

1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.1-15, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
 - .2 CAN/CSA-22.3 No. 1, Overhead Systems.
 - .3 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
 - .4 CSA Z462-12, Workplace Electrical Safety.
- .2 Institute of Electrical and Electronics Engineers (IEEE) / National Electrical Safety Code Product Line (NESC).
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standard Terms, 7th Edition.

1.2 DEFINITIONS

- .1 Electrical terms used in electrical specifications and on electrical drawings are those defined by IEEE SP1122.

1.3 CARE, OPERATION AND START-UP

- .1 Instruct Consultant and operating personnel in the operation, care and maintenance of systems, system equipment and components.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, maintenance, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment or component failure.
 - .5 Other items of instruction as recommended by manufacturer of the system or equipment.
- .3 Arrange and pay for manufacturer's factory service technician to supervise start-up, installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .4 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.4 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235-83(R2000).
- .2 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 SITE VISIT

- .1 Prior to tender submission visit the site and become familiar with the job and all conditions which may affect the overall cost. Ignorance of existing conditions will not be considered as basis for extra claims. Refer to Division 01 - General Requirements for additional information.

1.6 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Division 01 - General Requirements.
 - .1 Submit shop drawings for all electrical equipment unless otherwise indicated.
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- .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.
- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .5 If changes are required, resubmit corrected shop drawings.
- .2 Manufacturer's Field Reports: submit to Consultant within 7 days of review, verifying compliance of work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.
- .3 Submit WHMIS MSDS information in accordance with Division 01 - General Requirements.
- .4 Upon completion of work submit As-Built Drawings, Maintenance Manuals, and Submittals in accordance with Division 01 - General Requirements.

1.7 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Division 01 - General Requirements.
- .2 All electrical work is to be carried out by qualified, licensed electricians or apprentices for the province of Prince Edward Island and the electrical contractor must have a valid contractor license issued by the province of Prince Edward Island.
 - .1 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .3 The Consultant reserves the right to approve the quality of material and workmanship, and to call for any tests which they deem necessary to establish the integrity of the installation during the progress of the work and a complete test of each system at the completion of the work. The cost of such tests are not to be considered as extras.
- .4 Health and Safety: in accordance with Division 01 - General Requirements.
 - .1 Protect exposed live equipment during construction for personnel safety.
 - .2 Shield and mark all live parts "LIVE 120 VOLTS", or with appropriate voltage in English.
- .5 Quality Control: in accordance with Division 01 - General Requirements.
 - .1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to the authority having jurisdiction for approval before delivery to site.
 - .2 Submit test results of installed electrical systems and instrumentation.
 - .3 Submit certificate of acceptance from authority having jurisdiction upon completion of work to Departmental Representative.

1.8 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Division and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay all associated fees.
- .3 Notify Departmental Representative of changes required by Electrical Inspection Division prior to making changes.
- .4 Submit Certificates of Acceptance from Electrical Inspection Division or authorities having jurisdiction on completion of work to Departmental Representative.

1.9 CO-ORDINATION

- .1 Co-ordinate all work with work of other divisions to avoid conflict and notify Consultant if any changes are required.

- .2 Locate electrical systems, equipment, and materials to provide minimum interference and maximum usable space.
- .3 Where interference occurs, the Consultant must approve relocation of equipment and materials regardless of installation order.
- .4 Notwithstanding the review of shop drawings, the Electrical Contractor may be required to relocate electrical equipment which interferes with the equipment of other trades, due to lack of co-ordination of the Electrical Contractor with other trades. The cost of this relocation will be the responsibility of the Electrical Contractor and the Consultant will determine the extent of relocation required.
- .5 Leave space clear, and install equipment to accommodate future materials and/or equipment as indicated or specified, or to accommodate equipment and/or materials supplied by other Contractors.
- .6 Verify that the spaces in which the equipment is to be installed is sufficient and install all equipment to maintain head room and clearances, to conserve space, comply with codes, and to ensure adequate space for future servicing.
- .7 The Drawings for the Electrical work are diagrammatic performance Drawings only and are intended to convey the scope of work and indicate the general arrangement, locations, and size of equipment fixtures and outlets. The Drawings do not show Architectural, Mechanical or Structural details.
- .8 Do not scale or measure Drawings, but obtain information regarding accurate dimensions, from the dimensions shown on the Architectural Drawings or by site measurements. Follow the Electrical Drawings for laying out the work.

