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TECHNICAL SPECIFICATIONS FOR FIRE DETECTION & ALARM SYSTEM

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1.0 INTRODUCTION

The intent of this document is to establish the minimum requirement of design, engineering, selection, manufacture, assembly, erection, testing, commissioning and final handling over as mentioned hereinafter for the fire detection and alarm system.

2.0 CODES & STANDARDS

The design & installation of the above systems complies with the latest edition of following Indian codes:

Codes	Description
TAC	Rules for Fire alarm systems
IS: 2189	Code of practice for selection, installation and maintenance of automatic fire detection and alarm system

3.0 SCOPE OF WORK

3.1 Supply of Fire Detection and Alarm System

FDA system shall cover the entire ground floor of Metallurgy Building including the Bay area and also the corrosion test facility, metallography room and thermography room which are situated on the first floor with Addressable, microprocessor based fire detection & alarm panel, loop isolator module, automatic addressable type fire detectors along with Manual Call Points (MCP) located strategically.

a) Main Fire Alarm Panel (MFAP) shall be microprocessor based wall mounted panel (located in control room).

i. The microprocessor based main Fire alarm panel shall be designed to achieve the following:-

- To receive and supervise the signals from initiating device circuits of smoke/multi sensor detectors, manual call points.
- To process the signals and display the alarm / trouble conditions and also initiate action for remote audio annunciation, logging of event, printing hard copy of all events as per the software program.

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- To provide interface for initiating auxiliary functions such as tripping of air conditioning /ventilation scheme, elevator, tripping of breakers etc.
- System shall have capability to program, configure and expand facilities in the field without field replacement electronic integrated circuits.
- System shall store all field-defined programs in non-volatile memory.
- System shall provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification may include addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software must not place any limit on the type or extent of software modifications on-site. Modification of software must not require power-down of the system or loss of system for fire detection and protection while modifications are being made.
- The system shall be designed such that alarm indications override trouble conditions.
- The system shall have a provision of Auto Tele Dialer (ATD) to call the concerned persons/Fire office in the event of Fire. The Dialing facility shall be available to at least 4 persons at a time.
- System should feature a multicolor touch screen display for convenient operation.
- System should have back up batteries (2 Nos, 12V, 7AH) for uninterrupted operation during power failures.
- Battery low indication at 85% of the nominal voltage shall be provided on the panel enclosure

ii. Alarm Condition

- The system operation shall be such that the alarm operation of any alarm initiating circuits shall not prevent the subsequent alarm operation of any other initiating circuit.
- The system alarm operation subsequent to the alarm activation of any initiation device shall automatically perform the functions contained in this section.
- Alarm conditions shall be immediately displayed on the control panel. Alarm LED shall flash on the control panel until the alarm has been acknowledged. Once

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acknowledged the LED shall remain lit. A subsequent alarm received from another zone after acknowledgement shall illuminate the alarm LED and the panel display shall show the new alarm information.

- During an alarm condition, an alarm tone shall sound within the control panel until the alarm is acknowledged.
- When the alarm signals are silenced by pressing the Acknowledge pushbutton on the control module, the visual lamps shall continue to light until the alarm is reset at the control panel.
- All information associated with the alarm conditions, including the type of alarm point and its locations within the protected premises, is indicated on the Main Fire Alarm Control Panel Liquid Crystal Display (LCD).
- Operate audible notification appliances in all areas.
- Any subsequent alarm shall reactivate the audible signals.
- All alarm signals shall be automatically “locked in” at the control panel until the operated device is returned to its normal condition and the control panel is manually reset.
- All auxiliary functions shall be connected to and operated by the control panel.
- Upon the initiation of an alarm condition the system shall shut down the process.
- Supervise all circuits to addressable devices, annunciators and conventional peripherals and annunciate loss of communications with these devices. Upon loss of response from a device, it shall sound an audible trouble and indicate device or devices not responding.

iii. Trouble Condition

- Failure of normal power on the initiation circuits, or on the annunciation circuits, disarrangements in system wiring, or system ground faults shall activate a trouble circuit.
- An Amber “SYSTEM TROUBLE” LED shall flash and the system audible signal shall intermittently sound when any trouble is detected in the system.
- A trouble signal shall be acknowledged by actuating an ‘ACKNOWLEDGE’ push button switch. This shall silence the panel trouble buzzer.

