CONSTRUCTION OF RESIDENTIAL FLATS, SBILD & OTHER COMMERCIAL OUTFITS AT HINJEWADI, PUNE, MAHARSHTRA, IN EPC MODE

PART E: CHAPTER F (ALARM & PA)

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TECHNICAL SPECIFICATIONS FIRE DETECTION AND ALARM SYSTEM (FDAS) & PUBLIC ADDRESS (PA) SYSTEM

DISCIPLINE: FIRE & LIFE SAFETY SYSTEMS
SYSTEMS: FIRE DETECTION AND ALARM SYSTEM (FDAS) & PUBLIC ADDRESS (PA) SYSTEM

1.0 GENERAL INTENT AND SCOPE

- The EPC Contractor shall execute the furnishing, installation, connection, and testing of a complete, operative, and coordinated microprocessor-controlled, intelligent reporting fire alarm network equipment.
- The installation must comply with the requirements of IS/ISO-7240 (latest as amended), NBC-2026, State By-laws, and NFPA 72.
- The Contractor shall arrange and provide all necessary Licenses/Approval of Local Fire Authorities for the building/complex.
- The system shall incorporate proper zoning of the complex/buildings, specifically accounting for Non-Critical and Critical areas.

2.0 FIRE DETECTION AND ALARM SYSTEM (FDAS) - DSR 2025 BASED ITEM SPECIFICATIONS

The system shall utilize the latest technology in Addressable Intelligent Analog Fire Detection and Alarm Systems, comprising panels, smoke detectors, heat detectors, beam detectors, response indicators, manual call points, hooters, light strobes, repeater panels, VESDA (Very Early Smoke Detection Apparatus), and a WLD (Water Leak Detection) system.

The following items shall be executed as per standard Schedule of Rates (DSR) methodology for Supply, Installation, Testing, and Commissioning (SITC):

2.1 Fire Alarm Control Panels & Infrastructure

- SITC of Intelligent Addressable Fire Alarm Control Panel (FACP): Supplying, installation, testing, and commissioning of FACP with Degrade Mode, suitable for the required number of loops, supporting a minimum of 240 devices/detectors per loop. The panel shall be equipped with a 24-hour battery backup, a minimum 600 Character/10-inch color touch screen LCD display, and an inbuilt printer, installed in the LV/fire control room.
- Network Integration: All Fire Alarm Panels shall be integrated with each other on a peer-to-peer network. Independent Fire Alarm Panels shall be provided for Commercial and Residential Buildings, with central monitoring taking place in a ground-floor Fire Room secured by a 2-hour Fire Rated Door.
- Repeater Panels: SITC of Repeater panels in the building as required, including a mandatory unit installed in the Fire Pump Room.
- Open Protocol Interface: The FAS shall provide open protocol output on Modbus over IP or BACNET over IP for third-party integration to the BMS (Future Provision). The system data shall also be available with cloud-based services for remote monitoring and notification on mobile devices.

2.2 Detectors and Field Devices

- SITC of Intelligent Addressable Detectors: Supplying, installation, testing, and commissioning of exclusively UL Approved addressable intelligent Fire Detectors. All Smoke/Multicriteria Detectors shall have a sensitivity range of 0.5% obs/ft or better. Coverage must include all rooms, common areas, spaces above suspended ceilings, lobbies, parking areas, and other accessible subdivisions as per NBCS 2026 and NFPA 72.
- SITC of Response Indicators (RI): Supplying and fixing of Response Indicators provided individually for all fire detectors installed above the false ceiling in all areas/rooms as per norms.
- SITC of Manual Call Points (MCP): Supplying, installing, testing, and commissioning of Addressable manual call boxes near all exits, staircases, lift lobbies, etc., as per relevant Norms.
- SITC of Notification Appliances: Supplying and fixing suitable addressable sounders/hooters with strobes capable of providing a minimum 90 dB sound level.

2.3 Modules, Integration, and Emergency Communication

- SITC of Control/Monitor Modules: Supplying and integrating suitable numbers of input/output (C/M) relay modules for connecting other equipment, including Electrical Panels, lifts, firefighting systems (Fire Hydrant and Sprinkler System), Ventilators, PA System, Boom Barriers, EM Locks, Exhaust Emergency Units, and Air Conditioning Units.
- Fire Door Integration: SITC of supervised magnetic door contacts connected to the FAS for every fire door. Opening any emergency exit fire door shall generate a distinct 'Door Open' supervisory event at the FACP, clearly identifying the respective door location. The alarm/indication shall be individual for each door, ensuring the operation of one fire door does not generate door open alarms for others.
- SITC of Digital Voice Command Center (DVCC): Supplying, testing, and commissioning of a DVCC with Two-Way Communication Fire Fighters Telephone Jack & Handset (with necessary accessories) in all buildings as required. The DVCC shall be an integral part of the FAS and must work even in case of Fire Alarm system failure.

