هيئة كفاءة الإنفاق والمشروعات الحكومية
Expenditure Efficiency & Projects Authority

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Fire and Life Safety System Integration Guideline

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1.0 PURPOSE

To identify and develop the Commissioning Process required by NFPA (National Fire Protection Association) 3 & 4 for the integration of all Fire and Life Safety System (FLS) for projects. Commissioning Process covers design and construction requirements to prove the functionality and reliability of the Integrated FLS Systems as per the Basis of Design (BoD) and Owner Project Requirements (OPR).

2.0 SCOPE

This document identifies the building systems, equipment, devices, and appurtenances (for architectural items) that required to be integrated to the Fire Alarm and Detection Systems (FDAS) to form the building block for Fire and Life Safety Systems as applicable for project types. The procedure defines minimum requirements for integrating all Fire and Life Safety Systems (FLS) in buildings, the scope of each entity required for successful integration, and the process of integration during the design and construction stage.

3.0 DEFINITIONS

Definitions	Description
Owner Project Requirements (OPR)	A client/owner generated mandatory pre-design document by ASHRAE, LEED, and NFPA, which is the basis of the Basis of Design (BOD) preparation, construction, acceptance, and operational requirements. The document contains the specific and detailed functional requirement (in less technical term) of the project and expectations how the project will be used and operate
Single Knocking	Initiation of single FDAS device (smoke detector, heat detector, flow switch, etc.)
Double knocking	Initiation of a second FDAS device (smoke detector, heat detector, flow switch, etc.). Other term such as cross-zoning means same thing.
Cause and Effect Testing (C&E)	Test conducted to the completed Fire and Life Safety System to determine and prove the system response based on developed scenarios based on single and double knocking.
Doomsday Testing	A test to simulate an actual emergency condition, which includes loss of system normal power, and transfer to essential power. The test requires all building services systems and equipment to be operating including transient loads. For complete test detail, refer to document EPM-KT0-PR-000006.
Commissioning Record	T&C documentation that Includes issues log, commissioning plan & methodology, progress reports, submittal and O&M manual reviews, training record, test schedules, construction checklists, start-up reports, functional tests, and trend log analysis.
Integration Testing Plan	This can be part of the overall T&C Plan, which is a strategic project specific procedure of documentation on how to complete the T&C for a given scope of work in a given project time duration. It outlines the scope and extent of the work, organization, schedule, recording, allocation of resources, and coordination planning.
Integration Methodology	This can be part of the over-all T&C Methodology, which is a written protocol that defines procedures and expectations for test, conducted on equipment, assemblies, systems for integration purpose. The document includes test prerequisites, test conditions, limitation and tolerance, tools and instruments to be used, schematics, and safety risk assessment

4.0 REFERENCES

Document Number	Title of the Document
EPM-KT0-PR-000006	Project Testing and Commissioning Procedure
EPM-KT0-GL-000003	Project Testing and Commissioning Guideline
EPM-KE0-TP-000016	Fire and Life Safety Integration - Checklist
EPM-KEE-GL-000002	ELV Design System Guideline
EPM-KEE-TP-000022	ELV System Design Criteria - Template

Document Number	Title of the Document
EPM-KEE-RG-000002	List of ELV Design Deliverables
EPM-KEE-GL-000004	ELV System Design Aids
EPM-KEE-TP-000010	Checklist – CCTV Surveillance System Layout
EPM-KEE-TP-000012	Checklist – Structured Cabling System Layout
EPM-KEE-TP-000025	Checklist – Access Control System Layout
EPM-KEE-TP-000026	Checklist – Public Address System Layout
EPM-KEE-TP-000027	Checklist – Master Clock System Layout
EPM-KEE-TP-000029	Checklist – Audio/Visual System Layout
EPM-KEE-TP-000030	Checklist – Fire Alarm System Layout
EPM-KEE-TP-000031	Checklist – Intercom System Layout

5.0 RESPONSIBILITIES

5.1 Owner/Entity

Establish an OPR and ensure scope includes a Commissioning Authority/Fire Commissioning Agent to review completeness of design and construction documents related to the FLS integration. For the detailed SoW (Scope of Works) for the Owner during design, construction, and occupancy, refer to T&C document EPM-KT0-GL-000003.

5.2 Commissioning Authority (CA) and Fire Commissioning Agent (FCA)

Assist the Owner/Entity to ensure that the OPR is completely developed and requirements of the Codes are included. Review the (Cause and Effect) C&E Matrix and assist in the incorporation of all requirements of the Code. For the detailed SoW of the CA/FCA during design, construction, and occupancy, refer to the Project Testing and Commissioning Guideline (EPM-KT0-GL-000003).

5.3 Designer (Architect/Engineer) - A/E

Establish the C&E Matrix based on Code and Standard requirements for FLS and incorporate Owner requirements for Security and Access Control. Provide clarification to all enquiries during the construction phase. For the detailed SoW of the A/E during design, construction, and occupancy, refer to the Project Testing and Commissioning Guideline (EPM-KT0-GL-000003).

5.4 Owner Representatives - Consultants, Project Management or Construction Management

Participate in the review of the C&E Matrix and advise improvements to ensure compliance to Codes and Standards. Conduct site inspection and supervise the T&C implementation to ensure quality control. For the detailed SoW of the Owner Representative during design, construction, and occupancy, refer to the Project Testing and Commissioning Guideline (EPM-KT0-GL-000003).

5.5 T&C Agent - Main Construction Contractor In-house T&C Entity or Specialized Third Party

Lead the coordination between Trade Contractors involved in FLS Systems, supervise the integration works as per the approved C&E, witness all testing activities, and ensure that quality control measures are implemented. For the detailed SoW of the T&C Agent during design, construction, and occupancy, refer the Project Testing and Commissioning Guideline (EPM-KT0-GL-000003).