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- During an alarm condition, all “trouble” signals shall be inhibited.
- Unacknowledged alarm messages shall have priority over trouble messages, and if such an alarm occurs during a trouble sequence, the alarm condition will have display priority.

iv. System Supervision

- All wiring extending from the fire alarm system control panel to system components shall be supervised for open circuits, short circuits and/ or ground. Systems containing unsupervised wiring of any type shall not be acceptable.
- The occurrence of any fault shall activate the system trouble circuitry, but shall not interfere with the proper operation of any circuit that does not have a fault condition.
- Power supply shall be supervised so that any power failure shall be audibly and visually indicated at the control panel.
- DC Voltage shall be supervised so that a low voltage condition or disconnection of the battery shall be audibly and visually indicated at the control panel.
- The activation of any standpipe spray system shall activate a steady audible trouble signal and illuminate the supervisory LED at the control panel.

v. System Reset

- Means to reset the system to return the control unit to its normal state after an alarm condition shall be provided.

The fire alarm panel shall have a central power supply unit with a built-in battery backup for 24 hours operation with all functions.

All major devices installed in the panel and loop shall have 10% spare capacity. All wiring inside the panel shall be in accordance with the applicable codes & standards.

b) Multi sensor detectors shall incorporate a heat detection element and a photoelectric detection element. Both the element shall be incorporated in a single unit. Both the elements shall be operative at all times and the fire signal shall be available from any or both elements combined together.

c) Electronic horn shall be provided as an alarm annunciation device. They shall be placed in accordance with the applicable codes and standards, and shall provide sufficient coverage to notify all personnel in the affected area of an alarm condition.

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The horn portion shall be solid-state construction and shall produce a minimum broadband output of 105 dBA at 1 meter in an un echoic chamber with continuous applied power. Higher output horns shall be utilized if the background noise level is sufficient to warrant a higher output requirement

d) Manual call points and hooters shall be provided as per IS 2189.

Addressable manual call point with key (for preventing unauthorized access) and hooters shall be provided at strategic locations. Further, maximum travel distance between any two manual call points shall not exceed 30 meters in any direction. The number of call points and hooters should be 6.

e) Power/Control Cable

All the devices / detectors in the system shall be looped to main fire alarm panel as per IS 2189 with armored, stranded cooper cable.

f) Required no. of modules shall be provided for interfacing main fire alarm panel.

Control / Monitor modules shall be provided to:-

- Receive signals from each circuit of cable connected to the control module.
- Report the cable control module conditions to the Main FAP
- Supervision and monitoring of the associated initiating device circuits and notification appliance circuits for trouble and alarm conditions.
- Detection of the operation of any associated initiating device circuit.
- Operation of all notification appliances and release devices.
- Visually & audibly annunciate trouble, supervisory or alarm condition on panel display.

g) Required erection hardware, special tools and termination kits for complete erection & commissioning of the Fire Detection & Alarm package shall be in bidder scope.

h) Detectors shall be provided as per the below table:-

Sl. No.	Area	Number of Detectors
Ground Floor		
1.	Creep Lab	20

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2.	FESEM Room	4
3.	Alloy Development Bay	16
4.	Office room	2
5.	FMF Lab	6
First Floor		
6.	Corrosion test room	6
7	Corrosion test room lobby	2
8	Metallography	3
9	Thermography	3

Note: - All the items mentioned above shall be UL/FM/Vds/LPCB approved.

3.2 Erection & Commissioning of Fire Detection and Alarm System

Complete fire detection & alarm system shall be erected, commissioned and tested before handing over the system to Metallurgy Department

3.3 AMC for Fire Detection and Alarm System

AMC charges for 2 years on per annum basis to be quoted separately

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