1.10 CUTTING AND PATCHING

- .1 Electrical Contractor to inform all other divisions in time, of required electrical openings and/or penetrations. Where this requirement is not met, the cost of all cutting and associated work to provide openings and/or penetrations will be the responsibility of the Electrical Contractor. Obtain written approval of Structural Engineer before drilling through any beams or floors. Keep hole sizes to a minimum and be responsible to repair damage caused by lack of coordination.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Provide Departmental Representative with material delivery schedule within two weeks after award of Contract.
- .2 Arrange for delivery access and unloading and/or storage areas with General Contractor.

1.12 INSPECTION OF WORK

- .1 Periodic visits to the site during construction phase will take place to ascertain reasonable conformity to plans and specifications. The Contractor will be responsible for the execution of their work in conformity with the construction documents, the Contract, and the requirements of the inspection authority.

1.13 SCHEDULING OF WORK

- .1 Note that the Owner intends to carry on business as usual and work activities must be coordinated to maintain electrical services in occupied areas. Provide any required temporary work.
- .2 Work activities which disrupt occupants of the building, such as excessive noise caused by drilling of walls, floors or ceilings must be approved and scheduled in writing by the Departmental Representative at least 48 hours in advance.
- .3 All power shutdowns which affect building occupants or building operation must have prior approval of Owner and must be scheduled in writing at least 48 hours in advance with the Departmental Representative.
- .4 Overtime work, and work outside normal work hours deemed necessary to meet the schedule are the responsibility of the Contractor and must meet the requirements of the

PEI Employment Standards Act. All costs resulting from such overtime work must be included in the Contractor's total tender price.

1.14 FIRE RATING OF PENETRATIONS

- .1 Provide fire stopping and smoke seal materials at openings around cabling conduits passing through floors, ceilings and fire rated walls, as required to maintain fire rating equal to the fire rated assembly.
- .2 Use ULC or approved equal fire barrier products installed in accordance with manufacturers instructions at each penetration.
- .3 Acceptable products for fire barrier products to be 3M #CP25 fire barrier caulk, #303 putty, #FS 195 wrap and #CS195 sheet or approved equal.

2 Products

2.1 PRIOR APPROVAL OF PRODUCTS

- .1 The use of any product not listed by name in the specification must be approved by Consultant prior to tender submission.
- .2 By using pre-approved product substitutions the Contractor accepts the responsibility and associated costs for all required modifications to circuitry, devices and wiring. The Contractor is to submit shop drawings with deviation from the original design highlighted to the Consultant for review and approval prior to rough-in.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance with Division 01 - General Requirements.
- .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 Division prior to delivery and submit such approval as described in Part 1 - Submittals.

2.3 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint indoor electrical equipment enclosures light grey to EEMAC 2Y-1.

2.4 WARNING SIGNS

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

2.5 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.6 EQUIPMENT IDENTIFICATION

- .1 All junction and pull boxes are to be marked with an indelible ink marker to designate the circuit number of enclosed wiring, the designated panel name and electrical characteristics. Where boxes are painted in exposed areas, information is to be written on inside of box cover.
- .2 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, black white face, black white core, mechanically attached with self tapping screws.
 - .2 Sizes as follows:

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 line	6 mm high letters

- .3 Labels:
 - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
- .4 Wording on nameplates and labels to be approved by Consultant prior to manufacture.
- .5 Allow for average of twenty-five (25) letters per nameplate and label.
- .6 Identification to be English.
- .7 Nameplates for pull boxes and junction boxes to indicate system name and voltage characteristics.
- .8 Nameplates for pull boxes, to indicate system name, overcurrent protection device rating, voltage, phase, and number of wire, and power source.
- .9 Lamicoid nameplates installed on all various system controls, control panels, and large junction and pull boxes shall contain the following information:
 - .1 Designated name of equipment.
 - .2 Designated name of power source.
 - .3 Voltage, number of phases and wires.
 - .4 Branch circuit breaker number(s) where possible.
 - .5 The following is an example:

FORESTAGE GRID CHAIN HOIST
208V-3PH, FED FROM LT-24-3, 5, 7

2.7 WIRING IDENTIFICATION

- .1 Identify wiring with indelible pre-printed self-adhesive vinyl tape, indicating panel and circuit number. Wiring to be identified at both ends and at junction, pull boxes and splices.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1-15, Canadian Electrical Code.

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.

