

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for fire alarm systems.
 - .2 Control panel to carry out fire alarm and protection functions including receiving alarm signals, initiating general two-stage alarm, supervising system continuously, actuating zone annunciators, and initiating trouble signals.
 - .3 Trouble signal devices.
 - .4 Power supply facilities.
 - .5 Manual alarm stations.
 - .6 Automatic alarm initiating devices.
 - .7 Audible signal devices.
 - .8 End-of-line devices.
 - .9 Annunciators.
 - .10 Visual alarm signal devices.
 - .11 Ancillary devices.

1.2 REFERENCES

- .1 Government of Canada
 - .1 TB OSH Chapter 3-03, 1997-01-28, 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, 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-S524-2001, Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S525-1999, Audible Signal Device for Fire Alarm Systems.
 - .3 CAN/ULC-S526-2002, Visual Signal Devices for Fire Alarm Systems.
 - .4 CAN/ULC-S527-1999, Control Units.
 - .5 CAN/ULC-S528-1991, Manual Pull Stations for Fire Alarm Systems.
 - .6 CAN/ULC-S529-2002, Smoke Detectors for Fire Alarm Systems.
 - .7 CAN/ULC-S530-M1991, Heat Actuated Fire Detectors for Fire Alarm Systems.
 - .8 CAN/ULC-S531-2002, Standard for Smoke Alarms.
 - .9 CAN/ULC-S536-S537-2004, Burglar and Fire Alarm Systems and Components.

- .4 National Fire Protection Agency
 - .1 NFPA 72-2002, National Fire Alarm Code.
 - .2 NFPA 90A-2002, Installation of Air Conditioning and Ventilating Systems.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit two (2) 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 .
 - .1 Shop drawings: stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.
 - .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 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 Storage batteries.
 - .3 Battery charger.
 - .4 Manual pull stations.

-
- .5 Heat detectors.
 - .6 Open-area smoke detectors.
 - .7 Duct smoke detectors.
 - .8 Alarm bells.
 - .9 Alarm horns.
 - .10 Visible appliances.
 - .11 Main annunciator.
 - .12 Remote annunciator panel.
 - .13 Graphic annunciator panel.
 - .14 Master fire alarm boxes.
 - .15 Auxiliary transmitter.
 - .16 Master box pedestal.
 - .17 Radio master box pedestal.
 - .18 Master box.
 - .19 Radio master box location light.
 - .20 Radio fire alarm master box.
 - .21 Radio fire alarm auxiliary transmitter.
 - .22 Radio fire alarm interface panel.
 - .23 Combination auxiliary transmitter and interface panel.
 - .24 Freeze protection thermostatic switch.
 - .25 Electro-magnetic door holder-releases.
 - .26 Valve tamper switches.
 - .27 Wiring.
 - .28 Ground rods.
 - .29 Conduit.
 - .30 Outlet boxes.
 - .31 Fittings for conduit and outlet boxes.
 - .32 Trouble bell buzzer.
 - .33 Projected beam smoke detector.
 - .34 Surge suppression devices.
 - .35 Mark data which describe more than one type of item to indicate which type will be provided.
 - .36 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 Design data: Power Calculations:
 - .1 Submit design calculations for existing system and 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 Instructions for operation:
 - .1 Projected beam smoke detector.
- .5 Schedules:
 - .1 Conductor wire marker schedule.
- .6 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 documented experience approved by manufacturer.
- .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 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Include:
 - .1 Spare glass rods for manual pull box stations if applicable.

- .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 Contract Administrator.

1.5 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 Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .2 Indoor Environmental Quality Credit EQ - 4.4 Low - Emitting Materials. Co-ordinate with Section 01 35 21 - LEED Requirements.
 - .3 Adhesives, sealants and sealant primers: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.1 Low-Emitting Materials: Adhesives and Sealants.
 - .1 Low VOC complying with SCAQMD Rule #1168, October 2003,
 - .4 Paints and coatings: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.2: Low-Emitting Materials: Paints and Coatings.
 - .1 Conform with VOC and Chemical component limits of Green Seal's Standard GS-11 January 1993 requirements.
 - .2 VOC content of anti-corrosive coatings must be less than VOC content limits of Green Seal Standard GS-03 May 1997 requirements.
 - .3 Paints and coatings not covered by GS-11 and GS-03 to meet requirements of SCAQMD Rule #1113, November 1996.

