PROTECTION AGAINST EXTERIOR FIRE EXPOSURE

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1.0 SCOPE

This data sheet provides guidelines for evaluating fire exposure from adjacent buildings or outdoor yard storage and recommendations for protecting property from such exposures.

This data sheet does not address all the exposure hazards from ignitable liquids, fire in certain outdoor equipment, detonations, explosions, wildland fire or contamination. This data sheet also does not address the exposure presented by other tenants in the building who may have inadequate protection provided in the space they occupy.

This data sheet is applicable to fire exposures on adjacent property and to situations where the fire exposure and exposed building are on the same property. In the former case, controlling the exposure may be outside the influence of the owner of the exposed building. In the latter case, providing adequate and reliable automatic sprinklers in the exposing building eliminates the hazard. Where adequate and reliable protection is provided, this data sheet assumes that protection is not impaired.

1.1 Hazards

An exterior exposure hazard exists whenever there is a possibility that a fire could spread from one building to another or from yard storage or equipment to a building.

1.2 Changes

April 2025. This document has been completely revised. Significant changes include the following:

A. Updated for consistency with FM Global Loss Prevention Data Sheet1-42, *MFL Limiting Factors*, and other resources.

B. Updated exposure sprinkler design criteria based on recent research.

C. Updated FM exposure fire loss information.

D. Removed information regarding hazards created by vehicles when buildings are constructed over highways.

2.0 LOSS PREVENTION RECOMMENDATIONS

The guidance in this data sheet is intended to prevent physical loss and damage to property from a fire exposure under normal conditions. It does not address potential loss or damage from any other hazard. It also does not preclude damage from very large fires under adverse conditions such as a maximum foreseeable loss (MFL) fire on-site or on an adjacent property. Refer to Data Sheet 1-22, *Maximum Foreseeable Loss*, for guidance in those cases.

2.1 FM Approved Equipment

Use 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*, an online resource of FM Approvals.

2.2 Fire Exposure from Buildings, Yard Storage or Outdoor Equipment

2.2.1 When adjacent buildings, yard storage or outdoor equipment are protected by automatic sprinklers and/or a special protection system, and the protection is verified to be adequate and reliable, no fire exposure exists.

2.2.2 When exposing buildings are of noncombustible or fire-resistive construction, are vacant or contain only noncombustible contents, no fire exposure exists.

2.2.3 If the exposing wall and roof of an exposing building are categorized as Stable Fire-Resistive (SFR) (see Appendix A) and no unprotected wall or roof openings (such as windows or skylights) are present; no fire exposure exists.

2.2.4 When one or more adjacent buildings, yard storages or outdoor equipment are unprotected, creating an exterior fire exposure, do one of the following (listed in order of preference):

A. Provide adequate and reliable sprinkler protection in all buildings (including the exposing building) and/or for yard storage or outdoor equipment as needed based on construction and occupancy (see Data Sheet 3-26, *Fire Protection for Nonstorage Occupancies*, Data Sheet 8-9, *Storage of Class 1, 2, 3, 4 and Plastic Commodities*, or other applicable data sheets).

B. Provide separation between buildings, yard storage, or outdoor equipment in accordance with Data Sheet 1-42, *Maximum Foreseeable Loss Limiting Factors* or other applicable data sheets.

Having less space separation than what is described in Data Sheet 1-42 may be acceptable in certain situations with good fire service response. Consult with your FM loss prevention engineer for details before applying this concept.

C. Improve the active and/or passive protection of the exposed walls and windows on a building as described in Section 2.3.

2.2.5 For all occupancies and outdoor storage with ignitable liquids, evaluate whether the ignitable liquid can compromise the minimum safe separation distance by flowing into the area. Recommend containment or drainage if needed and practical. (See Data Sheets 7-83, *Drainage and Containment Systems for Ignitable Liquids*, and 7-88, *Outdoor Ignitable Liquid Storage Tanks*.)

2.2.6 Relocate combustible materials within the minimum safe separation space.

2.2.7 Maintain unpaved yards in the minimum safe separation distance, so that the height of grass and weeds does not exceed 4 in. (100 mm).

2.2.8 Locate dumpsters (rubbish skips) at least 30 ft (9 m) from exposed buildings, unless the exposed walls are (1) blank (no unprotected openings), (2) minimum 1-hour fire rated and (3) have no combustible roof eaves. When these criteria are met, no separation is needed.