SYSTEM	PRIME COLOR	AUXILIARY COLOR
600V (normal)	Yellow	Green
208/120V (normal)	Yellow	-----
208/120V (essential)	Yellow	Blue
Telephone	White	-----
Data	Blue	-----
Fire Alarm	Red	-----

Access Control	Orange	-----
CCTV	Orange	Black
Low Voltage Lighting	Black	-----

3 Execution

3.1 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.2 LOCATION OF EQUIPMENT

- .1 Change location of equipment at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

3.3 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify with Consultant before proceeding with installation.
- .3 Install electrical equipment at the following heights:
 - .1 Local switches: 1200 mm.
 - .2 Wall receptacles:
 - .1 General: 400 mm.
 - .2 Above top of continuous baseboard heater: 200 mm.
 - .3 Above top of counters or counter splash backs: 375 mm.
 - .4 In mechanical rooms: 1200 mm.
 - .3 Telephone and data outlets: 400 mm.
 - .4 Fire alarm manual stations: 1200 mm.
 - .5 Fire alarm visual and/or audible signal devices: 2100 mm.
 - .6 Wall mounted exit lights: 2100 mm.
 - .7 Luminaires: as indicated in the Luminaire Schedule.

3.4 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 will be permitted, under the direct supervision of a qualified licensed electrician.
 - .1 Permitted activities are to 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 Code 1 Electrical Contractor License as issued by the Province.
- .3 Load Balance:
 - .1 Measure phase current to panelboard 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.
 - .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment. Coordinate with Utility for balancing of service transformers.
 - .3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

- .4 Conduct and pay for following tests in accordance with Division 01 - General Requirements.
 - .1 Lighting and its control.
 - .2 Systems: fire alarm system, door access control system, intrusion alarm, CCTV and lockdown systems.
- .5 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .6 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.

3.5 CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.
- .3 Clean luminaire lenses, housings, louvers, etc. upon completion of construction.

END OF SECTION

1 General

1.1 DESCRIPTION OF WORK

- .1 Work of this Section consists of the complete removal of all obsolete or abandoned electrical equipment including, but not limited to:
 - .1 Existing obsolete lighting, conduit and wire, and raceway.
 - .2 Existing obsolete power and communication system conduit and wire/cabling.
- .2 All removal or alteration work of electrical construction to be done in accordance with the safety standards outlined in the Canadian Electrical Code.

1.2 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Division 01 - General Requirements.

1.4 SITE SURVEY

- .1 Prior to Tender submission, visit the site and survey and quantify the extent of the removals/alterations required for this contract and include for all costs in the total tendered price. Any existing conditions information indicated on the drawings is for general guidance only.
- .2 In conjunction with site visit, review all drawings and include all costs due to existing conditions in total tendered price.

1.5 PROTECTION

- .1 The Contractor is responsible for any damages to existing structures or systems as a result of the work.

1.6 SALVAGE MATERIAL

- .1 Existing equipment and devices designated for reuse are to be removed, stored, cleaned and re-installed as indicated on the drawings.
- .2 Identify any damaged equipment or materials intended for reuse prior to demolition and point out deficiencies to the Departmental Representative at that time.

2 Products

2.1 NOT APPLICABLE

- .1 Not Applicable.

3 Execution

3.1 GENERAL REMOVALS

- .1 Where indicated remove all obsolete or abandoned equipment or electrical services including wire and conduit back to the source.
 - .2 Coordinate work of this Section with other trades.
 - .3 Schedule all removal work with the Departmental Representative. Do not disrupt building operations except as permitted by the Schedule.
 - .4 Any existing conduit, wiring, boxes or equipment that is to remain in service is to be properly supported as required by the Canadian Electrical Code. Any additional hangers, straps or fasteners required are to be supplied under this contract.
 - .5 Make alterations to existing electrical services as required and make good all circuits affected by the renovations.
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- .6 Any existing electrical circuits and/or equipment that are interrupted during construction to accommodate alterations but are to remain in service are to be reconnected and circuits made good.
- .7 Any relocating of existing equipment and any rerouting of existing wire and conduit to coordinate with new work to be included in total tendered price.

3.2 IDENTIFICATION OF EXISTING CIRCUITS AND EQUIPMENT

- .1 All modified circuits in existing panelboards serving renovated areas are to be traced out to identify any devices not labeled on existing directories and to confirm all circuits indicated on directories are accurate. Provide new, updated, typewritten circuit directories in all panelboards modified by the renovations.
- .2 Provide identification indicating circuit and panel number at all new and existing wiring devices in renovated area.
- .3 Provide equipment nameplates and labels for all new and existing equipment in renovated area.
- .4 Equipment identification, wiring identification and conduit and cable identification is to be in accordance with Section 26 05 00 - Common Work Results - Electrical.

3.3 CUTTING

- .1 Cutting required for removals and alterations to be to the approval of the Consultant and performed with appropriate power tools.

3.4 CLEANING

- .1 Reused existing equipment to be cleaned in accordance with Division 01 - General Requirements.

