

TABLE OF CONTENTS

Pages

Division 26 - ELECTRICAL

Section 26 05 01 - Common Work Results - Electrical.....7
Section 26 05 20 - Wire and Box Connectors 0-1000 V1
Section 26 05 21 - Wires and Cables (0-1000 V)1
Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings2
Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.....2
Section 26 05 35 - Surface & Lighting Fixture Raceways2

Division 28 - ELECTRONIC SAFETY AND SECURITY

Section 28 31 02 - Multiplex Fire Alarm System5

END OF TABLE

Part 1 General

1.1 GENERAL

- .1 This Section covers items common to Sections 26, 27 & 28. This section supplements requirements of Section 01.

1.2 CODES AND STANDARDS

- .1 Do complete installation in accordance with CSA C22.1 latest edition unless specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1-M1987 except where specified otherwise.

1.3 DRAWINGS AND SPECIFICATIONS

- .1 Carefully examine the site and ascertain all related conditions, and verify all dimensions.
- .2 Should any discrepancy appear between the electrical drawings and the specifications which leaves the trade in doubt as to the true intent and meaning of the drawings and specifications, obtain a ruling from the Project Authority before submitting a tender. If this is not done, it will be assumed the more expensive alternative has been allowed.

1.4 SHOP DRAWINGS

- .1 Submit one (1) set of shop drawings to the Project Authority for all electrical equipment that is to be used in the project.
- .2 All shop drawings shall be submitted electronically in PDF format. Provide a separate PDF file for each set of shop drawings. Each set of shop drawings shall contain information pertinent to this project. All accessories, options, mounting hardware, etc. shall be highlighted or clearly identified on each shop drawing. All shop drawings shall be reviewed and marked as such by the electrical contractor prior to submission to the engineer.

1.5 MAINTENANCE MANUALS

- .1 Compile and submit to the Project Authority for review one (1) printed set of maintenance manuals. Each manual shall contain shop drawings for all major electrical equipment, a list of suppliers providing components, original factory manuals, name and address of contractors, test results and certificates. Manuals shall be bound in blue 3 ring binders the project name, address and date of completion embossed in white on the binding and the cover.

1.6 WARRANTY

- .1 Unless specified elsewhere, all materials and workmanship shall be warranted for a period of one (1) year from the date of final acceptance per site. During this time, the contractor shall repair or replace, at their expense, any defective materials or workmanship.

1.7 CARE, OPERATION, START-UP, AND TRAINING

- .1 Instruct owner's operating personnel in the operation, care and maintenance of systems, system equipment and components.
- .2 Manufacturer's factory trained service representative shall supervise the start-up of installation and to check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are familiar with all aspects of its care and operation.
- .4 Where systems require programming, provide initial programming to allow system to operate in all functional modes.

1.8 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235-83 (R2010).
- .2 Distribution devices and equipment shall operate satisfactorily at 60 Hz within normal operating limits established by above standard.
- .3 Equipment shall operate in extreme operating conditions established in above standard without damage to equipment.

1.9 VOLTAGE DROP CALCULATIONS

- .1 Perform voltage drop calculations on branch circuit wiring. Adjust conduit and wire sizes as required to conform to a maximum of 5% voltage drop from the supply side of the customers service to the point of utilization and 3% voltage drop in feeder or branch circuits. Refer to CEC section 8.

1.10 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay associated fees.
- .3 Contractor shall provide drawings and specifications required by Electrical Inspection Department and Supply Authority.
- .4 Notify Project Authority of changes required by Electrical Inspection Department prior to making changes.
- .5 Provide Certificates of Acceptance from authorities having jurisdiction on completion of work to Project Authority.

1.11 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance with specifications and drawings.
- .2 All equipment and material shall be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department.
- .3 Factory assemble control panels and component assemblies.

1.12 FINISHES

- .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.

1.13 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
- .2 Nameplates:
 - .1 Lamacoid 3 mm thick plastic engraving sheet, black face, white core, attached with adhesive back.

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 lines	6 mm high letters

- .3 Labels: Embossed plastic labels with 6 mm high letters unless specified otherwise.
- .4 Wording on nameplates and labels shall be approved by Project Authority prior to manufacture.
- .5 Allow for average of twenty-five (25) letters per nameplate and label.
- .6 Identification to be English and French.
- .7 Use one nameplate or label for each language.
- .8 Nameplates for terminal cabinets and junction boxes shall indicate system and/or voltage characteristics.
- .9 Terminal cabinets and pull boxes: indicate system and voltage.

