
1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results for Electrical
- .2 Section 27 05 26 – Grounding and Bonding for Communications
- .3 Section 28 05 28 – Pathways for Electronic Safety and Security
- .4 Section 28 23 00 – Video Surveillance System

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-C22.1 (2015), Canadian Electrical Code, Part I.
- .2 Building Industry Consulting Services International (BICSI)
 - .1 BICSI Electronic Safety and Security Design Reference Manual (ESSDRM) 3rd Edition.
 - .2 BICSI Telecommunications Distribution Methods Manual (TDMM) 13th Edition.

1.3 SYSTEM DESCRIPTION

- .1 The access control system installed under this contract shall include only the cabling and pathways. The departmental representative will make arrangements to supply the active equipment, install and commission the access control system.
- .2 The access controls system will be a distributed controller system using minimum 53 mm EMT conduit in a bus style configuration between doors and room 119. Both the intrusion alarm and the access control system will be installed in the common pathway. Coordinate cable and pathway installation with section 28 16 00 and Division 26.
- .3 Hard wired telecommunications drops shall be installed and certified by Division 27.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 10 01 – General Requirements.

1.5 OPERATION AND MAINTENANCE SUBMITTALS

- .1 Provide operation and maintenance data for incorporation into manual in accordance with Section 01 10 01 – General Requirements.

1.6 CARE, OPERATION AND START-UP

- .1 Provide these services for such period, and for as many visits as necessary to put equipment into full operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

2 Products

2.1 DOOR BELL

- .1 Pushbutton: Satin nickel finish, UV inhibitor touch pad surface, lighted pushbutton. Supply and install low voltage wiring between pushbutton and doorchime.
 - .1 Standard of Acceptance: Nutone #PB7LSN
- .2 Door Chime: Decorative wired door chime, 2-tones to differentiate between 2 different doors, complete with 16V low voltage transformer (NuTone C905), white in colour.
 - .1 Standard of Acceptance: Nutone #LA11WH

3 Execution

3.1 INSTALLATION

- .1 The access control system installed under this contract shall include only the cabling and pathways.
- .2 The Departmental Representative will make arrangements to supply the active equipment, install and commission the access control system.
- .3 Leave a minimum of 1 m slack at outlet locations and 3 m slack in room 119.
- .4 The access control system shall be installed in conduit/enclosed raceway in its entirety.
- .5 Install pathways and wiring as indicated on drawings 2800-1 and 2800-2.

3.2 COMMISSIONING

- .1 Perform commissioning in accordance with Section 01 91 13 – General Commissioning Requirements and per manufacturer's recommendations.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results for Electrical
- .2 Section 27 05 26 – Grounding and Bonding for Communications
- .3 Section 28 05 28 – Pathways for Electronic Safety and Security
- .4 Section 28 10 00 – Electronic Access Control and Intrusion Detection

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-C22.1 (2015), Canadian Electrical Code, Part I.
- .2 Building Industry Consulting Services International (BICSI)
 - .1 BICSI Electronic Safety and Security Design Reference Manual (ESSDRM) 3rd Edition.
 - .2 BICSI Telecommunications Distribution Methods Manual (TDMM) 13th Edition.

1.3 SYSTEM DESCRIPTION

- .1 The video surveillance system installed under this contract shall include only the cabling and pathways. The Departmental Representative will make arrangements to supply the active equipment, install and commission the video surveillance system.
- .2 The video surveillance system will be a use a star type configuration installed in the 53 mm EMT conduit origination from rooms 136 and 151 to each or the rooms indicated on the drawings. Coordinate the pathway installation with Division 26.
- .3 Hard wired telecommunications drops shall be installed and certified by Division 27.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 10 01 – General Requirements.

1.5 OPERATION AND MAINTENANCE SUBMITTALS

- .1 Provide operation and maintenance data for incorporation into manual in accordance with Section 01 10 01 – General Requirements.

1.6 CARE, OPERATION AND START-UP

- .1 Provide these services for such period, and for as many visits as necessary to put equipment into full operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

2 Products

2.1 POWER WIRING

- .1 The video surveillance system wiring shall incorporate as a minimum, two (2) conductor, 18AWG insulated copper conductors FT-4 rated complete with “Gray” coloured PVC outer jacket.
 - .1 Standard of acceptance:
 - .1 Belden – 5300 UE

2.2 MICROPHONE WIRING

- .1 The video surveillance system wiring shall incorporate as a minimum, two (2) conductor, 18AWG insulated copper conductors with drain, FT-4 rated complete with “Gray” coloured PVC outer jacket.
 - .1 Standard of acceptance:
 - .1 Belden – 5300 FE.