END OF SECTION

1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No.18-98 (R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
 - .2 CSA C22.2 No.65-93 (R2008), Wire Connectors.
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

2 Products

2.1 MATERIALS

- .1 Crimp style wire connectors, nylon insulated, with current carrying parts of copper alloy for conductors #16 AWG and smaller.
- .2 Fork tongue or ring style connectors, nylon insulated crimp style. Terminals for connecting conductors #16 AWG and smaller to screw down terminals.
- .3 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required. Use twist-on connectors for #14 AWG to #8 AWG conductors.
- .4 Fixture type twist-on splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors #10 AWG or less.
- .5 Compression type connectors for connecting #6 AWG conductors and larger, unless indicated otherwise.
- .6 Clamps or connectors for armoured cable, aluminum sheathed cable, Teck cable as required to: CAN/CSA-C22.2 No.18.

3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation is to meet secureness tests in accordance with CSA C22.2 No.65.
 - .2 Install fixture type connectors and tighten. Replace insulating cap.
 - .3 Install crimp style connectors with snap-on nylon caps on splices and joints on branch circuits.
- .2 All connections are to be made electrically and mechanically secure. Size and type of connector to be in accordance with manufacturers recommendations for each wire size and combination of wires.

3.2 RESTRICTIONS

- .1 Circuit splices are NOT permitted in equipment enclosures or electrical panelboards.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.
- .2 Section 26 05 20 - Wire and Box Connectors (0-1000V).
- .3 Section 26 05 29 - Hangers and Supports for Electrical Systems.
- .4 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- .5 Section 26 50 00 - Lighting.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 03-96, Test Methods for Electrical Wires and Cables.
 - .2 CSA C22.2 No. 51, Armoured Cables.

2 Products

2.1 BUILDING WIRES

- .1 Conductors: stranded for #8 AWG and larger, solid for #10 AWG and smaller.
- .2 Minimum size to be #12 AWG for lighting and power, #14 AWG for controls, #16 AWG for low voltage and lighting relay/controls.
- .3 Conductors to be sized as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE.
- .4 Single conductor metal sheathed cables are not permitted .
- .5 Conductor sizes on drawings are based on copper conductors.

2.2 ARMoured CABLES

- .1 Conductors: insulated, copper, size as indicated.
- .2 Type: AC90.
- .3 Armour: interlocking type fabricated from aluminum strip.
- .4 Connectors: standard as required, complete with double split rings in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

2.3 CONTROL CABLES

- .1 Type LVT: 2 soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket.
- .2 Low energy 300 V control cable: stranded annealed copper conductors sized as indicated, with PVC insulation type TW -40°C polyethylene insulation with shielding of tape coated with paramagnetic material wire braid over each conductor and overall covering of PVC jacket.

3 Execution

3.1 WIRING METHODS

- .1 All work to be concealed in finished areas where possible, wire in conduit where exposed in finished areas. Exposed conduits do not need to be painted.
 - .2 All work in or through fire rated or acoustic structures to be in accordance with Section 26 05 00 - Common Work Results - Electrical.
 - .3 Branch circuit work:
 - .1 Concealed work in wall partitions: building wire in conduit or armoured cable.
 - .2 Horizontal work above accessible ceilings: building wire in conduit or armoured cable.
 - .3 Surface work in unfinished areas: building wire in conduit.
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- .4 Armoured cable may be used where permitted by the Canadian Electrical Code for drops to new equipment in existing gypsum board walls and ceilings.
- .4 Drops to light fixtures to be building wire in flexible conduit or armoured cable, maximum length 1.5 m.
- .5 Branch circuit wiring to be sized for a maximum voltage drop of 3%.
 - .1 15A branch circuits to be wired with:
 - .1 #12 AWG up to 80'
 - .2 #10 AWG up to 125'
 - .3 #8 AWG up to 200'
 - .2 20A branch circuits to be wired with:
 - .1 #12 AWG up to 60'
 - .2 #10 AWG up to 95'
 - .3 #8 AWG up to 150'
 - .3 30A branch circuits to be wired with:
 - .1 #10 AWG up to 60'
 - .2 #8 AWG up to 100'
 - .3 #6 AWG up to 160'

3.2 GENERAL CABLE INSTALLATION

- .1 Support cables in accordance with Section 26 05 29 - Hangers and Supports for Electrical Systems.
- .2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0-1000 V).
- .3 Cable Colour Coding: to Section 26 05 00 - Common Work Results - Electrical.
- .4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .6 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
 - .2 In surface and lighting fixture raceways in accordance with Section 26 50 00 - Lighting.

