SECTION – 2.21

FIRE DETECTION & PROTECTION SYSTEM

1.0.0 INTRODUCTION

The Fire Detection and Protection System (FDPS) shall provide instantaneous audio alarm and quench (applicable area) when the fire is detected, in order to prevent loss of life, property and valuables etc. by warning inhabitants in the affected premises immediately and quench the fire as soon as possible (applicable area*). FDPS shall be able to evacuate the inhabitants in the affected area so as to obtain necessary help from Fire Fighting and Salvage staff.

2.0.0 SCOPE OF WORK

2.1. The scope of Bidder shall cover design, engineering, manufacture, inspection and testing at manufacturer's works, third party inspection if any, packing and forwarding, supply at site, storage and handling at site, erection with associated civil, cable laying, Termination, I&C and electrical works, inspection, testing and commissioning, performance testing and preparation, the remedy of all defects during the Defect Notification Period of the Complete Fire, detection & Alarm system.

2.2. The Fire detection & alarm system shall be designed, engineered and manufactured to achieve high availability and reliability. The design and engineering shall make use of most recent international standards and best design practices.

2.3. The Fire detection & alarm system shall be provided for all the closed area or buildings inside the BESS plant including local control room (LCR), Main Control room (MCR) and 132kV switchyard.

3.0.0 CODES AND STANDARDS

3.1 The equipment to be furnished under this specification shall be in accordance with the applicable section of the latest edition (including amendments) of the following Indian Standards (IS), IEC publications and other codes except where modified and / or supplemented by this specification.

Codes	Description
NFPA 70	National Electrical Code, 2023
NFPA 72	National Fire Alarm and Signalling Code, 2022
NFPA Codes	National Fire Protection Association Codes
IS 2189:2008	Selection, Installation and Maintenance of Automatic Fire Detection and Alarm System Code of Practice.
IS 2189	Selection, Installation and Maintenance of Automatic Fire Detection and Alarm System Code of Practice, 2008

CEA regulation	Measures relating to Safety and Electricity Supply Regulations, 2010, 2015, 2019 and 2018, Draft 2021
IS 694:1990	Installation & maintenance of power cable
IS 2175:1988	Specification for heat sensitive detector
IS 11360:1985	Specification for photo smoke detector
IS 9779:1981	Specification of sound level
IS 1554 (PART 1)	PVC insulated (heavy duty) electric cables, Part 1: For working voltages up to and including 1100 V, 1988
TAC	Tariff Advisory Committee
-	Under writer's laboratory (UL) - USA

4.0.0 GENERAL REQUIREMENTS

4.1. Battery container area shall adhere to NFPA 855 standard.

4.2. The FDPS shall be activated by automatic detection devices and or by manual operation.

4.3. The FDPS performs the function of monitoring the areas from fire continuously and giving an Audible alarm in case of sensing "Fire". Also, protecting it from spread of fire (applicable area*).

4.4. The sensing of the Fire is accomplished through various types of detectors.

4.5. The areas mentioned below shall be providing with the adequate number of detectors for continuous monitoring.

a. Main and Local Control Room – Prefab Building
b. Other Area/ Outdoor

4.6. Suitable Fire Detection System (FDS) using optical beam type smoke detectors and/or heat detectors shall be provided for entire Prefab Building in BESS area and other areas/outdoor.

4.7. The FDPS shall be intelligent, Analogue addressable Microprocessor type. The system shall consist of addressable 3D Multi Sensor and Photoelectric Detector to detect any abnormal change in smoke, heat level and provide signal to the fire alarm panel to actuate the corresponding output devices (Hooters, Relays and Quencher) as programmed to take appropriate alarming and quenching measures.

4.8. The system shall consist of addressable 3D Multi-sensor Detector & addressable manual call points. All the detectors and detection devices shall be connected with the Fire Alarm Panel (FAP).

4.9. The FAP shall be connected to Control and Monitoring System (SCADA) via RTU's in each block control room and Ethernet Switch in Main Control Room respectively.

4.10. Redundant power supply as well as communication shall be provided for whole system.

4.11. It shall be possible to change the sensitivity of each addressable detector to required value from the control room. It shall be possible to set the sensitivity for each detector from the Main/ block Control Room.