5.6 Operation and Maintenance Personnel (OMP)

Address operational and maintenance requirement of the systems and participate during testing of the systems as standalone and as integrated. For the detailed SoW of the OMP during design, construction, and occupancy, refer to the Project Testing and Commissioning Guideline (EPM-KT0-GL-000003).

5.7 Authority Having Jurisdiction (AHJ)

Ensure that all international and local code requirements for FLS are incorporated during the approval of the design drawings and that the completed project construction FLS complies to the procedure of integration testing as per NFPA 4 and best construction practices.

6.0 FLS INTEGRATION PROCESS

6.1 General

Low Current Systems (or ELV), equipment, devices, and appurtenances that can be integrated to the Fire Detection and Alarm System (FDAS) depends on project classification and contract requirements, and are itemized as follows;

1. Building Management System (BMS)
2. Mechanical Life Safety Systems such as Staircase Pressurization, Lift Lobby or Lift Shaft Pressurization, Atrium Smoke Extraction System, Zone Smoke Control System, and Car Parking Smoke Management System.
3. Security and Access Control System
4. Public Address and Voice Alarm System
5. Closed Circuit Television System (CCTV)
6. Data Infrastructure and Wireless Network
7. Elevators
8. Sprinkler Flow Switch and Valve Supervisory Switch
9. Audio Visual System
10. Door Hold Open Hardware
11. Duct Motorized Dampers
12. LPG Solenoid Valve
13. Clean Agents
14. Pre-action System
15. Kitchen Hood Suppression System
16. Roll-up Doors
17. Drop Curtains
18. Oxygen Solenoid Valve
19. Car Parking Entrance and Exit Booms
20. Two-way Emergency Communication System

For the explanation of each system, equipment, devices, and appurtenances functions for Fire and Life Safety System, refer to document EPM-KT0-GL-000003.

6.2 During Design Stage

1. Low Current Systems (or ELV), equipment, devices, and appurtenances that are required to be integrated to the Fire Detection and Alarm System (FDAS) shall be define in the OPR during the pre-design stage. OPR shall also include connectivity requirements to the Voice and Data Infrastructure TCP/IP backbone or a dedicated backbone for FDAS panel loop. The CA and the Owner Representative shall assist the Owner in establishing all requirements.
2. The design team (A/E and CA (Commissioning Authority) shall develop a conceptual Cause and Effect (C&E) Matrix which includes Low Current Systems, equipment, devices, appurtenances (for architectural items) to be controlled and monitor by the FDAS Control Panels.
3. The conceptual C&E Matrix shall include responses of Low Current Systems, equipment, devices, appurtenances, and architectural items based on:
   a. Type of initiation such as MPS, smoke detector, flow switch, etc.
   b. Single and double knocking responses
   c. Time delay prior to the FLS response
   d. Method and zoning of public notification during single knock
   e. Priority and progression of public notification during double knock and occupant evacuation.

4. A Particular Specifications shall be developed by the design team for the FLS Integration to indicate method of connection between systems and controllers. For other Integration Specification requirements during the design phase, refer to FLS Checklist EPM-KE0-TP-000016.
5. An FLS integration diagram shall be developed and prepared by the design team to aid the Main Contractor and FLS Trade Contractor regarding the requirements for systems connectivity and integration. The diagram shall indicate connectivity either by electro-mechanical interlink thru relays and contacts, hardwire analogue or digital interface, hardwire software interface, or fiber optic software interface, etc.
6. Cyber Security needs to be addressed, assigned responsibility, and direction for codes to follow shall be considered in the design.

6.3 During Construction Stage

1. The Main Contractor in coordination to all FLS Trade Contractors shall develop and populate the conceptual or design C&E Matrix to indicate response based on specific mechanical equipment tag/labelling shown in approved shop drawing; staircase, lift lobby, and other door designations in architectural shop drawings; roller shutters designation base on its location; and responses required based on floor level occupancy, etc.
2. The Main Contractor and his T&C Agent shall prepare a comprehensive Integration Testing Plan and Methodology to be approved by the CA and the Owner Representatives.
3. The Main Contractor shall ensure that field devices procurement shall be coordinated with the T&C schedule and re-certification shall be based on date of installation or use and not on the date of last test. All required testing shall immediately commence upon installation of field devices.
4. The Fire Detection and Alarm System (FDAS), Low Current Systems, Mechanical Life Safety Systems, equipment, devices, and appurtenances shall pass all required testing independently prior to the integration works. The Main Contractor shall ensure that all systems, equipment, devices, and appurtenances connected to the secondary loop/circuit of the FDAS (through the interface module) are available during the initial (floor wise or zone wise) integrated testing.
5. The Main contractor and his T&C Agent shall ensure the completion of each standalone system testing as per the requirement of NFPA 70, NFPA 72, NFPA 90, NFPA92, NFPA101, NEC, NEMA, ASMI/ANSI A17.1, and other pertinent Codes prior to commencing the integration works.
6. The Main Contractor in coordination with his T&C Agent shall conduct building wise Cause and Effect Testing to be witnessed by the Commissioning Authority, Client Representative, and the Operation and Maintenance Division of the Client prior to offering the substantially completed works to the AHJ.
7. The Main Contractor with his T&C Agent shall conduct a “Doomsdays Testing” to be witnessed and accepted by the AHJ prior to the preliminary project handover. The test shall be coordinated to the Fire Fighting Authority (or Civil Defense) for the provision of Fire Truck to test road access to the building including Fire Department Connection to the Sprinkler and Hose System. The test shall include emergency lighting systems verification and fire pump activation. For the complete scope of work regarding the Doomsday Testing, refer to document EPM-KT0-GL-000003 Project Testing and Commissioning Guideline section 5.
8. Integrated Testing and Commissioning records, to prove the completeness of the integrated testing works shall be submitted by the Main Contractor and his T&C Agent to the Client duly approved by the Commissioning Authority and Client Representatives.
9. All test procedure shall conform to NFPA 4 – 2018 and NFPA 72- 2013 edition and best construction practices.