3.4 INSTALLATION OF ARMoured CABLES

- .1 Group cables wherever possible.
- .2 Use permitted only for work in movable partitions and vertical power supply drops to lighting fixtures.
- .3 Install anti-shorts as required.
- .4 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

3.5 INSTALLATION OF CONTROL CABLES

- .1 Controls wiring for mechanical systems to be completed by the Controls Contractor. All other controls wiring to be completed by the Electrical Contractor.
 - .2 Install control cables in conduit as indicated.
 - .3 Ground control cable shield.
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- .4 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

3.6 RESTRICTIONS

- .1 Splices in wire and cable #6 AWG and larger is not permitted.
- .2 Flexible conduit or armoured cable drops to luminaires are to be installed from junction box to luminaires, loops between luminaires is not permitted.
- .3 Wiring and cabling, both concealed and exposed, is to be installed parallel and/or perpendicular to building lines in a clean, organized and professional fashion. Where possible, wiring and cabling is to follow a common pathway.

3.7 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Consultant and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 18.4-04 (R2009), Hardware for the support of Conduit, Tubing, and Cable (Bi-National Standard with UL 2239).

2 Products

2.1 SUPPORT CHANNELS

- .1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted suspended or set in poured concrete walls and ceilings as required.

2.2 SPECIFIC PURPOSE SUPPORTS

- .1 Specific purpose heat treated, spring steel fasteners to support boxes, conduit and cable from main structure, channels, and metal studs.

3 Execution

3.1 INSTALLATION

- .1 Secure equipment to hollow or solid masonry, tile and plaster surfaces with lead anchors or nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with bar type box hangers. Ensure that box hangers are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
 - .4 Strap AC90 at box location and at every 900 mm.
- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
 - .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for cables dropped vertically to equipment where there is no wall support.
- .11 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.
- .12 Electrical boxes concealed in hollow gypsum board walls to be supported by specific purpose brackets or clips designed for stud wall construction.

- .13 Boxes installed in steel stud walls to be mounted on screw gun brackets installed between studs.

3.2 RESTRICTIONS

- .1 Do not use wire lashing, wood blocking, nylon or plastic strap ('Ty-Wraps') to support or secure cables.
- .2 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .3 Do not install cable, raceway, or boxes directly to underside of roof deck, maintain a minimum separation of 1.5" as required by Code.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results – Electrical.
- .2 Section 26 05 29 – Hangers and Supports for Electrical Systems.
- .3 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware, a National Standard of Canada.
 - .2 CSA C22.2 No. 30-M1986 (R2012) Explosion Proof Enclosures for use in Class 1 Hazardous Locations.
 - .3 CSA 22.1-15, Canadian Electrical Code, Part 1, 23rd Edition.

2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1-15.
- .2 102 mm square or larger outlet boxes as required.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 Combination boxes with steel barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

- .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.
 - .1 Screw-on, turned edge covers for surface mounted boxes.
- .3 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster walls.
- .4 102 mm square or octagonal outlet boxes for luminaires.

2.3 FLOOR BOXES

- .1 Reuse existing.
- .2 New boxes shall match existing floor tile box with built-in communication outlets. Hubbell #AFB50131G floor box, complete with cover and flange assembly, two Decora duplex receptacles, one three (3) port communication outlet and Hubbell EXT422 Series armoured whip.

2.4 CONDUIT BOXES

- .1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.5 FITTINGS - GENERAL

- .1 Bushing and connectors with nylon insulated throats.
 - .2 Knock-out fillers to prevent entry of debris.
 - .3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.
 - .4 Double locknuts and insulated bushings on sheet metal boxes.
-

- .5 Double split rings for AC90 terminations.

3 Execution

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .7 Outlet boxes and conduit boxes to be flush mounted in new construction. Outlet and conduit boxes in existing construction to be flush mounted except in existing masonry filled block walls.
- .8 Install vapour barrier boxes around all device boxes installed in acoustical wall types and structures. Fill void between device box and vapour barrier with isolating expansion foam where indicated.

END OF SECTION

1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 45, Rigid Metal Conduit.
 - .2 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .3 CSA C22.2 No. 83-M1985 (R2003), Electrical Metallic Tubing.
 - .4 CSA C22.2 No. 211.2 (R2011), Rigid PVC (Unplasticized) Conduit.
 - .5 CSA C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT), a National Standard of Canada.
 - .6 CSA C22.2 No. 18.3-12, Conduit, Tubing, and Cable Fittings (Tri-National Standard with ANCE NMX-J-017 & UL 514B).
 - .7 CSA C22.2 No. 30-M1986 (R2012) Explosion Proof Enclosures for use in Class 1 Hazardous Locations.
 - .8 CSA 22.1-15, Canadian Electrical Code, Part 1, 23rd Edition.

