Part 1 General

1.1 GENERAL REQUIREMENTS

1. The specification covering the General Conditions of the Contract, General Specifications, Instructions to Bidders and all associated sections from an integral part of this specification and shall be read in conjunction herewith.

1.2 SCOPE

1. Provide all materials, labour, plant and equipment required for a complete and working installation as herein specified and as shown on the drawings.
2. The electrical installation shall be in accordance with the current edition of the Canadian Electrical Code, Provincial and Municipal codes and regulations.
3. Obtain all permits, approvals and pay all related fees required for this installation.
4. All equipment supplied under this Contract shall be new and be C.S.A. approved.
5. Arrange for, and co-ordinate, rough-in and final inspections with City of Winnipeg and Contract Administrator.

1.3 DEFINITIONS

The following are definitions of terms and expressions used in the specification:

- SUPPLY AUTHORITY means electrical power utility company responsible for delivery of electrical power to project.
- ELECTRICAL CODE means as shown on contract drawings or noted in Contract Documents.
- TYPE TESTED means that each piece of equipment produced by Manufacturer is not fully tested. An original piece with similar arrangement has been fully tested and results of that test are available.
- PROVIDE means to supply, install and leave in working order all materials and necessary wiring, supports, access panels, etc., as necessary for equipment indicated.

1.4 EXAMINATION

1. Examine the architectural, interior design, structural and mechanical drawings to ensure that the work under this Contract can be satisfactorily carried out. Report any discrepancies to the Contract Administrator prior to submission of tender.
2. Examine the site, local conditions and all existing apparatus if any to be re-used and verify that the condition of this equipment is suitable for its intended use in the new construction.

1.5 SUPERVISION

1. Supervise the work at all times through a responsible and competent supervisor.
2. Full co-operation shall be shown with other trades to facilitate installations and to avoid delays in carrying out the work.

1.6 ACCURACY OF DATA

1. Drawings are schematic; exact locations, distances, levels and other dimensions shall be governed by the building as constructed.
2. Outlets or equipment shall be moved to any point within a 10' radius when the Contract Administrator requests relocation before the work has been substantially completed, without additional cost.
3. Branch circuit wiring shall be installed with circuits arranged exactly as shown on the drawings. Conduit and cable runs may be modified to suit the installation.
4. Contractor shall provide a typical mock-up of one area if requested prior to complete rough-in.

1.7 APPROVAL OF MATERIAL

1. Substitutes should be in accordance with B6.

1.8 SHOP DRAWINGS

1. Submit shop drawings of electrical equipment in accordance with Section 01 33 00.

1.9 "AS-BUILT" DRAWINGS

1. Keep a record set of drawings on the site at all times recording any changes that may occur. Submit these drawings to the Contract Administrator upon completion of the work. As-builts shall include circuiting of new and existing equipment to remain. Transfer changes to electronic disc AutoCAD file. Submit disc and hard copy for final review and submission to Owners.
2. Submit a Certificate of Inspection from the local Inspection Authority upon completion of work and include with As-builts.
3. The Contract Administrator reserves the right to recommend that a portion of the Contract funds be withheld pending submission of acceptable as-built drawings.

1.10 TEST

1. The electrical installation shall be completely tested demonstrating that the equipment and systems installed perform in the manner intended.

1.11 GUARANTEE

1. The satisfactory operation of all work shall be guaranteed for a period of 12 calendar months after final acceptance of the building.

1.12 REQUEST FOR CHANGE

1. All quotations in response to request for change shall be submitted complete with an itemized cost breakdown of all materials and labour required in the change.

1.13 GROUNDING

1. The entire installation shall be grounded in accordance with the Canadian Electrical Code.
2. Isolated ground conductors for panels shall be minimum #6 (green insulation) and be in one continuous, separate run, to the building water main (unless noted otherwise). Where required, panels shall be equipped with a separate isolated ground bus connected to the aforementioned ground conductor.