2.3 VIDEO WIRING

- .1 CAT 6 cabling as per Division 27.
- .2 RG6 coax cabling as per Division 27.

3 Execution

3.1 INSTALLATION

- .1 The video surveillance system installed under this contract shall include only the cabling and pathways.
- .2 The Departmental Representative will make arrangements to supply the active equipment, install and commission the video surveillance system.
- .3 Leave a minimum of 1 m slack at outlet locations and 3 m slack in rooms 136 and 151.
- .4 The video surveillance system shall be installed in conduit/enclosed raceway in its entirety.
- .5 Install pathways and wiring as indicated on drawings 2800-1, 2800-2 and 2800-3.

3.2 COMMISSIONING

- .1 Perform commissioning in accordance with Section 01 91 13 – General Commissioning Requirements and per manufacturer’s recommendations.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 26 05 00 - Common Work Results for Electrical
- .2 26 05 21 - Wire and Cables - 0 - 1000 V.
- .3 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- .4 21 13 00 – Fire Suppression.

1.2 REFERENCES

- .1 CAN/ULC-S524, Standard for the Installation of Fire Alarm Systems.
- .2 ULC-S525, Audible Signal Devices for Fire Alarm Systems.
- .3 CAN/ULC-S527, Control Units Fire Alarm.
- .4 ULC-S528, Manually Actuated Signaling Boxes, Fire Alarm.
- .5 CAN/ULC-S529, Smoke Detectors for Fire Alarm Systems.
- .6 ULC-S530, Heat Actuated Fire Detectors for Fire Alarm Systems.
- .7 CAN/ULC-S536, Inspection and Testing of Fire Alarm Systems.
- .8 CAN/ULC-S537, Verification of Fire Alarm Systems.
- .9 NBC-2010, National Building Code of Canada.
- .10 NFC-2005, National Fire Code of Canada.
- .11 NFPA 72-2007 National Fire Alarm Code.
- .12 NFPA 90A-2009, Installation of Air Conditioning and Ventilating Systems.
- .13 Canadian Electrical Code 2015.

1.3 DESCRIPTION OF SYSTEM

- .1 Manufacturer shall be responsible to ensure full system is compatible with Owner approved smoke detectors and protective cages.
- .2 Fully supervised, microprocessor-based, addressable, fire alarm system, utilizing digital techniques for data control and digital, and multiplexing techniques for data transmission.
- .3 System to carry out fire alarm and protection functions including receiving alarm signals; initiating general alarm; supervising components and wiring; actuating auxiliary functions; initiating trouble signals and signaling to fire department via dual dialing over phone and cellular networks.
- .4 Zoned, non-coded, single stage.
- .5 Modular in design to allow for future expansion.
- .6 Operation of system shall not require personnel with special computer skills.

- .7 System to include:
 - .1 Central Control Unit in separate enclosure with power supply, stand-by batteries, central processor with microprocessor and logic interface, main system memory, input-output interfaces for alarm receiving, annunciation/display and program control/signaling, integral TVSS. Interface to be bilingual.
 - .2 Addressable zone relay modules.
 - .3 Power supplies.
 - .4 Initiating/input circuits.
 - .5 Output circuits,
 - .6 Auxiliary circuits.
 - .7 Wiring.
 - .8 Addressable manual and automatic initiating devices.
 - .9 Audible and visual signaling devices.
 - .10 Historic event recorder.
 - .11 Static graphics to be bilingual.
 - .12 Remote annunciator panel.
 - .13 Auto-dialer.
 - .14 ULC Listed dual channel digital communicator with standard phone line and cellular interfaces, to notify a ULC certified monitoring station. The monitoring station shall be supplied the necessary information in order to relay alarms to the local fire fighters and other responsible persons as approved by the end user. The function of the digital communicator may be shared with the intrusion alarm system provided the fire alarm signal captures the communicator and has priority over the intrusion alarm.
 - .15 All the components of the fire alarm system shall be indicated on a single line drawing including alarm and signaling devices, zones, power connections, sprinkler connections, door holder connections and shut down circuits, etc.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- .1 System:
 - .1 Shall be installed to the satisfaction of the Client Fire Marshall and Departmental Representative.
 - .2 System components: listed by ULC and comply with applicable provisions of the 2010 National Building Code, and meet requirements of local authority having jurisdiction.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 10 01 – General Requirements.
 - .1 Include:
 - .1 Detail assembly and internal wiring diagrams for control unit, auxiliary cabinets.
 - .2 Overall system riser wiring diagram, identifying control equipment, initiating zones, signaling circuits; identifying terminations, terminal numbers, conductors and raceways.
 - .3 Details for devices.
 - .4 Smoke detector protective cage data and installation details.
 - .5 Details and performance specifications for control, annunciation and peripherals with item by item cross reference to specification for compliance.
 - .6 Step-by-step operating sequence, cross referenced to logic flow diagram.