1.2 SUBMITTALS

- .1 Provide shop drawings and product data in accordance with Division 01 - General Requirements.

1.3 LOCATION OF CONDUITS

- .1 Drawings do not show all conduits. Those shown are in diagrammatic form only.

2 Products

2.1 CONDUITS

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with steel set-screw couplings and connectors.
 - .1 Exposed conduit does not need to be painted in finished areas to match adjacent finished surfaces.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits spaced every 1.5 m on center.
- .4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 Fittings: To CAN/CSA C22.2 No. 18.3, manufactured for use with conduit specified. Coating: same as conduit.
- .2 Factory "ells" where 90° bends are required for 25 mm and larger conduits, unless indicated otherwise.
- .3 Ensure conduit bends other than factory "ells" are made with an approved bender. Making offsets and other bends by cutting and rejoining 90 degree bends is not permitted.
- .4 Connectors and couplings for EMT. Steel set-screw type, size as required.

2.4 FISH CORD

- .1 Polypropylene.
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2.5 SEALANT

- .1 Low VOC mastic compound.
 - .1 Acceptable manufacturer or approved equal:
 - .1 DS-321.
 - .2 Flex Grip.
 - .3 Kingco 11-600.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change or violate any part of the installed system components or the certification of the components.
- .2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .3 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.
- .4 Surface mount conduits except in finished areas or as indicated.
- .5 Use electrical metallic tubing (EMT) except in cast concrete and above 2.4 m not subject to mechanical injury, as well as concealed work in masonry construction.
- .6 Use AC-90 for vertical power supply drops to light fixtures.
- .7 Minimum conduit size for lighting and power circuits: 16 mm. 12 mm conduit is acceptable for switch leg drops only where one two-wire circuit and ground is required.
- .8 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .9 Mechanically bend steel conduit over 19 mm dia.
- .10 Install fish cord in empty conduits.
- .11 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .12 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.

3.5 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials rubbish, tools and equipment.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.
- .2 Section 26 50 00 - Lighting.

1.2 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Division 01 - General Requirements.

1.3 SYSTEM DESCRIPTION

- .1 Occupancy sensors to turn lighting on when entering a controlled area and off after the area is vacated.
- .2 Products sourced from a single manufacturer.

2 Products

2.1 TECHNOLOGY

- .1 Passive infrared (PIR) sensing systems are passive and react only to energy sources. They detect the difference between heat emitted by the human body and the background space.
- .2 Ultrasonic sensors (US) detect volumetric motion using the Doppler Principle to sense movement.
- .3 Dual technology (DT) sensors use both PIR and US technologies.

2.2 PASSIVE INFRARED AUTOMATIC WALL SWITCH

- .1 Advanced PIR technology wall switch to provide automatic control of lighting.
- .2 Programmable for either Manual-ON or Automatic-ON.
- .3 Digital time delay of 15 seconds to 30 minutes.
- .4 LED to indicate occupancy detection.
- .5 Adjustable unit sensitivity.
- .6 No minimum load requirement.
- .7 Compatible with all load types.
- .8 Five-year warranty.
- .9 Load: up to 800 W @ 120 V.
- .10 Minimum coverage: 180 deg. - 290 sq.ft.
- .11 Finish: White.
- .12 Acceptable manufacturer or approved equal:
 - .1 Lutron #4-MS-OPS6M2-DV
 - .2 Cooper Greengate #OSW-P-0801-120-W.
 - .3 Wattstopper #PW-100.

3 Execution

3.1 INSTALLATION

- .1 Obtain complete installation instructions from manufacturer prior to rough-in.
 - .2 Review sensor locations on site prior to rough-in and install in location within room that provides maximum sensor coverage but confines coverage to the room. Motion outside the room is not to activate lighting within the room.
 - .3 Locate occupancy sensors on vibration-free surfaces at least 1.8 m away from air vents.
 - .4 Wire sensors into circuits as indicated to control luminaires in the indicated areas of
-

- coverage.
- .5 Program sensors and timers with time delay off set to 15 minutes.
- .6 Occupancy sensors are to be individually adjusted in accordance with the manufacturer's recommendations for the specific room in which they are installed, taking into account room shape, size and usage.
- .7 Test for acceptable operation.
- .8 Demonstrate operation to the satisfaction of the Consultant.

