

CHANGI AIRPORT
TO REPLACE THE HOSE REEL PIPE LINE
AND MANUAL CALL POINT (MCP)
CABLE
IN JEWEL WALK WAY ISLAND
TERMINAL 1
METHOD OF STATEMENT

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The general purpose is to ensure that a safe system of work applies to all work activities; as such this is the ideal way to prove that the risk associated with a particular activity has been carefully considered and appropriate controls implemented.

Objective

This method statement is critical to the health and safety of the activity it relates to. It is too followed and adhered, any deviation or changes must be first authorized by the site supervisor

Scope

This method statement for firefighting system covers below activities:

- Piping system installation
- Firefighting equipment and accessories installation
- Installation of pumps
- Flushing/Cleaning of piping and equipment
- Installation of fire detection system and accessories

Quality of Installation

Quality of installation and materials at the site will be ensured by the project team consisting of a Project Manager, Project Engineers, QA/QC engineer and the site Supervisor. All the installation at the project will be according to the project specification. applicable standards and /or industry norms. All installation work shall factually adopt and carried out as per the Manufacturer's/Client's Consultant's Health & Safety recommendations for handling and use of the materials/substance. Main Contractor/Sub-Contractor/Third party shall ensure that all workers are aware of the applicable H&S requirements.

Equipment

- | | |
|---------------------------------|----------------------------------|
| • Drilling Machine | • Cutting Players |
| • Pulls Spring | • Scaffolding |
| • Steel Tape Measure | • Ladder |
| • Tone Generator | • Leather Gloves |
| • Screw Driver Test Pen | • Hard Hat |
| • Screw Driver (Flay and Cross) | • Goggle Glass |
| • Insulation Tape | • Dust Mask |
| • Multitier Metter | • First Aid Kit |
| • Angle Grinder | • Soldering Gun |
| • Hammer Drills | • Two-way radio |
| • Hammer (Small) | • Clamp Metter |
| • Chisel | • Measuring equipment |
| • Air Blower | • Hack saw |
| • Knife | • Threading Machine |
| • Players | • Pipe wrenches & Spanners, etc. |

Firefighting Pipe Storage and Handling

- The installation of pipes will be stacked in the worksite designated store area on a level surface.
- Fittings for Firefighting will be distinctly packed and stored as per the sizes needed for the project.
- All open ends of pipes will be covered appropriately to protect from dirt/debris or rodents etc.

General Piping Installation Guidelines

- Firefighting pipework shall be installed following the piping general arrangements and their supporting drawings, specifications and schedules.
- Installation of pipework shall be carried out under conditions satisfactory to the consultant. All firefighting work conducted and accomplished will as per the approval of the consultant.
- Scheduling of work to carry out the installation of pipework shall be agreed and to the satisfaction of the main contractor and shall be co-coordinated with the work schedules of other all stakeholders such as trades, disciplines involved in the overall construction work.

Installation of Firefighting Pipes

- Make a proper and correct marking to the pipe path by using white chalks as per approved coordination drawings.
- It is recommended to run all piping as direct as possible, avoiding unwanted offsets and conceal piping in finished rooms. Make tees, bends, reducers etc. connections with standard fittings for full-size branches.
- All piping will be firmly supported by a combination network consists of pipe hangers and constantly support brackets. Pipe hangers are fixed and utilized to support the "dead load" of the firefighting/other installation for pipe system. Pipe hangers will be adjusted to appropriate space as per the relevant standard/Specification clause and Hanger rod sizes and numbers will comply with the requirement of the respective standard or Specification clause or Manufacture's recommendations.
- Hanging, bracing, and restraint of fire protection system piping must be performed in maintaining as per the spacing given below.
- Level the brackets by using the split level, water level etc.
- Fix the pipe on the brackets and insert the "U" bolts and tight it strongly.
- Where reinforced structures are holding pipelines or other objects supposed to extreme vibration or noise, rubber vibration isolation blocks should be installed as to safeguard and protect the transmittal of vibration or noise to the environment.

Threaded Joints

- Threaded piping will be made with a suitable pipe sealing compound (for example jute and mastic combination) enforced merely on male threads.
- Ends of pipe will be renamed out before being made up into fittings. joints in threaded steel pipe recommended being compliance as per the British Standard BS 21.
- All burrs will be removed, pipe ends will be renamed or filed out the size of the bore, and all chips will be removed.

(a) Pipe Fabrications and Installation

- While making firefighting piping layout and installation in the most beneficial manner possible concerning headroom, proper valve access, appropriate opening and equipment/device/machinery clearance. and clearance for another task peculiar priority and attention will be given to piping in the proximity of the equipment. Preserve the equipment/machinery parts for proper maintenance.
- Cut all firefighting installation required pipes correctly to measurement determined at the worksite. After cutting the pipedream it and remove all burrs.
- Install piping neatly, free from unnecessary traps and pockets. Work into place without springing or forcing. Use fittings to make all changes in direction.
- Make all networking to equipment using flanged joints or unions. Always remember to make reducing connections with reducing fittings only.
- Remove dirt, sand, rust, lubrication contamination rodents, etc. from the internal side of piping before tying in sections, fitting, valves, equipment or others.

(b) Offsets and Fittings

- Before the proceedings to install the pipes, carefully investigate the structural stability and finishing conditions affecting the work and take such proper steps as may be needed to meet such conditions.
- Installation of all firefighting pipes and or others should be close to walls, ceilings and columns to minimize the space occupancy.
- Pipework will be installed not closer than 200 mm to electrical conduits, lighting, and power cables. Pipes will be spaced in ducts, ceilings. voids and plant areas, such as adequate access is permitted to any pipe for maintenance or removal without disturbance to the remaining pipework and other services.
- Couplers, unions and fittings will be screwed up to the reduced depth of the thread, such that no more three turns are showing when pulled uptight.
- Installation of all firefighting pipes and or others should be completely cleaned of rust, sand, dust, rust, lubrication contamination, scale and other external matter before erection and before any primary fill water for hydraulic testing.
- Before hydraulic testing, all pipework systems including valves, strainers and fittings will be fully washed, such washing of the firefighting piping systems will be carefully and safely accomplished where there are isolation valves or equipment are employing.
- Any clogging due to external matter or airlock which is observed to disrupt the flow of fluid will be removed, either before or after the systems are in working.

- Installation of all firefighting pipes and or others will be of the unconventional pattern to make sure appropriate drainage system and the elimination of air pockets wherever mandatory. Increases or decreases in firefighting or other pipe diameters needed to suit pipe fittings, tee-offs and equipment

connections will be assemble using taper pieces flanged as needed with taper reduction situated about the axis of the firefighting pipe to facilitate appropriate flow and to permit proper venting and draining of the installation pipes. The angle of the taper of such assembly taper pieces will not be greater than 20 degrees.

- All firefighting or other pipes installation will be cleaned internally and externally for removal of dust, rust, and debris before painting work. Apply two coat of epoxy anti-corrosive paints on Blipped surface.
- Finally, apply approved quality Post Office Red paint on the pipes after the hydraulic test and in the final stages.

(c) Underground Steel Pipe Works (Applicable BI Sch 40 Pipes)

- Once the pipe fabrication is overall pipes will be cleaned internally and externally for removal of dust and debris before laying them in the trenches.
- The underground installed parts of firefighting pipes will be firmly wrapped with bitumen tape with 20mm overlapping until the pipe surface is completely wrapped and sealed against atmosphere.
- Lastly, full wrapped firefighting or other pipes are laid in the trenches for flanged connection with HDPE pipes.

(d) Installation of Firefighting Equipment and Other Relevant Accessories

- Always check and verify firefighting system's cabinets are essentially approved size and dimension. Make a proper Inspection for signs of any damage.
- Make an exact location of these firefighting system's cabinets as per approved shop drawings and with the careful measure of elevation and plumb.
- Fix firefighting system's cabinets using recommended (anchor bolts) bolts. Go ahead with the installation of relevant firefighting accessories such as a valve, landing valves, etc. and taking into consideration of approval for these installations of devices.

(e) Installation of Hose Reel

- Make the required size holes by using drill machine and insert the Set Anchor bolts on to it Depth of the bore will not exceed 50 mm and bore size would be 10mm
- Lock the top anchor bolts as per the manufacture's recommendations.
- Insert the Hose Reel's (HR) mounting base into the adjusted anchor bolts and tighten the four nuts to install the Reel firmly. Install the 1-inch Union into Hose Reel and attached it to Pipeline at Fire Hose Reel cabinet.

(f) Installation of Landing Valves

- Make sure the materials are of the approved quality and free from foreign materials. Physically inspect for cracks and damages.
- Install threaded type 65mm flange to the Firefighting Riser Pipes (FRP's). Install the approved quality rubber packing to it.

- Install the De-pressuring plate between the two flanges and tight the four screws for the secure joint properly.
- Outlet height of the Landing valve should be between the 750mm-1000mm from the finished floor level.
- Make a Rotation for the lever and examine and check for opening and closing of the shut-off lever.

(g) Installation of Breaching Inlet

- Locate Breaching inlet cabinet and its accessories as shown on the shop drawing near the appropriate location of the property for Fire brigade to inject water into the system in case of emergency.
- Installation of Pillar hydrant
- To ensure that the materials are as per the approved quality and standards and free from external damages.
- Fix the Rubber packing sheet on to mounting flange of the Pillar hydrant and install/mount the pillar hydrant on the Flange.
- Embed/insert six Nuts & bolts to mounting base of the hydrant point and tight it strongly. Properly Examine and check the vertical alignment of the hydrant point by using the split leveller.
- Outlet height of the pillar hydrant point should be within the 750mm -1000mm from the finished floor level.

(h) Installation of Firefighting Pumps

- Mark the Pump's mounting places on the pump plinth by using a marker pen.
- Drill the marked points by using hammer drill machine and insert & lock the anchor bolts firmly.
- Put/install the Fire Pumps (FP) on the Pump Plinth (PP) and Insert the rubber & anti-vibration mounting pads between the plinths and pump base to minimize the vibration possibility.
- Check the levels of the pumps (horizontal & vertical) by using the split level. Correct the levels if there is any oblique. Insert the correct size bolts into pumps base and tight it firmly by checking the levels of the pumps.
- After Installation and or mounting of the pump, make installation of the valves and accessories of suction and delivery appropriately following the approved shop drawings.
- Always make use of the method statements of joining of pipes, installation of valves for detailed and comprehensive information.
- Install or lay down the power cables from the Pump Control Panel (PCP) by using the cable tray. Always use method statement of installation of cable tray and installation of cables for detailed information.
- Inspect and check all the connections, terminations etc. appropriately before conducting the testing. Make a manual rotation for the motor fan and observe for gentle rotation.
- Get the services of the pump supplier and inspect the alignment of the pump.

(i) Method for Flushing & Cleaning of Piping and Fire Fighting Equipment

- After the piping is erected, all piping systems including the main header line and branch line will be cleaned to remove ball mill, welding scale, oil, corrosion, and other construction debris.
- The system will be flush cleaned and filled ready for service immediately after cleaning.
- Never operate pumps or equipment until debris or clogging has been removed from the respective system has been flushed out.

- Flush the piping system until all waste or debris or other clogging is removed and clean water comes out.
- Automatic devices for firefighting & fire alarm or other systems which can become clogged during the cleaning process will be disconnected and will not be connected permanently until the cleaning process is accomplished.

Installation of Fire detection system and accessories

Conducting Works

- Before commencing the installation, check all materials are of the approved brand. Size and free from technical faults, for example, corrosion, dents etc.
- The site supervisor will study and counter check the proposed locations of the conduit as shown on the approved shop drawing. Ensure proper coordination with the main contractor and other trades to optimize space allocation.
- The project engineer/supervisor will arrange the length of conduit needed for installation at the worksite and induct or advise the workforce to prepare these conduits.
- The installation will be carried out in a planned & timely fashion so as not to delay works by other trades.
- Technicians will mark the point locations and conduit path by using a permanent marker as shown in the approved shop drawings with the assistance of the supervisor and double-check the dimensions for any corrections.
- Before doing the installation, make sure that the conduit path coordinates and elevation has been checked and verified by the coordinator/consultant.
- GI conduits run in the concrete slab will be tightened to the rebar using binding wires to protect conduits and to keep their location unchanged.
- All GI conduit joints will be glued and socketed and only recommended and standard fittings will be used for joining.
- When the conduits run in-wall, they will be fully concealed by chasing the wall to the required depth and conduits will be kept fully attached to the wall using wire nails.
- Conduits cutting will always be done by using hacksaw blades.
- Remove the additional unwanted materials/chips from the joining area before joining of conduits, bends, junction boxes etc.
- Install bends, junction boxes etc. into the conduit using GI Socket and make sure the joint is properly fixed.

- Place the conduits as per approved shop drawings and bracket the conduit by using Saddles in 2m intervals where exposed conducting is required.
- Use Flexible conduits in where the rigid conduits not possible to install. Place surface mounted back boxes where it is required.
- Conduit path should be parallel to the walls, beams and need to be installed in a timely and proper manner. Conduits in the wall will be laid only vertically and horizontally.
- The physical separation between conduits from High Voltage Supply Lines (HVSL) shall not be less than 300mm.

Fire alarm Cabling Installation Works

- Installation of Fire alarm (FA) cables should be carried out following the guidelines below:
- Conduits paths should be cleared by using a draw wire before installation of cables. The Fire alarm (FA) cables shall be intact tidy of other services and piping.
- Working at height platforms such as scaffoldings and ladders to be used during installation shall be erected appropriately to ensure that the health safety of people working on it.
- When various FA cable runs occur, the cable shall be installed in such ways that crossover of other installed cables are neglected. The cables shall be sustained at the proper spacing.
- The Firefighting and or another cable pulling shall always be subjected to Consultants before approval.
- Fire alarm (FA) or other cables shall not be bent during installation.