Part 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 signal devices: to CAN/ULC-S525.
- .4 Visual signal devices: to CAN/ULC-S526.
- .5 Control unit: to CAN/ULC-S527.

- .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 SYSTEM OPERATION

- .1 Provide complete, electrically supervised, code 3 temporal common coded, manual and automatic, zoned, annunciated, fire alarm system.
- .2 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.
- .3 Single stage operation. Operation to actuation following:
 - .1 Manual station.
 - .2 Heat detector.
 - .3 Smoke detector.
 - .4 Automatic fire sprinkler system.
 - .5 Fire extinguishing system.
 - .6 Fire standpipe system.
- .4 Actuation of single operation device to initiate following:
 - .1 Building evacuation alarm devices to operate continuously.
 - .2 Transmit signal to fire department via fire alarm transmitter monitoring station.
 - .3 Zone of alarm device to be indicated on control panel and remote annunciators.
 - .4 Air conditioning and ventilating fans to shut down or to function so as to provide required control of smoke movement.
 - .5 Fire doors and smoke control doors if normally held open, to close automatically.
 - .6 Electro-magnetic door holders to de-energize.
 - .7 Operations to remain in alarm mode (except alarm notification appliances if manually silenced) until system is manually restored to normal.
- .5 Capability to program smoke detector status change confirmation on any or zones in accordance with CAN/ULC-S527, Appendix C.

2.3 CONTROL PANEL

- .1 Class A.
- .2 Single stage operation.
- .3 Zoned.
- .4 Coded.

- .5 Enclosure:
 - .1 CSA Enclosure 1 , c/w lockable concealed hinged door, full viewing window, flush lock and 2 keys.
 - .2 Provide modular type panel installed in flushsurface mounted steel cabinet with hinged door and cylinder lock.
 - .3 Mount with panel centerline 1.5 m above finished floor elevation.
 - .4 Switches and other controls: not accessible without use of key.
 - .5 Design of control panel: neat, compact assembly containing parts and equipment required to provide specified operating and supervisory functions of system.
 - .6 Control panel components: CSA approved and approved by control panel manufacturer for use in control panel.
 - .7 Panel cabinet: finished on inside and outside with factory-applied enamel finish.
 - .8 Provide main annunciator located on exterior of cabinet door or visible through cabinet door.
 - .9 Provide audible trouble signal.
 - .10 Provide rigid plastic identification plates, silk-screened labels attached to rear face of panel viewing window, for lamps and switches.
 - .11 Provide one (1) set of Form C dry alarm contacts per zone, common system Form C dry alarm contact, and common system Form C dry trouble contact. Indicate set/unset condition of master box auxiliary transmitter by control panel.
 - .12 Permanently label switches.
 - .13 Provide panel with following switches:
 - .1 Trouble silencing switch which silences audible trouble signals including remote trouble devices without extinguishing trouble indicating lamp(s).
 - .1 For non-self-resetting type switch: Upon correction of trouble condition, audible signals will again sound until switch is returned to its normal position.
 - .2 For silencing switch of momentary action self-resetting type: trouble signal circuit automatically restored to normal upon correction of trouble condition.
 - .2 Evacuation alarm silencing switch which when activated will silence alarm notification appliances without resetting panel, and cause operation of system trouble signals. Subsequent alarm(s) from additional zone(s) not originally in alarm to cause activation of notification appliances even with alarm silencing switch in "silenced" position.
 - .3 Individual zone disconnect switches which when operated will disable only their respective initiating circuit and cause operation of system and zone trouble signals.
 - .4 Reset switch which when activated will restore the system to normal standby status after cause of alarm has been corrected, and activated initiating devices reset.
 - .1 Operation of reset switch to restore activated smoke detectors to normal standby status.
 - .5 Lamp test switch.