7.0 ATTACHMENTS

1. EPM-KE0-TP-000016 – Fire and Life Safety System Integration Checklist
2. EPM-KT0-TP-000046 - Fire Detection and Alarm System Test Package
3. EPM-KEE-13-000002 - Fire and Life Safety Integration Block Diagram

7.1 Attachment 1 : EPM-KE0-TP-000016 Fire and Life Safety System Integration Checklist

PROJECT NAME:		DISCIPLINE:	REV.
EQUIPMENT TYPE: Fire and Life Safety Integration	EQUIPMENT TAG:	EQUIPMENT LOCATION:	

No.	QUESTIONS	ORIGINATOR		
		N/A	YES	NO
Fire and Life Safety Integration				
	Preliminary Requirements			
1	Design Site Survey (ekahau, cisco, air magnet, etc.) was conducted for Wireless Network System to ensure proper signal strength coverage of each Access Points. Parameters used for the Site Survey has been discussed and accepted by the Client Representatives.	☐	☐	☐
2	Design consider PAVA amplifier capacity to handle simultaneous activation of speakers and increase in output during fire condition.	☐	☐	☐
3	PAVA speaker and amplifier zoning matches the Fire Evacuation Strategy Zoning requirements.	☐	☐	☐
4	Security and Access Control strategy in place to determine doors to remain close and doors to unlock during single and double knocking.	☐	☐	☐
5	Evacuation strategy in place to determine use of elevator during evacuation and evacuation priority procedures in relation to public annunciation.	☐	☐	☐
6	Zoned-smoke control system employed in the Fire and Life Safety Strategy as required by NFPA 101 for specific project application.	☐	☐	☐
7	Elevator secondary recall level identified by the Architect and Fire/Life Safety Plan.	☐	☐	☐
8	Dedicated 2-way emergency communication system is required (or Enterprise Phone System is recommended to use).	☐	☐	☐
9	Mains power supplies for controllers, interface modules, and devices are included (24v DC, 24v AC, or 220 v AC) in the Specification or POE (Power Over Ethernet) is required for Low Current Systems, as applicable. Requirements for essential power shall also be indicated for POE and non-POE. POE shall comply to IEEE 802.3	☐	☐	☐
10	Low Current System (or ELV) field devices power requirements (as applicable) matches the POE Switch Chassis power availability (Up to 15 watts for POE switch, up to 30 watts for POE plus, and up to 60 watts for Universal POE in compliance to IEEE 802.3).	☐	☐	☐
11	Cyber Security needs to be addressed, assigned responsibility, and direction to codes to follow included.	☐	☐	☐
	Specification Requirements			
12	NFPA 72 Positive Alarm Sequence is applicable.	☐	☐	☐
13	Controllers used for all Smoke Control Systems are UL 864 Certified/UUKL listed.	☐	☐	☐
14	Specification states that Standalone and Integrated Testing of Low Current System related to Fire and Life Safety complies with NFPA 3 and 4 latest edition.	☐	☐	☐
15	The OPR and Particular Specification is provided for Fire and Life Safety Integration which includes sequence of operation of following systems, equipment, devices, and items be connected to the Fire Alarm Control Panel (FACP), as applicable:	☐	☐	☐
	a. Low Current System (or ELV) such as:			
	• Building Management System	☐	☐	☐
	• Security and Access Control to include Intrusion Detection	☐	☐	☐
	• Public Address and Voice Alarm System	☐	☐	☐
	• Close Circuit Television Camera Tracking System	☐	☐	☐
	• Audio-Visual System	☐	☐	☐
	• Data Infrastructure and Wireless Network System	☐	☐	☐
	b. Mechanical Life- Safety Systems such as:			
	• Staircase Pressurization System	☐	☐	☐
	• Lift Lobby or Lift Shaft Pressurization System	☐	☐	☐
	• Atrium Smoke Extraction System	☐	☐	☐
	• Car Parking Smoke Management System	☐	☐	☐
	c. Elevator primary and secondary recall	☐	☐	☐
	d. Sprinkler Flow Switch and Valve Supervisory Switch	☐	☐	☐
	e. Door Hold-open electro-magnetic hardware for smoke partitions	☐	☐	☐
	f. Main Entrance doors for Atrium Smoke Exhaust make-up air	☐	☐	☐
	g. Air ducting motorized dampers for smoke zones	☐	☐	☐
	h. LPG solenoid valve closure during single or double knock detection	☐	☐	☐