.7 Graphic annunciator, in English.

1.6 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for fire alarm system for incorporation into manual per Section 01 10 01 – General Requirements.
 - .1 Include:
 - .1 Instructions for complete fire alarm 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.

2 Products

2.1 MATERIALS

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .2 Power supply: to CAN/ULC-S524.
- .3 Audible & visual signal devices: to ULC-S524.
- .4 Control unit: to CAN/ULC-S527.
- .5 Manual fire alarm stations: to ULC-S528.
- .6 Thermal detectors: to ULC-S530.
- .7 Smoke and duct detectors: to CAN/ULC-S529.

2.2 SYSTEM OPERATION: SINGLE STAGE - SIGNALS ONLY

- .1 Actuation of any alarm initiating device to:
 - .1 Cause electronic latch to lock-in alarm state at central control unit.
 - .2 Indicate zone of alarm at central control unit.
 - .3 Cause audible and visual signaling devices to sound continuously throughout building and at central control unit.
 - .4 Transmit signal to fire department via central station.
 - .5 Cause air conditioning and ventilation fans to shut down upon activation of the duct smoke alarm or to function to provide required control of smoke movement.
 - .6 Cause fire doors and smoke control doors, if normally held open, to close automatically.
 - .7 Acknowledging alarm: indicated at central control unit.
 - .8 Possible to silence signals by "alarm silence" switch at control unit, after a 60 second period of operation.
 - .9 Subsequent alarm, received after previous alarm has been silenced, to re-activate signals.
- .10 Actuation of supervisory devices to:
 - .1 Cause electronic latch to lock-in supervisory state at central control unit.
 - .2 Indicate respective supervisory zone at central control unit and at remote annunciators.

- .3 Cause audible signal at central control unit to sound.
- .4 Activate common supervisory sequence.
- .5 Resetting alarm and/or supervisory device to return system indications/functions back to normal.
- .11 Trouble on system to:
 - .1 Indicate circuit in trouble at central control unit.
 - .2 Activate "system trouble" indication, buzzer and common trouble sequence. Acknowledging trouble condition to silence audible indication; whereas visual indication to remain until trouble is cleared and system is back to normal.
 - .3 Trouble on system: suppressed during course of alarm.
 - .4 Trouble condition on any circuit in system not to initiate alarm conditions.

2.3 CONTROL PANEL

- .1 Central Control Unit (CCU):
 - .1 Features specified are minimum requirements for microprocessor-based system with digital data control and digital multiplexing techniques for data transmission.
 - .2 The capacity of the fire alarm control panel is to be at least three (3) times the number of addressable points specified in the riser diagram.
 - .3 System to provide for priority reporting levels, with fire alarm points assigned highest priority, supervisory and monitoring lower priority, and third priority for troubles. Possible to assign control priorities to control points in system to guarantee operation or allow emergency override as required.
 - .4 Integral power supply, battery charger and standby batteries.
 - .5 Basic life safety software: retained in non-volatile Erasable Programmable Read-Only-Memory (EPROM). Extra memory chips: easily field-installed. Random-Access-Memory (RAM) chips in panel to facilitate password-protected field editing of simple software functions; e.g., zone labels, priorities and changing of system operation software.
 - .6 Circuitry to continuously monitor communications and data processing cycles of microprocessor. Upon failure, audible and visual trouble indication to activate.
 - .7 Communication between CCU and remote addressable detectors or zone relay modules to be supervised, Class A. Should communications fail between CCU and remote units, audible and visual trouble to be indicated at CCU. Data communication to be binary C, baseband, time-division multiplex, half-duplex. Each data channel: capable of communicating up to distance of 3000 m.
 - .8 Support up to two (2) RS-232-C I/O ports. CCU output: parallel ASCII (with adjustable baud rates to allow interface of any commercially available printer, terminal or PC).
 - .9 Equipped with software routines to provide Event-Initiated-Programs (EIP); change in status of one or more monitor points, may be programmed to operate any or all of system's control points.
 - .10 Software and hardware to maintain time of day, day of week, day of month, month and year.
 - .11 Main control panel to be recessed.
 - .12 Protocol module to comply with UL561. Module to allow off-site monitoring of the FACP over standard dial-up phone line and additional communication method (such as cellular). Coordinate with departmental representative and fire marshal requirements.

