

NFPA 231D

Standard for

Storage of

Rubber Tires

1994 Edition



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The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

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Errata

NFPA 231D

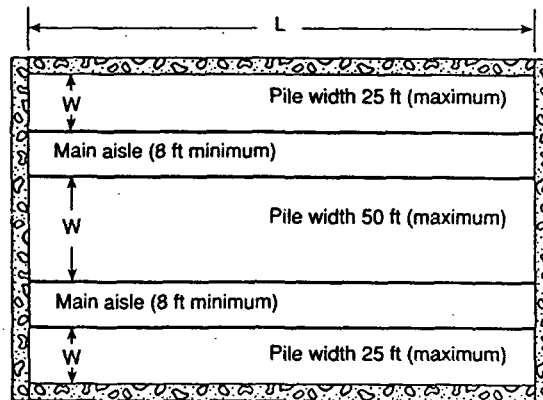
Storage of Rubber Tires

1994 Edition

Reference: 2-1.2(a), 2-1.2(b), Figure A-3-1, Appendix B, C-4.2.1(a)
Errata: 231D-95-01

The Committee on Rubber Tires notes the following errors in the 1994 edition of NFPA 231D, *Standard for Storage of Rubber Tires*:

1. In 2-1.2(a), second paragraph, delete the word "head".
2. In 2-1.2(b), second paragraph, delete the word "heads".
3. In Figure A-3-1, add indicators for the length and width dimensions as follows:



NOTE: L—Length; W—Width

Figure A-3.1 Typical piling arrangement in accordance with Section 3-1.

4. On page 12, in the third line under "Active Stage Important," change the word "joints" to "joists".
5. In C-4.2.1(a), first sentence, change the word "trees" to "tires".

Issue Date: December, 1995

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NFPA 231D
Standard for
Storage of Rubber Tires
1994 Edition

This edition of NFPA 231D, *Standard for Storage of Rubber Tires*, was prepared by the Technical Committee on Rubber Tires and acted on by the National Fire Protection Association, Inc., at its Annual Meeting held May 16–18, 1994, in San Francisco, CA. It was issued by the Standards Council on July 14, 1994, with an effective date of August 5, 1994, and supersedes all previous editions.

The 1994 edition of this document has been approved by the American National Standards Institute.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

Origin and Development of NFPA 231D

A tentative standard on the storage of rubber tires was developed by a subcommittee of the Committee on General Storage and adopted by the National Fire Protection Association, Inc. at its 1974 Annual Meeting in Miami Beach, FL.

The first official edition of NFPA 231D was prepared by the Committee on General Storage. It included revisions made to the tentative standard and was adopted by the Association at its 1975 Fall Meeting in Pittsburgh, PA. The 1980 edition was a partial revision of the 1975 edition, and the 1986 edition was a partial revision of the 1980 edition. The 1989 edition contained guidelines for outdoor storage of scrap tires in Appendix C.

The 1994 edition of the standard incorporates findings from recent full-scale fire tests. The concept of miscellaneous storage was introduced, and the suggestions for fighting rubber tire fires in sprinklered buildings were revised. Additional changes were incorporated to further enhance the document's user friendliness.

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on safeguards against fire for the indoor storage of rubber tires.

Contents

Chapter 1 Introduction	231D- 4	Chapter 5 Building Equipment, Maintenance, and Operations	231D-10
1-1 Scope	231D- 4	5-1 Mechanical Handling Equipment	231D-10
1-2 Definitions	231D- 4	5-2 Storage of Empty Wood Pallets	231D-10
1-3 Illustrations	231D- 5	5-3 Cutting and Welding Operations	231D-10
Chapter 2 Building Arrangement	231D- 6	5-4 Waste Disposal	231D-10
2-1 Construction	231D- 6	5-5 Smoking	231D-10
2-2 Fire Walls	231D- 7	5-6 Maintenance and Inspection	231D-10
Chapter 3 Storage Arrangement	231D- 7	Chapter 6 Referenced Publications	231D-10
3-1 Piling Procedures	231D- 7	Appendix A Explanatory Material	231D-10
3-2 Clearances	231D- 7	Appendix B Recommendations for Fighting Rubber Tire Fires in Sprinklered Buildings	231D-11
3-3 Miscellaneous Storage	231D- 7	Appendix C Guidelines for Outdoor Storage of Scrap Tires	231D-13
Chapter 4 Fire Protection	231D- 7	Appendix D Referenced Publications	231D-15
4-1 Automatic Sprinkler Systems	231D- 7	Index	231D-15
4-2 High-expansion Foam Systems	231D- 8		
4-3 Water Supplies	231D- 8		
4-4 Manual Inside Protection	231D- 8		
4-5 Hydrants	231D- 8		
4-6 Alarm Service	231D- 8		
4-7 Fire Emergency Organization	231D- 8		