4.12. The spacing of Detectors shall be as per IS: 2189 in each protected area, considering the construction features.

4.13. Response Indicators shall be provided for above false ceiling detectors.

4.14. Manual Pull stations shall be provided near exit points.

4.15. Electronic Hooters shall be provided in each protected area.

4.16. Fire Detection and Protection - Control Room

a. The Fire Alarm Panel shall be kept at SCADA room to provide the fire detection and protection function for all the above-mentioned protected area.
b. Smoke detectors shall be provided in all the above-mentioned protected area.
c. Heat detectors shall be provided in Battery room and HT panel room. The heat detectors shall be as per NFPA 72.
d. The Photoelectric Smoke detector and Air sampling smoke detector shall be provided in HT panel room.
e. HT panel room shall have Clean Agent Fire Extinguish System to suppress/quench the fire that existed inside the area. (Applicable only for Air-conditioned rooms)
f. The Clean Agent Fire Extinguish System shall be as per NFPA 2001.
g. Dry Chemical Powder (DCP) type fire extinguishers shall be provided as one per 15m inside the Prefab building.

4.17. Fire Detection and Protection – Other Areas/ Outdoor

a. For Outdoor, Sand buckets and Fire extinguishers shall be provided at applicable locations in the plant given below:
   - Inverter Duty Transformer Area
   - Auxiliary Transformer Area
   - Prefab Building outside area.
   - Power transformer area

5.0.0 SPECIFIC REQUIREMENTS

5.1 Fire Detection System

a. The fire Detection system consists of following components:
   - Optical Beam type Smoke Sensor
   - Heat Sensor
   - Air Sampling Smoke Detector
   - Accessories to mount

b. The fire detection system shall detect any abnormal change in smoke, heat level and provide the signal to fire alarm panel to actuate corresponding devices.

5.2 Fire Alarm Panel

a. The Fire Alarm Panel shall consist of necessary indication and control push buttons and other accessories required for operation of the system. When any of the detectors detects any fire inside the protected premises through any type of detector, then the Fire Alarm Panel shall display the corresponding location on the LCD/LED Screen/ Station & the Fire LED of the panel shall start glowing.

b. The audio-visual alarm comes ON in Panel indicating that the fire condition has been detected. Also, "EVACUATION" display unit (Hooter) located at strategic location shall start sounding.

c. The cables shall be 1.5mm2 (Cu) FRLS, PVC insulated, unarmoured for indoor and armoured for outdoor installation complying with IS: 1554.

d. Fire Alarm Panel shall have the capability to receive signal from smoke detector/fire alarm and relay the signal to all the doors with access control to "OPEN/UNLOCK" without access card or biometric.

e. Fire alarm system shall be fully programmable and user friendly. The system shall have reliability, flexibility, and ease of installation, commissioning, and maintenance. Robust power supply, large display option, fast response keypad.

f. Fire alarm system control panel shall function both as stand-alone system as well as interference between the Central Processing Unit and Fire Detectors and their accessories and control device.

g. Hooters shall have frequency between 500 Hz to 1000 Hz. Hooter sound level should not exceed 120 dB.

h. Addressable detector/ manual call point & required devices in various areas shall be connected to FAS by Class A wiring to detector interface unit. No of detector in a single loop shall be more than 99. FAS shall support 5 loops.

i. FAP shall consists of the following:
   - Intelligent, Analogue Addressable type Microprocessor based Fire Alarm Panels at suitable locations as per requirement.
   - Intelligent, Microprocessor based Repeater Panel in the Security room.
   - Intelligent Detectors of 3D Multi-sensor & Photoelectric type.