- .6 Drill switch which will enable test of notification appliances and restoration to normal without tripping master box.
 - .7 Master box disconnect switch which when activated will disconnect coded device and cause operation of system trouble signal.
 - .8 HVAC shutdown bypass switch. Operation of the switch to allow HVAC system to operate with detectors in alarm and cause operation of system trouble signals.
- .6 Supervised, modular design with plug-in modules:
- .1 Alarm receiver with trouble and alarm indications provision for remote supervised annunciation, for class A initiating circuit.
 - .2 Spare zones: compatible with smoke detectors and open circuit devices.
 - .3 Space for future modules.
 - .4 Latching type supervisory receiver circuits. Discrete indication for both off-normal and trouble.
- .7 Components:
- .1 Coded alarm receiver panel with trouble and alarm indications for class A initiating circuit.
 - .2 Single stage alarm pulse rate panels:
 - .1 Single stroke control type for output to signal control panel continuously.
 - .3 Audible signal control panel with control circuits complete with terminals for wiring and plug-in modules for dc signals up to 2.0 A load with trouble indication with class A B connections.
 - .4 Common control and power units:
 - .1 Control panel containing following indications and controls:
 - .1 "Power on" LED (green) to monitor primary source of power to system.
 - .2 "Power trouble" indication.
 - .3 "Ground trouble" indication.
 - .4 "Remote annunciator trouble" indication.
 - .5 "System trouble" indication.
 - .6 "System trouble" buzzer and silence switch c/w trouble resound feature.
 - .7 System reset switch.
 - .8 "LED test" switch if applicable.
 - .9 "Alarm silence" switch to silence signals manually. If new alarm occurs after signals have been silenced, signals to resound.
 - .10 "Signals silenced" indication.
 - .2 Master power supply panel to provide 24 V dc to system from 120 V ac, 60 Hz input.
 - .3 Fire department connections:
 - .1 Plug-in module for tripper shunt type municipal box.
 - .2 Fire department bypass switch c/w indicator for trouble at panel.

- .5 Auxiliary relays: plug-in type, dust cover, supervised against unauthorized removal by common trouble circuit and c/w individual bypass switch .
 - .1 Contacts: 2.0 A, 120 V ac, for functions such as release of door holders or initiation of fan shut down.
 - .2 Contact terminal size: capable of accepting 22-12 AWG wire.

2.4 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.

2.5 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: semi-flush mounted and interior type as indicated.
 - .1 For surface mounting provide station manufacturer's approved back box.
 - .2 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; pull-lever break-rod type is acceptable provided presence of rod is not required to reset station.
- .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 raised-letter plastic metal bilingual English French signage indicating "FIRE ALARM" with white letters of 19 mm high.

2.6 AUTOMATIC ALARM INITIATING DEVICES

- .1 Heat detectors: provide heat detectors designed for detection of fire by combination fixed temperature rate-of-rise rate compensating line-type fixed temperature 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 Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes to operate on fixed temperature principle only.
 - .3 Rate Compensating Detector (Spot Type): designed for flush outlet box mounting and supported independently of conduit, tubing or wiring connections.
 - .1 Detectors: hermetically sealed and automatically resetting type which will operate when ambient air temperature reaches detector setting regardless of rate of temperature rise.
 - .2 Detector operation: not be subject to thermal time lag.
 - .4 Line-Type Fixed Temperature Detectors: provide thermostatic or thermistor line-type heat detection cable with weather-resistant outer covering where indicated.
 - .1 Cable: nominally rated for temperature of 6888 138 degrees C and operate on fixed temperature principle.
 - .5 Open-Area Smoke Detectors: provide detectors designed for detection of abnormal smoke densities by photoelectric principle.
 - .1 Detectors: 2-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 above suspended ceilings, beneath raised floors, 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).
 - .6 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.

- .7 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.
- .8 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.
- .9 Photoelectric Detectors: operate on light scattering principle using LED light source.
 - .1 Detector: respond to both flaming and smouldering fires.
- .10 Locate detectors in accordance with their listing by ULC and the requirements of NFPA 72, except provide at least two (2) detectors in rooms of 54 square meters or larger in area.
- .11 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.
- .12 Temperature rating of detectors: in accordance with NFPA 72.
- .13 Locate detectors minimum 300 mm to lighting fixtures and not closer than 600 mm to air supply or return diffuser.
- .14 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.
- .15 Provide detectors with terminal screw type connections.
- .16 Removal of detector head from its base to cause activation of system trouble signals if detectors are provided with separable heads and bases.