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Information on referenced publications can be found in Chapter 6 and Appendix D.

Chapter 1 Introduction

1-1 Scope.

1-1.1 This standard shall apply to the indoor storage of rubber tires.

1-1.2 The provisions contained in this standard shall apply to new facilities for tire storage and the conversion of existing buildings to tire storage occupancy. This standard can be used as a basis for evaluating existing storage facilities.

1-1.3 Miscellaneous storage, as defined in this standard, shall be permitted to be protected in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

1-2 Definitions. Unless expressly stated otherwise, for the purposes of this standard, the following definitions shall apply:

Approved. Acceptable to the authority having jurisdiction.

NOTE: The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization concerned with product evaluations that is in a position to determine compliance with appropriate standards for the current production of listed items.

Authority Having Jurisdiction. The organization, office, or individual responsible for approving equipment, an installation, or a procedure.

NOTE: The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the

role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

Available Height for Storage. The maximum height at which tires can be stored above the floor while maintaining adequate clearance from structural members and the required clearance below sprinklers.

Bundled Tires. A storage method in which a number of tires are strapped together.

Conventional Pallet. A material handling aid designed to support a unit of load with stringers to provide support for material handling devices.

Encapsulated. A method of packing consisting of plastic sheet completely enclosing the sides and top of a combustible commodity or combustible package.

NOTE: Stretch-wrapping around the sides only shall not be considered to be encapsulated.

Horizontal Channel. Any uninterrupted space in excess of 5 ft (1.5 m) in length between horizontal layers of stored tires. Such channels may be formed by pallets, shelving, racks, or other storage arrangements.

Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Laced Storage. Tires stored where the sides of the tires overlap, creating a woven or laced appearance. [See Figure 1-3(g).]

Listed. Equipment or materials included in a list published by an organization acceptable to the authority having jurisdiction and concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

NOTE: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

Miscellaneous Storage.* The storage of rubber tires that is incidental to the main use of the building. Storage areas shall not exceed 2000 ft² (186 m²). (See Section 3-3.)

On-side Storage. Tires stored horizontally or flat.

On-tread Storage. Tires stored vertically or on their treads.

Palletized. Storage on portable racks of various types utilizing a conventional pallet as a base.

Pyramid Storage. On-floor storage in which tires are formed into a pyramid to provide pile stability.

Rack. Any combination of vertical, horizontal, and diagonal members that supports stored materials. Racks may be fixed or portable. A fixed rack is a supporting framework that remains in a fixed position within the warehouse during normal usage and into which the placement and retrieval of storage is by means of handling tires individually or in pallet loads.

NOTE: See NFPA 231C, *Standard for Rack Storage of Materials for Rack Arrangements*.

Rubber Tires. Pneumatic tires for passenger automobiles, aircraft, light and heavy trucks, trailers, farm equipment, construction equipment (off-the-road), and buses.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

Sprinkler Temperature Rating. Ordinary temperature-rated sprinklers include temperature ratings between 135°F and 175°F (57°C and 80°C), and high temperature-rated sprinklers include temperature ratings between 250°F and 300°F (121°C and 149°C).

Storage Aids. Commodity storage devices such as shelves, pallets, dunnage, separators, and skids.

1-3 Illustrations. The following illustrations do not necessarily cover all possible storage configurations.