- Intelligent Manual Call Point (MCP).
- Intelligent Monitor Module (Interface Unit), Control Relay Module & Output Module.

j. The FAP shall be equipped with battery backup using Lead Acid battery with float cum boost charger unit.

k. The FAP shall be kept in Prefab building. The FAP shall be provided with all the necessary accessories.

l. All addressable devices shall be interrogated in order from FAS.

m. FAP shall have individually controlled, monitored alarm output for external hooters, lamps, etc.

n. FAP shall support repeater panel.

o. Redundant power supply for the whole system shall be provided.

p. Redundant communication among all FAS panels shall be provided.

q. It shall be possible to change the sensitivity of each addressable detector to required value from the control room. It shall be possible reads sensitivity for each detector from the control room.

r. FAS shall have the facility to set date and time.

s. FAS shall have the facility to disable/isolate detector, Zone interference unit from the control panel for maintenance purpose and restore the same whenever required.

t. FAS shall check for each detector, zone interface unit for alarm, pre-warning, fault disabling/isolating shall be possible from control room panel.

u. FAS shall store more than 250 events.

v. Software changes shall be possible from FAS without re-burning of Erasable Programmable Read-Only Memory (EPROM).

w. Software database shall be maintained in non-volatile memory. It shall be possible to reprogram the software by authorized person only.

x. All equipment supplied under FAS shall conform to TAC norms.

5.3 Fire Protection System

a. HT switchgear room shall be provided with Clean Agent System of Novec 1230 / FM200.

b. Adequate numbers of portable / trolley mounted fire extinguishers shall be provided in various rooms prefab building and outdoor areas.

c. Portable Fire extinguishers shall be as following types:

- Caron Dioxide type fire extinguishers, 4.5 kg Capacity (SS-304 body).
- Water mist-cum-compressed air foam (CAP) gun type trolley mounted of 50 litre capacity.
- (M) Foam Type Fire Extinguisher, 9kg Capacity
- Clean Agent NOVEC 1230/ FM200, 4kg Capacity

d. All the Fire extinguishers offered by bidders shall be of reputed make and shall be ISI marked.
e. All the portable extinguishers shall be of freestanding type and shall be capable of discharging freely and completely in upright position.
f. Each extinguisher shall have the instructions for operating the extinguishers on its body itself.
g. All extinguishers shall be supplied with initial charge and accessories as required.
h. Portable type extinguishers shall be provided with suitable clamps for mounting on walls or columns.
i. Dry chemical powder type portable extinguisher shall conform to IS: 15683 / NFPA 10.
j. Carbon Dioxide type portable extinguisher shall conform to IS: 15683 / NFPA 10.
k. Wheel/Trolley mounted Mechanical foam type fire extinguishers (SS-304 body) of 9kg capacity, conforming to IS: 16018 / NFPA 10, shall be provided, one number for each Inverter duty Transformer.
l. One (01) number of water mist-cum-compressed air foam (CAP) gun type trolley mounted of 50 litre capacity shall be provided MV yard portion.
m. Also, adequate number of trolley mounted CO2 type fire extinguisher of 6.5 kg capacity shall be provided.

6.0.0 DESIGN CRITERIA

a. A comprehensive fire detection, alarm shall be installed in conformity with relevant IS 2189.
b. Electrical Room and BESS Container areas shall be provided with fire detection and alarm system based on multisensor smoke detectors. The fire alarm system shall be designed and installed as per IS 2189. If the system requirement which are not covered by IS 2189 shall be designed as per rules of NFPA 72 / IEC standards / Equivalent standards / Codes.
c. All the systems shall be designed in such a way so as to make the system complete and acceptable to TAC/nominated agency of insurance companies.
d. Class A wiring of fire detector with fire alarm panel shall be provided

6.1FIRE DETECTION AND ALARM SYSTEM

FIRE DETECTION AND ALARM SYSTEM SHALL CONSIST OF :

a. Micro-processor based analog addressable Local Fire Alarm Panel (Active Type)
b. Repeater Fire Alarm Panel
c. Addressable Multisensor Smoke detectors
d. Addressable Manual call points
e. Addressable Hooters with strobe
f. Addressable Monitor modules
g. Addressable Control Relay modules

Micro-processor based analog addressable Local Fire Alarm Panel (LFAP):

Local fire panels shall be provided in each electrical rooms. LFAP shall be provided based on the analog addressable microprocessor-based technology. LFAP shall receive signals from the respective detectors, manual call points installed all over the plant in case of fire. These local fire alarm panels shall be hooked up with Main fire panel located in central control room and repeater panel located in Security room (using existing FO Cable) which is available as per the system architecture for the operators to identify the location of fire originated. Ethernet port shall be provided in fire alarm panel to interface with EMS for communication protocol. All type detectors, interface units, control units, all manual call points & hooters shall be looped with the respective LFAPs as per the system architecture. Number of loops including spare loops and number of devices connected in the loop shall be considered based on the type of detectors and devices manufacturer recommendation. Each loops shall be connected with 80% of detectors / devices which shall be considered equivalent to full capacity over which 20% spare provisions shall be considered.

