

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section Includes:
  - .1 Materials and installation for fire alarm systems.
  - .2 Power supply facilities.
  - .3 Automatic alarm initiating devices.
  - .4 End-of-line devices.
- .2 Related Requirements
  - .1 Section 26 05 00 Common work result Electrical.

### **1.02 REFERENCE STANDARDS**

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .2 National Fire Protection Agency
  - .1 NFPA 72- 2016, National Fire Alarm Code.
  - .2 NFPA 90A- 2018, Installation of Air Conditioning and Ventilating Systems.
- .3 National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).
- .4 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN/ULC-S524- 2014, Standard for the Installation of Fire Alarm Systems.
  - .2 CAN/ULC-S527-2014, Control Units.
  - .3 CAN/ULC-S530-M91, Heat Actuated Fire Detectors for Fire Alarm Systems.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
  - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Include:
    - .1 Layout of equipment.
    - .2 Zoning.

- .3 Complete wiring diagram, including schematics of modules.
- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .2 Instructions: submit manufacturer's installation instructions.
  - .3 Manufacturer's Field Reports: manufacturer's field reports specified.
- .4 Closeout Submittals:
  - .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.
  - .2 Department representative will delegate authority for review and approval of submittals required by this Section.
  - .3 Submit to department representative 2 sets of approved submittals and drawings immediately after approval but no later than 15 working days to prior to final inspection.
  - .4 Submit following:
    - .1 Manufacturer's Data for:
      - .1 modules.
      - .2 Storage batteries.
      - .3 Battery charger.
      - .4 Heat detectors.
      - .5 Wiring.
      - .6 Conduit.
      - .7 Outlet boxes.
      - .8 Fittings for conduit and outlet boxes.
    - .2 System wiring diagrams:
      - .1 Submit complete wiring diagrams of system showing points of connection and terminals used for electrical connections in the system.
      - .2 Show modules, relays, switches and lamps in control panel.
    - .3 Design data: Power Calculations:
      - .1 Submit design calculations new work specified to substantiate that battery capacity exceeds supervisory and alarm power requirements.
      - .2 Show comparison of detector power requirements per zone versus control panel smoke detector power output per zone in both standby and alarm modes.
      - .3 Show comparison of notification appliance circuit alarm power requirements with rated circuit power output.
    - .4 Schedules:
      - .1 Conductor wire marker schedule.
    - .5 Test Reports:
      - .1 Preliminary testing:
        - .1 Final acceptance testing.

#### 1.04 DESIGNATED CONTRACTOR

- .1 Designated Contactor:
  - .1 Retain the services of an authorized representative qualified to

service a "Simplex Grinnell" fire alarm system to complete all the work of this section subject to proprietary rights.

### **1.05 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
  - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 There is an existing Simplex fire alarm system (Model 4100) presently installed in the building. All materials such as additional battery or "end of the line" resistors and monitored module must be selected to ensure compatibility with the existing fire alarm system.
- .2 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
  - .1 Power supply: to CAN/ULC-S524.
  - .2 Control unit: to CAN/ULC-S527.
  - .3 Thermal detectors: to CAN/ULC-S530.

### **2.02 POWER SUPPLY**

- .1 120 V, ac, 60 Hz input, 24 V dc output from rectifier to operate alarm and signal circuits, with standby power of gell cell batteries minimum expected life of 4 years, sized in accordance with NBC.

### **2.03 AUTOMATIC ALARM INITIATING DEVICES**

- .1 Heat detectors: provide heat detectors designed for detection of fire by combination fixed temperature rate-of-rise principle.
- .2 Combination Fixed Temperature Rate-Of-Rise Detectors (Spot Type): designed for semi-flush outlet box mounting and supported independently of conduit, tubing or wiring connections.
  - .1 Contacts: self-resetting after response to rate-of-rise actuation
  - .2 Operation under fixed temperature actuation to result in external indication.
- .3 Total number of detectors on any detection circuit: not exceed 80% of maximum number of detectors allowed by control panel manufacturer for that circuit. Provide additional zones if required to meet this

requirement.

- .4 Locate detectors in accordance with their listing by ULC and the requirements of NFPA 72, except provide at least 2 detectors in rooms of 54 square meters or larger in area.
- .5 Mount detectors at underside of ceiling or deck above unless otherwise indicated.
  - .1 For mounting heights greater than 3 m above floor level, reduce actual detector linear spacing from listed spacing as required by NFPA 72.
- .6 Temperature rating of detectors: in accordance with NFPA 72.
- .7 Locate detectors minimum 300 mm to lighting fixtures and not closer than 450 mm to air supply or return diffuser.
- .8 Ensure detectors, located in areas subject to moisture or exterior atmospheric conditions or hazardous locations as defined by NFPA 70, are approved for such locations.
- .9 Provide detectors with terminal screw type connections.
- .10 Removal of detector head from its base to cause activation of system trouble signals if detectors are provided with separable heads and bases.

#### **2.04 ALARM INITIATING DEVICE SPACING AND LOCATION**

- .1 Detector spacing and location: in accordance with manufacturer's recommendations and requirements of NFPA 72.
- .2 Provide at least 2 detectors in rooms of 54 square meters or larger.
- .3 Spacing: not to exceed 9m by 9 m per detector

#### **2.05 END-OF-LINE DEVICES**

- .1 End-of-line devices to control supervisory current in alarm circuits, sized to ensure correct supervisory current for each circuit. Open, short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel.

#### **2.06 CONDUIT**

- .1 Rigid Steel Conduit:
  - .1 Zinc-Coated.
- .2 Intermediate Metal Conduit (IMC):
  - .1 Zinc-coated steel only.

## 2.07 WIRING

- .1 Wire for 120 V circuits: No. 12 AWG minimum solid copper conductor.
- .2 Wire for low voltage DC circuits: No. 14 AWG minimum solid copper conductor
- .3 Insulation 75 degrees C minimum with nylon jacket.
- .4 Colour code wiring.

## 3 EXECUTION

### 3.01 MANUFACTURER'S INSTRUCTIONS

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

### 3.02 INSTALLATION

- .1 Install systems in accordance with CAN/ULC-S524 and TB OSH Chapter 3-04.
- .2 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. Connect alarm circuits to main control panel.
- .3 Connect signaling circuits to main control panel.
  - .1 Install end-of-line devices at end of alarm and signaling circuits.
  - .2 Locate and install detectors. Make necessary connections between room detection panel and main fire alarm panel.

### 3.03 FIELD QUALITY CONTROL

- .1 Site Tests:
  - .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and CAN/ULC-S537.
  - .2 Fire alarm system:
    - .1 Test each device and alarm circuit to ensure thermal detectors transmit alarm to control panel and actuate first stage alarm.
    - .2 Check annunciator panels to ensure zones are shown correctly.
    - .3 Simulate grounds and breaks on alarm and signaling circuits to ensure proper operation of system.
    - .4 Class A circuits.
      - .1 Test each conductor on circuits for capability of providing alarm signal on each side of single open-circuit fault condition imposed near midmost point of circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.

- .2 Test each conductor on circuits for capability of providing alarm signal during ground-fault condition imposed near midmost point of circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.
- .5 Class B circuits.
  - .1 Test each conductor on circuits for capability of providing alarm signal on line side of single open-circuit fault condition imposed at electrically most remote device on circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.
  - .2 Test each conductor on circuits for capability of providing alarm signal during ground-fault condition imposed at electrically most remote device on circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.
- .2 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

### 3.05 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**