

**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.
  - .4 List of recommended spare parts for system.

**1.5 Maintenance Material Submittals**

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

**1.6 Delivery, Storage And Handling**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .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 off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect materials from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**1.7 Verification**

- .1 Fire Alarm Verification to be performed by and independent fire alarm specialist trained from the manufacturer. The complete system shall be tested and verified in accordance with Standard CAN/ULC-S537, Standard for the Verification of Fire Alarm System Installation. Upon completion, a Certificate of Verification and a copy of the Verification Report shall be submitted to the Departmental Representative.

**1.8 Scope Of Work**

- .1 The existing Cerberus Pyrotronics system must be modified (add all hardware and software components required), re-programmed and utilized to operate the fire alarm system components in the areas of the building affected by this project.

**Part 2 Products**

**2.1 System Operation: (Existing)**

- .1 Actuation of any alarm initiating device to:

- .1 Cause electronic latch to lock-in alarm state at central control unit and data gathering panel/transponder.
- .2 Indicate zone of alarm at central control unit and at remote annunciator display.
- .3 For low rise buildings:
  - .1 Cause audible devices throughout building to sound at 20 strokes per minute.
  - .2 Cause audible devices in zone of alarm to sound continuously while other audible devices throughout building sound at 20 strokes per minute.
- .4 Cause audible signalling devices to sound in alarm tone throughout building.
- .2 Acknowledging alarm: indicated at central control unit.
- .3 Ensure that it is possible to silence signals by "alarm silence" switch at central control unit, after 60 seconds period of operation.
- .4 Subsequent alarm, received after previous alarm has been silenced, to re-activate signals.
- .5 Actuation of any supervisory device to:
  - .1 Cause electronic latch to lock-in supervisory state at central control unit and data gathering panel/transponder.
  - .2 Indicate respective supervisory zone at central control unit and remote annunciator display.
  - .3 Cause audible signal at central control unit to sound.
  - .4 Activate common supervisory sequence.
- .6 Trouble on system to:
  - .1 Indicate circuit in trouble at central control unit.
  - .2 Activate "system trouble" indication, buzzer and common trouble sequence. Acknowledging trouble condition to silence audible indication; visual indication to remain until trouble is cleared and system is back to normal.
- .7 Troubles on system: suppressed during course of alarm.
- .8 Trouble condition on any circuit in system not to initiate alarm conditions.

## **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: 16 AWG minimum, and in accordance with manufacturer's requirements.
- .4 To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.

## **2.3 Manual Alarm Stations**

- .1 Manual alarm stations: pull lever, glass rod, wall mounted semi-flush type, non-coded single pole normally open contact for single stage bilingual signage.
- .2 Addressable manual pull station.
  - .1 Pull lever, break glass rod, semi-flush wall mounted type, single action, single stage, electronics to communicate station's status to addressable module/transponder over 2 wires and to supply power to station. Station address to be set on station in field.

## **2.4 Automatic Alarm Initiating Devices**

- .1 Heat detectors, fixed temperature, rated 57 degrees C.
- .2 Thermal fire detectors, combination fixed temperature and rate of rise, non-restorable fixed temperature element, self-restoring rate of rise, fixed temperature 57 degrees C, rate of rise 8.3 degrees C per minute.
- .3 Addressable thermal fire detectors, combination fixed temperature and rate of rise, non-restorable fixed temperature element, self-restoring rate of rise, fixed temperature 57 degrees C, rate of rise 8.3 degrees C per minute.
  - .1 Electronics to communicate detector's status to addressable module/transponder.
  - .2 Detector address to be set on detector base in field.
- .4 Smoke detector: ionization/photo-electric type and air duct type with sampling tubes with protective housing.
  - .1 Twistlock Plug-in type with fixed base.
  - .2 Wire-in base assembly with integral red alarm LED.
- .5 Addressable smoke detector.
  - .1 Ionization/Photo-electric type.
  - .2 Electronics to communicate detector's status to addressable module/transponder.
  - .3 Detector address to be set on detector base in field.
- .6 Addressable variable-sensitivity smoke detectors.
  - .1 Ionization/Photo-electric type.
  - .2 Electronics to communicate detector's status to addressable module/transponder.
  - .3 Detector address to be set on detector base 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.

## **2.5 Audible Signal Devices**

- .1 Bells: surface mounted, single stroke, polarized, 24 V dc, 250 mm, 79 db.

**2.6 Visual Alarm Signal Devices**

- .1 Strobe type: flashing, red, 24 V dc.
- .2 Designed for surface mounting on walls.

**2.7 End-Of-Line Devices**

- .1 End-of-line devices to control supervisory current in signalling circuits, sized to ensure correct supervisory current for each circuit. Open 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.

**2.8 As-Built Riser Diagram**

- .1 Fire alarm system riser diagram: in glazed frame minimum size 600 x 600 mm.

**2.9 Ancillary Devices**

- .1 Remote relay unit to initiate fan shutdown.

**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 Install manual alarm stations and connect to alarm circuit wiring.
- .3 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.
- .4 Connect alarm circuits to main control panel.
- .5 Install bells 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 Install remote annunciator panels and connect to annunciator circuit wiring.
- .9 Install door releasing devices.

- .10 Install remote relay units to control fan shut down.
- .11 Sprinkler system: wire alarm and supervisory switches and connect to control panel.
- .12 Room detection system.
  - .1 Install detectors. Make necessary connections between room detection panel and main fire alarm panel.
  - .2 Locate and install audible signals and visual alarms.
  - .3 Locate and install detectors under raised floor. Fasten to steel brackets approximately 300 mm above sub-floor level to clear cables and conduits.
- .13 Connect fire suppression systems to control panel.
- .14 Splices are not permitted.
- .15 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and CCU, as required by equipment manufacturer.
- .16 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .17 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 Fire alarm system:
  - .1 Test such device and alarm circuit to ensure manual stations, thermal, smoke detectors transmit alarm to control panel and actuate general 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 systems.
  - .4 Addressable circuits system style DCLA:
    - .1 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals on each side of single open-circuit fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.
    - .2 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals during ground-fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.
  - .5 Addressable circuits system style DCLB:
    - .1 Test each conductor on all DCLB addressable links for capability of providing 3 or more subsequent alarm signals on line side of single open-circuit fault condition imposed near electrically most remote device on each link. Operate Acknowledge/Silence switch after

reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.

- .2 Test each conductor on all DCLB addressable links for capability of providing 3 or more subsequent alarm signals during ground-fault condition imposed near electrically most remote device on each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.
- .3 Provide final PROM program re-burn for system Departmental Representative incorporating program changes made during construction.

### **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 Closeout Activities**

- .1 Provide on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

**END OF SECTION**