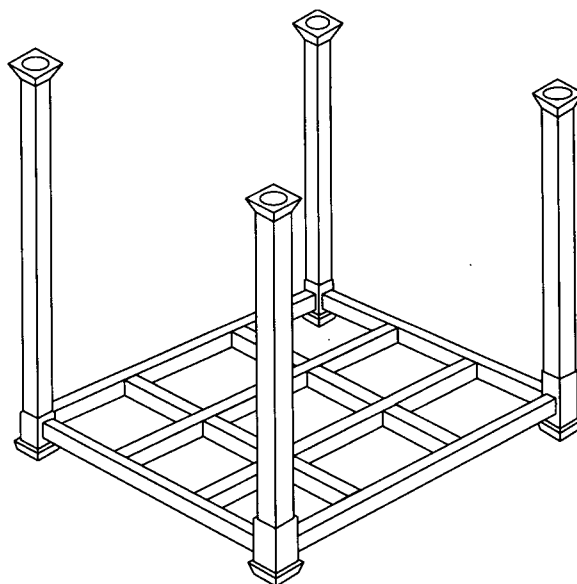


Figure 1-3(a) Typical open portable rack unit.

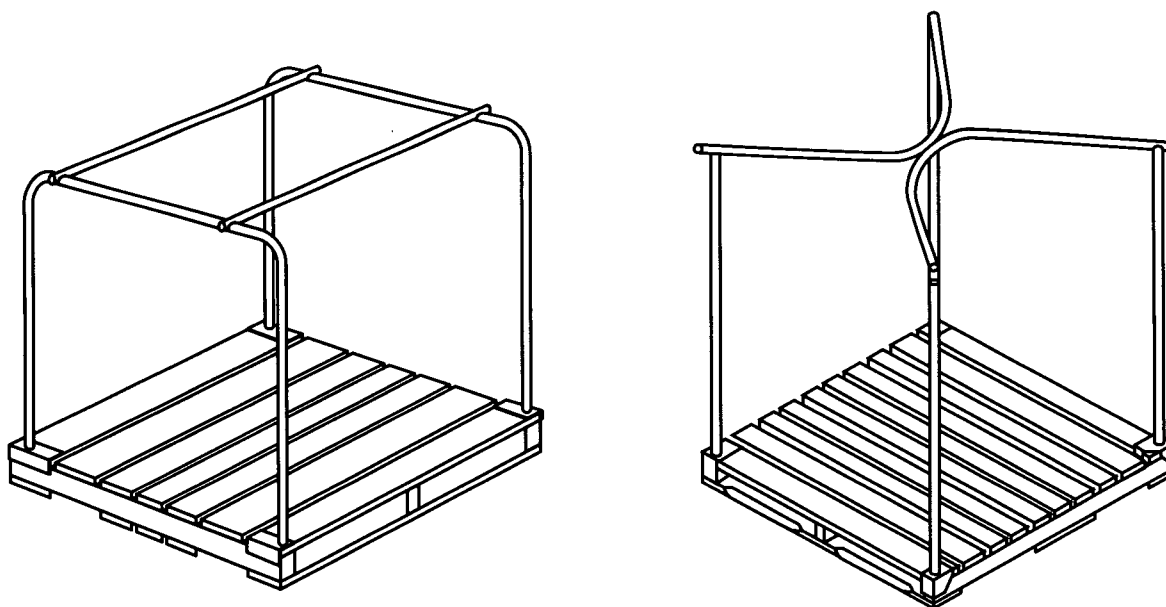


Figure 1-3(b) Typical palletized portable rack units.

