SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. General requirements that are common to NMS sections found in Division 26 - Electrical

1.2 REFERENCES

A. Canadian Standards Association (CSA International)
   1. CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
   2. CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

B. Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
   1. EEMAC 2Y-1, Light Gray Colour for Indoor Switch Gear.

C. Health Canada / Workplace Hazardous Materials Information System (WHMIS)
   1. Material Safety Data Sheets (MSDS).

1.3 DESIGN REQUIREMENTS

A. Operating voltages: to CAN3 C235.

B. Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
   1. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

C. Language operating requirements: provide identification nameplates for control items in English.

1.4 SUBMITTALS

A. Submittals: in accordance with Section 01 33 00 - Submittal Procedures

B. Quality Control:
   1. Provide CSA certified equipment and material.
   2. Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to Site.

3. Submit test results of installed electrical systems and instrumentation.
4. Permits and fees: in accordance with General Conditions of contract.
5. Submit, upon completion of Work, load balance report as described in PART 3 - Load Balance.
6. Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Contract Administrator.

C. Manufacturer's Field Reports: submit to Contract Administrator manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.5 QUALITY ASSURANCE

A. Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
1. Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
2. Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

1.6 SYSTEM STARTUP

A. Instruct City personnel in operation, care and maintenance of systems, system equipment and components.

B. Assist City personnel and the Contract Administrator in the start-up of equipment.

C. 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 will aspects of its care and operation.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to Site and submit such approval as described in PART 1 - Submittals.

B. Factory assemble control panels and component assemblies.

2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

A. Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.

B. Control wiring and conduit: in accordance with Section 26 29 03 - Control Devices except for conduit, wiring and connections below 50 V which are related to control systems specified in mechanical sections and as shown on mechanical drawings.

2.3 WARNING SIGNS

A. Warning Signs: in accordance with requirements of inspection authorities.

B. Lamacoid signs, minimum size 175 x 250 mm.

2.4 WIRING TERMINATIONS

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

2.5 EQUIPMENT IDENTIFICATION

A. The City will provide the nameplates and identification for installation under this Contract.

2.6 WIRING IDENTIFICATION

A. Identify wiring with permanent indelible identifying markings, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

B. Maintain phase sequence and colour coding throughout.

C. Colour coding: to CSA C22.1.

D. Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

A. Colour code conduits, boxes and metallic sheathed cables.

B. Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15m intervals.

C. Colours: 25mm wide prime colour and 20mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
Other Communication Systems	Green	Blue

2.8 FINISHES

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

PART 3 EXECUTION

3.1 INSTALLATION

A. Do complete installation in accordance with CSA C22.1 except where specified otherwise.

B. Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

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

3.3 MOUNTING HEIGHTS

A. Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

B. If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

C. Install electrical equipment at following heights unless indicated otherwise.
   1. Local switches: 1400mm.
   2. Wall receptacles:
      a. General:300 mm.
      b. In mechanical rooms: 1400mm.
   3. Panelboards: as required by Code or as indicated.
   4. Control panels: as indicated.

3.4 CO-ORDINATION OF PROTECTIVE DEVICES

A. Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.5 FIELD QUALITY CONTROL

A. Load Balance:

1. Measure phase current to panelboards 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.
3. Provide upon completion of work, load balance report as directed in PART 1 - Submittals: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

B. Conduct following tests :
1. Power distribution system including phasing, voltage, grounding and load balancing.
2. Circuits originating from branch distribution panels.
3. Lighting and its control.
4. Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
5. Insulation resistance testing:
   a. Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
   b. Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
   c. Check resistance to ground before energizing.
6. Carry out tests in presence of Contract Administrator.
7. Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

1.01 CLEANING

A. Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

B. Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

SECTION 26 05 20

WIRE AND BOX CONNECTER (0 – 1000 – V)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and installation for wire and box connectors.

1.2 REFERENCES

A. Canadian Standards Association (CSA International)
   1. CAN/CSA C22.2No.18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
   2. CSA C22.2No.65, Wire Connectors.

B. Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
   1. EEMAC 1Y 2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

C. National Electrical Manufacturers Association (NEMA)

PART 2 PRODUCTS

2.1 MATERIALS

A. Pressure type wire connectors to: CSA C22.2No.65, with current carrying parts of copper sized to fit copper conductors as required.