PROJECT NAME:		DISCIPLINE:	REV.		
EQUIPMENT TYPE: **Fire and Life Safety Integration**	EQUIPMENT TAG:	EQUIPMENT LOCATION:			
	i. Clean Agent Control Panel interlink for monitoring of fire/smoke detection status		☐	☐	☐
	j. Pre-action System Control Panel interlink for monitoring of fire/smoke detection status		☐	☐	☐
	k. Kitchen hood fire-suppression system interlink for Kitchen Exhaust Fan and Make-up AHU shutdown.		☐	☐	☐
	l. Roll-up door interlink for security and access control.		☐	☐	☐
	m. Drop curtains for smoke zone confinement in large and open areas (e.g. malls)		☐	☐	☐
	n. Oxygen solenoid shut-off for healthcare		☐	☐	☐
	o. Car parking exit and entry booms		☐	☐	☐
	p. 2-way emergency communication system (PABX or VoIP Server interface)		☐	☐	☐
16	Routing and other communication level protocol requirements such as IP or Non-IP based (e.g.TCP/IP) are identified in the Specification for all Low Current Systems integrated to the Fire Alarm System.		☐	☐	☐
17	Specification indicates preferred communication protocol for all Low Current System. Communication protocol is truly open for inter-operability for all system level integration.		☐	☐	☐
18	Designer must consider and coordinate aspects of system integration, such as Quality of Service (QoS), delay and packet loss management, delay variation, security, bandwidth, scalability, information storage, authorization level, and redundancy to ensure successful system integration		☐	☐	☐
19	Specification clearly defines method of integration between systems, equipment, devices, and other items within the controllers. Integration method shall indicate either of the following method: a. Electro-mechanical interlink thru relays and contactors. b. Hardwire analogue integration by voltage (0-10 v, 0-5v, 2-10 volts), or current signal (4-20mA) c. Hardwire digital integration d. Hardwire software integration by BACNet, LON, Modbus, KNX, DALI, OPC, M-Bus, EnOcean, and other BAS protocol. e. Fiber Optic software integration supported by BACNet, LON, Modbus, KNX, and other BAS protocol. f. Type of communication cabling.		☐	☐	☐
20	Level controller control signal output matches field devices signal input and vise-versa.		☐	☐	☐
21	Fire Alarm Control Panel voice card is capable to handle requirement for public annunciation as per Fire Evacuation Plan.		☐	☐	☐
22	Field devices (sensors, actuators, etc.) are NIST calibrated. Required criteria for the accuracy of field devices stated in the specification including device drift (during storage and during use) to identify re-calibration/replacement requirements.		☐	☐	☐
23	A Commissioning Authority /Fire Commissioning Agent & Integrator was employed by the Client to provide comprehensive review and recommendation for all documents related to Fire and Life Safety System (e.g. FLS Integration Specification, BOD, OPR, etc.) to comply with the Client's requirements, Codes, and Standards during the stages of design development.		☐	☐	☐
24	Testing and Commissioning requirements are defined in the Specification such as:		☐	☐	☐
	a. Comprehensive methodology for Integrated Testing.		☐	☐	☐
	b. Integration Testing Plan to include:				
	• Identification of procedure, limits, and process of inspection.		☐	☐	☐
	• Scope and list of systems, equipment, devices, and other items covered under the FLS Integration Program.		☐	☐	☐
	• Overview of the Integration Strategy.		☐	☐	☐
	• Milestone schedule.		☐	☐	☐
	• FLS Integrator Third Party Agent Organizational Chart.		☐	☐	☐
	• Reporting procedure for progress, defects, and corrections		☐	☐	☐
	• Division of Responsibilities between Trade Contractors.		☐	☐	☐
	• Integration checklist and templates.		☐	☐	☐
25	Training requirements for Maintenance Staff identified in the Specification (duration, programming, hands-on, external or local training, etc.)		☐	☐	☐

PROJECT NAME:		DISCIPLINE:	REV.		
EQUIPMENT TYPE: **Fire and Life Safety Integration**	EQUIPMENT TAG:	EQUIPMENT LOCATION:			
26	Clear description of division of responsibilities and Scope of Work between integrating parties such as connections for secondary circuits/loops from interface modules.		☐	☐	☐
	Drawings, Tables and Diagrams				
27	Fire and Life Safety Integration Diagram is developed and provided by the designer which includes methods of connection between systems, equipment, devices, and other items, inclusive of gateways as required.		☐	☐	☐
28	The architectural RCP reflects all Low Current System (or ELV) field devices and third fix (smoke detectors, Access Points, strobes, speakers, camera, etc.). Architectural RCP is the only base layout/reference for almost all Low Current field devices during design.		☐	☐	☐
29	The architectural plan reflects all Low Current System (or ELV) field devices and third fix (manual pull stations, strobes, speakers, camera, etc.) installed on the wall. Architectural layout is the only base layout for Low Current field devices installed on the wall during design.		☐	☐	☐
30	Fire Detection and Alarm System Cause and Effect Matrix is prepared which includes time delay for the alarm notification and smoke control system activation as per NFPA 72.		☐	☐	☐
31	Ensure documents and drawings meet the requirements specified in the OPR and applicable local regulations, codes, and standards.		☐	☐	☐

No.	Reviewer's Comments	Resolution

Originator's Name / Signature and Date:	Checker's Name / Signature and Date:

7.2 Attachment 2 : EPM-KT0-TP-000046 Fire Detection and Alarm System (FDAS) Test Package

FIRE ALARM TESTING AND COMMISSIONING

Fire Detection Alarm System (FDAS) Test Package

Witnessed by : _____

Representing : _____

Signature : _____

Date : _____

System : FIRE ALARM SYSTEM

Building : _____

Contract : _____

Client : _____

Consultant : _____

Remarks:		
Date:	**Engineer:**	**Sheet No.**
ENGINEER'S REPORT SHEET		

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

Date:	Engineer:	Sheet No.

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

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FIRE ALARM SYSTEM

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

1. FIRE ALARM SYSTEM - PRE-COMMISSIONING CHECK LIST

Addressable Fire Detection and Control	
Project Name:	
Location:	
Initiating Device Circuit	
No. of Initiating Device Loops:	
No. of Control and Monitoring Loops:	
Type of Cable:	
Size of the Cable:	
Style of Wiring:	
Drawing Reference:	

Loop 1	Yes	No	Comments
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Grounding:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
Within Loop Capacity as per approved drawing:	Yes ☒	No ☐	
Proper Identification per approved drawing:	Yes ☒	No ☐	
Loop 2	**Yes**	**No**	**Comments**
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Grounding:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
Within Loop Capacity as per approved drawing:	Yes ☒	No ☐	
Proper Identification per approved drawing:	Yes ☒	No ☐	
Loop 3	**Yes**	**No**	**Comments**
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Grounding:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
Within Loop Capacity as per approved drawing:	Yes ☒	No ☐	
Proper Identification per approved drawing:	Yes ☒	No ☐	

