AUTOMATED MONITOR FIRE SUPPRESSION SYSTEMS

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1.0 SCOPE

This data sheet focuses on FM Approved, automated monitor fire suppression systems. The data sheet contains recommendations related to the hazards and occupancies these systems may be used to protect in lieu of traditional fire protection methods such as automatic sprinklers. It also covers their design, installation, acceptance testing, inspection and maintenance.

For the purposes of this data sheet, automated monitor fire suppression systems include both fully automated systems, requiring no human interaction, as well as systems incorporating a central station that has been validated as part of the FM Approval. This differentiation and details are provided in the FM *Approval Guide*.

Although the scope of this data sheet covers FM Approved, automated systems, the guidance provided herein may also apply to manually operated units. Note that this data sheet does not cover portable or mobile units.

1.1 Hazards

1.1.1 Manually Operated vs. Automated Systems

Monitors are discharge devices upon which firefighting nozzles are mounted. They are designed to discharge and direct water spray and/or foam onto a fire and can be adjusted to direct discharge through a range of vertical and horizontal angles. They are designed with large, clear waterways to provide powerful, far-reaching streams.

Monitors are most commonly fixed in place or operated by manual means to supplement automatic sprinkler protection and/or achieve final extinguishment. Monitors may also integrate detection and control equipment to allow for remote operation across a full range of rotation and nozzle stream patterns. They may also incorporate fire detection that continuously scans large areas and objects, typically an image-based flame detector equipped with visual and infrared cameras. This design allows for automatic (i.e., self-targeting) operation. These designs are considered automated monitor fire suppression systems; as they can detect, locate and accurately deliver water to the fire location without the need for any human intervention.

1.1.2 System Applications

Automated monitor fire suppression systems are typically used as supplementary protection (i.e., in addition to sprinklers). In certain cases, they may also be used as sole (i.e., primary) protection for a specific hazard.

Currently, the use of these systems as primary protection is limited to some non-storage occupancies having hazards for which a sprinkler system alone will not provide adequate fire protection, is not cost effective, or where the fire hazard is outdoors. Applications for this technology are expected to increase in the future, but current applications recommended by FM are limited. Additional information is provided in Section 3.2.

1.1.3 Availability

Manually operated monitor assemblies are not complicated devices. They include a water supply, monitor and nozzle. However, automated monitor fire suppression systems are more complex, integrating a range of detection and control equipment, including associated electrical and communication systems. They are inherently more complicated than automatic sprinkler systems. The use of an FM Approved system is critical to ensuring an acceptable level of performance, reliability and availability.

See Understanding the Hazard (UTH): Special Protection Systems Reliability (P0379) for information on general deficiencies related to special protection systems.

1.2 Changes

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2.0 LOSS PREVENTION RECOMMENDATIONS

2.1 Introduction

2.1.1 Provide FM Approved equipment, materials and services whenever they are applicable. For a list of products and services that are FM Approved, see the *Approval Guide*, and online resource of FM Approvals.

2.1.2 Design and install automated monitor fire suppression systems in accordance with the following:

A. The application associated with their listing in the *Approval Guide*

B. The manufacturer's design, installation, operation, and maintenance (DIOM) manual, identified as part of the FM Approval by document identification number and revision level

C. The relevant occupancy- or hazard-specific data sheet

D. Any specific jurisdictional requirements

2.1.3 When a component is not identified in the manufacturer's DIOM manual, provide FM Approved equipment that conforms to the monitor system's specifications (e.g., pressure rating, rate of flow, etc.) and this data sheet.

2.2 Construction and Location

2.2.1 Use wet-pipe systems only in areas where the ambient temperature of the protected area will remain between 40°F (4°C) and 200°F (95°C).

2.2.2 Adhere to the relevant recommendations in FM Property Loss Prevention Data Sheet 9-18, *Prevention of Freeze-Ups*.

2.2.3 Maintain equipment within the operating environment specified in the manufacturer's DIOM manual. Locate all equipment so it is not subject to mechanical, chemical, climatic, or other conditions that can render it inoperative or susceptible to accidental damage or operation.

2.2.4 Where automated monitor systems are installed outdoors, follow the restrictions listed in the manufacturer's DIOM manual regarding ambient conditions such as temperature, dust, wind, snow, rain, etc.

2.2.5 For systems located in 50-year through 500-year earthquake zones (as defined in Data Sheet 1-2, *Earthquakes*), anchor equipment in accordance with FM Property Loss Prevention Data Sheet 2-8, *Earthquake Protection for Water-Based Fire Protection Systems*.