B. Fixture type splicing connectors to: CSA C22.2No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

C. Bushing stud connectors: to EEMAC 1Y 2 to consist of:
   1. Connector body and stud clamp for stranded copper conductors.
   2. Clamp for stranded copper conductors.
   3. Stud clamp bolts.
   4. Bolts for copper conductors.
   5. Sized for conductors as indicated.

D. Clamps or connectors for armoured cable, flexible conduit, non-metallic sheathed cable as required to: CAN/CSA C22.2No.18.

PART 3 EXECUTION

3.1 INSTALLATION

A. 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 shall meet secureness tests in accordance with CSA C22.2No.65.
   2. Install fixture type connectors and tighten. Replace insulating cap.
   3. Install bushing stud connectors in accordance with EEMAC 1Y 2.

END OF SECTION

SECTION 26 05 21

WIRES AND CABLES (0 - 1000 – V)

PART 1 GENERAL

1.1 RELATED SECTIONS

A. Section 26 05 20 Wire and Box Connectors (0 - 1000 – V).

1.2 REFERENCES

A. CSA C22.2 No .0.3, Test Methods for Electrical Wires and Cables.

B. CAN/CSA C22.2 No. 131, Type TECK 90 Cable.

1.3 PRODUCT DATA

A. Submit product data in accordance with Section 01 33 00, Submittal Procedures.

PART 2 PRODUCTS

2.1 TECK CABLE

A. Cable: to CAN/CSA C22.2 No. 131.

B. Conductors:
1. Grounding conductor: copper.
2. Circuit conductors: copper, size as indicated.

C. Insulation:
1. Chemically cross linked thermosetting polyethylene rated type RW90, 1000 V.

D. Inner jacket: polyvinyl chloride material.

E. Armour: interlocking aluminum.

F. Overall covering: thermoplastic polyvinyl chloride material.

G. Fastenings:
1. One hole stainless steel straps to secure surface cables 50 mm and smaller. Two hole stainless steel straps for cables larger than 50 mm.
2. Channel type supports for two or more cables at 900 mm centers.
3. Stainless steel threaded rods: 6 mm dia. to support suspended channels.

H. Connectors:

1. Watertight approved for TECK cable.

2.2 CONTROL CABLES

A. Type LVT: soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket

B. 600 V type: stranded annealed copper conductors, sizes as indicated with PVC insulation type TW, or cross linked polyethylene type RW90 (x link with shielding ofmetallized tapes over each pair of conductors and overall covering of thermoplastic jacket interlocked armour and jacket over sheath of PVC.

PART 3 EXECUTION

3.1 INSTALLATION OF TECK CABLE 0 – 1000 – V

A. Install cables.
1. Group cables wherever possible on channels.

B. Lay cable in cabletroughs/cable tray in accordance with Section 26 05 36.

C. Terminate cables in accordance with Section 26 05 20 Wire and Box Connectors (0 - 1000 – V).

3.2 INSTALLATION OF CONTROL CABLES

A. Install control cables in conduit.

B. Ground control cable shield.

END OF SECTION

SECTION 26 05 22

CONNECTORS AND TERMINATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and installation for connectors and terminations.

1.2 REFERENCES

A. Canadian Standards Association (CSA International)
   1. CSA C22.2 No.2012 (22nd Edition)
   2. CSA C22.2 No.41 M1987(R1999), Grounding and Bonding Equipment.

1.3 PRODUCT DATA

A. Submit product data in accordance with Section 01 33 00, Submittal Procedures.

PART 2 PRODUCTS

2.1 CONNECTORS AND TERMINATIONS

2.2 Copper long barrel compression connectors to CSA C22.2No.2 as required sized for conductors.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install terminations, and splices in accordance with manufacturer's instructions.

B. Bond and ground as required to CSA C22.2No.41.

END OF SECTION

SECTION 26 05 28

GROUNDING SECONDARY

PART 1 GENERAL

1.1 RELATED SECTIONS

A. Section 26 05 00 - Common Work Results For Electrical.

1.2 REFERENCES

A. American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)
   1. ANSI/IEEE 837, Qualifying Permanent Connections Used in Substation Grounding.

B. Canadian Standards Association, (CSA International)

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Grounding conductors: bare stranded copper, soft annealed, size as indicated.