1.14 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to latest edition of CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

1.15 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.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
Fire Alarm	Red	

- .1 Identify conduits, boxes and metallic sheathed cables except for branch circuit conduits less than 25mm.
- .2 Identification shall consist of self adhesive printed labels, white label with minimum 20mm black lettering.
- .3 Identify all junction boxes on the side and on the cover.
- .4 Identify conduits at 10m intervals and/or in every room.
- .5 Identify conduits and boxes such that labeling is clearly visible from floor level.
- .6 Junction boxes that contain branch circuitry shall identify each circuit on the label including panel designation and voltage.
- .7 Conduits 25mm and larger that contain branch circuitry shall identify the panel description, voltage and indicate 'branch circuits'.
- .8 Feeder conduits shall identify the load being fed and the voltage.
- .9 Systems conduits and boxes shall identify the system.
- .10 Provide a sample of the labeling to the Project Authority for approval prior to the installation.

1.16 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.17 MANUFACTURERS AND CSA LABELS

- .1 Visible and legible, after equipment is installed.

1.18 WARNING SIGNS

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

1.19 VAPOUR BARRIER INTEGRITY

- .1 Maintain the integrity of the building vapour barrier where penetrations occur as a result of the work under this division. Refer to appropriate specification sections under other divisions to determine the extent and quality of work.
- .2 Use vapour barrier back box covers in all exterior walls and insulated ceilings.
- .3 Seal all interior conduits that pass through unheated spaces using duct seal or approved alternate product.

1.20 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

1.21 EQUIPMENT SUPPLIED BY OTHER DIVISIONS

- .1 The Electrical Contractor shall be fully responsible for obtaining electrical ratings, specifications, installation requirements and approved shop drawings of all equipment requiring electrical connections that is supplied by other divisions. No electrical equipment shall be ordered prior to obtaining this information. No electrical equipment shall be ordered prior to a formal review and acceptance of this information by the Project Authority. The Project Authority shall issue written acceptance of the information and shall also provide, if required, documented changes to the electrical design resulting from the review of this information. No allowance shall be made to the Electrical Contractor for failure to complete this coordination work, thereby resulting in an incorrect installation.

1.22 FIRE STOPPING FOR ELECTRICAL CABLES

- .1 Provide fire stop assemblies, at all required fire separations, for any power and communications cables passing through a fire separation.
- .2 Where individual conduits or power cables pass through a fire separation, provide and install fire rated caulking.
- .3 Where multiple conduits, cable trays, or power cables pass through a single opening in a fire separation, provide a factory assembled steel, rectangular pass through frame with removable intumescent material. Dorn Equipment FIRSTO or equal.

1.23 EXAMINATION OF SITE

- .1 Prior to submitting a tender, the electrical contractor may inspect the site to review conditions, existing equipment, etc., to ensure that there are no conflicts and that all work can be carried out as directed herein. Contact Project Authority for access if required.

1.30 FIELD QUALITY CONTROL

All electrical work shall be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

1.31 ELECTRICAL TESTING

- .1 Conduct and pay for the following tests:

Section	System	Test Criteria	Report
28 31 02	Multiplex Fire Alarm System	As per 28 31 02 Item 3.2	Submit manufacturers' re-verification report.

- .2 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .3 Submit re-verification report for Project Authority's review.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.2No.65-93 (R2008), Wire Connectors.
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

Part 2 Products

2.1 MATERIALS

- .1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors: with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for round copper conductors.
 - .2 Clamp for round copper conductors.
 - .3 Clamp for conductors.
 - .4 Stud clamp bolts.
 - .5 Bolts for copper conductors.
 - .6 Bolts for aluminum conductors.
 - .7 Sized for conductors as indicated.
- .4 Clamps or connectors for armoured cable, aluminum sheathed cable, mineral insulated cable, flexible conduit, non-metallic sheathed cable as required.

Part 3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
 - .3 Install fixture type connectors and tighten. Replace insulating cap.
 - .4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

1.2 REFERENCES

- .1 CSA C22.2 No .03-96 (R2000), Test Methods for Electrical Wires and Cables.
- .2 CAN/CSA-C22.2 No. 131-M89 (R1994), Type TECK 90 Cable.

1.3 PRODUCT DATA

- .1 Submit shop drawings to Project Authority.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with the Waste Reduction Workplan.
- .2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
- .3 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 BUILDING WIRES

- .1 Size as per manufacturer's recommendations.
- .2 Copper conductors: size as indicated, with minimum 600V insulation of chemically cross-linked thermosetting polyethylene material rated RW90 or RWU90.

Part 3 Execution

3.1 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 All building wires shall be installed in conduit in accordance with Section 26 05 34.
 - .2 In surface and lighting fixture raceways in accordance with Section 26 05 35. Prior approval from Project Authority must be obtained prior to installing wires surface mounted.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA C22.1-2009, Canadian Electrical Code, Part 1.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with the Waste Reduction Workplan.
- .2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

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

2.2 SHEET 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.
- .3 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished walls.

2.3 CONDUIT BOXES

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

2.4 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.