2.2.9 Treat loaded trailers stored in the yard as an exposing building, taking into consideration the contents and construction of the trailer.

2.2.10 Leave dock doors closed when not in use.

2.2.11 Install metal chain link fencing around the yard in accordance with Data Sheet 10-6, *Protection Against Arson and Other Incendiary Fires*, to prevent direct access by vandals.

2.2.12 Install yard hydrants when combustible materials are stored outside (see Data Sheet 3-10, *Installation and Maintenance of Private Fire Service Mains and their Appurtenances*). Locate hydrants just outside the ends of spaces between buildings and at intervals not exceeding 300 ft (90 m).

2.3 Protection of Exposed Walls

2.3.1 Where the exposure and separation distance are such that a noncombustible exposed wall is needed, apply all of the guidance in this section.

2.3.1.1 Protect walls using one of the following methods:

A. Replace combustible exterior walls with a wall panel or material that is noncombustible or FM Approved as defined in Appendix A below.

B. Provide protection in accordance with Section 2.4.

2.3.1.2 Protect door openings on the exposed wall with doors that are:

A. Normally closed, self-closing or automatic closing

B. Provided with a latch

C. Noncombustible or minimum 3/4-hour fire-rated

D. Blank or have vision panels made of fire-rated, wired or tempered glass

2.3.1.3 Protect windows using one of the following methods:

A. Provide noncombustible window frames and glazing that are:

1. Tempered glass
2. Double-paned annealed glass
3. Heat-strengthened glass
4. Wired glass
5. Glass block
6. Listed fire-rated glass

B. Provide protection in accordance with Section 2.4.

C. Protect windows with minimum 3/4-hour automatic closing shutters.

2.3.2 Where the exposure and separation distance are such that a 1-hour fire-rated exposed wall is needed, apply all of the guidance in this section.

2.3.2.1 Protect walls using one of the following methods:

A. Recommend the exterior walls be constructed of a 1-hour fire-rated assembly or generic fire-rated construction with an equivalent fire rating per Data Sheet 1-21, *Fire Resistance of Building Assemblies*.

B. Provide protection in accordance with Section 2.4.

2.3.2.2 Protect door openings on the exposed wall with doors that are:

A. Normally closed, self-closing or automatic closing

B. Provided with a latch

C. Fire-rated with an hourly rating appropriate for the wall on which they are installed

D. Blank or have vision panels made of fire-rated, wired or tempered glass

2.3.2.3 Protect windows using one of the following methods:

A. Replace windows and frames with a listed window assembly of equivalent fire rating.

B. Replace windows and frames with a wall assembly of equivalent fire rating.

C. Protect windows with minimum 3/4-hour automatic closing shutters.

D. Provide noncombustible frames and glazing that is listed, minimum 3/4-hour fire rated glass, glass block or wired glass. Ensure the dimensions of the windows do not exceed the dimensions and area limitations of the listing or applicable building code. Keep combustibles away from the inside of the exposed windows at a distance at least equal to the largest dimension of the window.

E. Provide protection in accordance with Section 2.4.

2.3.2.4 Provide FM Approved roof decks and above-deck assemblies that are noncombustible or have an FM Approved Class A rating (per ASTM E108).

2.3.3 Where the exposure and separation distance are such that more than a 1-hour fire-rated exposed wall is needed, apply all of the guidance in this section.

2.3.3.1 Recommend the exterior walls be constructed of a fire-rated assembly or generic fire-rated construction with an equivalent fire rating per Data Sheet 1-21, *Fire Resistance of Building Assemblies*.

2.3.3.2 Protect door openings on the exposed wall with doors that are:

A. Normally closed, self-closing or automatic closing

B. Provided with a latch

C. Fire-rated with an hourly rating appropriate for the wall they are installed on

D. Blank or have vision panels made of fire-rated, wired or tempered glass

2.3.3.3 Protect windows using one of the following methods:

A. Replace windows and frames with a listed window assembly of equivalent fire rating

B. Replace windows and frames with a wall assembly of equivalent fire rating

C. Protect windows with fire-rated, automatic-closing shutters having an appropriate rating for the wall

2.3.3.4 Provide FM Approved roof decks and above-deck assemblies that are noncombustible or have an FM Approved Class A rating (per ASTM E108).

2.4 Active Exposure Protection

2.4.1 If exterior exposure sprinkler protection is provided, recommend the system be designed in accordance with the following:

A. Determine the sections of exposed walls that need exterior sprinkler protection up to a maximum of 400 feet (122 m) per Section 2.2.4.

B. Provide a water flow rate per linear foot (meter) in accordance with Table 2.4.1.

C. If the actual wall height is greater than 30 ft (9.1 m), provide additional levels of exterior sprinkler protection, evenly spaced vertically up the wall.

D. Provide the most practical horizontal sprinkler spacing between 6 ft and 12 ft (1.8 m and 3.7 m). Multiply the flow rate obtained in step B above by the horizontal sprinkler spacing chosen to get the minimum flow rate per sprinkler.

E. Ensure the water supply is capable of supplying the total systems demand along an exposure for a minimum duration of 60 minutes.

Example: A 15 ft (4.6 m) high combustible wall would need a single level of sprinklers. If the horizontal spacing of the sprinklers is 10 ft (3 m), then design each sprinkler to consider a minimum flow of 32 gpm (118.8 L/min).

Table 2.4.1. Exterior Sprinkler Design Water Flow[1,2]

Wall Construction	*Vertical spacing, ft (m)*	*Water flow[3], gpm/ft (L/min/m)*
Combustible	10 (3.0)	2.7 (32.5)
	15 (4.6)	3.2 (39.6)
	20 (6.1)	3.8 (46.5)
	30 (9.1)	4.8 (60.1)
Noncombustible	10 (3.0)	1.9 (24.0)
	15 (4.6)	2.5 (30.8)
	20 (6.1)	3.1 (37.8)
	30 (9.1)	4.1 (51.4)

Note 1. Horizontal sprinkler spacing should be between 6 ft and 12 ft (1.8 m and 3.7 m).
Note 2. Sprinkler pressure should be between 7 psi and 90 psi (0.48 bar and 6.2 bar).
Note 3. Water flow listed as gpm/ft (L/min) per unit length of wall (ft [m]).

2.4.2 Recommend exterior sprinklers be installed in accordance with Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*. Arrange them to operate automatically. Install exterior exposure sprinklers that meet the following criteria:

- FM Approved, non-storage sprinklers
- Vertical sidewall only (upright or pendant)
- Quick response or automatically-actuated, open water spray deluge
- 165°F (72°C) temperature-rated
- Installed between 6-12 in. (150-300 mm) away from the wall
- Installed with the deflector directing the flow towards the wall
- Installed having the thermal element “visible” from the most likely radiant source
- In areas subject to freezing, use dry systems

3.0 SUPPORT FOR RECOMMENDATIONS

An exposure fire, for the purposes of this document, is a fire in an adjacent building or yard storage or equipment that results in ignition of or damage to a building. The exposure (i.e., exposing building) may be owned and in the care and custody of the exposed building's owner, owned but in the control of others, or not owned and having no relation to the owner of the exposed building. The exposure may or may not be on the owner's property.

In many large exposure fires, the origin of the fire was on neighboring or adjoining properties. Buildings have also been damaged by exposure fires starting in yard storage (lumber, roll paper, tires, plastics, etc.) or in separate, unsprinklered structures. Automatic sprinklers and manual firefighting usually control the fire and keep it from spreading throughout the exposed building; although heat, water, and smoke damage may be considerable.

If a fire exposure hazard is found, guidelines in this data sheet can be used to determine if separation distances between the exposing and exposed buildings are safe for the degree of protection provided by the construction and sprinklers in the exposed building or if additional protection for the exposed building is needed.

Protection may be active, in which case a fire protection system (e.g., outside sprinklers) actively protects the exposed building during a fire, or passive, in which case the exposed building is protected by noncombustible or fire-resistive construction, materials or coatings, alone or in conjunction with some amount of open space.

Protection needed for an exposed building depends on the size and intensity of the exposure fire, the horizontal distance from the fire and the position of the exposed portion in relation to the fire. The growth of a fire will depend on: (a) the nature and quantity of combustibles; (b) the amount of ventilation air; and (c) external factors such as wind velocity, promptness of detection, manual response and available water supplies. In the vast majority of cases, assume sufficient ventilation air is available to feed the fire.

When evaluating the susceptibility of the exposed building to fire, consider the type of exposed wall and protection of openings. Generally, the main concern is the exposure to radiant heat. However, situations will exist where susceptibility to flowing ignitable liquids or the intake of smoke are of equal concern.

3.1 Loss History

Over a recent 10-year period, FM clients have reported 240 losses involving exterior exposure fires (not including wildland fires) for a total gross loss of US$318 million, or an average of US$1.3 million per incident (2023 values). Some of these losses involved outdoor yard storage exposing a building, and others involved a building exposing another building.

3.1.1 Yard Storage Fire

The client is a custom molder of residential and consumer plastic products. A fire occurred in palletized yard storage of 4 x 8 ft (1.2 x 2.4 m) sheets of polyethylene lattice, stacked to about 12 ft (3.7 m). The yard storage and an outdoor transformer were burned, and exposure damage to adjacent buildings was sustained. Exposure damage to production machinery and loss of the transformer led to production downtime.

Yard storage and the outdoor transformer were completely destroyed. Twelve thousand square feet (1,100 m^2) of steel exterior wall panels were damaged. Storage along the interior of exposed walls sustained thermal and water damage.

Molding machines not affected by the loss of the transformer were retooled to start making lattice within two days of the fire. Temporary power for the areas affected by the loss of the outdoor transformer was provided by a generator obtained on the third day after the fire. This generator enabled operation of two more molding machines to run lattice.

Contributing factors (positive and negative):

- Automatic sprinkler protection in the buildings limited fire damage to fringe only.
- Favorable winds prevented multiple ignitions within the building.
- Prompt response to the incident included orderly shutdown of equipment and prompt restoration of sprinkler systems to working order.

- Efficient rerouting of power to replace the lost transformer led to minimal down time.
- Proximity of stored product to the building added to the damage.
- Yard storage was accessible to the public through the chain link fence.
- Yard storage was seasonal, which made recognizing the exposure difficult.

Two people were charged with arson.

3.1.2 Yard Storage of Cotton Bales

The facility stores cotton in 18 warehouses with additional yard storage of cotton. Cotton is received via truck from local cotton gins. The cotton is stored on this site and then shipped in large quantities to various customers around the world. At the time of the loss, approximately 300,000 bales of cotton were on site. Typically, 160,000 bales are stored in the buildings with the remainder stored outside.

Seven warehouses are steel-on-steel frame (354,400 ft^2 [33,000 m^2]), and the 11 other warehouses are steel-on-wood frame (564,000 ft^2 [52,400 m^2]). Each warehouse stored approximately 11,000 bales to 12 ft (3.7 m) high. The space separation between warehouses end-to-end and side-to-side is approximately 100 ft (30 m). Each warehouse is provided with horizontal FRP light bands along the eaves, and all warehouses were provided with dry-pipe sprinkler systems.

A fire started with some hay bales due to maintenance personnel welding metal fencing at a livestock auction located across a dirt road. The fire spread by sustained winds of 38 mph (17 m/s), with gusts as high as 53 mph (24 m/s), and ignited the client's cotton bales that were stored two bales high to 12 ft (3.7 m). The large lots of cotton bales stored in the yard provided considerable fuel for the fire.

As the fire grew, employees were able to relocate 1,500 bales of cotton stored outdoors to an adjacent vacant lot. This relocation continued until the heat became too excessive. Five fire service trucks were on site before the fire started to affect the plant. These trucks were stationed between the livestock auction and the outdoor cotton storage, pre-wetting the cotton to help prevent it from becoming involved. The fire reportedly jumped over the fire trucks trying to pre-wet the cotton and ignited various areas of outdoor cotton storage. The fire then progressed through the yard storage to the south toward the warehouses. A total of 25,300 bales of outdoor cotton storage were consumed in the fire.

As the fire grew out of control, numerous other area fire services were called to the site. A total of 26 fire services responded, including the U.S. Forestry Service.

Once the fire reached the warehouse area, three warehouses were ignited; and all three buildings were totally consumed, including approximately 32,600 bales of cotton. The fire within the affected warehouses burned throughout the night into the following morning. During the night, the winds shifted to the north but continued with gusts over 50 mph (22 m/s). This shift helped direct the fire away from the remaining buildings. The fire was eventually extinguished the next day with the help of a helicopter dropping large quantities of water.

Before the fire was completely extinguished, it also jumped a six-lane highway to the east of the property. The fire service reported eight additional fires throughout the area caused by blowing embers.

Contributing Factors (positive and negative):

- Emergency response from various fire services was effective in limiting the fire to just three warehouses.
- The wind shift that took place during the night blew the fire away from the remaining buildings, giving the local fire services time to extinguish the fire.
- High winds in the area (38 mph with gusts up to 53 mph) quickly spread the fire among outdoor storage and, eventually, to the warehouses.
- Combustible construction of the warehouses and lack of adequate space separation allowed the fire to spread rapidly to the eaves of the buildings and adjacent warehouses.
- The large amount of outdoor storage made initial containment of the fire difficult.

3.1.3 Exposure Protection Limits Arson Fire

This facility manufactures shaped foam (expanded polyethylene) products, such as packaging for tool/equipment cases, helmet liners, matting, personal protective equipment and buoyancy aids. Foam is supplied in sheet form.

The building is predominantly single-story and is approximately 21,500 ft^2 (2,000 m^2). The construction is a steel frame with insulated metal panel roof and walls. The insulation material is mineral wool.

The occupancy involves foam cutting, shaping and heat-molding (electrical heating elements). The main hazard is the presence of in-process storage of foam plastic and finished product storage (generally solid, piled to a maximum of 8.5 ft (2.6 m). The bulk storage of raw material was located outside in the yard area. Exposure sprinklers (wet) were provided to protect the building. A substantial concrete wall and gate surrounded the yard.

Automatic sprinkler protection was also provided throughout the manufacturing areas. Protection was inadequate for the in-process storage.

The client's central station received a sprinkler water flow alarm at 2:47 a.m. and alerted the fire service. An anonymous telephone call to the fire service was also reported around the same time, which indicated a fire had started in one of the garbage skips at the premises.

The fire service arrived within eight minutes. Due to the severity of the fire, fire services in the surrounding area were called to assist.

The client's managing director arrived on scene at around 3:15 a.m. He reported the fire was beginning to die down and was completely extinguished by approximately 5:00 a.m.

All stock and equipment (fork truck, machine parts) in the yard was consumed by the fire. The exposure sprinklers operated and prevented fire spread into the building. The external cladding suffered heat damage.

Most of the exposure sprinklers operated (approx. 25), and two operated inside the building (one near an external door that may have been open during the fire). A small FRP skylight near the door suffered heat damage, and the operation of the sprinklers inside caused some minor water damage.

Following an investigation by authorities, the building was released back to the client late the next day. Management was informed by the police that one of the two night shift workers was arrested in connection with the fire.

Production resumed as normal two days following the fire.

3.1.4 Fire in Adjacent Business Spreads to Office Building

The client's buildings were exposed by other buildings on the same block. The building construction in this area dates from the 1920s and consists of wood roof decks on a combination of wood and metal frames with brick exterior walls. The client's buildings were provided with automatic sprinklers, but the surrounding buildings were not.

A fire started in a neighboring exposing building, reportedly used for miscellaneous storage; and a fire alarm was received from the client's exposed building at 10:41 p.m. The fire service arrived within minutes and found the fire had spread through a large portion of the exposing building. The fire spread to the client's exposed roof, and the fire caused some single pane annealed glass windows to break on the client's exposed building. Automatic sprinklers in a concealed space above the second floor drop ceiling and below the wood roof of that building operated and limited fire spread into the second floor, but the wood roof was still extensively damaged by fire. Water and smoke damage resulted throughout the remainder of the exposed building.

The fire service was able to prevent the fire from spreading to the other buildings on the city block. Light smoke damage was reported in the remainder of the buildings on the block.

Cleanup and recovery efforts began quickly. The buildings that experienced only smoke damage were cleaned and ready for use within one week. Some client operations in the exposed building were relocated to another adjacent building; other operations were relocated to an offsite client location.

Eventually, both the exposing building and the client's exposed building were demolished.

Contributing Factors:

- The sprinkler protection in the exposed building appeared to help limit the fire from spreading to the rest of the building, but the sprinklers above the suspended ceiling were ineffective in protecting the wood roof from the exterior fire exposure.
- The lack of sprinkler protection in the exposing building likely contributed to the size and initial spread of the fire.
- A lack of exposure sprinklers on the exposed wall and the wood roof construction were negative factors influencing fire spread to the exposed building.

4.0 REFERENCES

4.1 FM

Data Sheet 1-21, *Fire Resistance of Building Assemblies*
Data Sheet 1-22, *Maximum Foreseeable Loss*
Data Sheet 1-42, *MFL Limiting Factors*
Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*
Data Sheet 3-10, *Installation and Maintenance of Private Fire Service Mains and Their Appurtenances*
Data Sheet 3-26, *Fire Protection for Nonstorage Occupancies*
Data Sheet 7-83, *Drainage and Containment Systems for Ignitable Liquids*
Data Sheet 8-9, *Storage of Class 1, 2, 3, 4 and Plastic Commodities*
Data Sheet 10-6, *Protection Against Arson and Other Incendiary Fires*

4.2 Other

National Fire Protection Association (NFPA). NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*.

National Fire Protection Association (NFPA). NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*.

National Fire Protection Association (NFPA). NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*.

National Fire Protection Association (NFPA). NFPA 285, *Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components*.

APPENDIX A GLOSSARY OF TERMS

Combustible exposed wall: Any material or assembly with a critical heat flux for piloted ignition less than or equal to 12 kW/m^2. For a list of walls considered combustible, see the following table:

Table A-1. Combustible Walls

Any wall with exposed combustible materials such as wood eaves
Any wall with windows that can be opened
Any wall with windows that are single-pane, annealed glass
EIFS that does not meet the criteria to be considered noncombustible walls
Asphalt Coated Metal (ACM)
Rigid plastic panels (FRP, PVC)
Aluminum panels w/o insulation[1]
Non-Approved metal-faced panels w/plastic insulation
Cementitious panels on wood frame
Cementitious shingles on wood frame
Painted or unpainted wood of all types
Other assemblies on unprotected wood frame
Asphalt shingled wood sheathing

Note 1. Aluminum panels must be considered combustible due to low-melting temperature.

FM Approved: Products and services that have satisfied the criteria for Approval by FM Approvals. Refer to the *Approval Guide* and Roof*Nav* for a complete list of products and services that are FM Approved.

Fire door: A door assembly that has successfully met all acceptance criteria for the duration of a fire test exposure as described in an internationally recognized fire endurance test, such as NFPA 252.

Fire Rated (FR): An assembly that has passed an internationally recognized fire endurance test (e.g., ASTM E119) or is rated based on calculation or convention. For more information, see Data Sheet 1-21, *Fire Resistance of Building Assemblies*.

Fire-rated automatic closing shutters: A fire door assembly used for the protection of a window opening in an exterior wall.

Fire-rated glass: Glass, such as wired glass, glass block or ceramic glass that has passed a minimum ¾ hour fire endurance test and hose stream test.

Fire window assembly: A window or glass block assembly that has successfully met all acceptance criteria for the duration of a fire test exposure as described in an internationally recognized fire endurance test, such as NFPA 257.

Fire resistance rating: The time, in minutes or hours, that materials or assemblies have withstood a fire exposure, established in accordance with the test procedures of ASTM E119 or another internationally recognized fire endurance test.

Ignitable liquid: Any liquid or liquid mixture that has a measurable closed cup flash point. The hazard of a liquid depends on its ability to sustain combustion or create a flammable vapor-air mixture above its surface. Flash point is one way of understanding if a liquid can create that flammable vapor-air mixture. For a liquid to burn in a pool, it must have a fire point as well as a flash point. Ignitable liquids include flammable liquids, combustible liquids, inflammable liquids and any other term for a liquid that will burn.

Maximum Foreseeable Loss (MFL): The largest loss to result from an event, as calculated from an understanding of the overall hazard and associated business impact. This event assumes active protection systems or safety devices are impaired, with the exception of specifically FM Approved and tested MFL fire doors. The event can be related to fire, explosion, equipment failure or other scenario with the exception of natural hazards. MFL limiting factors are physical barriers or conditions that limit the spread of fire, contain explosive forces and control the amount of damage from the event.

Noncombustible walls: Any material or assembly with a critical heat flux greater than 12 kW/m^2 and less than or equal to 27 kW/m^2 that can withstand indefinite exposure without ignition, penetration, the opening of joints or failure. For a list of walls considered noncombustible, see the following table:

Table A-2. Noncombustible Walls[1]

Steel-faced panels w/o insulation on steel or reinforced concrete frame
Steel-faced panels w/ noncombustible insulation on steel or reinforced concrete frame
Cementitious panels w/o insulation on steel or reinforced concrete frame
Cementitious panels w/ noncombustible insulation on steel or reinforced concrete frame
FM Approved steel-faced, class 1 panels on steel or reinforced concrete frame
FM Approved steel-faced, noncombustible panels on steel or reinforced concrete frame
FM Approved wall panels w/ thermoset insulation on steel or reinforced concrete frame
FM Approved aluminum-faced, class 1 panels w/ thermoset insulation on steel or reinforced concrete frame
Aluminum-faced panels w/ noncombustible insulation on steel or reinforced concrete frame
Cementitious shingles on steel or reinforced concrete frame
Cementitious shingles over noncombustible sheathing on steel or reinforced concrete frame
Any unrated, precast, cast-in-place or tilt-up concrete panels (solid, hollow or insulated) on steel or reinforced concrete frame
Any unrated glass block
Any tempered glass panels in noncombustible frames on a steel or reinforced concrete building frame
Metal lath and plaster
Cementitious stucco
EIFS with noncombustible or Class 1 insulation over gypsum board sheathing

Note 1. Noncombustible exposed walls can also have no overhanging wood eaves.

Operable windows: Windows that can be opened by the normal occupants of the building without great difficulty or that could otherwise be opened frequently.

Stable Fire-Resistive (SFR): SFR walls are constructed of materials having a fire resistance rating at least adequate for the exposing occupancy. The category SFR only applies to exposing walls and not to exposed walls. To qualify as SFR, both the wall and its supporting structure need to have a fire-resistance greater than the expected duration of the exposing fire. This category includes freestanding walls and walls that are laterally supported by structural framework having adequate fire resistance. Expect that walls made of standard 2-core, hollow masonry units 12 in. (300 mm) thick up to 15 ft (4.5 m) in height or 16 in. (400 mm) thick up 20 ft (6.0 m) in height will remain stable with wooden roof construction. Thinner, solid, or fully grouted masonry walls may also qualify as SFR. Precast or tilt-up concrete walls with a moment connection at the base of the wall and wood roof may also be considered SFR.

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 2025. This document has been completely revised. Significant changes include the following:

A. Updated for consistency with FM Global Loss Prevention Data Sheet 1-42, *MFL Limiting Factors*, and other resources.

B. Updated exposure sprinkler design criteria based on recent research.

C. Updated FM exposure fire loss information.

D.Removed information regarding hazards created by vehicles when buildings are constructed over highways.

October 2016. Interim revision. Clarifications were made to recommendation 3.3.1.2.

July 2016. Interim revision. Clarification was made to recommendation 3.3.1.2.

July 2014. Interim revision.This document was revised to improve and simplify the way minimum safe separation distances (S_M) are determined. Additional changes include the following:

- Minimum safe separation distances exposing fire-rated construction (Tables 2 and 4) were revised. S_M was significantly reduced.
- Yard storage Figures 3 and 4 were revised to provide better agreement with Figures 1 and 2 and MFL separation distances in Data Sheet 1-22, *Maximum Foreseeable Loss.* S_M was reduced.
- Tables 1 and 3 were updated to reflect changes in other data sheets.
- Fire protection guidance for buildings over highways was added, and Data Sheet 1-16, *Fire Protection For Buildings Over Highways* was made obsolete.
- The terminology for occupancy hazard categories was updated to agree with Data Sheet 3-26, *Fire Protection for Nonstorage Occupancies.* The term “Light/ordinary” has been replaced with ″HC-1/HC-2″ for building occupancies. ″Low,″ ″ordinary,″ and ″high″ are used for yard storage .

April 2014. Replaced the terms ″light hazard″ occupancy with ″Hazard Category 1 (HC-1)″ occupancy, and the term ″ordinary hazard″ occupancy with ″Hazard Category 2 (HC-2)″ occupancy to be consistent with Data Sheet 3-26, *Fire Protection for Nonstorage Occupancies.*

October 2012. This document was revised to improve and simplify the way minimum safe separation distance (S_M) are determined. Additional changes include the following:

- Window and exposure sprinkler design criteria were added.
- Exposed and exposing wall categories were changed; former Categories A, B, C, and D no longer apply.
- The methodology for determining building exposure safe separation distances was changed in its entirety; former Tables 1a, 1b, 1c, and 2 are no longer used.
- The methodology for determining yard storage safe separation distances was changed in its entirety; former Equations 1 and 2 are no longer used.

- This data sheet now covers all yard storage exposures except those listed in Tables 1 and 3.
- Editorial changes were made.

January 2007. Minor editorial changes were made.

September 2006. Minor editorial changes were made.

January 2006. Minor editorial changes were made.

May 2003. This revision of the document has been reorganized to provide a consistent format.

September 1999, the March 1979 version was completely revised.