1.14 WORKMANSHIP

1. Install equipment, conduit and cables in a workmanlike manner to present a neat appearance to the satisfaction of the Contract Administrator. Install conduit and cable runs parallel and perpendicular in chases, behind furring or above ceilings. In areas where systems are to be exposed (electrical room only), install neatly and group to present a tidy appearance.
2. Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with adequate clearances and accessibility for same.
3. Include, in the work, all requirements shown on the shop drawings or manufacturers' installation instructions.
4. Replace work unsatisfactory to the Contract Administrator without extra cost.
5. All conduit must be clipped to structural concrete by means of anchors or supported by Unistrut hangers as close to U/S as possible. Tie wraps for wire hanging and fastening is not acceptable, unless pre-authorized by the Contract Administrator. Perforated strapping is also unacceptable.
6. All support material for all luminaires, outlet boxes, junction boxes, etc. in a non-combustible building shall be of non-combustible material. Wood is not acceptable.

1.15 IDENTIFICATION OF EQUIPMENT

1. All equipment, including receptacles, shall be identified with engraved lamacoid nameplates either screwed or riveted in place. Where Phenolic plastic coverplates are utilized, the circuit identification to be attached to the outlet box, visible when the coverplate is removed.
2. The utilization of Dynamo 6000 or equal is acceptable.
3. Wording for coverplates shall be confirmed by Contract Administrator.

1.16 CUTTING AND PATCHING

1. Arrange and pay for all cutting and patching as required for the electrical installation.

1.17 WIRING METHODS

1. Unless otherwise shown on the drawings, all wires shall be copper, minimum #12 AWG with 90°C x-link insulation. Wiring to be installed in conduit.
2. Wiring in concrete or masonry construction shall be in steel electrical metallic tubing (EMT). Provide a separate grounding conductor in EMT conduit runs embedded in concrete slabs. Conduits installed in areas exposed to moisture shall have watertight fittings.
3. All wiring in finished areas shall be concealed. Conduits shall be run at right angles to the building lines.
4. Conduit and wiring shall be grouped where possible and clipped in a neat and workmanlike manner.
5. AC-90 cable to be used for drops from conduit systems to recessed lighting fixtures in accessible ceilings or outlet boxes in steel stud walls only. Home runs shall be in conduit. Maximum run of AC-90 in accessible ceiling space shall be 5'-0".
6. Existing AC-90 runs to base building panels shall be removed and replaced with conduit and wire within this Contract.
7. All unused communication and power wiring in ceiling space shall be removed.
8. Each circuit for computer equipment shall have a separate neutral conductor.
9. Conduit runs shall be installed and inspected before AC-90 runs are installed to ensure conformance with Item 5 herein.
10. Soft wiring NMD-7 may be utilized in all wood construction where same meets Code. Conduit shall be installed to central junction box for NMD-7 cable termination.

1.18 MOUNTING

1. Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicate otherwise.
2. If mounting height of equipment is not indicated, verify with Contract Administrator before proceeding with installation.
3. Install electrical equipment at the following heights unless indicated or directed otherwise.
 1. Outlets above counters: 6" (150mm); splashbacks: 4" (100mm).
 2. General receptacles, telephone and television outlets: 16" (400mm) (bottom).
 3. Receptacles in mechanical and shop areas: 40" (1m).
 4. Switches, dimmers, push buttons, Luxo bracket: 48" (1.2 m).
 5. Fire alarm pullstations, thermostats: 46" (1.2 m).
 6. End of line resistors: 64" (1.6 m).
 7. Fire alarm bells, horns, speakers: 88" (2.2 m).
 8. Fire alarm horns complete with hush silence 1.2m.
 9. Panelboards, annunciators, etc.: 78" (2.0 m) to top.