Part 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.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.
 - .2 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .3 CSA C22.2 No. 83-M1985 (R2008), Electrical Metallic Tubing.
 - .4 CAN/CSA C22.2 No. 227.3-05 (R2010), Flexible Nonmetallic Tubing.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with the Waste Reduction Workplan.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 CONDUITS

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 51 mm and smaller. Two hole steel straps for conduits larger than 51 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 3 m oc.
- .4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

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

2.4 PULL CORD

- .1 Polypropylene.

Part 3 Execution

3.1 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in unfinished areas.
- .3 Use electrical metallic tubing (EMT) above 2.4 m not subject to mechanical injury.
- .4 Minimum conduit size for power circuits: 21 mm.
- .5 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .6 Mechanically bend steel conduit over 21 mm dia.
- .7 Install pull cord in empty conduits.
- .8 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .9 Dry conduits out before installing wire.

3.2 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 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.

3.3 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No. 62-93/R1999, Surface Raceway Systems.

1.2 PRODUCT DATA

- .1 Submit drawings to Project Authority.
- .2 Indicate types of raceways with terminology similar to that used in this Section.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with the Waste Reduction Workplan.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 METALLIC RACEWAY SYSTEM

- .1 Surface raceways shall be steel, paintable, low profile, 2 piece construction. Install raceway in locations deemed acceptable by Project Authority. Provide surface mounted devices, accessories, adapters, fittings, etc. to give a complete, functioning system. Equal to Wiremold V500 or V700 series. Provide cutting tool for the base and cover to ensure clean, square cuts.
- .2 A full line of fittings must be available including but not limited to, flat, internal and external elbows, couplings for joining raceway sections, wire clips, blank end fitting and a full compliment of device mounting brackets and plates. The fittings shall be colored to match the raceway.
- .3 Device brackets shall be available to install single- or two-gang devices both horizontal or vertical within the raceway. Devices both power and data/communication shall have the capacity of mounting flush or in conjunction with faceplates. Device brackets and plates shall be colored to match the raceway.

Part 3 Execution

2.1 INSTALLATION

- .1 Install raceways before installation of wiring. Install covers for raceways and fittings after installation or wiring.

- .2 Install supports, elbows, tees, connectors, fittings, bushings, adaptors as required.
- .3 Keep number of elbows, offsets, connections to minimum.
- .4 Use wiring with mechanical protection in channel raceways.
- .5 Install barriers in raceways where different voltage systems are required.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 01 - Common Work Results - Electrical.

1.2 REFERENCES

- .1 Government of Canada
 - .1 NBC-2015, National Building Code of Canada.
 - .2 TB OSH Chapter 3-03, 2010-04-01, Treasury Board of Canada, Occupational Safety and Health, Chapter 3-03, Standard for Fire Protection Electronic Data Processing Equipment.
 - .3 TB OSH Chapter 3-04, 2010-04-01, Treasury Board of Canada, Occupational Safety and Health, Chapter 3-04, Standard for Fire Alarm Systems.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S524-14, Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S525-07, Audible Signal Appliances for Fire Alarm.
 - .3 CAN/ULC-S526-07, Visual Signal Appliances, Fire Alarm.
 - .4 CAN/ULC-S527-99, Control Units.
 - .5 CAN/ULC-S528-05, Manual Pull Stations.
 - .6 CAN/ULC-S529-09, Smoke Detectors.
 - .7 CAN/ULC-S530-1991 (R1999), Heat Actuated Fire Detectors.
 - .8 CAN/ULC-S531-14, Smoke Alarms.
 - .9 CAN/ULC-S536-04, Inspection and Testing of Fire Alarm Systems.
 - .10 CAN/ULC-S537-13, Verification of Fire Alarm Systems.
 - .11 CAN/ULC-S561-13, Installation and Services for Fire Signal Receiving Centres and Systems.

1.3 SYSTEM DESCRIPTION

- .1 Connection of a new fire alarm monitoring panel to existing conventional and addressable fire alarm system control panels.
- .2 System to provide signalling to ULC listed monitoring agency via fire alarm monitoring panel.
- .3 System to include:
 - .1 Power supplies.
 - .2 Wiring.
 - .3 Panel.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- .1 System components: listed by ULC and comply with applicable provisions of National Building Code Local/Provincial Building Code, and meet requirements of local authority having jurisdiction.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings.
- .2 Include:
 - .1 Detail assembly and internal wiring diagrams for control units and auxiliary cabinets.
 - .2 Details for devices.
 - .3 Details and performance specifications for peripherals with item by item cross reference to specification for compliance.
 - .4 Flow diagram.
 - .5 Proof that the fire alarm monitoring panel is being installed and tested by a ULC certified installer.
 - .6 Proof that the fire alarm monitoring company is certified under CAN/ULCS561-13.