Notification Circuits (NAC) /Speaker with strobes, Speakers	
Number of Notification Circuits (NAC)	
Style of Wiring:	
Type of Cable:	
Size of Cable:	
Drawing Reference:	

NAC Circuit 1	Yes	No	Comments
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
NAC Circuit 2	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
NAC Circuit 3	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
NAC Circuit 4	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
NAC Circuit 5	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
NAC Circuit 6	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
NAC Circuit 7	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
Fireman's Phone Circuits			
No. of Phone Circuits:			
Style of Cabling:			
Type of Cable:			
Size of Cable:			

Drawing Reference:			
Phone Circuits 1	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
Phone Circuits 2	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
Phone Circuits 3	**Yes**	**No**	**Comments**
Proper Identification as per approved drawing:	Yes ☒	No ☐	
No. of Circuits as per approved drawing:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
Network Wiring			
Type of Cable:			
Style of Wiring:			
Size of Cable:			
Drawing Reference:			
Proper Identification as per approved drawing	Yes ☒	No ☐	
Free from Grounding:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Free from Short Circuit:	Yes ☒	No ☐	
Fire Alarm Control Panel			
Type of Panel:			
Device Capacity of the Panel:			
Number of Panels:			
Primary Power Requirement:			
Type of Secondary Power:			
Type:			
Hours of Standby:			
Type of Circuit Protection:			
MDB Location:			
Description	**Yes**	**No**	**Comments**
Correct Panel as per approval:	Yes ☒	No ☐	
Correct Location as per approved drawing:	Yes ☒	No ☐	
Correct Installation height as per approved drawing:	Yes ☒	No ☐	
No Physical Damage to the Panel:	Yes ☒	No ☐	

No Physical Damage to the Battery:	Yes ☒	No ☐	
Free from Extraneous Voltage:	Yes ☒	No ☐	
Proper Identification of Field Wiring:	Yes ☒	No ☐	
Power Supply with proper Grounding:	Yes ☒	No ☐	
Proper Cable Termination within the Panel:	Yes ☒	No ☐	
Correct Performance of the Panel:	Yes ☒	No ☐	
Alarm Initiating Devices			
Smoke Detector	**Yes**	**No**	**Comments**
Type:			
Sensitivity:			
Number of detectors:			
Correct type of detector as per approved drawing:	Yes ☒	No ☐	
Correct physical address as per approved drawing:	Yes ☒	No ☐	
Correct location as per approved drawing (Height/width, breadth)	Yes ☒	No ☐	
Correct placement as per approved drawing:	Yes ☒	No ☐	
No physical damage to Detectors:	Yes ☒	No ☐	
Correct termination at the Detector terminals:	Yes ☒	No ☐	
Correct functionality of the Devices:	Yes ☒	No ☐	
Heat Detector	**Yes**	**No**	**Comments**
No. of Devices:			
Type:			
Temperature:			
Correct Type of Detector as per approved drawing:	Yes ☒	No ☐	
Correct Physical Address as per approved drawing:	Yes ☒	No ☐	
Correct Location as per approved drawing (height/width, breadth)	Yes ☒	No ☐	
Correct Placement as per approved drawing:	Yes ☒	No ☐	
No Physical Damage to Detectors:	Yes ☒	No ☐	
Correct Termination at the Detector Terminals:	Yes ☒	No ☐	
Correct Functionality of the Devices:	Yes ☒	No ☐	
Manual Call Point	**Yes**	**No**	**Comments**
No. of Normal Call Points:			
No. of Weather Proof Call Points:			
Type of Action:			
Correct Type of Device as per approved drawing:	Yes ☒	No ☐	
Correct Physical Address as per approved drawing:	Yes ☒	No ☐	
Correct Location as per approved drawing:	Yes ☒	No ☐	
Correct Location as per approved drawing (height/width, breadth)	Yes ☒	No ☐	
Correct Placement as per approved drawing:	Yes ☒	No ☐	
No Physical Damage to Detector:	Yes ☒	No ☐	

Correct Termination at the Device Terminals:	Yes ☒	No ☐	

Correct Functionality of the Devices:	Yes ☒	No ☐	
Notification Peripherals	**Yes**	**No**	**Comments**
No. of Speakers:			
No. of Sounders:			
No. of Speaker with Strobes:			
No. of Flashers:			
Correct Quantity as per approved drawing:	Yes ☒	No ☐	
Correct Location:	Yes ☒	No ☐	
Correct Height from ground level as per approved drawing:	Yes ☒	No ☐	
No Physical Damages during installation:	Yes ☒	No ☐	
Proper Termination at each Terminal:	Yes ☒	No ☐	
Sufficient dB Level:	Yes ☒	No ☐	
Sufficient Candela Rating:	Yes ☒	No ☐	
Monitoring Devices	**Yes**	**No**	**Comments**
No. of Monitoring Devices:			
Correct Installation as per approved drawing:	Yes ☒	No ☐	
No Physical Damages for the Devices:	Yes ☒	No ☐	
Appropriate Monitor Points as per specification:	Yes ☒	No ☐	
Devices Remain in Normal Condition:	Yes ☒	No ☐	
Control Devices	**Yes**	**No**	**Comments**
No. of Control Devices:			
Proper Installation as per approved drawing:	Yes ☒	No ☐	
Proper Location as per approved drawing:	Yes ☒	No ☐	
Correct Height from Ground Level:	Yes ☒	No ☐	
No Physical Damages to the Panel:	Yes ☒	No ☐	
Correct Functionality:	Yes ☒	No ☐	

SIGN OFF:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
COMMISSIONING ENGINEER:			
COMMISSIONING MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

1. BATTERY AUTONOMY TEST

	Description	Acceptable / Measured Data	Date
1	The fire alarm panel shall include stand by battery power to support the system in mains failure.		
	a) 24 hours standby		
	b) Disconnect the mains power and allow the batteries to discharge		
	c) 30 minutes in alarm		