a) Repeater Fire Alarm Panel:

Repeater-Fire Alarm Panel (RFAP) of active type shall be located in Security room. Repeater panel shall be designed to provide full indication of events and controls of the local fire alarm control panels installed in each Electrical Building. It shall allow operator / fire man for resetting the local fire alarm system, silence sounders remotely and initiate evacuation requirements if applicable. The repeater panel shall be interfaced with fire detection systems through LFAPs.

b) ADDRESABLE MULTISENSOR SMOKE DETECTORS:

The multisensor smoke detectors shall be of intelligent analogue addressable type having the following features:

- Individual Addressing capability at the fire alarm panel to facilitate precise pointing of fire
- Location/detector activated.
- Discrimination between a false alarm and real fire condition
- Detection and automatic calibration / setting of over/ under sensitive detector by decreasing or increasing their sensitivity levels.
- Pre-alarm in case of a detector or a section of detectors requiring maintenance.
- All types of addressable detectors/ interface units shall be compatible with the fire alarm panel.

Detectors shall have built in electronic circuit for addressing capability for individual address on the fire alarm panel and shall have in-built short circuit isolating element. It detects smoldering smoke generated and sense the rise in temperature changes due to short circuit conditions in electric cables and burning of furniture, clothes, PVC flooring. The detector shall contains a chamber with an LED and a photodiode to measure smoke and thermistor to measure temperatur changes. When smoke enters the chamber, it scatters the light emitted by the LED, reducing the amount of light received by the photodiode. If the light reduction is significant enough (i.e., exceeds a threshold), the alarm is triggered. If the temperature rises rapidly (rate-of-rise) or reaches a high fixed temperature, the heat detection element is activated, triggering the alarm.

When either the smoke or heat sensor detects a potential fire hazard, the detector

sends a signal to a control panel and activates an audible alarm on the device. By combining both smoke and heat detection, multisensor detectors shall be less prone to false alarms caused by steam, dust, or other non-fire sources, as the signals from both sensors need to be above threshold to trigger an alarm.

c) ADDRESSABLE MANUAL CALL POINTS:

Manual call points should be installed at strategic locations to allow occupants to manually activate the alarm by breaking a glass or plastic cover and pressing a button or lever. They provide means of immediate manual alarm to actuate necessary extinguishing agent. Manual call point of push type shall be provided at electrical room, central control room and all around the BESS containers. MCPs shall be addressable and wall mounted type

d) ADDRESSABLE HOOTER WITH STROBE:

Hooter with strobe shall be installed in the electrical room, and BESS container area to draw attention of the personnel in case of fire accident in the plant. Hooters having a distinct sound from other alarms and annunciations with flashing strobe shall be installed at exit of electrical room. This shall be automatically actuated in case of actuation of any of the detectors / manual call points. The minimum sound level shall be 65 dB (A) or 5 dB (A) above any other noise likely to persist for a period longer than 30 s, whichever is greater should be produced by the sounders as per IS 2189. Hooters shall be of addressable type for interfacing with fire alarm panel. Hooters shall be designed for two tones viz., Fire and All clear.

e) ADDRESSABLE MONITOR MODULE:

Addressable Monitor Module in fire alarm system serves as a translator, connecting conventional, non-addressable devices to Local fire alarm panel. Monitor module shall be provided for each container to send signal to respective area Local fire alarm panel to intimate the fire.

f) ADDRESSABLE CONTROL RELAY MODULE:

Addressable Control relay Modules shall be provided to actuate NIFPS system of transformers.

g) CABLING:

All detectors, manual call points, hooters, modules etc. shall be wired for class A wiring.
Cables required for complete fire alarm system for interconnecting fire alarm panel, detectors and manual call points shall be 1100V grade, multicore, annealed, high conductivity stranded copper conductor, extruded PVC / XLPE insulated, laid up inner sheathed, galvanized steel strip / wire armoured, outer FRLS extruded PVC sheathed cable. Outer sheath shall be Red in colour.
Cables shall be cleated on ceiling for detector looping and laid in trenches up to the panel, buried in ground with other control / communication cables in the indoor area.

