

## **SECTION 18**

### **FIRE ALARM AND DETECTION SYSTEM**

#### **PART 1 - GENERAL**

##### **1.01 DESCRIPTION**

- A. Scope: The work covered by this specification comprises all materials, installation, labour, services, and all equipment and materials necessary to install, operate, test, and commission, including, but not limited to, the under-mentioned items:
1. Fire alarm control panel.
  2. Fire detectors.
  3. Fire alarm manual station.
  4. Audio/visual fire alarm device.
  5. Sitting of control equipment, audio/visual alarm, detectors and fire alarm manual stations.
  6. Cabling and wiring.
  7. Inspection, testing and commissioning.

##### **1.02 QUALITY ASSURANCE**

- A. The Contractor is responsible for the quality of all its purchased items and as such, must develop and submit a Supplier Quality inspection plan for review by the Engineer. The inspection plan is to cover those items intended for shop inspection and the procedures for carrying out same.
- B. Manufacturer: Fire alarm and detection system shall be the standard products of a manufacturer regularly engaged in manufacture of fire alarm and detection system of type and sizes required and complying with the requirements of the listed standards and whose products have been in satisfactory use in similar service for not less than 5 years and shall be installed by a specialist.
- C. Codes and Standards: Comply with the requirements of the following codes and standards, except as herein modified:

1. BSI - British Standard Institution:
  - BS 5445 Components of automatic fire detectors system.
  - BS 5446 Components of automatic fire alarm systems for residential purposes. Part 1 Point-type smoke detectors.
  - BS 5839 Fire Detection and Alarm Systems for Buildings.
  - BS 7671 Requirements for Electrical Installations.
2. NFPA Standards

### 1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's data on fire alarm and detection systems including, but not limited to, specifications, installation instructions, operation of each component and of the system. Also include standard of typical riser and wiring diagrams.
- B. Shop Drawings: Submit shop drawings showing equipment construction, device locations, connecting wiring of the entire fire alarm and detection system, raceway layout, including wiring and riser diagrams.
- C. As-Built Drawings:
  1. On completion of the installation, adequate instructions on its use shall be supplied to the person responsible for the use of the premises. The Contractor shall draw the attention of the user to the condition of false alarm and servicing.
  2. The Contractor shall supply the user with a logbook.
  3. As-built drawings shall be provided to the user showing the position of the various items of equipment, junction boxes, etc, and the sizes and routes of all cables and wires. Wiring diagrams of junction boxes and distribution cases and circuit diagrams of the fire alarm system shall be included.

### 1.04 TESTING AND COMMISSIONING

- A. Field Tests:
  1. Insulation of Cable and Wires: Insulation testing of installed cables and wires shall be made at 500 Vd.c. and the insulation resistance to earth and between conductors of the installed cables and wires shall be in

accordance with the requirements of EDD/R-1.

2. Earthing: Earth continuity and earth-loop impedance shall be tested to ensure compliance with the requirements of EDD/R-1.
3. Commissioning Test: The entire system shall be tested to ensure that it operates satisfactorily and that:
  - a. The alarm devices comply with the specifications.
  - b. All trigger devices and alarm points function correctly.
  - c. All ancillary equipment functions correctly.
  - d. Any connections to a fire brigade center operates correctly.

## PART 2 - PRODUCTS

### 2.01 ADDRESSABLE FIRE ALARM CONTROL PANEL

- A. Fire Alarm Panel: The addressable fire alarm control panel shall have in addition to the standard features the following ones:
  - 1. Microprocessor controlled.
  - 2. Self-contained and wall mountable.
  - 3. Integral switch mode power supply and battery chargers.
  - 4. 48-hour Ni-Cd battery back-up.
  - 5. Alarm circuits.
  - 6. Twin auxiliary relays configurable for Fire, Fault and/or Warning operation.
  - 7. RS485 Computer communication.
- B. Indications:
  - 1. Liquid crystal displays event in Address/form and type of event.
  - 2. Zone indicators indicate any fire off fault conditions and which zone.
  - 3. Buzzers for fire/fault audible indication.
- C. User Controls:
  - 1. Essential controls for Fire and Evacuate = Start sounders, stop sounders, Reset.
  - 2. Silence fault buzzer facility.
  - 3. Test for liquid crystal display and zone indicators.

### 2.02 FIRE ALARM MANUAL STATION

- A. The unit shall be of the surface mounted pattern, colored red.
- B. The unit shall be capable of flush mounting using a stainless steel surround and adaptor plate.
- C. The enclosure shall be suitable for conduit entry from above, below or rear.