2.2.6 Design and locate remote control stations and central stations in accordance with the manufacturer's DIOM manual.

2.3 Occupancy

2.3.1 Provide interlocks to automatically perform critical functions upon operation of the suppression system, in accordance with the occupancy-specific data sheet for the protected area. Examples include, but are not limited to, closure of dampers, shutdown of ventilation, stoppage of conveyors, and power down of electrical equipment and fuel supplies.

2.4 Protection

2.4.1 General

2.4.1.1 Automated monitor fire suppression systems are not an alternative to sprinkler protection unless the relevant occupancy-specific data sheet specifies they are. Examples of typical applications are provided in Section 3.2.

2.4.2 Design of Automated Monitor Fire Suppression Systems

2.4.2.1 Design systems in accordance with the limitations of their Approval listing and the manufacturer's FM Approved DIOM manual. Limitations include, but are not limited to, the following:

A. Use of the appropriate combination of components (e.g., monitors, nozzles) based on the hazard to be protected and the available water supply

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B. Minimum and maximum pressure and flow rates at the most remote monitor

C. Minimum and maximum spray coverage (reach)

D. Minimum and maximum installation height

E. Stream patterns (straight stream/narrow spray angle, wide spray angle, etc.)

F. Monitor orientation

G. Monitor placement relative to the protected area/hazard

H. Monitor placement relative to obstructions

I. Detection selection, design and placement

J. Video reference camera placement

K. Impact of ambient conditions (e.g., wind, dust and debris, etc.) on system performance

2.4.2.2 Refer to the relevant occupancy-specific data sheet for specific design criteria (i.e., minimum monitor flow rates and number of operating monitors).

2.4.2.3 When automated monitor fire suppression systems are installed as an alternative to sprinklers, provide a water supply capable of supplying the design discharge flow rate for the minimum time specified in the occupancy-specific data sheet. If not specified, design for a duration of two hours.

2.4.2.4 Design water supplies, including equipment such as water mains, pumps, tanks, valves and piping in accordance with FM Property Loss Prevention Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*, and the applicable 3-series data sheets.

2.4.2.5 Hydraulically calculate the requirements of the system in accordance with FM Property Loss Prevention Data Sheet 3-0, *Hydraulics of Fire Protection Systems*, and the manufacturer's DIOM manual.

2.4.2.5.1 Include the friction loss of any system components (e.g., monitors, valves), in accordance with the manufacturer's DIOM manual.

2.5 Equipment and Processes

2.5.1 Monitors

2.5.1.1 Locate monitors such that they are free of obstructions and potential damage from site activities.

2.5.1.2 Physically secure monitors in accordance with the manufacturer's DIOM manual. Consider the forces created across the full range of spray patterns and rotation of the monitor.

2.5.2 Detectors

2.5.2.1 Provide detection and actuation circuitry in accordance with FM Property Loss Prevention Data Sheet 5-48, *Automatic Fire Detection*, in conjunction with the recommendations in this section.

2.5.2.2 Select the type of FM Approved automatic detection in accordance with the manufacturer's FM Approved DIOM manual, the *Approval Guide* listing, and applicable occupancy or equipment hazard data sheets. Include the following considerations:

A. Hazard/commodity to be protected

B. Size/dimensions of coverage area

C. Ambient conditions (i.e., indoor vs. outdoor locations)

D. Field of view and potential obstructions (structural members, equipment and water spray from the operating monitor)

E. Potential sources of false activation

F. Spatial resolution of the detectors

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2.5.3 Video Reference Cameras

2.5.3.1 Locate video reference cameras in accordance with the manufacturer's DIOM manual.

2.5.4 Central Station

2.5.4.1 General

2.5.4.1.1 For systems incorporating a central station, use only the station associated with the FM Approval to remotely operate the automated monitor fire suppression system.

2.5.4.1.2 In addition to the FM Approved central station, provide capability for emergency, manual operation of the monitors by on-site personnel.

2.5.4.2 Central Station Connectivity

2.5.4.2.1 Where applicable, provide primary and backup communication methods in accordance with FM Property Loss Prevention Data Sheet 5-40, *Fire Alarm Systems*. Information on communication methods is provided in Appendix C of that data sheet.

2.5.4.2.1.1 A cellular or voice over internet protocol (VOIP) connection can be provided as a method of backup communication to the supervising station.

2.5.4.2.2 Where applicable, ensure the internet connection meets the minimum upload and download speed requirements specified in the manufacturer's DIOM manual.

2.5.4.2.3 Provide an independent network connection for the water monitor assemblies.

2.5.5 Actuation and Control

2.5.5.1 General

2.5.5.1.1 Provide a reliable, emergency source of power and associated system initiating and control devices. Provide an automatic power transfer switch and a minimum of 24 hours standby power and 10 minutes of alarm power. Refer to FM Property Loss Prevention Data Sheet 5-23, *Design and Protection for Emergency and Standby Power Systems*.

2.5.5.2 Cabling

2.5.5.2.1 Provide electrical and communication signal cabling type and gauge in accordance with the manufacturer's specifications.

2.5.5.2.2 Minimize the length of cable runs, per the manufacturer's specifications.

2.5.5.2.3 Route cabling away from the fire area, and protect it from ambient conditions or physical damage.

2.5.5.2.4 Ensure circuits feeding the monitor assemblies and accessories (detectors, cameras, etc.) are dedicated and separate from the circuits supplying other facility loads. Arrange the power supply such that disconnection of the main facility power does not interrupt power to the fire protection and associated loads.

2.5.5.3 System Initiation

2.5.5.3.1 Initiate the system automatically using the detection devices recommended in Section 2.5.2.

2.5.5.3.2 Provide a manual means of system initiation from at least one remote location within the protected facility.

2.5.5.4 Alarms

2.5.5.4.1 Provide alarm and actuation circuitry in accordance with Data Sheet 5-40, *Fire Alarm Systems*, and the manufacturer's DIOM manual.

2.5.5.4.2 Provide trouble/fault alarms that are distinct from those indicating operation of the automated monitor fire suppression system.

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2.5.5.5 Supervision

2.5.5.5.1 Provide electrical supervision in accordance with Data Sheet 9-1, *Supervision of Property*.

2.5.5.5.2 Provide supervisory alarm signals that are different from fire alarm signals at the fire alarm control panel.

2.5.5.6 Control/Actuation Devices

2.5.5.6.1 Provide an FM Approved releasing device that is electrically compatible (voltage and current) with the automated monitor fire suppression system's actuation devices (e.g., solenoids) and that interfaces with the detection and alarm systems.

2.5.5.6.2 Provide a Class N pathway for the actuation of the preaction deluge valve assembly.

2.6 Acceptance of Automated Monitor Fire Suppression Systems

2.6.1 Acceptance Testing

2.6.1.1 Use a contractor who is an authorized distributor or representative of the automated monitor fire suppression system manufacturer and trained to test the system in accordance with the manufacturer's DIOM manual.

2.6.2 Visual Inspection

2.6.2.1 Verify the system has been installed in accordance with submitted working drawings and specifications, including but not limited to:

A. Type and layout of detection devices

B. Use of appropriate monitor/nozzle assemblies

C. Placement and orientation of monitor assemblies

D. Type and placement of detection devices

E. Placement of video cameras

2.6.3 Functional Testing

2.6.3.1 Confirm functionality of all mechanical and electrical components (monitors, valves, detectors, alarms, etc.).

2.6.3.2 Inspect and test alarm and detection devices in accordance with Data Sheet 5-40, *Fire Alarm Systems*, and Data Sheet 5-48, *Automatic Fire Detection*.

2.6.3.3 Verify the signal strength and transmission speed of the primary internet connection and any backup cellular connection. Make necessary adjustments to conform to the manufacturer's DIOM manual.

2.6.3.4 Confirm operation of uninterruptible power supplies.

2.6.3.5 For systems utilizing a central station for remote operation of the suppression system, confirm the following:

A. Detection and confirm delivery of alarm signals to the central station

B. Functionality of all video cameras

C. Remote control of water monitor assemblies

2.6.4 Discharge Tests

2.6.4.1 Conduct full discharge tests to verify the system responds as designed from both automatic detection and manual actuation devices, including but not limited to:

A. Complete coordinated system operation (e.g., automatic detection and manual activation devices, visual/audible alarms, etc.)

B. Operation of releasing devices and valves

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C. Unobstructed flow from the monitor assemblies throughout the complete range of spray settings (straight stream/narrow spray angle to widest spray angle)

D. Full movement of monitor assemblies across their entire radial and vertical range

E. Proper spray coverage (reach) of all monitor assemblies

F. Discharge flow in accordance with hydraulic calculations, as confirmed at the most remote monitor assembly

G. Operation of auxiliary devices (equipment shutdown, interlocks, etc.)

2.6.4.1.1 For systems utilizing a central station for remote operation of the monitor assemblies, conduct the full discharge test remotely via the central station.

2.6.5 System Restoration

2.6.5.1 After acceptance tests are completed or following any other system operation, restore the water monitor assemblies, alarms and interlocks to operational condition.

2.6.5.2 Follow the proper shutdown sequence of valves and equipment in accordance with the manufacturer's recommendations.

2.6.5.3 Adhere to established impairment procedures. Refer to FM Property Loss Prevention Data Sheet 10-7, *Fire Protection Impairment Management*, for details.

2.6.5.4 Flush and drain piping that is normally empty.

2.6.5.5 Restore valves to their operational position.

2.7 Inspection, Testing, and Maintenance

2.7.1 Secure control valves, including any shutoff valves associated with the monitor assemblies, in accordance with Data Sheet 2-81, *Fire Protection System Inspection, Testing and Maintenance*.

2.7.2 Provide a valve supervision program in accordance with Data Sheet 2-81, *Fire Protection System Inspection, Testing and Maintenance*.

2.7.3 Inspect, test, and maintain monitor nozzles in accordance with the applicable guidance in Data Sheet 2-81, *Fire Protection System Inspection, Testing and Maintenance*.

2.7.4 Test detection systems in accordance with Data Sheet 5-48, *Automatic Fire Detection*.

2.7.5 Conduct inspection, testing, and maintenance of emergency power systems in accordance with Data Sheet 5-23, *Design and Protection for Emergency and Standby Power Systems*.

2.7.6 In addition to the inspection, testing, and maintenance activities described in Sections 2.7.1 through 2.7.5, conduct the following:

A. Weekly tests of network connectivity and speed

B. Weekly visual inspection of monitor assemblies and accessories

C. Monthly physical testing of monitor assemblies (remote and/or manual operation of assemblies only; no water flow)

D. Annual visual inspection of all system components (equipment, cabling, etc.)

E. An annual full discharge test (see Section 2.6.4). After full initial acceptance testing, hose connections to the monitor nozzle assembly may be used to divert water flow away from the protected area while still verifying functionality and water flow through the system.

2.7.7 Manage system impairments in accordance with Data Sheet 10-7, *Fire Protection Impairment Management*.

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2.8 Training

2.8.1 Provide training for all personnel responsible for the operation and maintenance of the system, addressing the following at a minimum:

A. Review of the manufacturer's DIOM manual

B. Functionality of the system and major system components

C. Associated equipment and interlocks, if applicable

D. Operation of the system under normal and emergency circumstances (i.e., automatic and manual operation), including the location of manual release devices

E. Necessary inspection, testing and maintenance of the suppression system and protected area

3.0 SUPPORT FOR RECOMMENDATIONS

3.1 Monitor Assembly History

Monitors have historically been used as manual firefighting devices to supplement automatic fire protection and/or provide final extinguishment. For example, FM Property Loss Prevention Data Sheet 8-34, *Protection for Automatic Storage and Retrieval Systems*, recommends strategies to achieve final extinguishment of challenging ASRS fires, such as pre-incident planning, the use of video cameras for the warehouse and the installation of firefighting methods such as monitors.

Until recently, these devices were either fixed in place, oscillating over a predetermined area, or required manual intervention to successfully operate the assemblies. Even monitor assemblies that could be operated remotely needed emergency responders to use them. This human factor impacted the reliability of these protection systems, rendering them supplemental protection systems.

Within the past 10-15 years, manufacturers have begun exploring automatically operated systems that mitigate these reliability concerns. These systems have the potential to be used as alternatives to automatic sprinkler protection, yet they remain inherently more complex systems.

As a result, FM Approval Standard Class Number 1421, *Examination Standard for Fire Protection Monitor Assemblies*, was modified to incorporate evaluation criteria for these remote and automated systems.

3.2 Recommended Automated Monitor Fire Suppression System Applications

Given the strong historical reliability and performance of automatic sprinkler systems, they remain FM's recommended protection method for most hazards and occupancies. However, some hazards may present a unique challenge to conventional sprinkler protection, and the larger water streams associated with monitors may offer more effective fire protection.

The applications listed in Table 3.2 represent areas where FM Approved, automated monitor fire suppression systems are recommended. This table is a summary only; specific design guidance is provided in the applicable occupancy-specific data sheets.

Table 3.2 primarily includes outdoor fire hazards and indoor nonstorage occupancies containing hazards for which conventional sprinkler protection is ineffective and/or not cost efficient. Automated monitor fire suppression systems may also be beneficial when supplementing sprinkler protection in higher challenge fire scenarios such as those found in storage occupancies.

Table 3.2. Applications for Automated Monitor Fire Suppression Systems

Hazard / Occupancy	*Comments*	*Associated Data Sheet*
Waste fuel-fired facilities	Tipping halls, bunker building	DS 6-13, *Waste Fuel-Fired Facilities*
Pulp and paper	For protection of outdoor storage or storage within noncombustible buildings	DS 8-22, *Storage of Baled Wastepaper*
Automatic storage and retrieval systems	Not to be used as sole protection. Used as a supplement to automatic sprinkler systems to help achieve final extinguishment of ASRS fires.	DS 8-34, *Protection for Automatic Storage and Retrieval Systems*

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Table 3.2 includes occupancies and hazards where the use of FM Approved automated monitor fire suppression systems is recognized. As the technology develops commercially (only one FM Approved system is available as of 2026), and more experience is gained with these systems' design, installation, and performance; expect that the hazards and occupancies listed above will expand.

3.3 System Validation

Automated monitor fire suppression systems need to be tested for functionality and reliability. Tests are covered in FM Approval Standard Class Numbers 1421, Examination Standard for Fire Protection Monitor Assemblies and 5511, Firefighting Nozzles for Use with Hose, Monitor Assemblies and other Firefighting Equipment. These standards confirm the performance of individual system components, as well as the functionality of the full system.

In addition, all system limitations, as outlined in the manufacturer's FM Approved DIOM manual, must be met. Failure to do so may negatively impact the system's performance in a fire event.

4.0 REFERENCES

4.1 FM

Data Sheet 1-2, *Earthquakes*
Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*
Data Sheet 2-8, *Earthquake Protection for Water-Based Fire Protection Systems*
Data Sheet 2-81, *Fire Protection System Inspection, Testing and Maintenance*
Data Sheet 3-0, *Hydraulics of Fire Protection Systems*
Data Sheet 5-23, *Design and Protection for Emergency and Standby Power Systems*
Data Sheet 5-40, *Fire Alarm Systems*
Data Sheet 5-48, *Automatic Fire Detection*
Data Sheet 6-13, *Waste Fuel-Fired Facilities*
Data Sheet 8-22, *Storage of Baled Wastepaper*
Data Sheet 8-24, *Idle Pallet Storage*
Data Sheet 8-27, *Storage of Wood Chips*
Data Sheet 8-28, *Pulpwood and Outdoor Log Storage*
Data Sheet 8-34, *Protection for Automatic Storage and Retrieval Systems*
Data Sheet 9-1, *Supervision of Property*
Data Sheet 9-18, *Prevention of Freeze-Ups*
Data Sheet 10-7, *Fire Protection Impairment Management*

UTH: *Special Protection System Reliability* (P0379)

4.2 FM Approvals

FM Approval Standard Class Number 1421, *Examination Standard for Fire Protection Monitor Assemblies*

FM Approval Standards Class Number 5511, *Firefighting Nozzles for Use with Hose, Monitor Assemblies and other Firefighting Equipment*

APPENDIX A GLOSSARY OF TERMS

Approval Guide: An online resource of FM Approvals, the *Approval Guide* provides access to a fully searchable database of the most up-to-date information on approximately 50,000 FM Approved fire protection products, building materials, electrical equipment and services that conform to the highest property protection standards.

Primary protection system: A system that provides adequate protection in accordance with the occupancy-specific data sheet.

Sole protection: See primary protection.

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Special protection system: A protection system that provides adequate fire suppression or extinguishment:

1. For hazards in which adequate fire suppression cannot be provided by automatic ceiling sprinklers due to the nature of the hazard or inherent elements that restrict sprinkler water from being effective (e.g., water spray obstructions).
2. As supplementary protection. Special protection systems include CO_2, clean agent, dry chemical, foam-water, hybrid and water mist systems, and automatic water monitor systems. Equipment hazard and occupancies suitable for protection by special protection systems are described in FM data sheets.

Supplementary protection: A special protection system provided in addition to automatic sprinkler protection:

- To reduce the size of a loss in an occupancy sensitive to sustained fire (e.g., processing equipment rooms or clean rooms)
- To assist with manual firefighting efforts
- As an alternative to emergency drainage in ignitable liquid storage and use occupancies.

In these cases, automatic sprinkler protection is still needed.

APPENDIX B DOCUMENT REVISION HISTORY

The purpose of this appendix is to capture the changes that were made to this document each time it was published. Please note that section numbers refer specifically to those in the version published on the date shown (i.e., the section numbers are not always the same from version to version).

April 2026. This is the first publication of this document.

APPENDIX C FORMS

Reserved for future use.

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