1.6 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for monitoring system equipment for incorporation into manual specified.
- .2 Include:
 - .1 Instructions for complete monitoring system to permit effective operation and maintenance.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.
 - .3 Copy of approved shop drawings with corrections completed and marks removed except review stamps.
 - .4 List of recommended spare parts for system.
 - .5 Copies of certificates indicating that the fire alarm system equipment have been installed and tested to:
 - .1 CAN/ULC S524-14
 - .2 CAN/ULC S536-04
 - .3 CAN/ULC S537-13
 - .4 CAN/ULC S561-13

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with the Waste Reduction Workplan.
- .2 Place materials defined as hazardous or toxic waste in designated containers.

- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

Part 2 Products

2.1 MATERIALS

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.

2.2 SYSTEM OPERATION: SINGLE STAGE - SIGNALS ONLY WHERE APPLICABLE

- .1 Actuation of any alarm initiating device to:
 - .1 Transmit signal to ULC monitoring facility via fire alarm monitoring panel.
- .2 Trouble or supervisory condition on system to:
 - .1 Indicate circuit in trouble at central control unit.

2.3 SYSTEM OPERATION: TWO STAGE - SIGNALS ONLY WHERE APPLICABLE

- .1 Actuation of any alarm initiating device on first stage to:
 - .1 Transmit signal to ULC monitoring agency via fire alarm monitoring panel.
- .2 Trouble or supervisory condition on system to:
 - .1 Transmit signal to ULC monitoring facility via fire alarm monitoring panel.

2.4 ULC FIRE ALARM MONITORING PANEL

- .1 Labeled to meet CAN/ULC S561-13.
- .2 Eight (8) supervised input zones.
- .3 Integral cellular telephone module and antennae suitable for this application.
- .4 Door tamper switch and alarm connection.
- .5 Integral power supply.
- .6 Programming keypad with LCD display and numeric/function keys.
- .7 Passive communications protocol with one telephone line and one cellular communicator.

2.5 ULC LISTED FIRE ALARM MONITORING AGENCY

- .1 The contractor shall, on behalf of the owner, provide a two (2) year contract with two (2) – one (1) year options with a ULC listed monitoring agency to monitor the fire alarm monitoring panel as per CAN/ULC S561-13. Contract shall include the following:
 - .1 All costs for the monitoring service including any regularly scheduled monthly costs for the duration of the contract.
 - .2 Shall commence on the day each location is deemed substantially complete.

Part 3 Execution

3.1 INSTALLATION

- .1 Monitoring system equipment installed shall be generically monitorable and shall not be proprietary to allow another company to utilize the monitoring equipment installed under this contract once the terms of the monitoring contract listed in 2.5.1 have expired.
- .2 Splices are not permitted.
- .3 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .4 Identify circuits and other related wiring at central control unit, annunciators and terminal boxes.
- .5 Arrange with telephone service provider to building for connection of land line to monitoring equipment and pay start up and monthly charges for phone line rental for the term of the contract.
- .6 Arrange with cellular service provider for connection to monitoring equipment and pay start up and monthly charges for cellular service for the term of the contract.
- .7 Provide cellular service booster in locations where the cellular signal within the building is less than 90dB to provide a minimum of 90dB cellular signal at all installations.
- .8 Coordinate with Project Authority for monitoring calling list at each site.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results – Electrical, CAN/ULC-S537 and CAN/ULC-S561-13.

3.3 VERIFICATION AND CERTIFICATION OF THE FIRE ALARM EQUIPMENT

- .1 The contractor shall retain the services of the fire alarm system manufacturer's authorized factory representative to verify and certify fire alarm system operation after installation of monitoring equipment. The manufacturer's authorized factory representative shall:
 - .1 Reverification of fire alarm system components modified under the terms of this contract.
 - .2 The contractor shall provide the manufacturer's authorized representative with sufficient personnel during system identification.
 - .3 The manufacturer's authorized representative shall provide the contractor with technical assistance to correct deficiencies identified during the verification.
 - .4 Inspection Certification:
 - .1 On completion of the verification and when all of the conditions have been complied with, the contractor shall issue to the Project Authority the following:
 - .1 A Certificate of Verification and copies of the verification worksheet that the fire alarm system has been completed as per CAN/ULC S537-04, and that the system is fully operational.
 - .2 A Certificate of Verification and copies of the verification worksheet that the installation and testing of the fire alarm monitoring panel has been completed as per CAN/ULC S561-13 and that the unit is functional.
 - .3 A certificate/documentation indicating that the fire alarm monitoring panel is communicating with and being monitored by a ULC listed monitoring agency.
 - .5 All costs involved in this inspection, both for the manufacturer's and the electrical contractor's work shall be included with the electrical contractor's total tender price.

END OF SECTION