

	<b>CONSTRUCTION OF ABC PROJECT</b>	
<b>TITLE</b>	<b>METHOD STATEMENT FOR INSTALLATION OF FIRE ALARM AND EMERGENCY LIGHTING SYSTEM</b>	Ref. No. :
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**CONSTRUCTION OF BUILDING  
AT WEST STREET**

**PROJECT No.**

**METHOD STATEMENT FOR INSTALLATION OF FIRE RESISTANCE CABLE  
FOR FIRE ALARM AND EMERGENCY LIGHTING SYSTEM**

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REVISION RECORD
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This cover page is a record of all revisions of the document identified above by number and title. All previous cover pages are hereby superseded and are to be destroyed.

Rev. No.	Date	By	Chkd.	Approvals	Description and Page Numbers of Revisions

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### 1.0 PURPOSE:

This method statement is applicable for installation of the fire resistance cables and devices for the fire alarm system and Emergency lighting system in all applicable areas for the Project of building.

### 2.0 SCOPE:

Supply , installation for the fire resistance cables and devices of the fire alarm system and Emergency lighting system for all applications in line with project requirements.

### 3.0 REFERENCES:

- Latest Approved shop drawings for the required and applicable areas for the fire alarm and voice evacuation system and shop drawings for the Emergency lighting system.
- Specification:
- Agreement:
- Manufacturer's Recommendation.
- Project Quality Plan
- Regulation of the local Electrical Authority,
- Requirements of Civil Defence or Fire Department.

### 4.0 DEFINITIONS:

Client:

Contractor :

Sub-Contractor :

PQP : Project Quality Plan

PSP : Project Safety Plan

PPE : Personal Protective Equipment

HSE : Health, Safety and Environment

MS : Method Statement

ITP : Inspection Test Plan

QA/QC : Quality Assurance / Quality Control Engineer.

### 5.0 RESPONSIBILITIES:

Responsibilities for ensuring that the steps in this procedure shall be carried out are specified at relevant steps in the procedure:

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- Project Manager
- Construction manager
- QA/QC Engineer
- Site Engineer
- HSE officer

#### **5.1 Project Manager**

- The work progress shall be carried out as per planned program and all the equipment's required to execute the works shall be available and in good condition as per project planned.
- Specific attention is paid to all safety measures and quality control in coordination with Safety Engineer and QA/QC Engineer and in line with PSP and PQP.

#### **5.2 Construction Manager**

- Construction Manager is responsible to supervise and control the work on site.

#### **5.3 Site Engineer**

- The method of statement to the system shall be implemented according to the project specifications and approved shop drawings.
- Provision of all necessary information and distribution of responsibilities to his Construction team.
- The work progress shall be monitored in accordance with the planned work program and he will provide reports to his superiors.
- The constant coordination with the Safety Engineer to ensure that the works are carried out in safe working atmosphere.
- The constant coordination with the QA/QC Engineer for any works to be carried out and initiate for the Inspection for the finished works.
- He will ensure the implementation of any request that might be raised by client/consultant.
- Efficient daily progress shall be obtained for all the equipment and manpower.
- He will engage in the work and check the same against the daily report received from the Foremen.
- The passage of all the revised information to the Foremen and ensure that it's being carried out properly.

#### **5.4 QA/QC Engineer:**

- The monitoring of executions of works at site and should be as per the approved shop drawings and project specifications.
- Ensure inspections for material and work are being raised for activities in timely manner and inspected by the consultant.
- He will follow and carry out all the relevant tests as per project specifications.
- Obtain the required clearance prior to inspections.

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- Should acquire any necessary civil works clearances and coordination.

#### **5.5 Site Foreman**

- The carrying-out of work and the proper distribution of all the available resources in coordination with the Site Engineer on a daily basis.
- Daily reports of the works are achieved and coordinated for the future planning with the Site Engineer.
- Incorporate all the QA/QC and Safety requirements as requested by the engineer.
- Meeting with any type of unforeseen incident or requirement and reporting the same to the Site Engineer immediately.

#### **5.6 Safety Officer**

- The implementation of all safety measures in accordance with the HSE plan and that the whole work force is aware of its proper implementation.
- The implementation of safety measures is adequate to maintain a safe working environment on the work activity.
- Inspection of all the site activities and training personnel in accident prevention and its proper reporting to the Construction Manager and the Project Manager.
- Ensure the site is maintained in a clean and tidy manner.
- Ensure only trained persons shall operate the power tools.
- Ensure all concerned personals shall use PPE and all other items as required.
- Ensure adequate lighting is provided in the working area at night time.
- Ensure high risk elevated areas are provided barricade, tape, safety nets and provided with ladders.
- Ensure service area/inspection area openings are provided with barricade, tape, and safety nets.
- Ensure safe access to site work at all times.

#### **5.7 Store Keeper**

- Responsible for overall Store operations in making sure to store the material delivery to the site and keep it in suitable area that will keep the material safe from rust and damage.

### **6.0 EQUIPMENT:**

- Power source
- Drilling machine
- Tool Box
- Measuring Tape
- Calibrated Ohm Meter / Multimeter
- Ladders / Scaffoldings
- Hammer
- Safety requirements tools such as safety shoes, safety helmet, safety glasses, fluorescent vest, and safety gloves to ensure maximum ability of safe work and dust mask when required.

### **7.0 PROCEDURE**

#### **7.1 Safety**

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- Ensure only trained persons shall operate the power tools.
- Ensure all concerned personnel shall use PPE and all other items as required.
- Ensure adequate lighting is provided in the working area at night time.
- Ensure service area/work area openings are provided with barricade, tape, and safety nets.

### **7.2 Work Sequence And Methodology**

- Check all material delivered to site is inspected properly by QA/QC Engineer and check if it is stored properly as per manufacturer's recommendations.
- Inspection request shall be raised for the inspection of materials received at site to the client.
- Work shall be carried out by the site staff under strict supervision and guidance of the concerned Supervisors / Foremen / Engineers.
- The QA/QC Engineer shall check all the installations as per the Installation Check list.
- Inspection request shall be prepared by QA/QC Engineer and will be submitted to consultant for their inspection and approval by coordinating with other contractors and arrange inspection for the finished work.

### **7.3 Handling and Storage**

- On receipt of the materials at site necessary precautions shall be taken for unloading, shifting and storage, as follows:
- Material shall be stored in a covered / dry space at all the time to avoid being damaged.
- All materials received at site shall be inspected and ensured that the materials are as per approved material submittal.
- Any discrepancies, damage etc., found will be notified and reported for further action.
- Material found not suitable for site use will be removed from site immediately.

### **7.4 Installation of the Fire resistance Cables:**

- The correct size of the Fire Resistant Cables shall be ascertained from approved shop drawings before installation.
- Fire resistance cables shall not be drawn into the same conduit, trunking compartment or ducting compartment as cables of other systems.
- Red colour cables will be used for the fire alarm system and white colour cables will be used for the Emergency lighting system.

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- 2X 1.5mm<sup>2</sup> fire resistance cable will be used for terminating the fire alarm detectors with the Fire alarm panel board, 2X 2.5mm<sup>2</sup> fire resistance cable to terminate the emergency lighting to the Central battery panels and sounders to fire alarm panels. Fire rated cables will be used for the connection between the main distribution board and the Central battery panels.
- Before pulling of cable in existing / new conduit, ensure that conduit has been inspected and are free from any sharp edges.
- Mark the location of the Fire Resistant Cable on the floor / slab / walls / structure as per approved layout drawing.
- Fix the proprietary single clips for single run of cable or two holes of clip formed from fixing strip covered with plastic with screws and wall plugs. The distance between clips shall be as recommended by the manufacturer.
- Where Fire Resistant cables pass through concrete, block work, walls, floors etc, they shall be suitably protected by a length of PVC conduit throughout the concealed length. Whereas in existing floors, concrete, block work, walls etc.
- No Fire Resistant Cable shall be installed directly in the concrete, block work or brickwork, walls, floors etc. without written permission of the consulting engineer.
- PVC Conduits not required when Fire Resistant cables are installed in false ceiling, floors or within dry type partitions, unless otherwise stated.
- All cables shall run in straight lines parallel and square with the lines of the building. Where the Engineer permission is given for cables to be concealed within plastered or rendered walls they shall be routed in straight lines parallel the floor or ceiling and plumb vertical down walls Cables shall be continuous without any through joints.
- After the fire resistance cables are installed these will be tested for continuity and insulation resistance before termination of fire resistance cables to the devices.

**7.5 Termination of Fire Resistant Cables will be carried out as per manufacturer's instructions:**

- With a sharp knife score circumference of outer sheath.
- Bend Fire Resistant Cable on score marks so that outer sheath breaks. Lightly score the aluminium tape and bend cable again so that the tape tears.
- Twist and pull to remove the outer sheath.
- With the outer sheath removed now unwind and remove any remaining tape.
- Separate the conductors strip the insulation from the conductors for the required length.
- The Fire Resistant Cable is now ready to fit the gland and terminate to the equipment / device.

**Installation Of FA Devices:**

- The devices/peripherals (Smoke detectors, heat detectors, break glass, duct detectors, beam detectors, control and monitoring modules) are connected in Class A circuit with the Control panels.
- The speakers & speaker with strobes are connected in Class A circuit with the Control panels.
- 2 Core 1.5mm<sup>2</sup> FP 200 cable to be used for cabling the Initiating Device Circuits (IDC) to the panel, additional 2c x 2.5mm<sup>2</sup> FP200 cable is required for the smoke detector with sounder base for the activation of the sounders units.