10. Clock outlets: 84" (2.15 m).
 11. Handicap suite switches, dimmers, pushbuttons: 35" (900mm).
 12. Handicap suite receptacles, television, telephone: 24" (600 m).
 13. Handicap suite thermostats: 35" (900mm).
 14. As per Architectural elevations.
 15. Heights as above or at bottom of nearest block or brick course.
 16. Occupancy sensor as per Manufacturer's instruction.
4. Refer to accessibility design standards.
 5. All transformers, motor control centres and floor-mounted distribution panels shall be mounted on 4" (100 mm) concrete housekeeping pads. The Electrical Sub Contractor shall be responsible for provision of these pads. Where ceiling heights will not allow housekeeping pads to be installed below distributions, and where pre-approved by the Consultant, 1 ½" (38mm) galvanized cantruss shall be provided in place of the pad.

1.19 WORK IN EXISTING BUILDING

1. The building shall remain open and in normal operation during the construction period of this contract.
2. Where existing services such as electrical power, fire alarm system, television system, are required to be disrupted and/or shutdown coordinate the shut-downs with the Contract Administrator and carry out the work at a time and in a manner acceptable to them. Carefully schedule all disruptions and/or shutdowns and ensure that the duration of same is kept to a minimum. Submit for approval, a written schedule of each disruption at least 72 hours in advance of performing work and obtain Owner's written consent prior to implementing.
3. Should any connections be required to maintain services during work in the existing building, supply and install all necessary material and equipment and provide all labour at no extra cost. Should any existing system be damaged, make full repairs without extra cost, and to the satisfaction of the Contract Administrator.
4. The drawings indicate major items of equipment to be deleted or relocated but may not indicate every item of equipment or conduit to be deleted or relocated. Be responsible for determining which existing equipment is to be deleted or relocated by examining the site and Construction Documents.
5. Where existing devices (receptacles, switches) mounted on a wall which will be covered with a new finish, provide an extension ring, coverplate, etc. as required to mount the device to the new wall.
6. Existing junction boxes shall remain accessible.
7. Refer to General Conditions for phasing and staging of work and adhere to that program. Comply with instructions regarding working hours necessary to maintain the building in operation.
8. It shall be the responsibility of the Electrical Contractor to ensure that any coring of holes through the deck will not penetrate existing conduits, cables or mechanical equipment in or under the floor slabs. He shall be responsible to take any and all action as deemed necessary by the Contract Administrator to correct any such penetrations at his cost. No coring shall be undertaken unless permission is given by the Contract Administrator.

9. When new ceilings are to be installed, existing devices are to be relocated down to new ceiling unless otherwise noted.
10. Where existing ceilings are to be lowered down, all excess devices are to be relocated down to new height and all runs to be extended to suit.

1.20 OUTLET BOXES

1. Outlet, junction and switch boxes shall be galvanized pressed steel of size and type to suit each individual application.
2. Outlets shall not be located anywhere on the outside curtain wall. Outlets shown thus shall be mounted on the nearest dividing wall 2' from outside wall, or nearest furred out column.

1.21 MECHANICAL EQUIPMENT WIRING

1. Provide starters and wiring for all heating, ventilating and plumbing equipment unless specified otherwise.
2. Control wiring for mechanical equipment shall be performed by Div. 23 Electrical Contractor shall provide 120V circuit in location designated by Controls Contractor.
3. Electrical Contractor to provide all control wiring for Owner supplied equipment and as designed on drawing.
4. Refer to the mechanical drawings for the exact location of mechanical equipment requiring an electrical connection.
5. Electrical Contractor shall report any discrepancies in voltage and control wiring specifications.

1.22 MISCELLANEOUS APPARATUS AND APPLIANCES

GENERAL

1. Provide all required electrical devices, components, conduits, fittings, wiring, disconnects, and miscellaneous equipment to make all connections to equipment.
2. Be familiar with the apparatus being supplied and carefully coordinate and cooperate with the supplier/installer to ensure a proper and complete installation.

RECEPTACLES

1. Where equipment has line cord and plug, ensure cap is compatible with receptacle. Provide cord sets to equipment where required.

1.23 PANELBOARDS

1. New panelboards shall match the existing. Load centres are not acceptable. Panels shall be complete with panel trim having concealed hinges and trim mounting screws, locking door with flush catch. Provide two keys for each panel.
2. Circuit breakers shall be bolt on moulded case with thermal breakers rated at 10,000A symmetrical.

