

General

The FM-200® Fire Suppression System is an engineered system utilizing a fixed nozzle agent distribution network. The system is designed and installed in accordance with the National Fire Protection Association (NFPA) Standard 2001, "Clean Agent Fire Extinguishing Systems." When properly designed, the FM-200 system will suppress surface burning fire in Class A, B, and C hazards.

80% of FM-200 fire fighting effectiveness is achieved through heat absorption and 20% through direct chemical means (action of the fluorine radical on the chain reaction of a flame). Complete suppression using FM-200 has the following advantages:

- The low concentration of FM-200 required means less visual obscurity and minimal risk to personnel.
- The small quantity of agent discharged minimizes over-pressurization of the protected area.
- Maximum safety for personnel due to low toxicity.
- Most effective when used with automatic detection to introduce FM-200 rapidly.
- The ability to prevent re-ignition as long as concentration levels are maintained.

Typical areas that can be protected by a FM-200 system are:

Bank Vaults	Libraries
Rare Book Stores	Electronic Data Processing
Telephone Exchanges	Studios
Communication Centers	Transformer and Switchrooms
Control Rooms	Test Laboratories
Flammable Liquid Storage	

System Operation

The basic system consists of extinguishing agent stored in high strength steel cylinders. Manual or automatic actuators are available for release of the agent into the hazard area. The agent is distributed and discharged into the hazard area through fixed piping and nozzles. Each nozzle is designed to deliver a uniform discharge of agent into the protected area. On large hazards, cylinders can be manifolded together. The cylinders are connected to the manifold by means of a flexible discharge bend and check valve.

Automatic actuation is accomplished through an approved detection system. When a fire condition cause the detector(s) located in the hazard area to go into alarm, a signal is sent to the detection control panel. This causes actuation of the release circuit which electrically operates the actuator located on the cylinder valve. The actuator opens the valve and allows the agent to enter the piping network and discharge out the nozzles.

Suggested Architect's Specifications

A comprehensive Architect and Engineering Specification for FM-200 Clean Agent Fire Suppression Systems and Pyro-Chem Detection/Release System equipment is available on diskette. This specification is ideal for insertion into Division 15: Mechanical Fire Detection/Suppression Systems and Division 13: Special Construction, Automatic Fire Suppression sections.

Listings and Approvals

FM-200 Agent

- Factory Mutual (FM)
- Underwriters Laboratories (UL)
- NFPA 2001 "Clean Agent Fire Extinguishing Systems"
- EPA SNAP
- Australian Industrial Chemicals Notification
- German Institute for Environmental Hygiene and Medicine

FM-200 System

- Underwriters Laboratories (UL)