B. Insulated grounding conductors: green, type RW90.

C. Non corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
   1. Grounding and bonding bushings.
   2. Protective type clamps.
   3. Bolted type conductor connectors.
   4. Thermit welded type conductor connectors.
   5. Bonding jumpers, straps.
   6. Pressure wire connectors.

PART 3 EXECUTION

3.1 INSTALLATION GENERAL

A. Install complete permanent, continuous grounding system including, conductors, connectors, accessories for new equipment. Where EMT is used, run ground wire in conduit.

B. Install connectors in accordance with manufacturer's instructions.

C. Protect exposed grounding conductors from mechanical injury.

D. Use mechanical connectors for grounding connections to equipment provided with lugs.

E. Soldered joints not permitted.

F. Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

G. Ground secondary service pedestals.

3.2 EQUIPMENT GROUNDING

A. Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, frames of motors, motor control centres, starters, control panels, distribution panels.

3.3 FIELD QUALITY CONTROL

A. Perform tests in accordance with Section 26 05 00 - Common Work Results For Electrical.

B. Perform tests before energizing electrical system.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORT FOR ELECTRICAL SYSTEM

PART 1 GENERAL (Not Used)

PART 2 PRODUCTS

2.1 SUPPORT CHANNELS

A. U shape aluminum, size 41 x 41 mm, 2.5 mm thick, surface mounted or suspended.

PART 3 EXECUTION

3.1 INSTALLATION

A. Secure equipment to hollow or solid masonry, tile and plaster surfaces with lead anchors.

B. Secure equipment to poured concrete with expandable inserts.

C. Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

D. Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

E. Fasten exposed conduit or cables to building construction or support system using straps.
1. One hole stainless steel straps to secure surface conduits and cables 50 mm and smaller.
2. Two hole stainless steel straps for conduits and cables larger than 50 mm.
3. Beam clamps to secure conduit to exposed steel work.

F. 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.

G. For surface mounting of two or more conduits use channels at 1 m on centre spacing.

H. Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

I. Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

J. Do not use wire lashing or perforated strap to support or secure raceways or cables.

K. Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Contract Administrator.

L. Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

SECTION 26 05 32

OUTLET BOXES, CONDUIT BOXES, AND FITTINGS

PART 1 GENERAL

1.1 REFERENCES

A. CSA C22.1, Canadian Electrical Code, Part 1.

PART 2 PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

A. Size boxes in accordance with CSA C22.1.

B. 102 mm square or larger outlet boxes as required for special devices.

C. Gang boxes where wiring devices are grouped.

D. Blank cover plates for boxes without wiring devices.

E. 347 V outlet boxes for 347 V switching devices.

F. Combination boxes with barriers where outlets for more than one system are grouped.

2.2 SHEET STEEL OUTLET BOXES

A. 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.

B. Electro galvanized steel utility boxes for outlets connected to surface mounted EMT conduit, minimum size 102 x 54 x 48 mm.

C. 102 mm square or octagonal outlet boxes for lighting fixture outlets.

D. Matching extension and plaster rings as required.

2.3 CONDUIT BOXES

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

2.4 FITTINGS GENERAL

A. Bushing and connectors with nylon insulated throats.

B. Knock out fillers to prevent entry of debris.

C. Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

D. Double locknuts and insulated bushings on sheet metal boxes.

PART 3 EXECUTION

3.1 INSTALLATION

A. Support boxes independently of connecting conduits.

B. Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

C. For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

D. Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

END OF SECTION

SECTION 26 05 34

CONDUITS, CONDUITS FASTENING AND CONDUITS FITTING

PART 1 GENERAL

1.1 REFERENCES

A. Canadian Standards Association (CSA)
1. CAN/CSA C22.2 No. 18 98, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.
2. CSA C22.2 No. 45 M1981, Rigid Metal Conduit.
3. CSA C22.2 No. 56 1977, Flexible Metal Conduit and Liquid Tight Flexible Metal Conduit.
4. CAN/CSA C22.2 No. 227.3, Flexible Nonmetallic Tubing.

PART 2 PRODUCTS

2.1 CONDUITS

A. Rigid metal conduit: to CSA C22.2 No. 45, aluminum, threaded.

B. Flexible metal conduit: to CSA C22.2 No. 56, liquid tight flexible metal.

2.2 CONDUIT FASTENINGS

A. One hole stainless steel straps to secure surface conduits 50 mm and smaller. Two hole stainless steel straps for conduits larger than 50 mm.

