

# METHOD STATEMENT FOR INSTALLATION AND INSPECTION OF CLEAN AGENT SYSTEM (FM 200)

---

## 1. SCOPE

This procedure covers installation and inspection of Clean Agent System (FM 200).

## 2. PURPOSE

The purpose of this procedure is to define the method of installation and inspection of Clean Agent System (FM 200).

## 3. ABBREVIATIONS

### 3.1. Abbreviations

1. ICL - Inspection Check List
2. IR - Inspection Request
3. ITL -Independent Testing Laboratory
4. ITP - Inspection and Test Plan
5. ITR -Inspection & Test Requests
6. MAT - Material Submittal
7. MEP - Mechanical Electrical Plumbing
8. MET - Method Statement
9. MIR - Material Inspection Request
10. MSDS - Material Safety Data Sheet
11. PPE -Personal Protective Equipment
12. PQP -Project Quality Plan
13. PTW -Permit To Work ( Working at Height or enclosed spaces)
14. RA -Hazard Identification and Risk Assessment
15. RFIA - Request for Inspection and Approval
16. SPD - Shop Drawing
17. TBM - Temporary Bench Mark

## 4. QUALITY CONTROL

Quality of installation and materials at site will be ensured by our project team consisting of a Project Manager, Project Engineers, QA / QC Engineer and the site Foremen. All will be according to the Specification, NFPA standards and /or local civil Defence authority requirements.

## 5. MATERIALS USED

1. All materials to be used are as per the approved material submittals.
2. HFC 227ea CLEAN AGENT SYSTEM DESCRIPTION: The HFC 227ea Clean Agent system consists of a Central banking system with main cylinders and manifolds. The total No. of cylinders is selected based on the requirement of the largest room. The No. of cylinders triggered will depend on the quantity of Clean Agent gas required for that

particular area and will be directed to that area by an electrically operated Directional Valve.

3. The system shall provide a Clean Agent minimum design concentration of 7 %, by volume, in all areas and/or protected spaces at the minimum anticipated temperature within the protected volume.
4. The system shall be complete in all ways. It shall include all mechanical and electrical installation, all detection and control equipment, agent storage containers, Clean Agent, nozzles, pipe and fittings, manual release and abort stations, audible and visual alarm devices, auxiliary devices and controls, shut downs and testing, training and all other operations necessary for a functional, Clean Agent suppression system.

The system shall be actuated by a combination of ionization and /or photoelectric detectors installed within the protected spaces.

Automatic Operation of each protected area shall be as follows:

1. Actuation of one detector within the system, shall
2. Illuminate the "ALARM" lamp on the Control Panel facia.
3. Energize an alarm bell and an optional visual indicator.
4. Energize auxiliary contacts to perform auxiliary functions.
5. Actuation of a second detector, within the system shall:
6. Illuminate the "PRE DISCHARGE" lamp on the control panel facia.
7. Energize an alarm Horn or Horn/strobe device.
8. Shutdown HVAC systems and/or close dampers.
9. Start time-delay sequence.
10. System Abort sequence is enabled at this point.

After completion of the time-delay sequence, the Clean Agent system shall discharge and the following shall occur:

Shutdown all power to high-voltage equipment.

Energize a visual indicator outside the hazard in which the discharge occurred.

The system shall be capable of being actuated by manual discharge devices located at each hazard exit. Operation of a manual device shall duplicate the "Verified Detection" sequence description above except that the time delays and abort functions shall be bypassed. The manual discharge station shall be of the electrical actuation type and shall be supervised at the main control panel.

## **5.1. Design Data**

1. Clean Agent is an electrically non-conducting, volatile or gaseous fire extinguisher that does not leave a residue upon evaporation.
2. System Component
3. Agent - HFC 227ea Clean Agent. : The amount of clean agent in the system shall be at least sufficient for the largest single hazard or group of hazard that are to be protected simultaneously.
4. Storage container: The HFC 227ea clean agent is stored in container to hold that specific agent at ambient temperature.
5. Storage container and accessories shall be so located and arranged that inspector testing, recharging and other maintenance are facilitated and interruption of protection in held to a minimum.
6. It can be located as close as possible to or within the hazard or hazards they protect.

