

**Part 1 General**

**1.1 SUMMARY**

- .1 Section Includes
  - .1 Materials and installation for fire alarm systems.
  - .2 Automatic alarm initiating devices.
  - .3 Audible signal devices.
- .2 Scope of Work but not limited to:
  - .1 Materials and installation for fire alarm systems.
  - .2 Automatic alarm initiating devices.
  - .3 Audible signal devices.
- .3 Related requirements
  - .1 Section 26 05 00 - Common Work Results Electrical.

**1.2 REFERENCES**

- .1 Government of Canada:
  - .1 NBC-2015, National Building Code of Canada.
  - .2 CSA C22.1-18, Canadian Electrical Code, Part 1 (24<sup>th</sup> Edition).
- .2 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems.
  - .2 CAN/ULC-S526-07, Visible Signal Devices for Fire Alarm Systems, Including Accessories.
  - .3 CAN/ULC-S527-99, Standard for Control Units for Fire Alarm Systems.
  - .4 CAN/ULC-S529-09, Smoke Detectors for Fire Alarm Systems.
  - .5 CAN/ULC-S537-04, Standard for the Verification of Fire Alarm Systems.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for multiplex fire alarm system and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Indicate on shop drawings:
    - .1 Detail assembly and internal wiring diagrams for control unit, and 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 Details and performance specifications for control, annunciation and peripherals with item by item cross reference to specification for compliance.
- .5 Step-by-step operating sequence, cross referenced to logic flow diagram.

#### **1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for fire alarm system for incorporation into manual.
- .3 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.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect components from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

#### **1.6 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installer: company or person specializing in fire alarm system installations approved by manufacturer with 5 years documented experience.
- .2 Provide services of representative or technician from manufacturer of system, experienced in installation and operation of type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of system and to provide instruction to project personnel.
- .3 System:
- .4 Extra Materials:

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .5 Maintenance Service:
  - .1 Provide one year's free maintenance with two inspections by manufacturer during warranty period. Inspection tests to conform to CAN/ULC-S536. Submit inspection report to Departmental Representative.

## **Part 2 Products**

### **2.1 DESCRIPTION**

- .1 The fire pump booster station building is equipped with an existing Edwards IO1000 series single stage addressable fire alarm control panel.
- .2 System to include:
  - .1 Wiring.
  - .2 Manual and automatic initiating devices.
  - .3 Audible and visual signalling devices.
- .3 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .4 Audible signal devices: to CAN/ULC-S524.
- .5 Visual signal devices: to CAN/ULC-S526.
- .6 Smoke detectors: to CAN/ULC-S529.
- .7 Regulatory Requirements:
  - .1 System components: listed by ULC and comply with applicable provisions of NBC, and meet requirements of local authority having jurisdiction.

### **2.2 WIRING**

- .1 Twisted copper conductors: rated 300 V.
- .2 To initiating circuits: 18 AWG minimum, and in accordance with manufacturer's requirements.
- .3 To signal circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.

### **2.3 AUTOMATIC ALARM INITIATING DEVICES**

- .1 Addressable variable-sensitivity smoke detectors.
  - .1 Photo-electric type.
  - .2 Electronics to communicate detector's status to addressable module/transponder.
  - .3 Detector address to be set on detector head in field.
  - .4 Sensitivity settings: 7 settings, determined and operated by control panel. No shifting in detector sensitivity due to atmospheric conditions (dust, dirt) within certain parameters.

- .5 Ability to annunciate minimum of 2 levels of detector contamination automatically with trouble condition at control panel.

## **2.4 VISUAL/AUDIBLE SIGNAL DEVICES**

- .1 Combination Horn/Strobe: Minimum 90 db, 24 V dc.
- .2 Combination strobe type: Flashing, white, with field selectable candela setting from 15 up to 110Cd, 24V dc.
- .3 Wall or ceiling mounted as indicated on drawings.

## **2.5 GRAPHIC DISPLAY**

- .1 Passive type. Passive graphic on white photo bond paper in metal frame(s) with polycarbonate glazing. Graphic designed to meet NFPA 72 6.2.3 to render them tamper resistant.
- .2 Graphic shall be mounted at Fire alarm control panel and all locations of remote annunciators. Orient graphic based on each location. All wording on graphic shall be bilingual.
- .3 Graphic shall indicated:
  - .1 Building floor plan, including corridors, stairways, elevators.
  - .2 Location and divisions of fire alarm zones, control panel, and annunciators
  - .3 Location of sprinkler room, relevant duct smoke detectors, deluge valves, and other suppression systems
  - .4 Accurate "You are here" indicator.
- .4 Update all passive graphics with new floor plan layout.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for fire alarm installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 INSTALLATION**

- .1 Install systems in accordance with CAN/ULC-S524.
- .2 Locate and install detectors and connect to alarm circuit wiring. Mount detectors more than 1 m from 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.
- .3 Connect alarm circuits to main control panel.

- .4 Install horns and visual signal devices and connect to signalling circuits.
- .5 Connect signalling circuits to main control panel.
- .6 Install end-of-line devices at end of signalling circuits.
- .7 Splices are not permitted.
- .8 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .9 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.

### 3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical and CAN/ULC – S537.
- .2 On completion of all the work shown on drawings and described herein, the fire alarm system shall be in perfect working order.
- .3 To ensure that all components are working properly, the Electrical Contractor shall arrange an inspection of the installation by ULC approved, factory trained personnel. This inspection shall be so arranged so as to coincide with other commissioning teams.
- .4 The approved ULC supplier shall make an inspection of the fire alarm system, including those components necessary to the direct operation of the system, such as manual stations, smoke detectors, sprinkler monitoring devices and signaling devices. The inspection shall comprise an examination of such equipment for the following:
  - .1 That the wiring connection to all equipment components are correct and meet CAN/ULC-S524 and CSA requirements.
  - .2 That equipment is installed in accordance with the approved ULC supplier's recommendations, and that all devices (where possible without destructive testing) have been operated and/or tested to verify their operation.
  - .3 That the supervisory wiring of those items of equipment connected to a supervised circuit, is operating properly and that the Governmental Regulations, if any, concerning such supervisory wiring, have been met to the satisfaction of the Inspecting Officials.
  - .4 All such tests and inspection shall be in conformance with CAN/ULC-S536 and CAN/ULC-S537.
  - .5 On completion of the inspection and tests, and when all of the above conditions have been complied with, including any necessary corrective measures, the approved ULC supplier shall issue an inspection report, and a certificate of verification. The inspection report shall include a detailed list showing the location of each device and certifying the test result of each device. The certificate of verification shall confirm that the inspection has been completed and is satisfactory.
  - .6 All costs involved in this inspection, both from the approved ULC supplier and the Contractor's work shall be included with the Contractor's total Tender price.
  - .7 All cost associated with final commissioning of the system shall be included in the contractor's tender price.

**3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by fire alarm system installation.

**3.6 MAINTENANCE**

- .1 Provide individual price on tender form for temporary program changes during construction period, to include zone labels, control functions, system operation.

**END OF SECTION**