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- 2 core 1.5mm<sup>2</sup> FP 200 cable to be used for cabling the Speakers with the panel, additional 2c x 2.5mm<sup>2</sup> FP200 cable is required from the FACP for the speaker with strobe for the activation of the strobe unit allied in vertical walls the run of conduit will be kept straight.
- Comply with NFPA 72 for installation of fire-alarm equipment.
- Smoke- or Heat-Detector Spacing:
  1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" & "Heat-Sensing Fire Detectors".
  2. Smooth ceiling spacing shall not exceed 30 feet (9 m).
- Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.
- Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

#### **FIRE ALARM CONTROL PANEL**

- Install the semi-recessed Back box provided at the location as per the approved shop drawings.
- Power supply for the FACP shall be through an un-switched SPUR outlet located above the FACP concealed above false ceiling. The un-switched SPUR switch shall be a separate branch circuit.
- The back box must be dust free and clean before dropping all the field cables inside the back box.

#### **MANUAL CALL POINT**

- Install the recessed recommended 2" x 4" back box at the locations as per the approved shop drawings.
- Install and terminate the Manual call point as per the manufacturer instructions.

#### **CONTROL & MONITOR MODULES**

- Water-Flow Detectors and Valve Supervisory Switches: Located near each sprinkler valve station and / or water flow detector that is required to be supervised. The module shall be mounted inside recommended 2" x 4" back box and wired to the sprinkler valve station and / or water flow detector via GI flexible conduit.
- AHUS', FAHU'S, Lifts, Access Controlled Doors, Public Address System etc.. Which is required to be controlled in case of a fire situation, the Control module shall be mounted inside recommended 4" x 4" back box and wired to the equipment to be interfaced.
- Install and terminate the Monitor and Control modules as per the manufacturer instructions.

#### **SMOKE & HEAT DETECTORS**

- Ceiling-Mounted Smoke and Heat Detectors: No less than 100mm from a sidewall to the near edge. For exposed solid-joint construction, mount detectors on the bottom of joists. On smooth ceilings, install Smoke detectors not more than 9m apart in any direction and Heat detector not more than 7m apart.

#### **SOUNDERS & SOUNDER/FLASHER**

- Install the recessed recommended 4" x 4" back box at the locations as per the approved shop drawings.
- Install and terminate the Sounders as per the manufacturer instructions

#### **Fault Finding For Emergency Battery System**

##### **Battery Charger Faults:**

Battery Charger Faults that can arise during the operational lifetime of a panel. You may observe one of the following Faults;

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Charger 2% out of range Battery Charger Supply incorrect to correctly measure the output voltage you will need to follow the steps below.

- a) To prevent damage to the system, disconnect the batteries & power down the system, disconnect the power & harnesses from the Power Supply.
- b) Connect the Multi-meter to the battery leads (with batteries disconnected), power up & measure the voltage. Calculate the difference between the measured voltage & 27.6v. NOTE: After 90 seconds, the voltage will drop to <24v. If this happens, power down & start again.

**Positive/Negative Earth Ground Faults:**

Fire Panels have the ability to detect positive or negative Earth Ground Faults. An Earth Ground Fault occurs when an electrical circuit is shorted to ground

**Inspection, testing and commissioning**

All construction/inspection/testing works shall be carried out in accordance with specifications. Work shall be carried out by the site MEP staff under the guidance of respected Engineer and shall further be checked and approved by QA/QC Engineer.

- a) Check all devices installed as per the specifications & Drawing.
- b) Visual Inspection: Conduct visual inspection prior to testing.
- c) Inspection shall be based on completed Record Drawings and system documentation as per NFPA.
- d) Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
- e) System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- f) Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
- g) Test audible appliances for the private operating mode according to manufacturer's written instructions.
- h) Test visible appliances for the public operating mode according to manufacturer's written instructions.
- i) Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- j) Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances. Test all the field loop devices with the control panel.
- k) Check the detectors with the artificial test smoke spray.
- l) Use forms developed for initial tests and inspections.
- m) Field tests shall be witnessed by authorities having jurisdiction.
- n) Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- o) Perform tests and inspections.
- p) After testing & commissioning provide training demonstration to facility management team.
- q) Conduct Cause effect inspection as per programmed cause & effect matrix. Test all the connected devices responds as per the matrix.
- r) Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in specifications.
- s) Install framed instructions in a location visible from fire-alarm control unit.
- t) Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

**8.0 ATTACHMENTS**

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	8.1 Inspection & Test Plan
	8.2 Inspection Check Sheet
	8.3 Risk Assessment
	8.4 Manufacturer recommendations.