2.4 POWER SUPPLIES

- .1 120 V, 60 Hz as primary source of power for system.
- .2 Voltage regulated, current limited distributed system power.
- .3 Primary power failure or power loss (less than 102 V) will activate common trouble sequence.
- .4 Interface with battery charger and battery to provide uninterruptible transfer of power failure or loss.
- .5 During normal operating conditions fault in battery charging circuit, short or open in battery leads to activate common trouble sequence and standby power trouble indicator.
- .6 Standby batteries: sealed, maintenance free.
- .7 Continuous supervision of wiring for external initiating and alarm circuits to be maintained during power failure.

2.5 INITIATING/INPUT CIRCUITS

- .1 Receiving circuits for alarm initiating devices such as manual pull stations, smoke detectors and heat detectors, wired in Class A configuration to central control unit.
- .2 Alarm receiving circuits (active and spare): compatible with smoke detectors and open contact devices.
- .3 Actuation of alarm initiating device: cause system to operate as specified in "System Operation".
- .4 Receiving circuits for supervisory, N/O devices. Devices: wired in Class A configuration to central control unit.
- .5 Actuation of supervisory initiating device: cause system to operate as specified in "System Operation".

2.6 ALARM OUTPUT CIRCUITS

- .1 Alarm output circuits connected to signals, wired in Class A configuration to central control unit.
- .2 Signal circuits' operation to follow system programming; capable of operating horns and strobes. Each signal circuit: rated at 3 A, 24 V DC, fuse protected from overloading/overcurrent.
- .3 Manual alarm silence, automatic alarm silence and alarm silence inhibit to be provided by system's common control.

2.7 AUXILIARY CIRCUITS

- .1 Auxiliary contacts for control functions.

- .2 Actual status indication, positive feedback, from controlled device.
- .3 Alarm and/or supervisory trouble on system to cause operation of programmed auxiliary output circuits.
- .4 Upon resetting system, auxiliary contacts to return to normal or to operate as pre-programmed.
- .5 Fans: stagger-started upon system reset, timing circuit to separate starting of each fan or set of fans connected to auxiliary contact on system. Timing circuit: controlled by CCU.
- .6 Auxiliary circuits: rated at 2 A, 24 V DC and 120 V AC, fuse protected as indicated.

2.8 WIRING

- .1 Twisted copper conductors: rated 120 V.
- .2 To initiating circuits: 18 AWG minimum, and in accordance with manufacturer's requirements.
- .3 To initiating circuits: 16 AWG minimum, and in accordance with manufacturer's requirements.
- .4 To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.
- .5 To be run separately in EMT. Coordinate requirements with CEC 2015 and manufacturers recommendations. To be FT-6 rated and rated for fire alarm use and comply with all applicable ULC standards.

2.9 MANUAL ALARM STATIONS

- .1 Addressable manual pull station.
- .2 Pull lever, break glass rod, semi-flush, wall-mounted type, single action, single stage, electronics to communicate station's status to addressable module over two wires and to supply power to station. Bilingual markings. Station address to be set on station in field. Backbox to accommodate pull station and relay. Dual action devices to be impact resistant, Lexan construction. Mount devices at 1200 mm AFF unless otherwise noted.

2.10 AUTOMATIC ALARM INITIATING DEVICES

- .1 Addressable smoke detector: ionization type.
- .2 Addressable duct smoke detectors: air duct type with sampling tubes with protective housing.
- .3 Addressable early warning laser smoke detectors: extremely bright laser diode, combined with special lens' and mirror optics. Smoke detectors to be installed in rooms 159 to 173.
- .4 Twistlock plug-in type with fixed base.
- .5 Addressable heat detectors as per ULC requirements.