6.2PROPOSED DETECTION SYSTEM FOR THE AREAS UNDER CONSIDERATION:

SL. No.	Area	Type of Detectors
1.	Electrical room	Addressable Multisensor Smoke detectors, Addressable Manual call points & Addressable hooters with strobe.
2.	BESS area	Monitor Module and Manual call points.

7.0.0 TECHNICAL PARAMETERS

SI. NO.	DESCRIPTION	UNIT	TECHNICAL REQUIREMENTS
A.	**Local Fire alarm control panel**		
1.	Type	-	Microprocessor Based
2.	Type of Display	-	LCD, Alphanumeric, display of addresses of at-least 320 characters
3.	Response Time	Sec.	3 Sec. (Max.) for full loaded panel
4.	Addressable Intelligence Capability	-	Yes
5.	Fault Isolation Capability	-	Yes
6.	Alarm Verification Capability	-	Yes
7.	Sensor self-test capability	-	Yes
8.	Memory	-	Non-volatile
9,	Fault Tolerant wiring capability	-	Required
10.	No. of loops per panel	-	To be decided by the Bidder
11.	Min. acceptable loop length	Km	2.5 km for fully loaded panel
12.	Power Supply	-	230V +10%, 50Hz, mains and UPS Supply
13.	Type of batteries	-	Lead acid batteries with float cum boost battery charger
14.	Weather Protection Class	-	IP65
15.	Loop Isolator	-	Built-in
16.	Networkable to other panel	-	Yes
17.	Temperature Range	°c	o to 50 °c
18.	Humidity range	°c	0 to 100%
19.	Corrosion Class and Sesimic Zone	-	C5 and V
20.	Auto detection of periphery	°c	Yes

21.	No. of wires SLC loop cabling type	°c	2 wire for detectors Style 6,Class A
22.	Other standard Approvals.	uc	UL Listed, ULC listed, FM approved,
23.	Seismic Acceleration		0.36g
B.	**Multi - sensor detector**		
1.	Type	-	Analogue addressable type Photo thermal Multi criteria detector comprising of photoelectric type & Fixed temperature type detection
2.	Memory	-	Non-volatile
3.	Principal of working	-	Work on both temperature rise and smoke shattering
4.	Temperature setting of the rate of rise sensor	C/min	8°C/min
5.	Sensor Coverage / Nominal Sensitivity for Optical smoke sensor	-	Wide,0.5% obs I ft to 4% obs / ft
6.	Facility to adjust the sensitivity and Facility to reset the detector sensitivity to factory setting level	-	Required
7.	Base	-	Suitable to mount the multicriteria detector in a simply click/turn arrangement. shall have built fault isolator in the base. suitable for two wire loop in loop out termination
8.	Fault isolator module	-	To be present in the detector base
9.	Operating voltage & power requirements	-	24V DC, loop powered
10.	LED indication	-	Multi status-multi colour LED with 360° angle view, to be visible from 6 m distance
11.	Type of addressability	-	Electronic addressability with device mapping
12.	Moisture	-	0-100% RH
13.	Operating temperature	°c	0-60°c
14.	Type of signalling circuit suitable for	-	Class A, style 6
15.	Wire to which the base shall be suitable for	-	2C x 1.5 Sq.mm
16.	Remote and local test capability		Required
17.	Marking of the detector	-	Type, power supply requirement, upper limit & lower limit, date of manufacture