Alarm Sequence Set and Battery Autonomy Test Commenced		
Date:	Start Time:	Completion Time:

SUB: Battery Test / Date

S. No.	Test Time	Measured Voltage	Remarks

SIGN OFF:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
COMMISSIONING ENGINEER:			
COMMISSIONING MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

1. MSFD PANELS

Damper Panel Ref	Control Module Ref	MSFD Ref	Monitor Module Ref	Location	Remarks

SIGN OFF:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
COMMISSIONING ENGINEER:			
COMMISSIONING MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

1. TESTING & COMMISSIONING REPORTS

Details:

Fire Alarm Control Panel:	
Manufacturer:	
Model No:	
Software Rev:	
Building Name:	
Panel Location:	

Alarm Initiating Devices and Circuit Information

Device	Qty of Devices Installed	Circuit Style	Qty of Devices Tested
Manual Fire Alarm Call Points			
Photo Detectors			
Heat Detectors			
Water Flow Switches			
NOVAC			
Foam System		-	-
Alarm Verification Feature		Disabled ☐	Enabled ☒
Speaker with Strobe			
Speakers			
Are Circuits Monitored for Integrity		Yes ☒	No ☐

Supervisory, Trouble & Monitoring Signal Initiating Devices and Circuit Information

Device	Qty of Devices Installed	Correct Text Label	Qty of Devices Tested
Sprinkler Zone Control Valve			
Sprinkler Fire Hose Reel			
MSFD			
Generator Fuel Level			
NOVAC System			

Control Modules and Circuit Information

Device	Qty of Devices Installed	Correct Text Label	Qty of Devices Tested
Exhaust Fans			
AHU			
Roller Shutter			
Access Controlled Doors			
Damper Control			
FCU			
Door Holder			
Lighting Control System			

System Power Supply	
A. Primary (Main)	
Nominal Voltage:	
Over Current Protection Type:	
Location:	
B. Secondary (Standby)	
Storage Battery:	
Type:	

Check List: Prior to Any Testing			
Description	**Yes**	**No**	**Comments**
Notifications are made to:			
Building Occupants:	☒	☐	
Building Management:	☒	☐	

System Tests and Inspections			
Type	**Visual**	**Functional**	**Comments**
Control Panel:	☒	☒	
Interface Equipment:	☒	☒	
Lamps/LEDs:	☒	☒	
Primary Power Supply	☒	☒	
Trouble Signals	☒	☒	
Supervisory Signals	☒	☒	
Ground Fault Monitoring	☒	☒	
Secondary Power (Battery Condition)			
Load Voltage	☒	☒	
Charger Test	☒	☒	
Notification Appliances			
Audible	☒	☒	
Visible	☒	☒	
Speakers	☒	☒	
Voice Clarity	☒	☒	

Alarm Initiating, Supervisory and Control Device Tests & Inspections			
Location/Address	**Device Type**	**Receipt of Correct Text Label**	**Functional Test**
Location & address of devices checked and confirmed	Devices have been checked for the correct type of device	Checked at the FAP	All devices have been activated and checked at the Panel
☒ Passed	☒ Passed	☒ Passed	☒ Passed
The device activation test sheets and printouts are attached with the document			
The control and monitoring loops are attached with the document			
Comments:			
When the network is completed, 1% of the devices already tested in the CUP are to be re-tested back to fire command center and the graphic package is to be checked and confirmed.			
The CUP buildings cause and effect matrix will be tested standalone incorporating nodes 1 & 2.			

Emergency Communications Equipment			
Device	**Visual**	**Functional**	**Comments**
Phone Set	☒	☒	

Phone Jacks	☒	☒	
Off Hook Indicator	☒	☒	
Amplifier(s)	☒	☒	
Call in Signal	☒	☒	
System Performance	☒	☒	
Interface Equipment			
Device	**Visual**	**Device Operational**	**Simulated Operation**
AHU	☒	☒	☐
FCU	☒	☒	☐
EXHAUST FAN	☒	☒	☐
MSFD	☒	☒	☐
ROLLER SHUTTER	☒	☒	☐
ACCESS CONTROL	☒	☒	☐
DOOR HOLDER	☒	☒	☐
Supervisory Station Monitoring			
Device	Visual	Functional	Comments
Alarm Signal	☒	☒	
Alarm Restoration	☒	☒	
Trouble Signal	☒	☒	
Trouble Signal Restoration	☒	☒	
Supervisory Signal	☒	☒	
Notification of Testing Completion	**Yes**		**No**
Building Management	☒		☐
Building Occupants	☒		☐
THE FOLLOWING DID NOT OPERATE CORRECTLY			
Standalone Cause & Effect Testing is complete and ready to be witnessed by CML. During the testing it was noted that there are elements of interfacing that are still to be completed, however all control and monitoring modules have been checked and proved by Setra.			
Interfacing works to complete -			
System Restored to Normal Operation			
Date:		Time:	
The testing performed in accordance with applicable NFPA and local civil defense standards.			