2.7 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 two (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 0.9 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.
- .6 Mount detectors installed beneath raised floors with base within 50 mm of underside of raised floor, with detector facing downward.
 - .1 Where space under raised floor is less than 300 mm in height, mount detectors with their bases either horizontal or vertical, with detection chamber(s) located in upper half of underfloor space.
 - .2 Do not mount detectors facing upward.
 - .3 Space detectors beneath raised floors maximum 4.5 m by 4.5 m, 6 m by 6 m per detector.

2.8 DUCT SMOKE DETECTORS

- .1 Provide detectors installed in ducts of ionization photoelectric type and listed by ULC duct installation.
- .2 Provide integral control and power modules required for operation with main control panel.
- .3 Ensure detectors and associated modules are compatible with main control panel and suitable for use in supervised circuit.
- .4 Detector circuits: 4-wire type where detector operating power is transmitted over conductors separate from initiating circuit. Malfunction of electrical circuits to detector or its control or power modules to cause operation of system trouble signals.
- .5 Provide a separate, fused power circuit for each smoke detection initiating circuit.
- .6 Failure of power circuit: indicated as a trouble condition on corresponding initiating circuit.
- .7 Provide duct detectors in accordance with NFPA 90A.
- .8 Provide duct detectors with approved duct housing, mounted exterior to duct, with perforated sampling tubes extending across width of duct.
- .9 Activation of duct detectors to cause shutdown of associated air handling unit annunciation at control panel and tripping of master box transmitter and sounding of building evacuation alarms.
- .10 Provide detectors with visible indicator lamp that flashes when detector is in normal standby mode and glows continuously when detector is activated.
- .11 Provide remote indicator lamp for each detector.
- .12 Permanently label remote indicator with description number of associated air handling unit(s).

- .13 Provide each detector with remote test switch. Mount switch not more than 1.8 m above finished floor.
- .14 Permanently label test switch with description number of associated air handling unit(s).

2.9 AUDIBLE SIGNAL DEVICES

- .1 Provide remote system trouble 100 mm bell buzzer arranged to operate in conjunction with panel's integral trouble signal.
- .2 Locate remote trouble bell as indicated.
 - .1 Provide 100 mm trouble bell at control panel arranged to operate in conjunction with panel's integral trouble signal.
 - .2 Provide trouble bell with rigid plastic white on red engraved identification sign which reads "FIRE ALARM SYSTEM TROUBLE".
 - .3 Lettering on identification sign: minimum 25 mm high.
- .3 Audible device(s):
 - .1 Bells: surface mounted, single stroke, polarized, 24 V dc, 100 150 250 mm, db.
 - .2 Signal chimes: heavy duty, single stroke, 24 V dc, with solid striking plunger and resonating chamber, db.
 - .3 Bells: vibrating motorized type, gongs of special alloy steel, 24 V dc, 100 150 250 mm, db.
 - .4 Horns: db, weatherproof mounting, 24 V dc.
 - .5 Mini-horns: db, surface flush mounting, red colour, 24 V dc.
- .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.
- .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.

2.10 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 .

2.11 REMOTE ANNUNCIATOR PANELS

- .1 Provide panels where indicated mounted 1.5 m above finished floor elevation.
- .2 Panels: duplicate requirements for control panel annunciator, with exception of individual trouble lamps are not required.
- .3 LED type with designation cards to indicate zone.
- .4 LEDs to annunciate alarm and trouble.
- .5 Wired in multiple with main control panel and with other remote annunciator panels.
- .6 Supervised, including trouble signal for open circuit.
- .7 LED test button.

2.12 GRAPHIC ANNUNCIATOR PANEL

- .1 Provide panel located as shown.
- .2 Mount with panel centerline 1.5 m above finished floor elevation.
- .3 Panel: interior weatherproof type, flush surface pedestal-mounted.
- .4 Panel: provided with building room floor plan, drawn to scale, with alarm lamps mounted to represent location of each concealed detector each initiating device.
- .5 Panel graphic: show locations of annunciator panel and control panel, and have "you are here" arrow showing its location. Orient building floor plan on graphic to location of person viewing graphic, i.e. direction viewer is facing is toward top of graphic display. Provide North arrow.
- .6 Label principal rooms and areas shown with room numbers titles.
- .7 Provide detectors mounted above ceilings on ceilings, beneath raised floors and different types of initiating devices with different symbols lamps of different colours for identification. Lamps to illuminate upon activation of corresponding device and remain illuminated until system is reset.
 - .1 Provide panel with lamp test switch.