18.	Facility for cleaning the detector during maintenance	-	Required
19.	Pre-alert alarm capability	-	Required
20.	Audible base	-	Not required
C.	**Addressable Manual call point**		
1.	Type	-	Analogue addressable type microprocessor based push type manual call point
2.	Power supply requirement	-	Loop powered,24 V DC
3.	Colour	-	Fire red shade as per IS-5
4.	Operating temperature	°c	0-60°c
5.	Moisture	-	100% RH, Non- condensing
6.	Operating instruments	-	Clear and visible operating instructions on the body
7.	Marking & data	-	To be marked the type, manufacture name, maximum operating voltage, current and frequency The word fire indication on the front of MCP in raised letters,1.75 inches(44 mm) or larger
8.	Dimensions of knockouts for conduit	-	25 mm diameter, Top entry
9.	Type of addressability	-	Electronic addressability with device mapping
10.	LED indication	-	Not required
11.	Cable to be used	-	2C x 1.5 Sq.mm
12.	Ingress protection	-	IP-54 for indoor use and IP-67 for outdoor use
13.	Memory	-	Non-volatile
14.	Remote and local test capability	-	Required
15.	Fault isolator module	-	Required to be integrated
16.	Mounting	-	On wall or column at 1.4 M from FFL.
D.	**Hooter with Strobe**		
1.	Type	-	Electronic hooters, Addressable, suitable in industrial environment
2.	Sound level	dB	Range of 65 dB - 120 dB (A) with field settable feature
3.	Mounting	-	Type- A hooter: suitable for recessed mounting Type - B Hooter: suitable for surface/wall mounting
4.	Operating voltage & power requirements	-	24V DC, separately powered
5.	LED indication	-	Multi status-multi colour LED with 360° angle view, to be visible from 6 m distance

6.	Moisture	-	0-100% RH
7.	Operating temperature	°c	0-60°c
8.	Type of signalling circuit suitable for	-	Class A, Style 6
9.	Strobe Colour	-	Red
10.	Remote and local test capability	-	Required
11.	Marking of the detector	-	Type, power supply requirement, data of manufacture, sound level
12.	Enclosure	-	Weatherproof protection, IP-55
13.	Facility for cleaning the detector during maintenance	-	Required

8.0.0 TESTS

a. All type test report as per the above-mentioned standards shall be submitted.

b. Test Witness

- Tests shall be performed in presence of employer representative if so desired. The Bidder shall give at least seven (07) days' advance notice of the date when the tests are to be carried out.

c. Test Certificates

- Certified reports of all the tests carried out at the works shall be furnished in four (4) copies for approval of the employer.
- The equipment shall be dispatched from works only after receipt of employer written approval of the test reports.
- Type test certificate on any equipment, if so desired by the employer, shall be furnished. Otherwise, the equipment shall have to be type tested, free of charge, to prove the design.

d. Maintenance responsibility during Guaranteed Availability Period

- During Guaranteed Availability Period, Supplier shall take continual actions to ensure the guaranteed availability and shall make available all the necessary resources such as specialist personnel, spare parts, tools, test devices etc. for replacement or repair of all defective parts and shall have prime responsibility for keeping the system operational

9.0.0 SPECIAL TOOLS AND TACKLES

a. A set of special tools and tackle which are necessary or convenient for erection, commissioning, maintenance and overhauling of the equipment shall be supplied.

b. The tools shall be shipped in separate containers, clearly marked with the name of the equipment for which they are intended.

10.0.0 GUARANTEED PARTICULARS

Electrical and mechanical characteristics shall be guaranteed by the bidder. In case of failure of materials to meet the guarantee, M/s Employer shall have right to reject the material. Guaranteed

Technical particulars are to be submitted by the successful bidder during detailed engineering along with submitted drawings / documents.

11.0.0 WARRANTY

All the equipment included in the scope shall satisfy the warranty of 12 months from the date of Commissioning, or 18 months from the delivery at site whichever later.

12.0.0 TRAINING AT SITE

Training shall be provided to Employer for programming of Fire Alarm System at free of cost by the system provider / EPC Bidder.

13.0.0 QUALITY CONTROL

Bidder shall submit the MQAP, FAT and FQP for the Fire Detection and Protection system, structures, and other accessories to mount FDPS.

14.0.0 SPARES

The bidder shall submit the List of mandatory Spares and bidder has to furnish an undertaking that the spares required for satisfactory operation of offered system (Hardware).