SIGN OFF:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
COMMISSIONING ENGINEER:			
COMMISSIONING MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

1. COMMISSIONING SHEETS

A. Pre-Functional Testing (Installation)

	PRE-REQUISITE	Yes/No	Remarks
1	Installation of containment:		
2	Verify installation of cables per system requirement:	Yes	
3	Ensure installation of devices per approved drawings:	Yes	
4	Ensure installation of panels per approved drawings:	Yes	

Comments:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
T&C AGENT:			
T&C AGENT MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

A. Startup / No Power

	PRE-REQUISITE	Yes/No	Remarks
1	Ensure field wiring are free from ground/short circuit prior to terminate in the FA panel		
2	Ensure proper identification of field wiring prior to terminate in the FA panel	Yes	
3	Ensure no physical damage to devices / equipment.	Yes	
4	Programing / Labeling	Yes	

Comments:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
T&C AGENT:			
T&C AGENT MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

A. Pre-Functional Testing - Check Sheet

	PRE-REQUISITE	Yes/No	Remarks
1	Switch on power		
2	Connect batteries	Yes	
3	Upload the program	Yes	
4	Check panel configuration	Yes	

Comments:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
T&C AGENT:			
T&C AGENT MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

A. Functional Performance Testing and Witness

	PRE-REQUISITE	Yes/No	Remarks
1	Test the function of smoke detectors		
2	Test the function of heat detectors	Yes	
3	Test the function of Manual call points	Yes	
4	Test the function of flow switch activation.	Yes	
5	Test the function of NOVEC/VESDA system alarm	Yes	
6	Test all the notification devices & very appropriate SPL/LUX levels etc.	Yes	
7	Test the interface in line with approved C&E Matrix.	Yes	

Comments:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
T&C AGENT:			
T&C AGENT MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

A. Integration Testing

	PRE-REQUISITE	Yes/No	Remarks
1	Connect Network Cables		
2	Upload Network Programs		
3	Test N/W Points in the Area FACPs		
4	Test NDUs		
5	Test Graphics		

Comments:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
T&C AGENT:			
T&C AGENT MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

A. Handover

	PRE-REQUISITE	Yes/No	Remarks
1	Training		
2	Documentation		
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Comments:

On-behalf of	Name	Date	Signature
TRADE CONTRACTOR:			
MAIN CONTRACTOR:			
T&C AGENT:			
T&C AGENT MANAGER:			
CONSULTANT:			

Client:	Contract No. :
	MS No. :
Location:	System :
	Unit No. :

6. SEQUENCE OF OPERATION AND TEST PROCEDURES

Pre-Start Checks / Pre-Commissioning (PFT)

Ensure the installation of the system confirms to the standards recommended by local Civil Defence Authority and NFPA.

A. Pre-Start Checks / Pre-Commissioning (PFT)	Function Test	Remarks
1. All fire alarm panels shall be in accessible locations		
2. Dedicated power supply for FACP		
3. All voice evacuation circuits shall be class A and outgoing and incoming cables shall follow different path physically.		
4. Recommended to have 100% detection and access for periodical maintenance of devices.		
5. Maximum distance between Manual call stations shall not be more than 20m.		
6. Standard installation heights of Manual call stations, Fireman's phone jack, and Notification peripherals shall be 1220mm, 1520mm and 2300mm from FFL Respectively.		
7. Check if the field wires properly identified prior to making connection.		
Identify the field wiring and make sure there is no extraneous voltages, grounding, and short circuit in appropriate circuits.		
1. Select a circuit, check the voltage using multi meter for extraneous voltage. Check all circuits prior to connecting to the panel.		
2. Select a circuit to check the resistance of the cable using a multi meter. The reading shall be No greater than 30ohms. Complete continuity checks for all circuits prior to connecting to the panel.		
When all devices and modules installed, a Simplex "True START" instrument is used to validate the integrity of a loop and all connected devices checking for:		
a) **Heads missing**: The sensor head not installed on the base. Test report can be used to prove the sensor was not installed during installation		
b) **Invalid Address**: An invalid address is 0,251 to 255. IDNET supports address 1 to 250		
c) **Duplicated Address**: More than one device is set to the same address. Use the LED ON feature to find the duplicate devices.		
d) **Out of range**: The sensor analog value is out of acceptable range, most likely a dirty sensor. Replace or clean the sensor.		
e) **Unknown device**: The True START instrument does not recognize the device at this address. Run a duplicate device test / Bad device.		
Through pre-testing, determine conformance of the system to the requirements of the approved drawings and specification		
1. Upon connecting all field circuit to the FACP, initiate some Fire Alarm devices randomly and check the performance in line with approved drawings prior to final testing		
Correct deficiencies if observed on pre-testing, rapid malfunctioning or damaged items shall be re-tested until satisfactory performance and conditions are achieved.		

A. Commissioning / Test Procedures (FPT)	Function Test	Remarks
System provider shall commission the system and test the same in a standalone mode.		
Following sequence shall be followed while conducting the tests		
1. Test and verify the functionality and Battery capacity of each Fire Alarm Control Panel (Node) prior to conduct any tests in the field devices. Battery Calculation sheet attached.		
2. Test 100 % field devices and appliances. All smoke detectors shall be tested using aerosol and heat detectors shall be tested with a heat generator (at least once) before it can be tested with other means such as magnetic test.		
a) FACP shall be tested to verify correct receipt of alarm, supervision and fault signals (inputs)		
b) While 100% testing of devices, verify the receipt of alarm and correct text labeling on area FACP simultaneously.		
Note: The same sequence shall be followed for all FACP's. During the testing, ensure the system is reset after initiation of every 10 devices.		
B. Initiating Devices		
a) **Smoke Detectors:** The Detector shall be tested to ensure smoke entry into the sensing chamber and an alarm response. Testing with smoke or listed aerosol approved by the manufacture shall be permitted as an acceptable test method. Detectors can be tested using magnetic rod. Place the magnetic rod near the TEST point on the detector base and hold for 10 seconds.		
b) **Heat Detector:** The detector shall be tested with a heat source per manufactures recommendation and alarm shall be verified. Detectors can be tested using magnetic rod. Place the magnetic rod near the TEST point on the detector base and hold it for 10 seconds.		
c) **Manual Call Points** - Alarms shall be verified by activating key operated manual call points		
d) **Duct Detectors:** Duct detectors shall be tested to ensure that the device will sample the air stream in order to activate. Spray aerosol into the duct at which sampling tubes are fixed or use the magnetic test point inside the detector enclosure.		
e) **Zone Control Valve:** Valve shall be operated and supervisory signal receipt shall be verified to be within the first two revolutions of the hand wheel or per the manufacturer's published instructions.		
f) **Sprinkler Flow Switch:** Drain valve (Near each zone control valve) shall be opened to cause water flow and alarm receipt shall be verified.		
Records: The above activities shall be recorded in each Area FACP as a historical log and can be retrieved as a print out from the relevant panel		
C. Create Field Fault (Randomly)		
a) Smoke detector missing		
b) Wrong device		
c) Bad answer		
d) No answer and verify the receipt of fault and correct text labeling		
e) AC Power Failure		
f) Negative to Ground		
g) Positive to Ground		
h) Battery Depleted		
i) Open Circuit		
j) Verify the receipt of System Faults in Area FACP.		

