

**Part 1      General**

**1.1          SUMMARY**

- .1 Section Includes:
  - .1 Trouble signal devices.
  - .2 Manual alarm stations.
  - .3 Automatic alarm initiating devices.
  - .4 Audible signal devices.
  - .5 End-of-line devices.
  - .6 Visual alarm signal devices.
  - .7 Ancillary devices.
  - .8 Sustainable requirements for construction and verification.

**1.2          REFERENCES**

- .1 Government of Canada
  - .1 TB OSH Chapter 3-04, [1994-12-22], 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-S524-06 AM1, Standard for the Installation of Fire Alarm Systems.
  - .2 CAN/ULC-S525-07, Audible Signal Device for Fire Alarm Systems.
  - .3 CAN/ULC-S526-07, Visual Signal Devices for Fire Alarm Systems.
  - .4 CAN/ULC-S528-05, Manual Pull Stations for Fire Alarm Systems.
  - .5 CAN/ULC-S529-09, Smoke Detectors for Fire Alarm Systems.
  - .6 CAN/ULC-S530-91(R1999), Heat Actuated Fire Detectors for Fire Alarm Systems.
  - .7 CAN/ULC-S531-2002, Standard for Smoke Alarms.
  - .8 CAN/ULC-S536-04, Inspection and Testing of Fire Alarm Systems.
  - .9 CAN/ULC-S537-04, Verification of Fire Alarm Systems.
- .4 National Fire Protection Agency
  - .1 NFPA (Fire) 72, National Fire Alarm Code. 2010 Edition.
  - .2 NFPA (Fire) 90A, Installation of Air Conditioning and Ventilating Systems. 2012 Edition.

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**1.3 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Waste Management.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal all packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Existing Centre Block fire alarm system is manufactured by Simplex. All new devices and components shall be compatible & ULC approved for use with the existing manufacturer.
- .2 Equipment and devices: ULC listed and labelled and supplied by the existing manufacturer.
- .3 Power supply: to CAN/ULC-S524.
- .4 Audible signal devices: to CAN/ULC-S525.
- .5 Visual signal devices: to CAN/ULC-S526.
- .6 Manual pull stations: to CAN/ULC-S528.
- .7 Thermal detectors: to CAN/ULC-S530.
- .8 Smoke detectors: to CAN/ULC-S529.
- .9 Smoke alarms: to CAN/ULC-S531.

**2.2 MANUAL ALARM STATIONS**

- .1 Provide non-coded single action type with mechanical reset features.
  - .1 Non-coded single pole normally open contact for single stage.
  - .2 General alarm key switch for two stage system.
- .2 Stations: surface mounted and interior or weatherproof type as indicated.
  - .1 For surface mounting provide station manufacturer's approved back box.

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- .2 Cast type back box finish to match station finish.
  - .3 Equip each station with terminal strip with contacts of proper number and type to perform functions required.
  - .4 Stations: type not subject to operation by jarring or vibration.
    - .1 Break-glass-front stations are not permitted;
  - .5 Station colour: red.
  - .6 Provide station with visible indication of operation.
  - .7 Restoration to require use of key.
    - .1 Keys: identical throughout system for stations and control panel(s).
  - .8 Mount stations with operating lever not more than [1.2] m above finished floor.
  - .9 Where weatherproof stations are required, provide stations with cast metal, weatherproof housings with hinged access doors.
    - .1 Finish housings with red enamel paint and provide permanently affixed engraved metal, bilingual signage indicating "FIRE ALARM" with white letters of 19 mm high.

### **2.3 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 surface 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 Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes to operate on fixed temperature principle only.
- .3 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.
- .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 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.

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- .6 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.
  - .7 Temperature rating of detectors: in accordance with NFPA 72.
  - .8 Locate detectors minimum 300 mm to lighting fixtures and not closer than 600 mm to air supply or return diffuser.
  - .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 AUDIBLE SIGNAL DEVICES**

- .1 Provide remote system trouble 100mm bell arranged to operate in conjunction with panel's integral trouble signal.
- .2 Locate remote trouble bell as indicated.
  - .1 Provide trouble bell with rigid plastic engraved identification sign which reads "FIRE ALARM SYSTEM TROUBLE".
  - .2 Lettering on identification sign: minimum 25 mm high.
- .3 Audible device(s):
  - .1 Bells: surface mounted, single stroke, polarized, 24 V dc, 100 mm, 90 db.
- .4 Do not exceed 80 percent of listed rating in amperes of notification appliance circuit. Provide additional circuits above those shown if required to meet this requirement.

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- .5 Provide appliances specifically listed for outdoor use in locations exposed to weather.
  - .6 Finish appliances in red enamel.
  - .7 For surface mounting provide appliance manufacturer's approved back box. Back box finish to match appliance finish.

## **2.6 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.

## **2.7 VISUAL ALARM SIGNAL DEVICES**

- .1 Surface-mounted assembly of stroboscopic type suitable for use in electrically supervised circuit and powered from notification appliance circuits.
- .2 Appliances: minimum of 75 candela measured as approved by ULC, but not less than effective intensity required by National Building Code of Canada for appliance spacing and location.
- .3 Protect lamps with thermoplastic lens and labelled "FIRE" in letters at least 12 mm high.
- .4 Provide visible appliances within 300 mm of each audible appliance.
- .5 Visible appliances may be part of audio-visual assembly, where more than two appliances are located in same room or corridor.

## **2.8 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 twisted solid copper conductor.
- .4 Insulation 105 degrees C minimum with nylon jacket, type FAS, rated for 300V.
- .5 Colour code wiring.

## **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.

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**3.2 INSTALLATION**

- .1 Install systems in accordance with CAN/ULC-S524 and TB OSH Chapter 3-04.
- .2 Locate and install manual alarm stations and connect to alarm circuit wiring.
- .3 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.
- .4 Connect alarm circuits to main control panel.
- .5 Locate and install signal and visual signal devices and connect to signalling circuits.
- .6 Connect signalling circuits to main control panel.
- .7 Install end-of-line devices at end of alarm and signalling circuits.
- .8 Locate and install remote relay units to control fan shut down.

**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 and ancillary devices.
    - .2 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of system.
    - .3 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.
- .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 Verification requirements include:
  - .1 Materials and resources.
  - .2 Storage and collection of recyclables.
  - .3 Construction waste management.
  - .4 Resource reuse.
  - .5 Recycled content.
  - .6 Local/regional materials.
  - .7 Low-emitting materials.

**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 General Instructions.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**