- .6 Wire-in base assembly with integral red alarm LED, and terminals for remote relay alarm LED.
 - .7 Electronics to communicate detector's status to addressable module.
 - .8 Detector address to be set on detector base in field.
 - .9 Complete with two (2) auxiliary contacts.
- 2.11 AUDIBLE/VISUAL SIGNAL DEVICES
- .1 Electronic horn/strobe with high intensity horn (90 dB) and low intensity strobe (4.7 candela) with bilingual FIRE/FEU markings on white lexan strobe lens.
 - .2 Overall red lexan cover with no exposed screws complete with backbox.
 - .3 Exterior horns without strobes to be weatherproof complete with recessed weatherproof backbox.
 - .4 Horn/strobes installed in cell blocks are to have red wire cage installed.
- 2.12 VISUAL ALARM SIGNAL DEVICES
- .1 Strobe type: flashing, red, 24 V DC.
 - .2 Designed for surface mounting on ceiling on wall outlet box.
- 2.13 PRE-ACTION RELEASING/DELUGE PANEL
- .1 6-zone control panel for pre-action applications.
 - .2 ULC-S527-99 and S635 listed.
 - .3 Adjustable waterflow discharge timer and two soak timers.
 - .4 Built-in programmer.
 - .5 History log with 256 event storage.
 - .6 24VDC operation.
 - .7 Low AC voltage sense.
 - .8 Automatic battery charger for charge supervision.
- 2.14 GRAPHIC DISPLAY
- .1 Acrylic graphic display passive type as follows:
 - .1 Passive graphic display(s) on white photo bond paper in metal frame(s) with polycarbonate or Plexiglas glazing. In compliance with NFPA-72 6-2.3, the graphic(s) "shall be designed and fabricated" and installed in a manner "to render them damage and tamper resistant". The display(s) shall be securely attached to the wall adjacent to the fire alarm main panel. The labeling on the graphic must closely correspond to the displays on the fire alarm annunciator or the labels for each fire panel alarm indication. All wording shall be bilingual. The floor plan drawing is to indicate:
 - .2 Building's outline showing all exterior doors.
 - .3 Building's corridors, stairways and elevators.
 - .4 Location of, and divisions between, the fire alarm zones.
 - .5 Location of the main fire alarm panel and all devices.
 - .6 The location of the propane shutoff valve.
 - .7 Duct smoke detector locations and/or ventilation equipment rooms, where relevant use of legend and symbols is recommended).
 - .8 Kitchen fire suppression system, where relevant.

- .9 An accurate “you are here” indicator each graphic display must be oriented to match the direction of the location at which it is to be posted. - i.e., oriented to the direction in which the person viewing the display is facing.

2.15 RECORD RISER DIAGRAM

- .1 Fire alarm system riser diagram: in glazed frame. Plastic mylar on white background.

2.16 ANCILLARY DEVICES

- .1 Remote relay unit to initiate fan shut-down.
- .2 Isolation modules.
- .3 Power supplies/signal boosters.
- .4 End of line devices.
- .5 Addressable relay output modules for tying into mechanical equipment and door hold opens.

2.17 MANUFACTURERS

- .1 Manufacturer shall be responsible to ensure full system is compatible with Owner approved smoke detectors and protective cages.
- .2 Acceptable Manufacturers – Substitutions are not acceptable:
 - .1 GE Security Canada (Edwards EST-3)
 - .2 Simplex
 - .3 Siemens
 - .4 Notifier NFS-640 Series

3 Execution

3.1 INSTALLATION

- .1 It is intended that all fire alarm equipment, detectors, pull stations, speaker horns, etc. with the exception of the main control panel, will be flush mounted and wire and conduit will be concealed in construction in finished areas.
- .2 Install systems in accordance with CAN/ULC-S524-M91.
- .3 Install central control unit and printer and connect to AC power supply, AC standby power. Centre panel at 1500 mm AFF.
- .4 Install manual alarm stations and connect to alarm circuit wiring.
- .5 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.
- .6 Detectors shall be mounted both above and below the suspended ceiling tile as indicated.
- .7 Connect alarm circuits to main control panel.
- .8 Install horns and visual signal devices and connect to signaling circuits.
- .9 Provide separate conduits for initiation and signaling circuits.