Records: The above activities shall be recorded in each area FACP as a historical log and can be retrieved as a print out from the relevant panel		
A. Operation of Evacuation Signals and Auxiliary Functions (Outputs)		
a) While 100% testing of devices, verify the broadcast of evacuation and sounder signals from area FACP as per approved Cause & Effect Matrix.		
b) **Fuses** - The fuse ratings shall be verified. 230AC - 2A & 24VDC - 9A		
c) **Lamps & LEDs** - Press Lamp test button at each area FACP and verify all Lamps & LEDs are illuminated.		
d) **Primary (Main) Power Supply** - All secondary power shall be disconnected and tested under maximum load, including all alarm appliances requiring simultaneous operation. All secondary power shall be reconnected at the end of test. Ideal condition for maximum load is during the alarm condition.		
Records: The above activities shall be recorded for each FACP as a historical log and can be retrieved as a print out from the relevant panel		
B. Secondary Power Supply		
a) All primary power supplies (Mains AC Power) shall be disconnected in area FACP and the occurrence of required trouble indication for loss of primary power shall be verified.		
b) Above condition shall prevail for 24hrs and at the 59th minute of the final hour, an alarm shall be generated for duration of 30 minutes to verify the ability of batteries to meet standby and alarm requirements at each area FACP.		
Records: The above activities shall be recorded for each FACP as a historical log and can be retrieved as a print out from the relevant panel		
C. Testing and Verification of Fireman's Phone		
a) **Off Hook Indicator** - Phone set shall be installed or shall be removed from hook and receipt of signal on Voice Command Center at Fire Command Center shall be verified (Network to be completed)		
b) Phone Jacks - Phone jack shall be visually inspected, communication path through jack shall be initiated and exact location shall be verified in the Fire Command Centre (Network to be completed)		
• Select any fire zone and plug in handset into available jacks in the same zone. Then establish communication between Fire Command Centre.		
• There are six simultaneous conversations possible at a given time. Repeat the testing sequence in the rest of the Zones and record the result in the testing and commissioning report.		
D. Programming and Testing Procedure resulting in modification made to the system		
a) When an initiating device, notification appliance or control relay is added, it shall be functionally tested.		
b) When an initiating device, notification appliance or control relay is deleted, another device, appliance or control relay on the circuit shall be operated.		
c) When changes are made to site- specific software, the following shall apply.		
• All functions known to be affected by the changes or identified by a means that indicates changes shall be 100% tested.		
• In addition, 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, also shall be tested and the correct system operation shall be verified.		
d) Changes to all control units connected or controlled by the system executive software shall require a 10 percent test of the system.		

A. Interface Procedure				
S/N	Equipment / System	Description	Type of interface	Comments Pass/Fail
1	Staircase Pressurization Fan			
2	Exhaust Fan			
3	Car Park Supply & Extract Fan			
4	Motorized Fire & Smoke Damper			
5	Air Handling Unit			
6	Smoke Louvres			
7	FCU			
8	Lifts			
9	Escalators			
10	Emergency / Lighting Control			
11	Door Holders			
12	Door Closer			
13	Accordion Door			
14	Security System			
15	Fire Shutter			
16	Smoke Guard System			
17	Fire Pump Status			
18	Fire Pump Status			
19	VESDA			
20	Kitchen Fire Suppression System			
21	Gaseous Suppression System			
22	Aqueous Foam Suppression System			
23	PA System			
24	Emergency Generators Status			
25	Fuel Tank Level			
26	Gate Barrier			
27	Pre-Action System			
28	EMCS			
29	Auto dial facility			
B. Initiating Devices				
S/N	Equipment	Alarm / Alert	Type of Signal	Comments Pass/Fail
1	Smoke Detector			
2	Heat Detector			
3	Manual Call Point			
4	Duct Detector			
5	Zone Control Valve			
6	Sprinkler Flow Switch			
C. Documentation				
• Pre-Commissioning Report				
• Test & Commissioning Report				
• Commissioning Logic Pack				
• Cause and Effect Matrix				

A. Equipment and Instrumentation
• The following instruments will be used for commissioning. These will be selected as having the maximum field measuring accuracy and being the best suited to the function being measured, and will be applied as recommended by the manufacturer. • All instrumentation used for the testing of the Fire Alarm system must have up to date calibration certificates and be logged on the Instrument Log Sheet with a copy of the calibration certificate.
B. Test Instruments
• Decibel Meter • Multimeter • Insulation Resistance Tester • Simplex True Start Instrument.
C. Demonstration Procedures
• After the system has been commissioned and all the relevant paper work completed. It must be offered to the Commissioning Manager. He/she will organize a time and date with all relevant parties to witness the system. • After the system has been witnessed the witnessing team or individual will decide to sign off the system or not depending on the success of the witness.

SIGN OFF:

Name	Date	Signature

7. LOOPS AND DESCRIPTION OF DEVICES

Device No.	Device Binary Address	Device Type	LOCATION OF DEVICE	Correct Installation	IR Testing	Device Tested	Device Status on FACP	REMARKS

7.3 Attachment 3 : EPM-KEE-13-000002– Fire and Life Safety Integration Block Diagram