B. Beam clamps to secure conduits to exposed steel work.

C. Channel type supports for two or more conduits at 1 m oc.

D. Stainless steel threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

A. Fittings: manufactured for use with conduit specified. Coating: same as conduit.

B. Factory "ells" where 90° bends are required for 25 mm and larger conduits.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

A. Weatherproof expansion fittings with internal bonding assembly suitable for 100mm linear expansion.

B. Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

C. Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

A. Polypropylene.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

B. X-ray cast walls and floors before coring to confirm location of embedded items.

C. Use rigid aluminum threaded conduit in areas subject to mechanical injury.

D. Use liquid tight flexible metal conduit for connection to motors or vibrating equipment.

E. Minimum conduit size for lighting and power circuits: 19 mm.

F. Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

G. Install fish cord in empty conduits.

H. Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

I. Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

A. Paint walls before installation of electrical equipment including conduits.

B. Run parallel or perpendicular to building lines.

C. Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

D. Run conduits in flanged portion of structural steel.

E. Group conduits wherever possible on suspended or surface channels.

F. Do not pass conduits through structural members except as indicated.

G. Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

END OF SECTION

SECTION 26 05 36

CABLE TRAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED SECTIONS

A. Section 01 33 00, Submittal Procedures.

1.2 REFERENCES

A. Canadian Standards Association (CSA International)
   1. CAN/CSA C22.2No.126, Cable Tray Systems.

B. National Electrical Manufacturers Association (NEMA) standards
   1. NEMA FG 1, Fibreglass and Cable Tray Systems.
   2. NEMA VE 1, Metal Cable Tray Systems.

1.3 SHOP DRAWINGS AND PRODUCT DATA

A. Submit shop drawings and product data in accordance with section 01 33 00 Submittal Procedures.

B. Identify types of cable troughs used.

C. Show actual cable trough installation details and suspension system.

PART 2 PRODUCTS

2.1 CABLETROUGH

A. Cable troughs and fittings: to NEMA VE 1.

B. Ladder type, Class D1 to CAN/CSA C22.2No.126.

C. Trays: extruded aluminum, 750 mm wide with depth of 100 mm.

D. Fittings: horizontal elbows, end plates, drop outs, vertical risers and drops, tees, wyes, expansion joints and reducers where required, manufactured accessories for cable trough supplied.
   1. Radii on fittings: 600 mm minimum.

E. Barriers where different voltage systems are in same cable trough.

2.2 SUPPORTS

A. Provide supports as required.

PART 3 EXECUTION

3.1 INSTALLATION

A. Extend existing cable trough system to provide support to final end device.

B. Provide separate tray system for 600 VAC and 120 VAC and 24 VDC control cables. Provide barrier between 120 VAC and 24 VDC systems.

C. Support cable trough on both side.

D. Install green insulated 1/0 copper bonding conductor to run full length of new cable troughs. Connect new bonding conductor to existing bonding conductor where extending tray system

E. Bonding conductors to be fastened with electrically conducting metal clamps at 6 m centres and at each end of terminated cable trough.

F. Remove sharp burrs or projections to prevent damage to cables or injury to personnel.

3.2 CABLES IN CABLETROUGH

A. Install cables individually.

B. Lay cables into cable trough. Use rollers when necessary to pull cables.

C. Secure cables in cable trough at 3 m centres, with nylon ties.

D. Identify cables every 30 m with size 2 nameplates.

END OF SECTION

SECTION 26 27 26

WIRE DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Switches, receptacles, wiring devices, cover plates and their installation.

1.2 RELATED SECTIONS

A. Section 01 33 00, Submittal Procedures.

B. Section 26 05 00, Common Work Results for Electrical.

1.3 REFERENCES

A. Canadian Standards Association (CSA International)
   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.55, Special Use Switches.
   4. CSA C22.2 No.111, General Use Snap Switches (Bi national standard, with UL 20, twelfth edition).