2.4 Cabling and Conduit Works

- Wiring in False Ceilings: Supplying and laying fire alarm armoured copper cable for areas featuring a false ceiling. Armoured Fire survival cable shall be laid securely with clamps.
- Concealed Wiring: Supplying and drawing of fire alarm armoured copper cables in concealed MS Conduits of suitable size, strictly wherever there is no false ceiling. Spacing between two detectors and subsequent wire routing shall conform to relevant codes and manufacturer standards.

3.0 PUBLIC ADDRESS AND VOICE ALARM (PA/VA) SYSTEM - DSR 2025 BASED ITEM SPECIFICATIONS as per IS-18881-1998

The EPC Contractor shall design, supply, install, test, commission, and hand over a continuous-duty 24 V DC Public Address and Voice Alarm (PA/VA) system completely integrated with the Fire Alarm System. The following items shall be executed as per standard DSR methodology for Supply, Installation, Testing, and Commissioning (SITC):

3.1 Control Equipment & Rack Infrastructure

- SITC of Central Control Unit: Supplying, installation, testing and commissioning of a microprocessor-based, EN 54-16 certified Public Address and Voice Alarm (PA/VA) Central Control Unit complete with Digital Signal Processing (DSP), zone-wise paging, live announcements, pre-recorded emergency messages, all-call facility, emergency override,

background music muting and full integration with the Fire Alarm System. The controller shall support fault monitoring, event logging, password-protected operation and future system expansion.

- Advanced Power Mixing Amplifier: advanced power mixing amplifier with inbuilt blue tooth for audio streaming, supports audio play back fom USB pen drive, 4 mike / line inputs plus music source input, 2 tone chime generator for channel 1, Inrush current 36 A, Freq response 80 to 18000 Hz, Distortion

- SITC of Amplifiers and Power Supply: Supplying, installation, testing and commissioning of EN 54-16 certified digital Class-D amplifiers complete with 100 V line output, automatic battery charger, 24 V DC sealed maintenance-free battery bank, automatic changeover arrangement and hot standby amplifier (N+1 redundancy). The system shall provide a minimum of 24 hours standby operation followed by 30 minutes emergency voice alarm operation during mains failure. Amplifier loading shall not exceed 75% of the installed capacity and a minimum 25% spare capacity shall be available for future expansion. The amplifiers shall incorporate overload, short-circuit, over-temperature and surge protection with continuous fault monitoring.

- SITC of Equipment Racks: Supplying and fixing lockable, powder-coated mild steel racks to house all PA control equipment, featuring adequate ventilation and comprehensive cable management.

- SITC of Paging Consoles: Supplying, installation, testing and commissioning of desktop gooseneck condenser paging microphone complete with push-to-talk switch, LED indication, flexible stem, phantom power operation and desk stand. The paging console shall support zone-wise paging, all-call announcements and emergency voice announcements and shall be fully compatible with the PA controller.

3.2 Field Devices & Speakers

- SITC of Ceiling-Mounted Speakers: Supplying, installation, testing and commissioning of EN 54-24 certified ceiling-mounted loudspeakers suitable for 6/8 Watt with built in 100 V line operation with selectable power taps as specified in the approved drawings. Speakers shall be complete with metal grille, ceramic terminal block, thermal fuse and minimum 2-hour fire-rated back box, suitable for installation in offices, corridors, lift lobbies and common areas. The speakers shall provide clear speech intelligibility for emergency evacuation announcements.

- SITC of Wall-Mounted Speakers: Supplying, installation, testing and commissioning of EN 54-24 certified wall-mounted loudspeakers suitable for 12 Watt with built in 100 V line operation with selectable power taps, complete with metal grille, ceramic terminal block, thermal fuse and minimum 2-hour fire-rated back box. Speakers shall be installed in parking areas, staircases and other designated locations as per approved drawings.

3.3 Cabling, Monitoring, and Integration

- SITC of Speaker Circuit Supply and laying of 2 Core × 1.5 sq.mm minimum FRLSH fire survival copper cable complying with IEC 60331 / BS 6387 / EN 50200 (as applicable). The cable shall be laid in GI/MS conduit, cable tray or approved supports complete with glands, lugs, ferrules and terminations.

