

STORAGE OF BALED WASTE PAPER

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1.2 Superseded Information	2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 Protection	2
2.1.1 Indoor Storage	2
2.1.2 Outdoor Storage	3
3.0 SUPPORT FOR RECOMMENDATIONS	3
3.1 Loss History	3
4.0 REFERENCES	3
4.1 FM	3
APPENDIX A GLOSSARY OF TERMS	3
APPENDIX B DOCUMENT REVISION HISTORY	3

List of Tables

Table 1. Solid Piled and Palletized Storage Protection	2
Table 2. Loss History of Baled Waste Paper Fires	3



1.0 SCOPE

This data sheet provides recommendations for the protection of baled waste paper storage indoors and outdoors. The protection recommendations in Data Sheet 3-26, *Fire Protection Water Demand for Nonstorage Sprinklered Properties*, may be applied if there is less than 200 ft² (19 m²) of storage, stored no higher than 10 ft (3.0 m).

1.1 Changes

October 2013. Interim Revision. The following changes were made:

A. The terms “standard sprinkler (aka, control mode density area [CMDA])” and “large drop sprinkler (aka, control mode specific application [CMSA])” 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., 25 sprinklers @ 7 psi [3.4 bar]).

1.2 Superseded Information

This data sheet supersedes all previous editions of Data Sheet 8-22.

2.0 LOSS PREVENTION RECOMMENDATIONS

2.1 Protection

2.1.1 Indoor Storage

2.1.1.1 Fires in baled waste paper are of a burrowing nature and are difficult to extinguish. Firefighting efforts may require smoldering bales to be removed from the building to facilitate complete extinguishment. The removal may be difficult if the piles have become saturated with water from sprinklers and hoses. Waterlogged bales will fall apart if material-handling equipment such as a forklift is used. In addition they produce smoke that complicates manual firefighting. Apply general safeguards for storage such as housekeeping, aisle spacing, and human element considerations. Possible ignition sources could be from cutting and welding (hot work), spontaneous ignition, smoking or sparks from incinerators and other sources.

Baled waste paper typically occupies approximately 160 ft³ per ton (2000 lbs/ton) (5 m³/1000 kg). The bulk density of baled waste paper is 12 lbs/ft³ (200 kg/m³).

2.1.1.2 Bales of waste paper will expand and become unstable when wet. Provide at least 2 ft (0.6 m) separation from walls, steel framing and sprinkler risers to minimize damage due to expansion. Limit pile size to 1000 ft² (93 m²) of floor area. Maintain 15 ft (4.6 m) aisles between piles and other combustibles. Small pile sizes and 15 ft (4.6 m) aisles will slow the growth of fire.

2.1.1.3 Warehouses that store baled waste paper may also store loose piles of waste paper. The recommended protection for the same height of baled waste paper will also provide adequate protection for the loose piles of waste paper. See Table 1 for storage sprinkler protection guidelines.

Table 1. Solid Piled and Palletized Storage Protection

Maximum Storage Height, ft (m)	Maximum Building or Ceiling Height, ft (m)	Storage Sprinklers, Number of A.S. @ Pressure, psi (bar)	
		K11.2 (K160), upright or pendent, quick or standard response	K11.2 (K160), upright, standard response
		165°F (74°C) Wet-Pipe	286° F (141° C) Dry-Pipe
10 (3.1)	20 (6.1)	25@7 (0.5)	30@7 (0.5)
15 (4.6)	25 (7.6)	25@7 (0.5)	30@7 (0.5)
20 (6.1)	30 (9.1)	25@7 (0.5)	30@7 (0.5)
30 (9.1)	40 (12.2)	50@7 (0.5)	65@7 (0.5)
Over 30 (9.1)	Over 40 (12.2)	DNA	DNA
Provide 750 gpm ² (2700 L/min) for hose demand and duration of 4 hours			

Note: Larger K-factor sprinklers are acceptable if the number of sprinklers are equal or greater than those recommended for the K11.2 (K160).

2.1.1.4 When determining sprinkler protection requirements do not interpolate between storage and building heights to determine intermediate protection.

2.1.1.5 Refer to Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*, for installation guidelines for the storage sprinklers recommended in this data sheet, as well as their compatibility with the facility's construction features, such as sloped ceilings, heat and smoke vents, and draft curtains.

2.1.2 Outdoor Storage

2.1.2.1 Wind

2.1.2.1.1 Sparks or burning fire brands from nearby fires are a potential ignition source for outside storage and combustible buildings. Separation distances between outside storage and exposed combustible buildings will not prevent fire spread when fires are driven by high winds. Provide outside building sprinkler protection at locations where a potential exists for exposure fires. Refer to Data Sheet 1-20, *Protection Against Fire Exposure (From Buildings or Yard Storage)*, for recommendations on yard housekeeping.

2.1.2.1.2 Limit pile size for outside storage to 750 tons (680,000 kg) and space piles a minimum of 50 ft (15 m) apart. Aisle separation is needed to provide access for firefighting. Pile height should be limited to a maximum of 20 ft (6.1 m). Water supplies should be capable of supplying 1500 gpm (5700 L/min) for 5 hours.

2.1.2.2 Building Exposure

Refer to Data Sheet 1-20, *Protection Against Fire Exposure (From Buildings and Yard Storage)* for protection recommendations from exposure fires. When using Data Sheet 1-20, a building storing baled waste paper should be classified as HIGH. The classification of yard storage of baled waste paper should be "A."

3.0 SUPPORT FOR RECOMMENDATIONS

3.1 Loss History

Between 1981 and 1996 there were 94 fire losses involving baled waste paper at FM client facilities.

Table 2 summarizes the 94 fire losses involving baled waste paper.

Table 2. Loss History of Baled Waste Paper Fires

Description	No. of Losses	Percent of Losses
Outside Losses	28	30
Inside Losses	66	70
Totals	94	100

4.0 REFERENCES

4.1 FM

Data Sheet 1-20, *Protection Against Fire Exposure (From Buildings and Yard Storage)*.

Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*

Data Sheet 3-26, *Fire Protection Water Demand for Nonstorage Sprinklered Properties*

APPENDIX A GLOSSARY OF TERMS

This document does not have any defined terms.

APPENDIX B DOCUMENT REVISION HISTORY

October 2013. Interim Revision. The following changes were made:

- A. The terms "standard sprinkler (aka, control mode density area [CMDA])," "large drop sprinkler (aka, control mode specific application [CMSA])" 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., 25 sprinklers @ 7 psi [3.4 bar]).

January 2002. The following changes were made:

1. Section 2.1.1.2 has been amended to include recommendations for baled waste paper pile size and aisle width between piles and other combustibles.
2. Section 2.1.1.4 has been amended to include additional guidance for determining density and area recommendations.

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

May 1998. Revised, supersedes the 1977 edition.

August 1977. Data Sheet completely revised.