15.0.0 BILL OF MATERIAL:

Sl.No	Description
1	Microprocessor based Addressable Local fire alarm Control Panel
2	Microprocessor based Repeater Fire Alarm Panel
3	Addressable Multi Sensor detectors with integrated isolator base
4	Addressable Manual Call Points
5	Addressable Hooters with Strobe
6	Addressable Control Relay Module
7	Addressable Monitor Module
8	Fire Resistant Cable - 2C x 1.5 Sq.mm CU Cable
9	Cat-6 Cable

16.0.0 DOCUMENTS REQUIRED TO BE SUBMITTED BY BIDDER AT TIME OF PROPOSAL:

a. Quality assurance plan.
b. Material test certificates.
c. Technical data sheets for all equipment covered.
d. Installation drawings and manuals for all equipment/ systems.
e. Current UL/ FM certificates

17.0.0 DOCUMENTS REQUIERD TO BE SUBMITTED AFTER AWARD OF CONTRACT:

a. Detailed design / drawing submission schedule including erection, testing & commissioning schedules.
b. Operation and maintenance manual for all equipment.
c. Technical data sheets for all equipment covered.
d. Detailed write-up, Layout drawings and equipment drawings etc.

e. Detailed write-up for shop tests and site performance tests.
f. Test certificates for type/ routine and standard acceptance tests.
g. As-built drawings for all equipment/ systems supplied under this contract and all buildings/ structures/ works
executed under this contract incorporating all changes/ modifications up to the time of commissioning / handling over to the Owner.
h. Materials test certificates and performance test certificates for all equipment tested at works.
i. Drawings/ data required to be submitted to statutory authorities.
j. Any other document/ details as required as per approved QAP.
k. Fire alarm system architecture
l. Firefighting system layout
m. BESS plant fire fighting layout

18.0.0 BIDDER SPECIFIC FIELDS TO BE FILLED IN DATA SHEET:

SI. NO.	DESCRIPTION	UNIT	TECHNICAL REQUIREMENTS
A.	**Local Fire alarm control panel**		
1.	Type		
2.	Type of Display		
3.	Response Time		
4.	Addressable Intelligence Capability		
5.	Fault Isolation Capability		
6.	Alarm Verification Capability		
7.	Sensor self-test capability		
8.	Memory		
9,	Fault Tolerant wiring capability		
10.	No. of loops per panel		
11.	Min. acceptable loop length		
12.	Power Supply		
13.	Type of batteries		
14.	Weather Protection Class		
15.	Loop Isolator		

16.	Networkable to other panel		
17.	Temperature Range		
18.	Humidity range		
19.	Corrosion Class and Sesimic Zone		
20.	Auto detection of periphery		
21.	No. of wires SLC loop cabling type		
22.	Other standard Approvals.		
23.	Seismic Acceleration		
B.	**Multi - sensor detector**		
1.	Type		
2.	Memory		
3.	Principal of working		
4.	Temperature setting of the rate of rise sensor		
5.	Sensor Coverage / Nominal Sensitivity for Optical smoke sensor		
6.	Facility to adjust the sensitivity and Facility to reset the detector sensitivity to factory setting level		
7.	Base		
8.	Fault isolator module		
9.	Operating voltage & power requirements		
10.	LED indication		
11.	Type of addressability		
12.	Moisture		

13.	Operating temperature		
14.	Type of signalling circuit suitable for		
15.	Wire to which the base shall be suitable for		
16.	Remote and local test capability		
17.	Marking of the detector		
18.	Facility for cleaning the detector during maintenance		
19.	Pre-alert alarm capability		
20.	Audible base		
C.	**Addressable Manual call point**		
1.	Type		
2.	Power supply requirement		
3.	Colour		
4.	Operating temperature		
5.	Moisture		
6.	Operating instruments		
7.	Marking & data		
8.	Dimensions of knockouts for conduit		
9.	Type of addressability		
10.	LED indication		
11.	Cable to be used		
12.	Ingress protection		
13.	Memory		
14.	Remote and local test capability		
15.	Fault isolator module		
16.	Mounting		
D.	**Hooter with Strobe**		
1.	Type		
2.	Sound level		
3.	Mounting		
4.	Operating voltage & power requirements		
5.	LED indication		

6.	Moisture		
7.	Operating temperature		
8.	Type of signalling circuit suitable for		
9.	Strobe Colour		
10.	Remote and local test capability		
11.	Marking of the detector		
12.	Enclosure		
13.	Facility for cleaning the detector during maintenance		