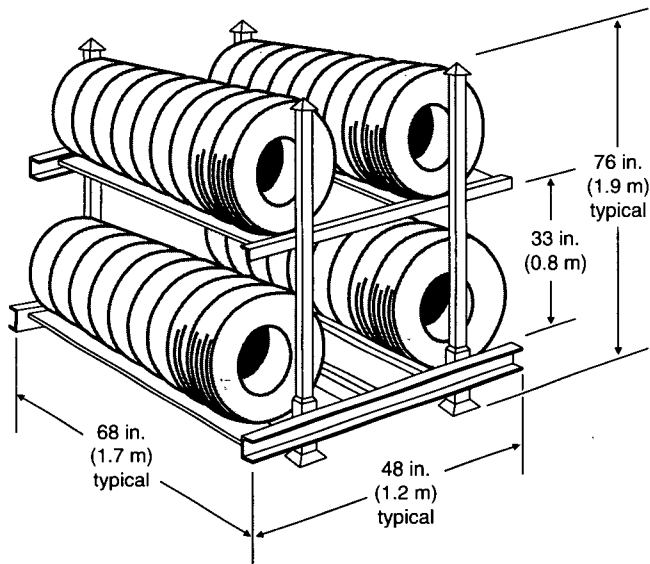
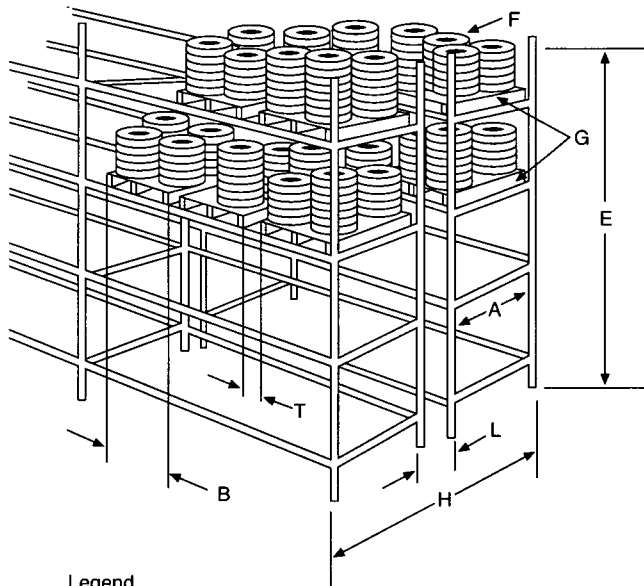


Figure 1-3(c) Open portable rack.



Legend

A—Load depth
B—Load width
E—Storage height
F—Commodity

G—Pallet
H—Rack depth
L—Longitudinal flue space
T—Transverse flue space

Figure 1-3(d) Double-row fixed rack storage.

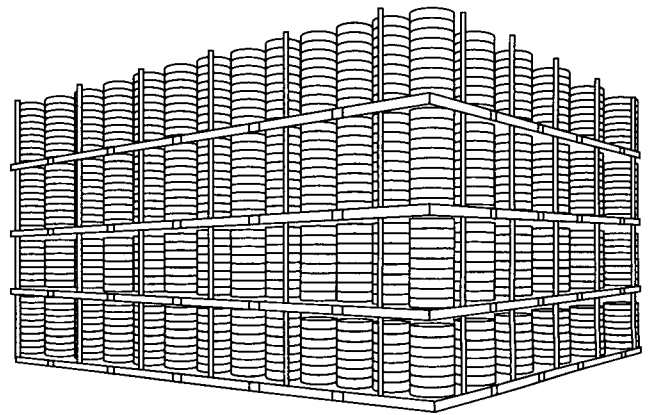


Figure 1-3(e) Palletized portable rack on-side storage arrangement (bundled or unbundled).

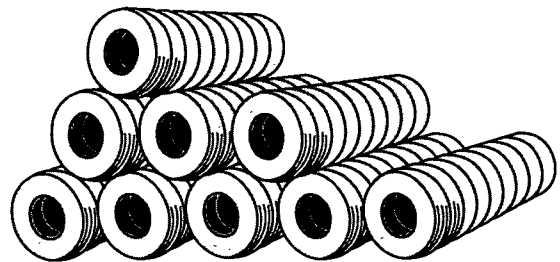


Figure 1-3(f) On-floor storage; on-tread, normally bundled; distance along tire hole not to exceed 25 ft (7.7 m).