3.2 COMMISSIONING

- .1 The system must be completely commissioned prior to interim inspection to verify optimum operation.
- .2 Sensors must be added or relocated and patterns adjusted as required to eliminate nuisance turning on/off of luminaires.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results - Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CSA-C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
 - .3 CSA-C22.2 No.111, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

1.3 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Division 01 - General Requirements.

2 Products

2.1 SWITCHES

- .1 15 A, 120 V, single pole, double pole, three-way, four-way switches as indicated to: CSA-C22.2 No.55 and CSA-C22.2 No.111.
- .2 Manually-operated general purpose ac switches with following features:
 - .1 Terminal holes approved for # 10 AWG conductor.
 - .2 Silver alloy contacts.
 - .3 Urea or melamine moulding for parts subject to carbon tracking.
 - .4 Suitable for side wiring.
 - .5 White toggle.
 - .6 Specification grade.
 - .7 Hospital grade as indicated.
- .3 Toggle operated fully rated for tungsten filament, fluorescent lamps, and LED drivers/ lamps and up to 80% of rated capacity of motor loads.
- .4 Switches of one manufacturer throughout project.
- .5 Acceptable products:
 - .1 Hubbel HBL 1201 W,
 - .2 Leviton 1201-2W,
 - .3 Pass and Seymour.

2.2 RECEPTACLES

- .1 Duplex receptacles, CSA type as indicated, U ground, to: CSA-C22.2 No.42 with following features:
 - .1 White thermoplastic moulded housing.
 - .2 Suitable for # 10 AWG conductor for side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Four side wiring screws.
 - .5 Triple wipe contacts and rivetted grounding contacts.
 - .6 Specification grade.
 - .7 Acceptable manufacturer or approved equal:
 - .1 Decora Duplex, CSA type 5-15R:
 - .1 Cooper #6252W.

- .2 Hubbell #DR15WHI.
 - .3 Leviton #DR15-WH.
 - .4 Pass & Seymour #PT26252W.
 - .2 Decora Duplex, CSA 5-20R:
 - .1 Cooper #6352W.
 - .2 Hubbell #DR20-WHI.
 - .3 Leviton #DR20-WH.
 - .4 Pass & Seymour #26352W.
- .2 Duplex ground fault circuit interrupter (GFCI) receptacles to have the following features:
 - .1 White thermoplastic housing.
 - .2 Suitable for side wiring.
 - .3 0.025s trip-time and 10,000 A maximum interrupting capacity.
 - .4 Integral test button and indicator light.
 - .5 Acceptable manufacturer or approved equal:
 - .1 Decora Duplex CSA 5-15R:
 - .1 Cooper #VGF15-W.
 - .2 Hubbell #GF15WLA.
 - .3 Leviton #N7599-WH.
 - .4 Pass & Seymour #1595W.
- .3 Receptacles of one manufacturer throughout project.

2.3 COVER PLATES

- .1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.
- .2 Cover plates from one manufacturer throughout project.
- .3 Nylon white cover plates as indicated, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.
- .4 Sheet metal cover plates with turned-in corners for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
- .5 All wiring device cover plates to be labeled using white background, self adhesive vinyl strips with black type lettering identifying panel and circuit number for each device.

3 Execution

3.1 INSTALLATION

- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount switches at height in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Mount receptacles at height in accordance with Section 26 05 00 - Common Work Results - Electrical.
 - .3 Do not use back entrances for connecting wiring devices to circuits. Wrap conductors around screw terminals and tighten. Tighten all unused screw terminals.
- .3 Cover plates:
 - .1 Protect cover plate finish with paper or plastic film until painting and other work is finished.

- .2 Install suitable common cover plates where wiring devices are grouped.
- .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
- .4 Do not install outlet boxes back-to-back in wall; allow 150 mm horizontal clearance between boxes.

3.2 TESTING

- .1 All receptacles to be tested for voltage drop and results recorded where branch circuit voltage drop exceeds 3%, the wire will have to be replaced to meet the 3% requirement.

END OF SECTION

1 General

1.1 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI C82.1, Electric Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE).
 - .1 ANSI/IEEE C62.41, Surge Voltages in Low-Voltage AC Power Circuits.
 - .2 ANSI C78 Series Fluorescent Lamps.
- .3 United States of America, Federal Communications Commission (FCC).
 - .1 FCC (CFR47) EM and RF Interference Suppression.

1.2 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.3 SUBMITTALS

- .1 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Consultant.
- .2 Photometric data to include: VCP Table and spacing criterion and luminaire coefficient of utilization (CU) tables and/or electronic files.
- .3 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .4 Quality assurance submittals: provide the following in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures and relamping schedule.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Division 01 - General Requirements.
- .2 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
- .3 Divert unused metal materials from landfill to metal recycling facility.
- .4 Disposal and recycling of fluorescent lamps as per local regulations.