7. Where it is manifold, check valve will be provided to prevent agent loss if the system is operated when any containers are removed for maintenance.
8. Networking of pipes
9. Detectors, actuator & control system
10. Automatic detector shall be any listed method or device capable of detecting and indicating heats flame, smoke, combustible vapours or an abnormal condition in the hazard such as process trouble that is likely to produce fire.
  - a. Operating Devices
  - b. Discharge valve
  - c. Selector valve
11. Electric control equipment. A fire alarm control panel shall supervise the actuating devices and associated wiring and as required, cause Actuation.
12. Time Selections: It is used only for personal evacuator or to prepare the hazard area for discharge.

## **5.2. Storage and Handling for Clean Agent**

1. Using suitable means of transportation carefully transport packaged/crated components to their place of installation.
2. Ensure cylinders are not installed where they could be exposed to fire or an explosion hazard.
3. They should be installed in such a way to ensure ease of removal after use or for weighing and inspection.
4. Each container has a nameplate with an identifying part number. The part numbers should be checked against the parts listed on the system plans to verify that the correct equipment was received.
5. Cylinder containers should be located according to system plans in clean, dry, relatively vibration free areas.
6. Cylinders should never be mounted in any area which the cylinders could potentially be submerged in liquid.
7. Ensure cylinders are not exposed to direct sunlight.
8. Cylinder brackets shall be mounted securely to rigid surfaces which will support the container load.

## **5.3. Work Sequence and Methodology for Clean Agent System**

1. The erection/installation work area/s should be cordoned or taped off and safety notices displayed.
2. Cylinder and piping to be securely bracketed especially at the fittings and nozzles
3. Clean and blow out all pipes before installing
4. All dead end pipes lines to be provided with a capped nipple.
5. After assembly, blow out entire pipe system before installing discharge nozzles

## **5.4. Methodology**

1. Starting with the cylinder manifold, securely mount the manifold at the appropriate height.
2. Continue piping remainder of the distribution piping, following appropriate approved for construction drawing

3. All piping must be rigidly supported by a combination network comprised of pipe hangers and rigid support brackets. Pipe hangers are used to support the “dead load” of the pipe system. Pipe hangers shall be space at intervals not exceeding 12 feet.
4. Rigid supports are required to support the “live load” of the pipe system during discharge. Rigid bracing is required at each directional change fitting, tee and nozzle. All drops to 180 degrees nozzles require back-bracing in the opposite direction of the discharge.
5. Before installing nozzles, blow air through complete piping system to determine there is no blockage.
6. Screw on discharge nozzles
7. Note: All piping shall be laid out to reduce friction losses to a reasonable minimum and care shall be taken to avoid possible restrictions due to foreign matter or faulty fabrication.
8. Method of pressure testing Pneumatic Testing of pipe line

Test Condition		Performance Required	Report
Test pressure	40 psi		
Duration	10 min	At the end of 10 min duration the pressure drop shall not exceed 20% of test pressure	
Monitoring	By pressure gauge. Installed at the lowest elevation		

### 5.5. Method of Testing

1. Plug all the openings.
2. Fill complete pipeline with air from an air compressor.
3. Pressurize the line into an intermediate pressure, say 20 psi, wait for 05 minutes, and check all major joints for leak with soap solution.
4. If the system is OK as per point No. 3 again pressure the system up to 40 psi.
5. Maintain the pressure for 10 minutes and check for pressure drop if any.

## 6. HEALTH AND SAFETY

Work shall strictly follow as per the Manufacturer’s/ Client’s / Consultant’s Health & Safety recommendations for handling and use of the materials. Ensure all involved personnel shall be aware of the same.