

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 01 00 10 – General Instructions.

**1.2 REFERENCES**

- .1 Government of Canada
  - .1 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.
  - .2 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 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN/ULC-S524-2011, Standard for the Installation of Fire Alarm Systems.
  - .2 CAN/ULC-S525-2007, Audible Signal Device for Fire Alarm Systems.
  - .3 CAN/ULC-S526-2007, Visual Signal Devices for Fire Alarm Systems.
  - .4 CAN/ULC-S527-2011, Control Units.
  - .5 CAN/ULC-S528-2005, Manual Pull Stations for Fire Alarm Systems.
  - .6 CAN/ULC-S529-2009, Smoke Detectors for Fire Alarm Systems.
  - .7 CAN/ULC-S530-M1991, Heat Actuated Fire Detectors for Fire Alarm Systems.
  - .8 CAN/ULC-S531-2011, Standard for Smoke Alarms.
  - .9 CAN/ULC-S536-S537-2004, Burglar and Fire Alarm Systems and Components.
- .4 National Fire Protection Agency
  - .1 NFPA 72-2010, National Fire Alarm Code.
  - .2 NFPA 90A-2012, Installation of Air Conditioning and Ventilating Systems.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 00 10 – General Instructions.
    - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 00 10 – General Instructions.
- .2 Shop Drawings:
  - .1 Submit shop drawings in accordance with Section 01 00 10 – General Instructions.
- .3 Quality assurance submittals: submit following in accordance with Section 01 00 10 – General Instructions.
  - .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 00 10 – General Instructions in accordance with ANSI/NFPA 20.
  - .2 Authority of Jurisdiction will delegate authority for review and approval of submittals required by this Section.
  - .3 Submit to Authority of Jurisdiction 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 Control panel and modules.
      - .2 Manual pull stations.
      - .3 Heat detectors.
      - .4 Open-area smoke detectors.
      - .5 Wiring.
      - .6 Conduit.
      - .7 Outlet boxes.
      - .8 Fittings for conduit and outlet boxes.
      - .9 Mark data which describe more than one type of item to indicate which type will be provided.
      - .10 Submit 1 original for each item and clear, legible, first-generation photocopies for remainder of specified copies.
    - .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 Instructions for operation:
      - .1 Projected beam smoke detector.
    - .4 Schedules:
      - .1 Conductor wire marker schedule.
    - .5 Test Reports:
      - .1 Open-area 2-wire smoke detectors.
      - .2 Preliminary testing:
        - .1 Final acceptance testing.
        - .2 Submit for inspections and tests specified under Field Quality Control.

#### 1.4 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Installer: company or person specializing in fire alarm system installations with 5-years' 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:
  - .1 To TB OSH Chapter 3-04.
  - .2 Subject to Fire Commissioner of Canada (FC) approval.
  - .3 Subject to FC inspection for final acceptance.
  - .4 To Canadian Forces Fire Marshal approval.
- .4 Extra Materials:
  - .1 Provide maintenance materials in accordance with Section 01 00 10 – General Instructions.
- .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.

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

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle in accordance with Section 01 00 10 – General Instructions.
  - .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 recycling in accordance with Section 01 00 10 – General Instructions.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .2 Control unit: to CAN/ULC-S527.
- .3 Thermal detectors: to CAN/ULC-S530.
- .4 Smoke detectors: to CAN/ULC-S529.

### **2.2 SYSTEM OPERATION**

- .1 Provide separate circuits from control panel to each zone of initiating devices. Transmission of signals from more than one zone over common circuit to control panel is prohibited.

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

- .1 Open-Area Smoke Detectors: provide detectors designed for detection of abnormal smoke densities by both ionization and photoelectric principles.
  - .1 Detectors: 4-wire type.
  - .2 Provide necessary control and power modules required for operation integral with control panel.

- .3 Detectors and associated modules: compatible with control panel and suitable for use in supervised circuit.
- .4 Malfunction of electrical circuits to detector or its control or power units to result in operation of system trouble signals.
- .5 Equip each detector with visible indicator lamp that will flash when detector is in normal standby mode and glow continuously when detector is activated.
- .6 Provide remote indicator lamps for each detector that is located concealed from view.
- .7 Each detector: plug-in type with tab-lock or twist-lock, quick disconnect head and separate base in which detector base contains screw terminals for making wiring connections.
- .8 Detector head: removable from its base without disconnecting wires. Removal of detector head from its base to cause activation of system trouble signals.
- .9 Screen each detector to prevent entrance of insects into detection chamber(s).
- .2 4-Wire Smoke Detectors: detector circuits 4-wire type capable of transmitting detector operating power over conductors separate from initiating circuit.
  - .1 Provide separate, power circuit for each smoke detection initiating circuit (zone).
  - .2 Failure of power circuit to be indicated as trouble condition on corresponding initiating circuit.
- .3 2-Wire Smoke Detectors: detector circuits of 2-wire type capable of transmitting detector operating power over initiating circuit are permitted, provided detectors used are approved by control panel manufacturer for use with control panel provided and are ULC listed as being compatible with control panel.
  - .1 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 Ionization Detectors: multiple chamber type responsive to both invisible and visible particles of combustion.
  - .1 Detectors: not susceptible to operation by changes in relative humidity.
- .5 Photoelectric Detectors: operate on light scattering principle using LED light source.
  - .1 Detector: respond to both flaming and smoldering fires.
- .6 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.
- .7 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.
  - .2 For heights greater than 9 m space detectors no farther apart than 34% of their listed spacing.
- .8 Temperature rating of detectors: in accordance with NFPA 72.
- .9 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.
- .10 Provide detectors with terminal screw type connections.
- .11 Removal of detector head from its base to cause activation of system trouble signals if detectors are provided with separable heads and bases.

## **2.4 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 9 m by 9 m per detector, and 9 linear m per detector along corridors.
- .4 Locate detectors minimum 1.5 m from air discharge or return grille, and not closer than 300 mm to lighting fixtures.
- .5 In areas without finished ceilings, mount detectors at underside of deck above unless otherwise indicated.

## **2.5 END-OF-LINE DEVICES**

- .1 End-of-line devices to control supervisory current in alarm circuits and signalling 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 and remotely as indicated.

## **2.6 CONDUIT**

- .1 Rigid Steel Conduit:
  - .1 Zinc-Coated.
- .2 Intermediate Metal Conduit (IMC):
  - .1 Zinc-coated steel only.
- .3 Electrical Metallic Tubing (EMT).
- .4 Surface Metal Raceway and Fittings:
  - .1 Two-piece painted steel.
  - .2 Totally enclosed snap-cover type.

## **2.7 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 Wire to remote annunciators: No. 18 AWG minimum solid copper conductor.
- .4 Colour code wiring.

## **2.8 ANCILLARY DEVICES**

- .1 Remote relay unit to initiate fan shutdown.

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**Part 3            Execution**

**3.1            MANUFACTURER'S INSTRUCTIONS**

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

**3.2            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. Locate duct type detectors in straight portions of ducts.
- .3       Connect alarm circuits to main control panel.
- .4       Install end-of-line devices at end of alarm and signalling circuits.

**3.3            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 manual stations, thermal and smoke 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 signalling 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.
- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

#### **3.4 TRAINING**

- .1 Arrange and pay for on-site lectures and demonstrations by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

#### **3.5 CLEANING**

- .1 Proceed in accordance with Section 01 00 10 – General Instructions.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**