1.5 ACCEPTABLE PRODUCTS

- .1 Luminaires to match existing. Ledalite Centris #9506 TO3 MN471EW

2 Products

2.1 LAMPS

- .1 Fluorescent lamps to be - T8, 32 Watt, medium bi-pin, rapid or instant start to suit application, 4100 K, minimum 30,000 hour lamp life, at 3 hour start interval, minimum 2950 initial lumens, minimum CRI 80; or as indicated.

2.2 BALLASTS

- .1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic.
 - .1 Rating: 120 V, 60 Hz, as indicated, for use with 3-32W T8 lamps.
 - .2 RFI/EMI suppression circuit to: FCC (CFR47) Part 18, sub-part C, Class A and Part 15, sub-part B, Class B.
 - .3 Totally encased and designed for 40 °C ambient temperature.

- .4 Power factor: minimum 98 % with 98% of rated lamp lumens.
- .5 Crest factor: 1.5 maximum.
- .6 Capacitor: thermally protected.
- .7 Thermal protection: non-resettable on coil.
- .8 Harmonics: 10 % maximum THD.
- .9 Operating frequency of electronic ballast: 20 khz minimum.
- .10 Ballast Factor: greater than 0.90.
- .11 Sound rated: Class A.
- .12 Mounting: integral with luminaire.
- .13 Be warranted by manufacturer for five years.
- .14 Must be compatible with existing Lutron lighting control system.

2.3 FINISHES

- .1 Light fixture finish as indicated in Luminaires Schedule. Finish to meet ULC listings and CSA certifications related to intended installation.

2.4 LUMINAIRES

- .1 As indicated in Luminaires Schedule on drawings.

3 Execution

3.1 INSTALLATION

- .1 Locate and install luminaires as indicated. Install lamps in all fixtures.
- .1 Provide adequate support to suit ceiling system.

3.2 WIRING

- .1 Connect luminaires to lighting circuits.
- .1 Install flexible conduit for vertical power supply drop to luminaires as indicated. Horizontal wiring using flexible conduit is not permitted.

3.3 LUMINAIRE SUPPORTS

- .1 For suspended ceiling installations support luminaires from ceiling grid in accordance with local inspection requirements.

3.4 LUMINAIRE ALIGNMENT

- .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.5 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical and Section 01 91 13 – General Commissioning Requirements.

3.6 CLEANING

- .1 Luminaire lenses, housings, louvers, etc., are to be cleaned upon completion of construction in accordance with Section 01 74 19 - Construction Waste Management Disposal.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 19 - Construction Waste Management Disposal.
- .3 Section 01 91 13 - General Commissioning Requirements.
- .4 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

- .1 Atomic Energy Control Board Regulations
- .2 Canadian Code for Preferred Packaging
- .3 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No.141, Unit Equipment for Emergency Lighting.
 - .2 CSA C860, Performance of Internally-Lighted Exit Signs.
- .4 National Fire Protection Association (NFPA)
 - .1 NFPA 101, Life Safety Code.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures and disposal.

2 Products

2.1 EXIT SIGNS

- .1 Exit lights: to CSA C22.2 No.141 and CSA C860, packaged in accordance with the Canadian Code for Preferred Packaging guidelines.
- .2 120 VAC normal power; self-powered for 90 minutes.
- .3 Housing: White thermoplastic.
- .4 Face: Acrylic with pictorial white running man on green face with chevrons as indicated on drawings.
- .5 Lamps: multiple - LED-120 V input, 4 W.
- .6 Ten (10) years unconditional Parts and Labour Warranty.
- .7 Double or single face, universal wall or ceiling mounted as indicated on the drawings.
- .8 Acceptable manufacturer or approved equal:
 - .1 Lumacell #LCS Series.
 - .2 Ready-Lite #RCS Series.
 - .3 Aim-Lite # RPPL Series.

3 Execution

3.1 INSTALLATION

- .1 Install exit lights to manufacturer's recommendations, listing requirements, NFPA standard and local regulatory requirements.
- .2 Connect fixtures to exit light circuits using RW90 wire in EMT conduit.
- .3 Connect emergency lamp sockets to emergency circuits.
- .4 Ensure that exit light circuit breaker is locked in on position.
- .5 Provide tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

3.2 CLEANING

- .1 Proceed in accordance with Section 01 74 19 - Construction Waste Management Disposal.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION
