

**REQUEST FOR PROPOSAL & SPECIFICATION DOCUMENT
MEMS & NANOFABRICATION SEMICONDUCTOR CLEANROOM
FACILITY**



ANNEXURE 5

**Fire Detection System and Control Panel
Specifications**

Annexure-5 Fire Detection System and Control Panel Specifications

1 DETAILED SCOPE OF WORK

- 1.1 Supply, Installation, testing and commissioning of fire alarm control panel (FDA) with analogue addressable multi-sensor fire detectors, analogue addressable laser smoke detectors, flame detectors, manual pull stations, SMF batteries, Modbus, hooter, interfacing devices and mounting accessories.
- 1.2 The bidder shall select the FDA panel such that all the devices can be connected in a single loop. The system shall be designed such that loop shall be limited to only 80% of its total capacity and the selection of the FDA panel shall be in accordance with it. Necessary additional power supplies required for sounders/control modules/relay modules apart from FDA panel shall be provided by the bidder.
- 1.3 The supply & installation of the entire FDA system shall conform to IS 2189 / BS 5839 / NFPA 71 & 72. All equipment and systems shall be tested and approved by UL /FM/relevant IS/EN Standard.
- 1.4 All equipment/components shall be new & the manufacturer's current/ latest model. The bidder shall arrange authorized system integrator of the manufacturer of the FDA control panel for the satisfactory installation of the complete system. **The bidder shall clearly indicate the manufacture name and model considered in the quote.**
- 1.5 All equipment and components shall be installed in strict compliance with the manufacturer's recommendations. The installation shall comply to the manufacturer's installation manuals for all wiring diagrams, schematics, mounting, positioning of detector etc.
- 1.6 Devices shall be attached to walls or ceiling and shall be held firmly in place. Fasteners and supports shall be adequate to support the required load. At detector and sounder locations, cables should be terminated in approved ~~galvanized~~ junction boxes wherever required. All other devices forming part of the system should utilize dedicated /custom back boxes.
- 1.7 FDA panel, power supplies, and Modbus shall be enclosed in an outdoor enclosure and suitable ventilation provision shall be provided for the enclosure.

The bidder shall perform all minor civil works, including plastering of drilled holes and filling gaps with suitable sealant to ensure the required aesthetics, without any extra payment.

- 1.8 Necessary batteries required for the installation of the fire alarm system shall be supplied by the bidder.
- 1.9 Fault isolators shall be provided after each loop card before the first device and one isolator module shall be provided after every twenty devices.
- 1.10 The bidder shall ensure that the fire alarm panel shall have inbuilt support connectivity through MODBUS(TCP/IP) and the same shall be integrated to Building Management System (BMS).
- 1.11 The FDA panel shall have capability such that interactions between any applications can be configured, and modified using inbuilt keyboard in the panel. It shall not be manufacturer dependent for adding new devices or modifying the existing devices connected to the FDA system. It's a mandatory requirement and fire alarm panel without this facility shall not be considered.**
- 1.12 The offered components (FDA panels, detectors, sounders, manual pull station) shall conform and shall have certification by at least one of the following: VdS (Germany), UL (USA), FM (USA), & LPCB (UK).
- 1.13 Detailed specifications of individual brought out items shall be as per Annexure 8A**
- 1.14 All the passwords and software supplied by the manufacturer or which is mandatory required for the future modification in the FDA system shall be supplied by the bidder.
- 1.15 The FDA panel and Modbus shall be protected with a surge protector of suitable rating.
- 1.16 The total system shall be warranted for one year from the date of commissioning and acceptance at the site. The warranty certificate from the manufacturer will only be considered**

2 INSPECTION & TESTING:

The following are mandatory tests to be carried out:

2.1 Commissioning Test

Commissioning of the entire installation of FDA panel and its devices, Hydrogen detector & its panel shall be done in the presence of the representative of the department. All necessary instrumentation, equipment, tools, consumables, materials and labour shall be provided by the Bidder.

2.2 Functional Test

The FDA panel shall be checked for basic tests such as visually checking input voltage

and current. Each loop wiring shall be separately tested for fault signal indication in the FACP.

100% testing of all sensors, MCP, Sounders to be carried out as a part of functional checks.

The power source shall be cut off and checked for standby supply from the batteries. After six hours the FACP source shall be switched on to check for auto switch over to the mains module.

Test shall be conducted for AC fail, charger fail, DC fail, Battery disconnect or battery fail. In all such cases the relevant LED should glow and the piezo sound shall also give sound output.

3 DOCUMENTATION:

3.1 Documents to be provided along with offer (Offer without the following Documents shall be summarily rejected).

- List of makes and model of each components.
- Catalogues, technical data sheets of detectors, FDA panel, detectors, manual pull station, fault isolator, Hooter, FRLS cable etc.
- Proof of valid approval / listing / (listing No., validity etc.) of detectors, FDA Panel, detectors and its associated devices.

3.2 Documents to be provided after placement of order for approval

- Cable power supply calculation.
- Data sheets/test certificates of the bought-out items.
- Detailed work Execution plan
- Detailed Test & Evaluation plan.

3.3 Documents to be provided after completion work, testing & commissioning.

- Manufacturer's conformity certificates for all FDA System Components like Detectors, FDA Panel, etc.,
- Test and evaluation documents.
- One hard copy and one soft copy of operation and maintenance manual. These manuals should indicate periodic maintenance schedules and instructions required for trouble free maintenance of system.

- After commissioning the system all system keys, passwords and software required for programming devices shall be handed over to the IIST in order to ensure smooth functioning of the system.
- After completion of commissioning activities, training is to be given for the facility personnel at site.
- As-Built drawing (Soft and Hard copy)

4 WARRANTY:

The party shall provide 12-month warranty for the entire system for defect liability, after final official handing over at his own cost. During this period party has to adhere the following:

- He has to attend quarterly based preventive maintenance visits and breakdown maintenance calls. All the defective components have to be replaced or rectified on one to one basis.
- During the preventive maintenance, the bidder has to verify the function of the devices connected by activating them randomly. A minimum of 10 devices shall be verified in each loop.
- Breakdown maintenance should be attended within 48 hours and shall be completed within a reasonable period.
- Department will not provide any transportation and accommodation.

5 TRAINING

The Bidder shall impart comprehensive training to the Department personnel at site during commissioning.

6 FDA PANEL (FIRE DETECTION ALARM PANEL)

Sl.No	Item Description	Specification
1.	Make	Ravel / Secutron/ Honeywell/ Morley (Honeywell) /Notifier/ Hochiki/ Siemens/Edward /Thorn Security/Zition/Telefire/ Simplex
2.	Type	Addressable & Analogue, Microprocessor based, suitable for detectors, Manual Pull station, hooters etc., with High resolution LCD display, with built-in system health verification checks, with capability for intelligence, fault isolation, sensor self – test, Alarm delay function
3.	No. of loops	Two loop panel (one Loop Card and One additional Loop card as Standby)
4.	No. of zones	NA
5.	Input power Rating	230 V AC ,50Hz, 24 V built-in Zero Maintenance batteries suitable for minimum 48 hours battery backup
6.	Output	NO/NC Potential free contacts for remote display & alarm annunciation (loop wire) and for AHU tripping.
7.	Remote Monitoring	Modbus with TCP/IP Facility.
8.	Minimum addressable capability	99 addressable devices per loop.
9.	Approvals / Listing	UL/FM /EN

7 ADDRESSABLE MULTI SENSOR FIRE DETECTORS

Sl.No	Item Description	Specification
1.	Make	Compatible to FDA Panel recommended by manufacturer
2.	Type	Addressable, Intelligent, Detectors along with mounting base modular construction with capability for

		intelligence, remote / local test, status & alarm display functions programmable from panel / hand held device, with dust compensation feature
3.	Type of Detector	Multi (Photoelectric and Heat)
4.	Status indication	Blinking LED
5.	Alarm indication	Twin LED
6.	Sensor Operating Range	-10 °C to 37 °C, 20-95% RH (Minimum)
7.	Input Voltage	15 to 30 V DC, two wire supply
8.	Listing /Approval	UL /FM Approvals.

8 ANALOG ADDRESSABLE LASER SMOKE DETECTORS

Sl.No	Item Description	Specification
1.	Make	Compatible to FDA Panel recommended by manufacturer
2.	Type	Spot type Analogue-Addressable loop-powered laser detectors suitable for detecting a wide range of smoke from slow smoldering and fast flaming fire in clean room environment..
3.	Type of Detector	Laser detector
4.	Status indication	360-degree local visual indication
5.	Sensitivity range	Minimum 6 levels of sensitivity ranging from 0.02%/ft and can be changed through FACP.
6.	Sensor Operating Range	0 to 38° C
7.	Humidity range	10 to 93% non-condensing
8.	Velocity range	0 to 4000fpm (0 to 20.3m/s)
9.	Listing /Approval	UL /FM/ EN Approvals.

9 ADDRESSABLE MANUAL PULL STATION:

Sl.No	Item Description	Specification
1.	Make	Compatible to FDA Panel recommended by manufacturer.
2.	Type	Pull Type, Addressable, Resettable, suitable for outdoor application.
3.	Operating voltage	15 to 30 V DC
4.	Approvals / Listing	UL/FM /LPCB

10 FAULT ISOLATOR MODULE:

Sl.No	Item Description	Specification
1.	Make	Compatible to FDA recommended by manufacturer.
2.	Operating voltage	17 to 31 V DC
3.	Features	With minimum short circuit time of 50 μ Sec. LED Display when in isolation mode.

11 INTERCONNECTING CABLE FOR FIRE ALARM SYSTEM DEVICES

Sl.No	Item Description	Specification
1.	Make	LAPP INDIA/GLOSTER/POLYCAB/HAVELLS
2.	Type	Multi stranded copper conductor, FRLS, mylar shielded cable as per latest standard: Cables shall be laid inside FRLS conduit/ mini cable trunking
3.	Size	2 x 1.5 Sq.mm

12 ADDRESSABLE SOUNDER WITH STROBE

Sl.No	Item Description	Specification
1.	Make	Compatible to FDA panel recommended by manufacturer.
2.	Operating voltage	24 V DC

3.	Type	Addressable through control module
4.	Sound output	85dB @ 1m

13 ZONE INTERFACE MODULE:

Sl.No	Item Description	Specification
1.	Make	Compatible to FDA recommended by manufacturer.
2.	Operating voltage	16 to 32V DC
3.	Features	Module status with LED.

14 OUTDOOR ENCLOSURE FOR FDA PANEL & ITS ACCESSORIES:

Sl.No	Item Description	Specification
	Size	Compatible to FDA. shall accommodate FDA panel, and all associated accessories in a single enclosure.
	Features	Door of the box shall be hinged type. Door shall be clear such that the FDA panel shall be visible through door. The Enclosure shall be suitable for outdoor application. Suitable ventilation provision shall be available.

15 FLAME DETECTOR

Sl.No	Item Description	Specification
1.	Make	Compatible to FDA recommended by manufacturer.
2.	Capability	Suitable for delivering all security and performance required for high- risk industrial installations combined with immunity to false sensing due to arc welding, hot body radiations, lightening or sunlight.
3.	Type of Detector	Flame detector (UV/IRS)
4.	Range of field view	120° horizontal & 95° vertical
5.	Spectral range for UV	185 to 256 nm

	radiation	
6.	Spectral range for IR radiation	4.4µm range
7.	Operating temperature range	- 40° C to 75° C
8.	Voltage range	10 to 32V DC
9.	Networking provision	RS485 Digital MODBUS
10.	Time delay setting	0, 3, 5 and 7 Seconds
11.	Time response	<6S
12.	Provision for sensitivity adjustment	8,16,24 or 32 counts per seconds
13.	Approval Standards	UL/FM/ATEX/ other relevant standards approved

16 BILL OF QUANTITY

The quantities mentioned above are tentative. The actual quantity may vary based on actual site conditions. In addition to the above items, any other items/ accessories required for completion of the work and commissioning of the system also in the scope of supply.

Sl.No	Description	Unit	Qty.
1.	Supply of Addressable two loop Fire Detection panel with Digital voice controller & PA address system as per specification	Nos	01
2.	Supply of Analog Addressable Multi-Sensor	Nos	03
3.	Supply of Analog Addressable Laser Smoke Detector	Nos	06
4.	Supply of addressable manual pull station	Nos	03
5.	Supply of addressable sounder with strobe.	Nos	04
6.	Supply of Flame Detector	Nos	02

7.	Supply of short circuit isolator	Nos	02
8.	2 Core x 1.5 Sq.mm, Multi stranded copper conductor FRLS aluminum mylar shielded cable for fire alarm devices	Per mtr	As per site requirement
9.	Supply of mini cable trunking of suitable size for cable.	Per mtr	As per site requirement/actuals.
10.	Supply of weather proof enclosure for FDA Panel	Per mtr	