1.4 SHOP DRAWINGS AND PRODUCT DATA

A. Submit shop drawings and product data in accordance with Section 01 33 00, Submittal Procedures.

PART 2 PRODUCTS

2.1 SWITCHES

A. 20 A, 120 V, single pole, double pole, three way, four way switches to: CSA C22.2 No.55 and CSA C22.2 No.111.

B. Manually operated general purpose ac switches with following features:
   1. Terminal holes approved for No. 10 AWG wire.
   2. Silver alloy contacts.
   3. Urea or melamine moulding for parts subject to carbon tracking.
   4. Suitable for back and side wiring.
   5. Ivory toggle.

C. Toggle operated locking fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.

D. Switches of one manufacturer throughout project.

E. Acceptable materials: Leviton specification grade, Hubbell specification grade.

2.2 COVER PLATES

A. Cover plates for wiring devices to: CSA C22.2 No.42.1.

B. Cover plates from one manufacturer throughout project.

C. Sheet stainless steel utility box cover for wiring devices installed in surface mounted utility boxes.

D. Stainless steel, 1 mm thick cover plates for wiring devices mounted in flush mounted outlet box.

E. Stainless steel or cast aluminum cover plates for wiring devices mounted in surface mounted FS or FD type conduit boxes.

F. Weatherproof double lift spring loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

G. Weatherproof spring loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.

PART 3 EXECUTION

3.1 INSTALLATION

A. 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 toggle switches at height in accordance with Section 26 05 00, Common Work Results for Electrical.

3.2 Cover plates:

A. Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.

B. Install suitable common cover plates where wiring devices are grouped.

C. Do not use cover plates meant for flush outlet boxes on surface mounted boxes.

END OF SECTION

SECTION 26 28 21

MOULDED CASE CIRCUIT BREAKERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials for moulded-case circuit breakers.

1.2 RELATED SECTIONS

A. Section 01 33 00, Submittal Procedures.

1.3 REFERENCES

A. Canadian Standards Association (CSA International).
   1. CSA-C22.2 No. 5, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

1.4 SUBMITTALS

A. Submit product data in accordance with Section 01 33 00, Submittal Procedures.

B. Include time current characteristic curves for breakers with ampacity of 90 A and over or with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage.

PART 2 PRODUCTS

2.1 BREAKERS GENERAL

A. Moulded-case circuit breakers: to CSA C22.2 No. 5

B. Bolt on moulded case circuit breaker: quick make, quick break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.

C. Common trip breakers: with single handle for multi pole applications.

D. Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
   1. Trip settings on breakers with adjustable trips to range from 3 8 times current rating.

E. Circuit breakers to have minimum symmetrical rms interrupting capacity rating matching panel board or switchboard containing breaker.

2.2 THERMAL MAGNETIC BREAKERS DESIGN A

A. Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 MAGNETIC BREAKERS DESIGN B

A. Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install circuit breakers as indicated.

END OF SECTION

SECTION 26 28 23

DISCONNECT SWITCHES – FUSES AND NON-FUSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and installation for fused and non-fused disconnect switches.

1.2 RELATED SECTIONS

A. Section 01 33 00, Submittal Procedures.

B. Section 26 05 00, Common Work Results for Electrical.

1.3 REFERENCES

A. Canadian Standards Association (CSA International).
   1. CAN/CSA C22.2 No.4, Enclosed Switches.
   2. CSA C22.2 No.39, Fuseholder Assemblies.

1.4 SUBMITTALS

A. Submit product data in accordance with Section 01 33 00, Submittal Procedures.

PART 2 PRODUCTS

2.1 DISCONNECT SWITCHES

A. Fusible, non-fusible, horsepower rated disconnect switch in CSA Enclosure 12, to CAN/CSA C22.2 No.4size as indicated.

B. Provision for padlocking in on off switch position by three locks.

C. Mechanically interlocked door to prevent opening when handle in ON position.

D. Fuses: size as indicated

E. Fuseholders: to CSA C22.2 No.39 relocatable and suitable without adaptors, for type and size of fuse indicated.

F. Quick make, quick break action.

G. ON OFF switch position indication on switch enclosure cover.

2.2 EQUIPMENT IDENTIFICATION

A. Provide equipment identification in accordance with Section 26 05 00, Common Work Results for Electrical.

B. Indicate name of load controlled on size 4 nameplate.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install disconnect switches complete with fuses if applicable.

END OF SECTION