- System Integration and Fault Monitoring: The PA system shall be fully integrated with the Fire Alarm System. Upon receipt of a fire signal, the system shall automatically broadcast pre-recorded evacuation messages to the affected zones and override all routine paging and background music.

The system shall continuously monitor amplifier health, speaker circuits, batteries, chargers, communication links and power supplies and shall generate audible and visual fault indications for open circuit, short circuit, earth fault, amplifier failure, battery failure, charger failure and communication failure.

- Acceptance Testing: The complete PA System shall undergo 100% testing and commissioning before handover. Testing shall include speaker audibility test, speech intelligibility (STI) test, battery autonomy test, amplifier redundancy test, fault monitoring test, emergency paging test, automatic fire alarm interface test and cause & effect verification. All test reports shall be submitted to the Engineer-in-Charge for approval.

- System Certification: All major equipment including the Voice Alarm Controller, Amplifiers and Loudspeakers shall be EN 54 certified. The complete system shall comply with NBC, IS 2189, NFPA 72 and IEC/EN standards applicable to Voice Alarm Systems.

- SITC of Equipment Rack: Supplying, installation and commissioning of lockable 19-inch CRCA steel equipment rack of suitable size with powder-coated finish, front and rear access doors, cable management arrangement, ventilation, cooling fan, heavy-duty base frame and all accessories required for housing the complete PA/VA system equipment.

3.4 Minimum Technical Requirements (PA System)

Parameter	Requirement
Amplifier Output	120/240/500 W RMS, 100 V/70 V line
Frequency Response	40 Hz–20 kHz (±1 dB)
Total Harmonic Distortion	≤0.05%
Signal-to-Noise Ratio	≥100 dB
Channel Separation	≥90 dB at 1 kHz
Tone Controls	Bass ±10 dB @100 Hz; Treble ±6 dB @10 kHz
Spare Capacity	Minimum 25%
Maximum Amplifier Loading	75% of installed capacity
Power Supply	230 V AC, 50 Hz with automatic 24 V DC battery backup
Battery Backup	Minimum 24 Hours Standby + 30 Minutes emergency operation Alarm
Speaker Line	100 V line
Amplifier Redundancy	Hot Standby (N+1)
Cable	2C*1.5 sq.mm FRLSH Fire Survival Cable

4.0 Approve Make

LIST OF APROVED MAKE OF FIRE ALARM & DETECTION SYSTEM		
1.	Control Panel.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
2.	Repeater Panel.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack

3.	GUI Software .	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
4.	Third party BMS / Scada integration S/w.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
5.	PC in whole Tender.	DELL/HP/LENOVO / IBM
6.	Multi Sensor(Smoke + heat).	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
7.	Multi criteria Detector.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
8.	Duct detector, All other fire alarm detector and accessories.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
9.	Manual Call point.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
10.	Response Indicator.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
11.	Sounder.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
12.	Monitor Module.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
13.	Exit Point Sounder With Strobe.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
14.	Control/Relay/Module/Fault Isolator.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
15.	2 Way communication Fire Fighter's Jack.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
16.	Fire Fighter's handset.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack

17.	2 Core 1.5 Sq. mm Fire survival armored cable.	RR Kabel /Polycab / Lapp/Grandlay / Batra Henlay
18.	Graphic User Interface.	UL - Honeywell Notifier /Siemens Cerberus /TYCO Simplex EN – Hochiki / Honeywell Esser / Bosch / Schrack
19.	CCTV cameras	Cisco/ Axis/Avigilon / Bosch/i-PRO
20.	NVR	Cisco/ Axis/AVTRON / Pelco / Tyco /i-PRO
21.	Workstations	Dell / HP / IBM / Lenovo
22.	FHD LED Display	Panasonic/ Sony/ Samsung / LG/i-PRO
23.	IP-PBX SYSTEM & IP Phones	Tadiran/ seimens /Polycom/Matrix/Aeonix / i-PRO
24.	PA Systems	Honeywell/AVTRON / Bosch/i-PRO
25.	Speaker	Honeywell / AVTRON/ Bosch/i-PRO
26.	ITAM (for asset inventory management)	Arista/Nexxus /HPE /Palo-alto/i-PRO
27.	Access Control System	Cardex / Lenel / Impulse / Bosch / Smart/i-PRO
28.	EV Charging	ABB,Siemens, Panasonic, Luby