The practice of Proper Housekeeping for Materials.

- All firefighting & fire alarm system's cables shall run from point to point without joints.
- Installation of all firefighting cables shall be on Pre-laid conduits, cable trays or cable ladders.
- Before to prepare wires for pulling, make sure that the wires are essentially and appropriately marked for their circuit number designation. The termination of all firefighting & fire alarm system's cables shall be performed by a senior FLS technician.
- Drawing of firefighting & fire alarm systems should be done smoothly and excessive force should not be applied to pull the cables.
- Once the FA cable is cut to make termination, the work involved shall be accomplished without interruption. If for any reason that the work cannot be accomplished, the FA cable ends shall be sealed promptly with PVC tape.

system's cables shall be marked at each end and access points by a label indicating the cable size and circuits. Each group of cables shall be indicated by a separate cable tag.

- Each firefighting & fire alarm system's cables shall be provided with a means of proper identification fixed adjacent to the termination at each end. It shall be in the form of a plastic label securely fixed to the ceiling box or tied to the cable and provide details of the cable size, function and cable reference number.
- The cores of all mains cable shall be individually identified at termination using colours. Where the core insulation is not itself coloured, bonds of self-adhesive PVC tape in the appropriate colour shall be affixed to each core over the insulation.
- Conduct insulation resistance test and earth continuity test.
- Central Monitoring (If applicable)
- Configuring the central monitoring system based on panels configuration
- Enter the panel, detectors and call point location on the graphics circuit and call point and detectors address
- Check the functional test from the central monitoring unit

Reference Documents

- Contract Specifications
- Program of Works
- Approved Shop-drawing
- Approved Material Submittal
- Local Authority's Rules (UAE Fire Code) and Regulations
- National Fire Protection Association (NFPA 72)

Health & Safety Hazards

Before commencing any work, the team shall strictly follow as per the Manufacturer's/ Client's / Consultant's Health & Safety recommendations for handling and use of the materials and ensure all involved personnel shall be aware of the same.

The general safety guidelines are given below:

- Ensure the work area is safe & clean.
- All employees shall adopt safe working practices.
- Safety equipment (Safety helmet, safety shoes, coveralls, gloves, goggles, face mask as applicable) to be worn at all times.



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- When working at a high level, the appropriate safety harness shall be used and secured whilst working-extra care shall be taken whilst using tools at a high level to prevent dropping.
- Ensure sufficient lighting is available during all stages of installation & testing.
- Report all accidents no matter how small to the Safety Officer on duty.
- Ensure any electrical isolation permit is obtained if required, for installation any electrical equipment, panel, cable, wires and accessories.

Identified Hazard and Control Measures

	Aspect / Hazard	Impact /Risk	Proposed Controls (OH&S)
1	Use of hand tools	Cuts / abrasions	Users to ensure that all tools are in good condition before use. No Homemade tools allowed. Guards should be present and not removed.
2	Use of electrically powered tools.	Electrocution	Users to check equipment before use. Do not use equipment with damaged casing or damaged leads. All equipment to be 110v~240v/1ph/50hz.
3	Stacked/stored materials	Trip hazard / falling materials	Ensure that materials stacked/stored in the work area are not access/egress routes or near an edge or opening in the slab. The material should be secure so that it does not accidentally fall or roll into access/egress routes.
4	Accumulated debris and tools.	Slips, trips and falls	Clear work area after every shift. Use provided site skips / bins. Ensure housekeeping standards are maintained.
5	Hot work	Burning / Fire	Keep the distance from the fire and welding point / Maintain the fire extinguisher.

Responsibilities

Project Manager

- Project Manager shall be responsible for overall project execution.
- He will coordinate with the client and head office.
- He is responsible for progress monitoring, attending review meeting and resource management.
- Overall, he will be responsible for the timely completion of the project following all contractual requirements.

Project Engineer

- Setting out for installation and commissioning of Fire Alarm and Fire Fighting Systems are carried out according to the specifications, drawings and approved method statement.
- Provision of all necessary information and distribution of responsibilities to his construction team in consultation with the construction manager.
- The work progress is monitored following the required program and reports the same to the Construction Manager.
- The implementation of any request that might be raised by the Consultant.



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- Allocation of manpower, materials and equipment's in consultation with Construction Manager also monitoring their timely supply at the construction location.

Supervisor

- The carrying-out the work and the proper distribution of all the available resources in coordination with the Site Engineering daily.
- Daily reports of the works are achieved and coordinated for future planning with the site Engineer.
- Incorporate all the QC and Safety requirements as requested by the concerned Engineer.
- Meeting with any type of unforeseen incident or requirement.