- D. Terminals shall be provided for normally open or normally closed operation, shall be capable of accepting cable up to a size of 4 sq mm cross sectional area and rated to carry continuously a current of 10 amps at 230 Volts AC or 8 amps at 12/24 Volts DC.
- E. The unit shall be inscribed in the Arabic language.

## 2.03 SMOKE DETECTORS

- A. Smoke detectors shall generally be of the surface mounting type suitable for mounting on a pre-wired base, itself mounted on a 51 mm diameter BS conduit box.
- B. The enclosure shall be formed of white engineering grade plastic and contacts shall be gold plated brass and/or beryllium.
- C. The detectors shall be rated for operation on a DC supply in the range of 16-32 volts with a quiescent supervisory current of 70-150 uA and shall be capable of carrying a continuous alarm current of 80 mA minimum.
- D. Local LED indication of operation shall be provided and the facility for connection of a similar remote indication shall be included.
- E. Smoke detectors shall be suitable for incorporation in ducted air sampling systems and where such an application is specified the sampling equipment shall form a standard accessory.
- F. Smoke detectors shall conform to BS 5445 Part 7 and shall be of the optical type as approved by the Engineer.
- G. Optical type:
  - 1. Shall encompass a pulsed light beam and photo sensor so set and housed as to be insensitive to general ambient light level variations.
  - 2. The unit shall be designed to operate on the basis of light scatter due to presence of smoke.
- H. For addressable system the detector shall be mounted on an addressable base.

## 2.05 AUDIBLE ALARMS

- A. Audible alarm units shall be sirens or electronic sounders as indicated on the drawings.
- B. Audible alarm sounders shall be colored red and shall be inscribed in the Arabic/English language.

- C. The units shall be designed to operate at 230 Volts AC to be compatible with the automatic detection system.
- D. Audible alarm sounders shall be designed for surface mounting over a concealed or surface mounted standard 51 mm BS conduit box, providing back entry connection.
- E. All units shall incorporate radio and television interference suppression or be of a design free of generating such interference.
- F. Electronically operated sounders shall have the availability of selection of a continuous or warbling note.
- G. The minimum sound output shall be not less than 96 dB (A) at 1m.
- H. A volume control shall be provided.

## PART 3 - EXECUTION

### 3.01 WIRING

- A. The fire alarm system shall be installed using fire retardant cables. Conductor cross sectional area shall be 1.5 sq mm minimum.
- B. The installation shall be surface or concealed type in accordance with the general installation standard as specified. Conduit systems used for fire alarm wiring shall not be utilized for any other service.
- C. Each monitored fire alarm circuit shall be wired in true parallel configuration. Spur connections shall not be made.
- D. Fire alarm accessories shall generally be surface mounted over a standard conduit box, even though the general installation is of recessed pattern.
- E. The supply to the fire alarm panel shall be derived from a switch to that service and capable of being locked in the "ON" position. The switch or circuit breaker shall be colored RED and shall be distinctly labelled "FIRE ALARM - DO NOT SWITCH OFF" in the language specified.
- F. Joint in a cable shall be enclosed in a suitable and accessible junction box labeled "FIRE ALARM".
- G. Cables fixed to surfaces shall be neatly run and securely fixed at suitable intervals.
- H. Fire alarm system should be so installed and constructed so that it does not cause any kind of radio interference.

### 3.02 INSTALLATION OF THE COMPONENTS

- A. Fire alarm components shall be installed directly to conduit outlet boxes at the following mounting heights above finished floor level, measured to the center of box unless stated otherwise.
  - 1. Fix manual call station semi-recessed at 1400 mm height.
  - 2. Automatic smoke and heat sensors: Ceiling mounted.
  - 3. Alarm sounder: 2400 mm above finished floor.
  - 4. Outdoor alarm: Fix where indicated and approved by the Engineer.
  - 5. External response indicators: Fix beside or above doors as directed by the Engineer.

- B. Indicator/alarm panels shall be sited adjacent to the main entrance of the building such as to be fully visible from outside the building.
- C. Manual station, heat detectors and smoke detectors shall be sited in accordance with the minimum distances specified in BS 5839 as a minimum standard of installation but shall be increased in number as necessary to provide a full and effective system.
- D. Audible alarm units shall provide the minimum levels of audibility specified.

**\*\* END OF SECTION \*\***