2.13 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 30 candela measured as approved by ULC, but not less than effective intensity required by National Building Code of Canada for appliance spacing and location shown.
- .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.

2.14 ELECTRO-MAGNETIC DOOR HOLDER-RELEASES

- .1 Provide as indicated shown.
- .2 Mount armature portion on door. Armature complete with adjusting screw for setting angle of contact plate.
- .3 Mount electro-magnetic release on wall or in wall recess behind door.
- .4 Activation of fire alarm system smoke detector smoke detector designated for door release service to release doors on circuit to close.
- .5 Total projection of door holder-release not to exceed 100 mm.
- .6 Door holders: not require battery backup power.

2.15 VALVE TAMPER SWITCHES

- .1 Provide switches to monitor open position of valves controlling water supply to sprinkler systems.
- .2 Switch contacts to transfer from normal position to off-normal position during first two revolutions of hand wheel or when stem of valve has moved not more than one-fifth of distance from its normal position.
- .3 Provide switch with tamper resistant cover.
- .4 Removal of the cover to cause switch to operate into off-normal position.

2.16 OFF-PREMISES FIRE ALARM

- .1 Provide auxiliary connection to base fire alarm system in accordance with NFPA 72, except as specified.

2.17 CONDUIT

- .1 Electrical Metallic Tubing (EMT):
- .2 Surface Metal Raceway and Fittings:
 - .1 Two-piece painted steel.
 - .2 Totally enclosed snap-cover type.

2.18 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 Wire for connection to base telegraphic alarm loop: No. 12 AWG minimum solid copper conductor.
- .5 Insulation 75 degrees C minimum with nylon jacket.
- .6 For underground or wet allocations cable from control panel to master box auxiliary transmitter and to telegraphic loop: type UF.
- .7 Colour code wiring.

2.19 SURGE SUPPRESSION

- .1 Provide line voltage surge suppression devices to suppress voltage transients which might damage control panel and transmitter components.
- .2 Mount suppressors in separate enclosure(s) adjacent to control panel and transmitter unless suppressors are specifically UL approved for mounting inside control panel and transmitter provided and approved for such use by control panel and transmitter manufacturers.

2.20 LINE VOLTAGE SURGE SUPPRESSOR

- .1 Suppressor: ULC approved with maximum 330 volt clamping level and maximum response time of 5 nanoseconds.
- .2 Suppressor: multi-stage construction which includes inductors and silicon avalanche zener diodes.
- .3 Equip suppressor with long-life indicating lamp light emitting diode neon lamp which extinguishes upon failure of protection components.
- .4 Fuses: externally accessible.
- .5 Wire in series with incoming power source to protected equipment using screw terminations
LOW VOLTAGE SURGE SUPPRESSOR

- .6 Provide surge suppression for circuits which leave building shell.
- .7 When circuits interconnect 2 or more buildings, provide arrestor at circuit entrance to each building.
- .8 Suppressor: UL 497B listed with maximum 30 volt clamping level and maximum response time of 5 nanoseconds.
- .9 Suppressor: multi-stage construction and both differential and common mode protection.

2.21 AS-BUILT RISER DIAGRAM

- .1 Fire alarm system riser diagram: in glazed frame on black lamacoid sheet with bevelled edges, white lettering and designations, minimum size 600 x 600 mm.

2.22 ANCILLARY DEVICES

- .1 Remote relay unit to initiate fan shutdown.

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 Install main control panel and connect to ac power supply, ac dc standby power.
- .3 Locate and install manual alarm stations and connect to alarm circuit wiring.
- .4 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.
- .5 Connect alarm circuits to main control panel.
- .6 Locate and install bells, horns and visual signal devices and connect to signalling circuits.
- .7 Connect signalling circuits to main control panel.
- .8 Install end-of-line devices at end of alarm and signalling circuits .
- .9 Install remote annunciator panels and connect to annunciator circuit wiring.
- .10 Locate and install door releasing devices.

- .11 Locate and install remote relay units to control fan shut down.
- .12 Sprinkler system: wire alarm and supervisory switches and connect to control panel.
- .13 Connect fire suppression systems to control panel.

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 sprinkler system transmit alarm to control panel and actuate general alarm and ancillary devices.
 - .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 74 11 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION