

IDLE PALLET STORAGE

Table of Contents

	Page
1.0 SCOPE	2
1.1 Changes	2
1.2 Superseded Information	2
2.0 LOSS PREVENTION RECOMMENDATIONS	2
2.1 Occupancy	2
2.1.1 Outdoor Storage	2
2.1.2 Indoor Storage	3
2.1.3 Pallets in Manufacturing Areas	3
2.2 Protection	3
2.2.1 General	3
2.2.2 Plastic Pallets, Indoor Protection	3
2.2.3 Wood and FM Approved Pallets, Indoor Storage	3
2.2.4 Metal Pallets	4
3.0 SUPPORT FOR RECOMMENDATIONS	4
3.1 Loss History	4
4.0 REFERENCES	5
4.1 FM Global	5
APPENDIX A GLOSSARY OF TERMS	5
APPENDIX B DOCUMENT REVISION HISTORY	5

List of Tables

Table 1. Separation Distances for Outdoor Storage of Idle Pallets	2
Table 2. Safe Separation Distances for Adjacent Piles of Pallets Stored Outdoors	3
Table 3. Protection Guidelines for Solid Pile, Wood, and FM Approved Idle Pallet Storage Arrangements ..	4

1.0 SCOPE

This property loss prevention data sheet provides fire protection recommendations for the storage of wood, plastic, and FM Approved idle pallets to help minimize exposure to fire, water, and smoke damage.

1.1 Changes

January 2015. Interim revision. The definitions for combustible and noncombustible walls were added to Appendix A.

1.2 Superseded Information

This data sheet supersedes all previous editions of Data Sheet 8-24.

2.0 LOSS PREVENTION RECOMMENDATIONS

2.1 Occupancy

2.1.1 Outdoor Storage

2.1.1.1 Outdoor storage of pallets is preferred. For outdoor storage, apply the recommended separation distances given in Table 1. FM Approved plastic pallets can be stored in the same locations as wood pallets.

2.1.1.2 When pallets are stored close to a building, limit the height of storage to prevent burning pallets from falling onto the building.

2.1.1.3 For adjacent piles of pallets, use the separation distances given in Table 2.

Table 1. Separation Distances for Outdoor Storage of Idle Pallets

Exposed Wall Category	Separation Distance, ft (m)					
	≤50 Pallets		51 to 200 Pallets		>200 Pallets	
	Wood & FM Approved	Plastic	Wood & FM Approved	Plastic	Wood & FM Approved	Plastic
Combustible	15 (4.5)	30 (9)	40 (12)	80 (24)	90 (27)	150 (45)
Noncombustible	12 (3.7)	15 (4.5)	30 (9)	40 (12)	50 (15)	100 (30)
1-hr	4 (1.2)	8 (2.4)	12 (3.7)	24 (7.4)	20 (6)	40 (12)
2-hr	3 (1)	6 (2)	10 (3)	20 (6)	15 (4.5)	30 (9)
3-hr	3 (1)	3 (1)	8 (2.5)	16 (5)	13 (4)	26 (8)
4-hr	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)

Note: Separation distances of 3 ft (1 m) are recommended for access only with a 4-hr wall.

Table 2. Safe Separation Distances for Adjacent Piles of Pallets Stored Outdoors

Separation Distance, ft (m)					
≤50 Pallets		51 to 200 Pallets		>200 Pallets	
Wood & FM Approved	Plastic	Wood & FM Approved	Plastic	Wood & FM Approved	Plastic
15(4.5)	30 (9)	40 (12)	80 (24)	90 (27)	150 (45)

2.1.2 Indoor Storage

2.1.2.1 General

Indoor storage arrangements of idle pallets vary among locations. In general, idle pallet storage arrangements can be described as solid-piled, single-row, double-row, or multiple-row racks, or small amounts of pallets needed for in-process manufacturing.

2.1.3 Pallets in Manufacturing Areas

2.1.3.1 Where sprinkler protection does not meet the recommendations in Section 2.2, do the following:

A. Limit the single stack height for plastic, wood, and FM Approved pallets to 5 ft (1.5 m) maximum, except when ceiling protection of the storage area meets the requirements for higher levels of storage as recommended in this data sheet.

B. Maintain a minimum distance of 10 ft (3.0 m) between single stacks of plastic, wood, and FM Approved pallets and other single stacks of pallets or combustible material or equipment.

2.2 Protection

2.2.1 General

2.2.1.1 Building column and overhead steel protection are not necessary if all of the other protection guidelines in this data sheet are met.

2.2.1.2 Refer to Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*, for installation guidelines for the sprinklers listed in this data sheet, as well as their compatibility with the facility's construction features and recommendations related to the use of heat and smoke vents and draft curtains in the presence of storage sprinklers.

2.2.1.3 Base the protection for the storage area on the most severe pallet type present within that storage area. If other commodities or a more hazardous material are present in the same storage area, base the protection on the item requiring the most protection.

2.2.2 Plastic Pallets, Indoor Protection

2.2.2.1 Classify plastic pallets that are not FM Approved as an uncartoned unexpanded plastic (UUP) commodity and protect them in accordance with the recommendations in Data Sheet 8-9. This includes all plastic pallets made of unexpanded plastic, composites, 2-way entry, 4-way entry, solid tops, etc., but not those made from materials that are considered a higher hazard than unexpanded plastics, such as expanded plastics. Protect plastic pallets made with expanded plastics in accordance with the recommendations for that commodity in Data Sheet 8-9.

2.2.2.2 When in-rack sprinklers are required per Data Sheet 8-9, use only those in-rack designs that specify the use of horizontal barriers for UUP protection.

2.2.3 Wood and FM Approved Pallets, Indoor Storage

2.2.3.1 On-Floor Storage

2.2.3.1.1 Protect wood and FM Approved pallets stored on-floor in solid piles per the design guidelines in Table 3.

2.2.3.1.2 Use a hose stream demand of 500 gpm (1900 L/m) and a duration of 90 minutes when K11.2 (160) sprinklers are provided.

2.2.3.1.3 Use a hose stream demand of 250 gpm (950 L/m) and a duration of 60 minutes when K14.0 (200) sprinklers are provided.

Table 3. Protection Guidelines for Solid Pile, Wood, and FM Approved Idle Pallet Storage Arrangements

Protection Guidelines for Solid Pile, Wood, and FM Approved Idle Pallet Storage Arrangements, Number of Sprinklers @ psi (bar)					
Ceiling Height, ft (m)	Storage Height, ft (m)	Wet System, Pendent Sprinklers, 160°F (70°C)		Wet System, Upright Sprinklers, 160°F (70°C)	Dry System, Upright Sprinklers, 280°F (140°C)
		Quick Response	Standard Response	Standard Response	Standard Response
		K14.0 (200)	K11.2 (160)	K11.2 (160)	K11.2 (160)
15 (4.5)	10 (3.0)	12 @ 50 (3.5)	15 @ 25 (1.7)	15 @ 25 (1.7)	25 @ 25 (1.7)
20 (6.0)	15 (4.5)	12 @ 50 (3.5)	15 @ 25 (1.7)	15 @ 25 (1.7)	25 @ 25 (1.7)
25 (7.5)	20 (6.0)	12 @ 50 (3.5)	15 @ 25 (1.7)	15 @ 25 (1.7)	25 @ 25 (1.7)
30 (9.0)	20 (6.0)	12 @ 50 (3.5)	15 @ 25 (1.7)	15 @ 25 (1.7)	25 @ 25 (1.7)
30 (9.0)	25 (7.5)	12 @ 50 (3.5)			
35 (10.5)	30 (9.0)	12 @ 75 (5.2)			
40 (12.0)	35 (10.5)	12 @ 75 (5.2)			

2.2.3.1.4 Where the storage or ceiling heights are greater or protection options using sprinklers with larger K-Factor are not shown in Table 3, protect on-floor storage of wood and FM Approved pallets per Section 2.2.2.

2.2.3.2 Rack Storage

2.2.3.2.1 Rack Storage with Ceiling Sprinklers only

2.2.3.2.1.1 The K14.0 (200), quick response, pendent sprinkler protection recommendations in Table 3 apply to wood pallets stored in racks.

2.2.3.2.1.2 When in-rack sprinklers are required per Data Sheet 8-9, use only those in-rack designs that specify the use of horizontal barriers for UUP protection.

2.2.3.2.1.3 Where the storage or ceiling heights are greater than those shown in Table 3, protect wood and FM Approved pallets per Section 2.2.2.

2.2.4 Metal Pallets

2.2.4.1 When idle metal pallets are stored indoors, provide sprinkler protection required for the occupancy.

3.0 SUPPORT FOR RECOMMENDATIONS

Testing has demonstrated the protection recommendations in Data Sheet 8-9 for UUP will provide adequate protection for idle plastic pallet storage.

FM Global has conducted full-scale rack and solid piled storage fire tests with plastic pallets. These tests form the basis for the protection criteria provided for both on-floor and rack storage of idle pallets.

3.1 Loss History

A review of FM Global losses involving the storage of idle pallets from 2002 to 2012 shows that:

- 91% of the losses involved idle wood pallet storage, with the remaining 9% involving plastic pallets.
- 65% of the losses occurred in storage located outside a building.
- 57% of the indoor fires reported indicated sprinkler protection was effective, with the remaining reported as ineffective in reducing the extent of the loss. The average monetary loss of fires involving adequately protected pallet storage was 12% of the fires where no or ineffective protection was provided.

4.0 REFERENCES

4.1 FM Global

Data Sheet 1-2, *Earthquakes*

Data Sheet 1-10, *Smoke and Heat Venting in One-story Sprinklered Buildings*

Data Sheet 1-24, *Protection Against Liquid Damage*
Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*
Data Sheet 2-8, *Earthquake Protection for Water-Based Fire Protection Systems*
Data Sheet 5-48, *Automatic Fire Detection*
Data Sheet 7-29, *Ignitable Liquid Storage in Portable Containers*
Data Sheet 8-1, *Commodity Classification*.
Data Sheet 8-9, *Storage of Class 1, 2, 3, 4 and Plastic Commodities*

APPENDIX A GLOSSARY OF TERMS

Clearance: The clear space maintained between the top of storage and the deflector of the sprinkler (ceiling or in-rack) located above it. For all ceiling-level sprinklers, a minimum clearance of 3 ft (0.9 m) is required. For all in-rack sprinklers, the deflector must be located a minimum of 6 in. (150 mm) above the top of storage.

Combustible (C): Includes painted or unpainted wood, rigid plastic building materials that are not FM Approved, and Class 2 insulated steel decks.

Noncombustible (NC): Noncombustible walls usually consist of panels over steel framing. Panels may be painted or galvanized steel, corrugated iron, or corrugated cementitious panels supported on a steel frame. The panels are light in weight, and unless protected or adequately separated, they may buckle and open at their joints, or crack under fire exposure. Since heat will easily conduct through thin steel and ignite combustible insulation, insulations acceptable for use in this category include glass fiber, mineral wool, and expanded glass. For other types of insulation, see Class 1 or combustible categories. Noncombustible panels also include protected metal panels and fiber-reinforced cement panels FM Approved and listed in the *Approval Guide* under Exterior Roofing and Siding.

Commodity: A commodity is the combination of product, packaging material, container, and material handling aids (e.g., pallets). Data Sheet 8-1 contains commodity classification guidelines that are applicable to this data sheet. The purpose of assigning a commodity classification is to allow specification of the proper level of fire protection. A commodity classification is dependent on how the product burns and how the burning product responds to the application of sprinkler discharge.

Wood pallet (formerly Group I): All wood and other cellulosic material pallets with slatted and/or solid top and/or bottom.

Plastic pallet (formerly Group II): All plastic pallets that have a solid or gridded deck, independent of the pallet manufacturing process, type of resin used in fabrication, or geometry of the pallet. FM Approved plastic pallets are not included in this group.

FM Approved: References to “FM Approved” in this data sheet mean the product or service has satisfied the criteria for FM Approval. Refer to the *Approval Guide* for a complete listing of products and services that are FM Approved.

FM Approved plastic pallet: FM Approved plastic pallets are plastic pallets that have been evaluated through fire testing to be equivalent to a wood pallet.

Slave pallet: Flat plywood, usually less than 20 ft² (2.0 m²), used for a material-handling system. When many slave pallets are stacked idle, the arrangement resembles a solid pile of wood (Class 3 Commodity). Slave pallets may be made with other materials such as plastic.

APPENDIX B DOCUMENT REVISION HISTORY

January 2015. Interim revision. The definitions for combustible and noncombustible walls were added to Appendix A.

January 2013. The following major changes were made:

- A. The terms “control mode density area (CMDA) sprinkler,” “control mode specific application (CMSA) sprinkler,” and “suppression mode sprinkler” have been replaced with “storage sprinkler.” This terminology is consistent with other FM Global data sheets.
- B. All ceiling-level sprinkler protection options are now given as a number of sprinklers at a minimum operating pressure (e.g., 12 sprinklers @ 50 psi [3.4 bar]).

C. Unexpanded plastic pallets that are not FM Approved are now classified as uncartoned unexpanded plastics and should be protected in accordance with the recommendations in Data Sheet 8-9, *Storage of Class 1, 2, 3, 4 and Plastic Commodities*.

D. Safe separation distance recommendations for outdoor idle pallet storage have been updated to reflect the methodology used in Data Sheet 1-20, *Protection Against Exterior Fire Exposure*.

E. The terms "Group I" and "Group II" are no longer used to describe pallets. Pallets are now described as plastic, wood, metal, or FM Approved.

September 2000. This revision of the document has been reorganized to provide a consistent format.