- .10 Connect signaling circuits to main control panel.
- .11 Connect door holders and releasing devices to alarm loop using relays and addressable relay modules.
- .12 Install remote relay units to control fan shutdown.
- .13 Splices are not permitted.
- .14 Confirm with manufacturer if supplied addressable relays or intelligent interface devices require separate DC power and if so supply and install DC power feed from main fire alarm panel and sized per manufacturer's recommendations.
- .15 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and CCU, as required by equipment manufacturer.
- .16 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .17 Identify circuits and other related wiring at central control unit and terminal boxes.
- .18 Run empty 21 mm conduit from telephone room to fire alarm panel.
- .19 Make all arrangements to have fire alarm remotely annunciated at Central Station. Supply all equipment, connections, etc. required. Departmental Representative to pay all fees and connection costs to the telephone company and local Fire Department.
- .20 Connect relay units to control fan shut-down and door releases with relays and intelligent interface devices and as indicated.
 - .1 Configuration:
 - .1 Include system configuration and programming to meet the needs of the building design as required. Include programming of detection devices, relays, signal devices and custom configuration.
 - .2 Lamacoid nameplate on control panel indicating name and branch circuit #.
 - .3 Coordinate mounting heights of exterior horns with architectural elevations.

3.2 FIELD QUALITY CONTROL

- .1 Perform test in accordance with Section 26 05 00 and CAN/ULC-S537.
 - .1 Fire alarm system:
 - .1 Test such device and alarm circuit to ensure manual stations and smoke detectors, transmit alarm to control panel and actuate general alarm and ancillary devices.
 - .2 Simulate grounds and breaks on alarm and signaling circuits to ensure proper operation of trouble signals.
 - .3 Check annunciator panels to ensure zones are shown correctly.
 - .4 Verify correct door control and general operation.
 - .5 Verify fan control.
 - .2 Provide final PROM program reburn for system incorporating program changes made during construction.

3.3 INSPECTION

- .1 The manufacturer to make an inspection of all equipment, including those components necessary for the direct operation of the system such as manual stations, detectors and controls. The inspection to comprise an examination of such equipment for the following:
 - .1 That the type of equipment installed is that designated by this specification.
 - .2 That the wiring type, installation and connections to all equipment components show that the installer undertook to have observed all applicable codes and standards.
 - .3 That equipment supply by the manufacturer was installed in accordance with the manufacturer's recommendation and that all devices have been operated or tested to verify their operation.
 - .4 That the supervisory wiring of those items of equipment connected to a supervised circuit is operating and that the governmental regulations, if any, concerning the supervisory wiring, have been met to the satisfaction of inspection officials.
- .2 The manufacturer to supply to the electrical contractor reasonable amounts of technical assistance with respect to any changes necessary to conform to Paragraphs 1, 2, and 4 above. During the period of inspection by manufacturer, the electrical contractor to make available to the manufacturer, electricians as designated by the manufacturer.
- .3 To assist the electrical contractor in preparing his bid, the manufacturer to indicate the number of hours necessary to complete this inspection prior to closing of tenders.
- .4 On completion of the inspection and when all of the above conditions have been complied with, the manufacturer to issue to the Departmental Representative:
 - .1 A copy of the Inspecting Technician's report showing location of each device and certifying the test results of each device.
 - .2 A certificate of verification confirming that the inspection has been completed in accordance with CAN/ULC-S537 and showing the conditions upon which such inspection and certification have been rendered.
- .5 The representative of the manufacturer shall provide evidence of technical training on the type of electronic equipment specified herein and shall have at least five (5) years experience with early warning fire detection and control systems.
- .6 Final test and acceptance of the system shall be witnessed by representative of three parties: the departmental representative, the Contractor, the Manufacturer.
- .7 Service technicians and replacement components for the system specified shall be available within 24 hours from an authorized service representative of the manufacturer who is able to provide evidence of the technical training and authorization by the manufacturer.
- .8 All costs involved in this inspection, both from the manufacturer and the electrical contractor work, to be included in the tender price.

3.4 CLEANING

- .1 Remove protective coverings from sensors and components.
- .2 Clean sensors and keypads such that they are free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.

3.5 WARRANTY

- .1 Provide a written guarantee, signed and issued in the name of the Departmental Representative, stating that the fire alarm system is guaranteed against defects in material, workmanship and performance for a period of two (2) years from the date of the Final Certificate of Completion. CAN/ULC-S537.

3.7 COMMISSIONING

- .1 Perform commissioning in accordance with Section 01 91 13 – General Commissioning Requirements and per manufacturer's recommendations.

END OF SECTION