3. Affix typewritten directory to the inside of the panelboard indicating loads controlled by each circuit.
4. Panelboards to be surface or recessed mounted as indicated.
5. Revise the directory in existing panels to suit revised circuiting (typewritten). Place existing directory behind new directory for verification by Contract Administrator.

1.24 WIRING DEVICES

1. Colours of receptacles, switches, outlets and coverplates shall be confirmed with Contract Administrator.
2. Switches shall be totally enclosed in moulded housing, 15AC1 or 20AC1 series, 15 amps or 20 amps, 125 VAC as indicated equal to Hubbell No. 1201, P & S No. 15AC1, or Bryant No. 4801. Mount switches 48" A.F.F. unless otherwise noted.
3. Receptacles shall be 15 ampere, 125 VAC, ivory, parallel slot, U-ground, side and back wiring screw terminate. Approved manufacturers are: Hubbell No. 5262, Arrow Hart No. 5262, Bryant No. 5262. Mount receptacles 16" A.F.F. unless noted otherwise.
4. Isolated ground receptacles shall be Pass & Seymour IG6200 pr Bryant No. GF-5262-I with orange face. Mount receptacle 16" A.F.F. unless noted otherwise.
5. Incandescent lighting dimmer controls shall be Lutron Nova T rated at 1500, 1000 or 600 watts as indicated on drawing. Colour of dimmer snap-on cover shall be ivory colour or shall match existing, unless indicated otherwise on drawing. Mount dimmers 48" A.F.F. unless otherwise noted.
6. Provide stainless steel coverplates for recessed devices.

1.25 LIGHTING

1. Supply and install all luminaires complete with lamps. All new luminaires shall be provided with electronic ballast, Power Smart approved.
2. Any unused fixtures above the ceiling must be removed and circuits terminated.
3. Lighting shall adhere to the Manitoba Hydro Power Smart Program.
4. All compact fluorescent fixtures shall utilize Power Smart approved ballasts.
5. T5HO fluorescent fixtures, LED exit signs in renovated construction and occupancy sensors shall be rebateable under this program.
6. Pulse-start fixtures to be totally enclosed.
7. To ensure these products are supplied, and to facilitate the application process, shop drawings shall include the quantity, manufacturer, catalogue number and a specification sheet of each ballast to be used in each linear and compact fluorescent fixture.
8. A copy of the Power Smart Listing should be provided with each applicable product submitted.
9. A summary of total quantity, manufacturer and catalogue number shall be provided for furtherance to the Owner's representative for application preparation. This is to be submitted with approval shop drawings.
10. Submit all invoicing required to satisfy the program.

1.26 UNIT EQUIPMENT FOR EMERGENCY LIGHTING

1. Provide emergency lighting battery units as indicated. Units shall be comprised of a steel cabinet with corrosion-resistant undercoating, removable front panel and shall be wall mounted and cord connected.
2. Units shall be rated for 24 volts and provided with a minimum 6 circuit fuse panel with number of heads indicated on drawings and shall be rated for a minimum of 300 watts for minimum of 30 minutes.
3. Units shall be equal to Emergi-Lite ESL series, approved manufacturers: Aimlite, Emergi-Lite, Lumacell, Beghelli and Ready-Lite.
4. Remote heads shall be injection molded, impact resistant, flame retardant thermoplastic. The lens shall be inverse concave design and fully adjustable for aisle or area distribution.
5. Fixture shall be supplied with a canopy for installation on any four inch octagon box on wall or in ceiling as show on drawings.
6. Lamps shall be 12W, MR16 and rated for 24 volts.
7. Remote heads shall be Emergi-Lite mode no. EF9QD or approved manufacturers: Amilite, Emergi-Lite, Lumacell, Beghelli and Ready-Lite.
8. Wire shall be minimum #12 AWG unless refused by code or noted otherwise.

END OF SECTION