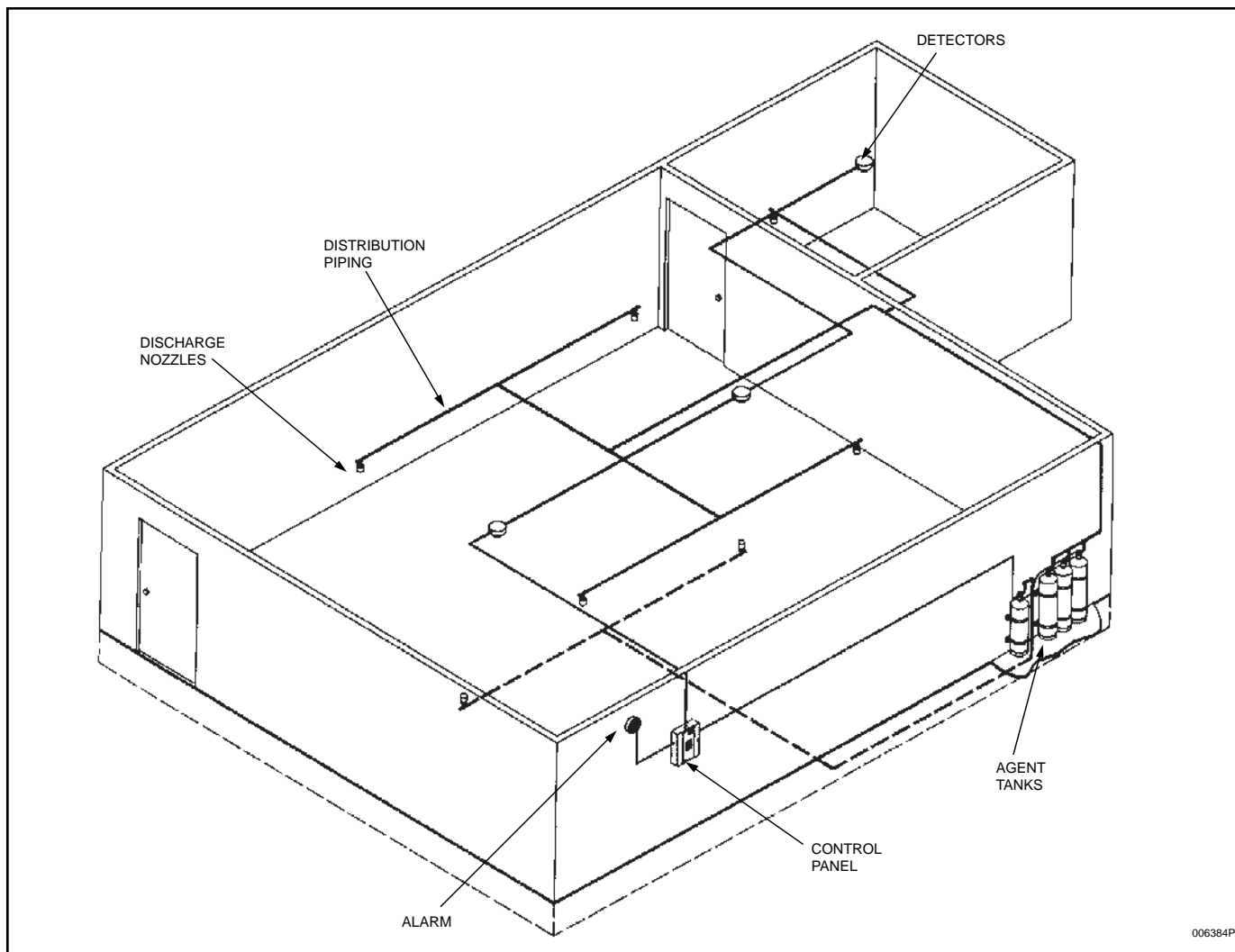
tyco / Tyco Suppression
Systems



One Stanton Street
Marinette, WI 54143

December 17, 2001

Typical Installation



1. **Agent Tank** – The agent storage tank consists of an approved DOT4BW450 or DOT4BW500 high pressure steel tank fitted with a valve and internal siphon tube, factory filled with FM-200, and superpressurized with dry nitrogen to 360 psi (25 bar) at 70 °F (21 °C). Tanks sharing the same manifold shall be equal in size and fill density. Tanks are available in 8 sizes, ranging from 8 liter to 343 liter. A nameplate is adhered to the tank displaying the agent weight, tare weight, gross weight, fill density, and charge date. On the larger size tanks, an optional liquid level indicator is available.
2. **Agent** – FM-200 (HFC-227ea) is a clean, gaseous agent containing no particles or oily residues. It is produced under ISO 9002 guidelines to strict manufacturing specifications ensuring product purity. FM-200 leaves no residue or oily deposits on delicate electronic equipment, and can be removed from the protected space by ventilation. FM-200 is thermally and chemically stable, but without the extremely long atmospheric lifetimes associated with other proposed halon replacements. The atmospheric lifetime of FM-200 has been determined to be 36.5 years. The EPA does not consider FM-200 to be a long-lived substance when discharged, and as such, has placed no restrictions on its use.
3. **Distribution Piping Network** – FM-200 engineered systems are based on a Hydraulic Flow Program developed by Hughes Associates Inc. The program predicts the two-phase flow of the agent and nitrogen through a pipe network. Information detailing the enclosure is entered and the program calculates the required pipe sizes, nozzle drill sizes, average nozzle pressures, and discharge time. As system design calculations are critical to the success of the extinguishing system, only Pyro-Chem or Pyro-Chem trained personnel are permitted to perform system calculations.
4. **Nozzles** – FM-200 is distributed within the protected area by the discharge nozzle which is sized to ensure the correct flow of agent for the hazard. Nozzles are available with seven or eight ports to allow for either 180° or 360° horizontal discharge patterns. Ports are drilled in .004 in. (0.1 mm) increments to the specified system design. Nozzles are supplied in brass with NPT threads. Nozzles are available in 6 sizes, ranging from 3/8 in. to 2 in.
5. **Detection System** – The Pyro-Chem Detection System is used where an automatic electronic detection system is required to actuate the FM-200 suppression system. This detection system is used to actuate a single, fixed, fire suppression or alarm system based on inputs received from fire detection devices. The detection circuits can be configured using cross, counting, independent or priority-zone (counting) concepts. The detection system has been tested to the applicable FCC Rules and Regulations for Class A Computing devices.
6. **Actuation Line** – The “Master” tank is actuated via the detection release circuit. To actuate the “Slave” tanks, 1/4 in. flexible, stainless steel actuation hose is used. The hose is connected to the pilot pressure port of the master tank valve and from that location, run to pneumatic actuators located on top of each of the slave tank valves. The pressure channeled from the master pilot port operates the pneumatic actuators on the slave valves, causing them to open.