



Approvals



Updates to FM Property Loss Prevention Datasheet 4-2, Water Mist Systems

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October 7, 2026

Areas of Focus

- Non-Storage Occupancies Hazard-Category 2 and Hazard Category 3 (HC-2 and HC-3)
- Additional equipment hazards and occupancies suitable for HC-2 and HC-3
- Ignitable liquid storage (ILS) in cutoff rooms
- Additional application as primary protection



FM Approvals

FM 5560

Examination Standard for Water Mist Systems

January 2021

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HC-2 and HC-3 - Background

Class 2 Commodity
(EUR Commodity Category I)



FM HC-2 Fire Hazard

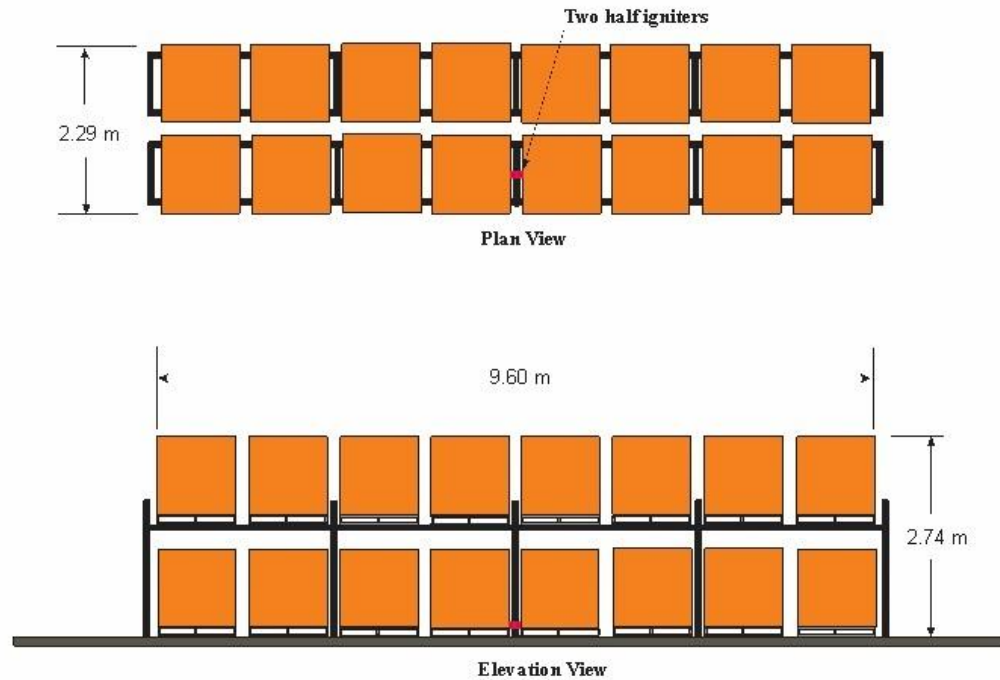
Cartoned Expanded Polystyrene (CEP)
(EUR Commodity Category IV)



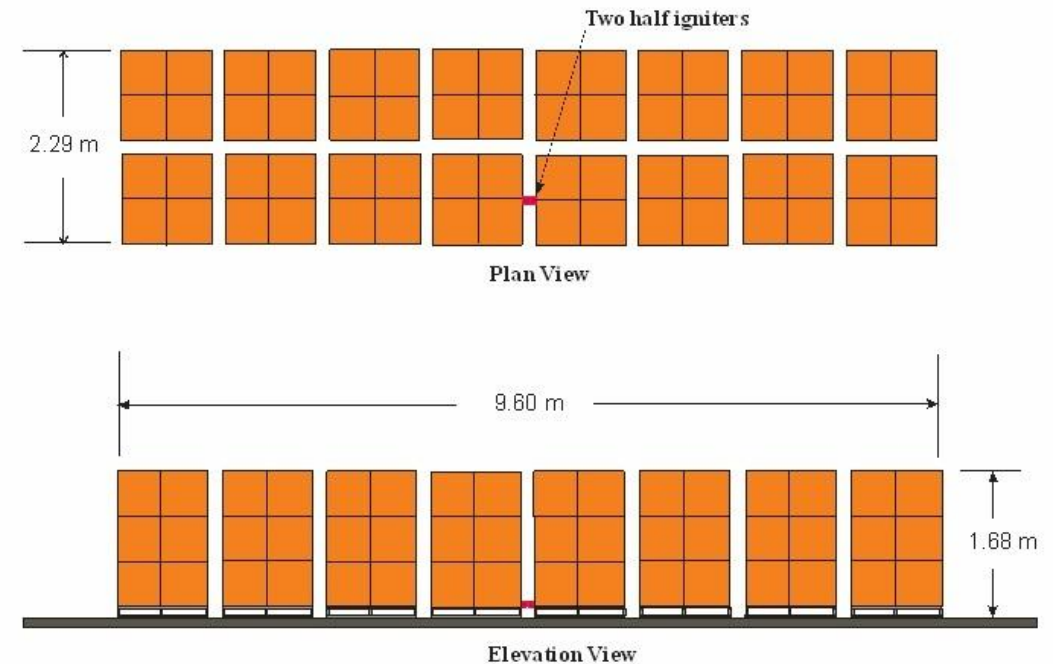
FM HC-3 Fire Hazard

HC-2 and HC-3 - Background

HC-2 Fuel Array



HC-3 Fuel Array



HC-2 and HC-3 - Background



HC-2 and HC-3 – FMDS 4-2 Updates



Table 2.4.1.1

<i>FM Approval Listing Category</i>	<i>Occupancy</i>	<i>Restrictions</i>	<i>Associated Data Sheet(s)</i>
Protection of Non-Storage Occupancies, Hazard Category 2 (HC-2)	HC-2 Protection designated as HC-2 in the specific data sheet	Nonstorage and manufacturing areas with ordinary combustibles, with cartoned plastics and ignitable liquids used or stored not in excess of incidental quantities. No plastic construction elements. No low-pile storage of CUP and CEP FM Approved water mist systems for the HC-2 category are suitable for HC-2 or HC-1 occupancies. Application of FM Approved water mist systems for HC-2 occupancies is limited to: - A. wet pipe systems; do not use dry or preaction systems, except for data centers. Do not use systems listed to protect areas and ceiling heights greater than specified in the FM Approval listing.	3-26 5-28 5-31 5-32 7-13 7-35 7-50 7-91 7-95 7-110 7-112

HC-2 and HC-3 – FMDS 4-2 Updates



Table 2.4.1.1

<i>FM Approval Listing Category</i>	<i>Occupancy</i>	<i>Restrictions</i>	<i>Associated Data Sheet(s)</i>
Protection of Non-Storage Occupancies, Hazard Category 3 (HC-3)	HC-3 Protection designated as HC-3 in the specific data sheet	Nonstorage and manufacturing areas with ordinary combustibles with cartoned plastics and ignitable liquids not used or stored in excess of incidental quantities. No plastic construction elements. FM Approved water mist systems for the HC-3 category are suitable for HC-3, HC-2, or HC-1 occupancies. Application of FM Approved water mist systems for HC-3 occupancies is limited to wet pipe systems.: - Do not use dry or preaction systems, except for data centers Do not use systems listed to protect areas and ceiling heights greater than those specified in the FM Approval listing.	3-26 7-6 7-112

HC-2 and HC-3 – FMDS 4-2 Updates



Table 2.4.3.1. Protection of 0.2 gpm/ft² (8 mm/min) and 0.3 gpm/ft² (12 mm/min) Applications with Water Mist Systems

0.2 gpm/ft² (8mm/min)	0.3 gpm/ft² (12 mm/min)
5-32, <i>Data Centers and Related Facilities</i>	5-33, <i>Lithium-Ion Battery Storage Energy Storage Systems</i>
	7-15, <i>Garages</i>
	7-20, <i>Oil Cookers</i>
	7-112, <i>Lithium-Ion Battery Manufacturing and Storage</i>

- FM Approved HC-2 or HC-3 water mist systems may be used to provide primary protection with either a 0.2 gpm/ft² (8 mm/min) or 0.3 gpm/ft² (12 mm/min) application density, respectively as an alternative to sprinklers. This application is for the occupancy or occupancy hazard identified in the specific Data Sheets shown in Table 2.4.3.1.
- Use only water mist systems specifically FM Approved for either HC-2 or HC-3 to provide adequate protection with their listings and associated limitations.
- Provide a reduced area of coverage and nozzle spacing in accordance with the DIOM manual for either an actual delivered 0.2 gpm/ft² (8 mm/min) or 0.3 gpm/ft² (12 mm/min) application density.

HC-2 and HC-3 – FMDS 4-2 Updates



■ Takeaways

- Reference associated data sheets in tables
- Associated datasheets, including FM DS 3-26, *Fire Protection for Nonstorage Occupancies*, will be revised for clarification as tied to updates in FM DS 4-2
- Examples:
 - ...*provide automatic sprinkler protection designed to provide 0.2 gpm/ft² over 3000 ft² (8 mm/min over 280 m²)* → Means what it says
 - ...*design the ~~automatic sprinkler system~~ protection for an HC-2 occupancy* → water mist or sprinklers HC-2
- Concept of HC-2/HC-3 water mist system designed to traditional sprinkler density provides additional options for water mist

ILS Cutoff Rooms- Background

- Fuel Loading
 - Heptane
 - 1-gal (3.8-L) and 5 gal (19-L) plastic containers



1-gal



108 containers



5-gal



48 containers

ILS Cutoff Rooms- Background

- Test Enclosure
 - Sized to manufacturer requirement in 5 ft (1.5 m) increments for length, width, and height (minimum size 25 by 25 by 25 ft (7.6 by 7.6 by 7.6 m))
 - 10 by 10 ft (3 by 3 m) minimum opening required



ILS Cutoff Rooms- Background

- Fire Tests include 2-, 3-, or 4-tiers, each tier 5 ft (1.5 m) for each size container

1-gal containers, 4-tier rack storage

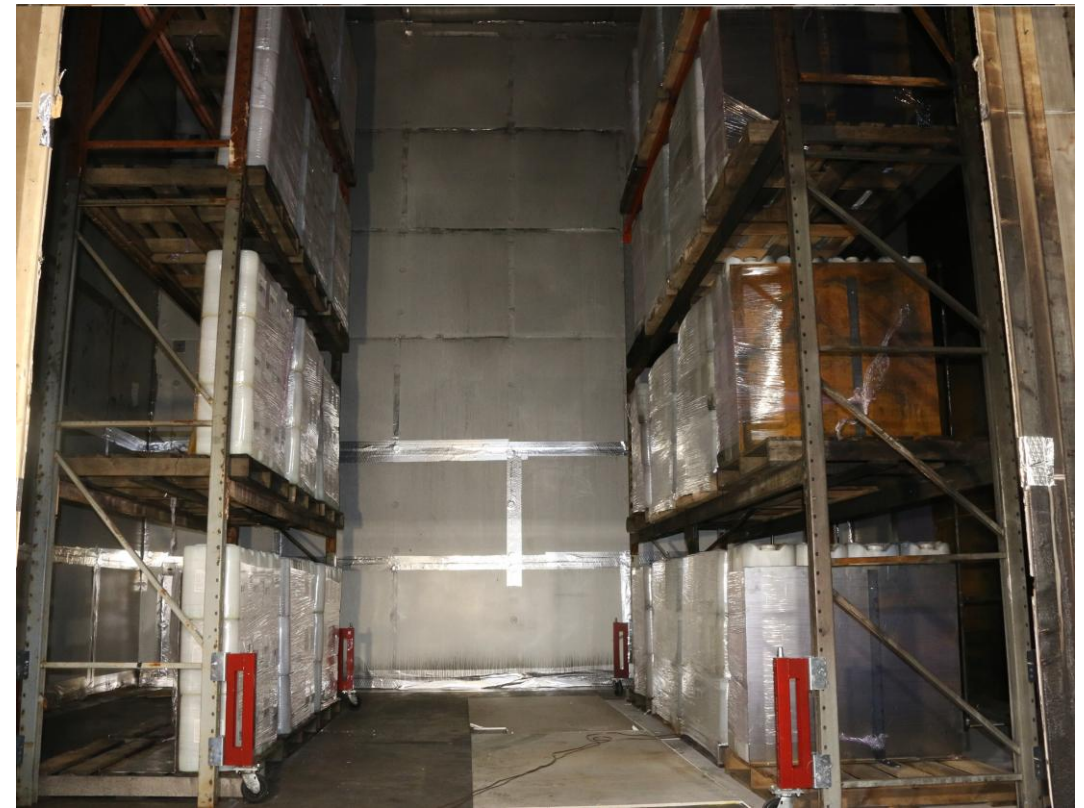


Target



Main array with igniter

5-gal containers, 4-tier rack storage



ILS Cutoff Rooms- Background



ILS Cutoff Rooms – FMDS 4-2 Updates



<i>FM Approval Listing Category</i>	<i>Occupancy</i>	<i>Restrictions</i>	<i>Associated Data Sheet(s)</i>
Ignitable Liquid Storage Cut-off Room	Cut-off rooms with ignitable liquid use or storage having metal container sizes up to standard intermediate bulk container (IBC). Storage types permitted within the protection include palletized, rack and shelf.	Plastic container size is limited to a maximum of 6.5 gal (25 L) and includes both cartoned and uncartoned.	7-29 7-32

ILS Cutoff Rooms – FMDS 4-2 Updates



■ Takeaways

- Ignitable liquid storage for use in cutoff room applications in accordance with FM DS 7-29 (Ignitable Liquid Storage) and 7-32 (Ignitable Liquid Use).
- Considered primary protection with a 60-minute water supply duration to all nozzles in the protected space
- Storage types permitted within the protection include palletized, rack and shelf
- Storage height is limited to the storage height in the FM Approval listing
- FM Approved water mist systems for ignitable liquid storage in cutoff rooms are suitable for the protection of ignitable liquid use occupancies within the same maximum volume, maximum ceiling height, and maximum opening size limitations as the listing.

Thank you. Any questions?

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