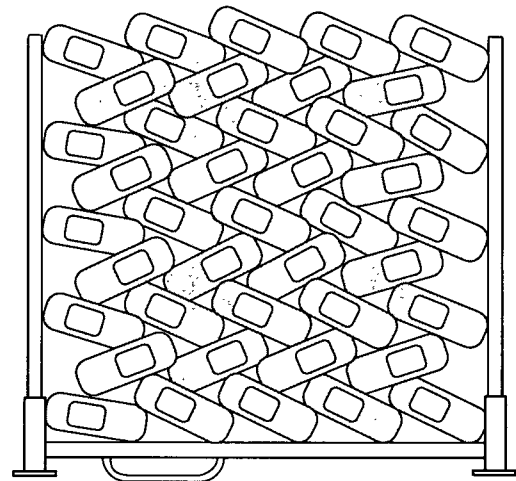


Figure 1-3(g) Typical laced storage.

Chapter 2 Building Arrangement

2-1* Construction.

2-1.1* Buildings used for the storage of tires that are protected in accordance with this standard shall be permitted to be of any of the types described in NFPA 220, *Standard on Types of Building Construction*.

2-1.2 Steel columns shall be protected as follows:

(a) Storage exceeding 15 ft through 20 ft (4.6 m through 6 m) in height.

One-hour fireproofing or one sidewall sprinkler head directed to one side of the column at a 15-ft (4.6-m) level.

(b) Storage exceeding 20 ft (6 m) in height.

Two-hour fireproofing for the entire length of the column, including connections with other structural members; or two sidewall sprinkler heads, one at the top of the column and the other at a 15-ft (4.6-m) level, both directed to the side of the column.

Exception: The above protection shall not be required where storage in fixed racks is protected by in-rack sprinklers.

2-2 Fire Walls.

2-2.1 Where protection in accordance with Section 4-1 is provided, stored tires shall be segregated from other combustible storage by aisles at least 8 ft (2.4 m) wide. Where not so protected, stored tires shall be separated by fire walls.

2-2.2 Where tires are stored up to 15 ft (4.6 m) high, walls between adjacent warehouse areas and between manufacturing and warehouse areas shall have not less than a 4-hour fire rating. Where tires are stored over 15 ft (4.6 m) high, walls between manufacturing and warehouse areas shall have a fire rating of not less than 6 hours.

Chapter 3 Storage Arrangement

3-1* Piling Procedures.

3-1.1 Piles shall not be more than 50 ft (15 m) in width.

Exception No. 1: Where tires are stored on-tread, the dimension of the pile in the direction of the wheel hole shall be not more than 50 ft (15 m).

Exception No. 2: Tires stored adjacent to or along one wall shall not extend more than 25 ft (7.6 m) from that wall.

3-1.2 The width of the main aisles between piles shall not be less than 8 ft (2.4 m).

3-2 Clearances.

3-2.1 The clearance from the top of storage to sprinkler deflectors shall be not less than 3 ft (0.9 m).

3-2.2 Storage clearance in all directions from roof structures shall be not less than 3 ft (0.9 m).

3-2.3 Storage clearance from ducts shall be maintained in accordance with NFPA 91, *Standard for Exhaust Systems for Air Conveying of Materials*.

3-2.4 Storage clearance from unit heaters, radiant space heaters, duct furnaces, and flues shall be not less than 3 ft (0.9 m) in all directions or shall be in accordance with the clearance shown on the approval agency label.

3-2.5* Clearance shall be maintained to lights or light fixtures to prevent possible ignition.

3-2.6 Not less than 24 in. (0.6 m) clearance shall be maintained around the path of fire door travel unless a barricade is provided.

3-3 Miscellaneous Storage.

3-3.1 On-tread storage piles, regardless of storage method, shall not exceed 25 ft (7.6 m) in the direction of the wheel holes.

3-3.2 Acceptable storage arrangements shall include:

- (a) On-floor, on-side storage up to 12 ft (3.7 m) high;
- (b) On-floor, on-tread storage up to 5 ft (1.5 m) high;
- (c) Double-row or multi-row fixed or portable rack storage up to 5 ft (1.5 m) high;
- (d) Single-row fixed or portable rack storage up to 12 ft (3.7 m) high; or
- (e) Laced tires in racks up to 5 ft (1.5 m) in height.

Chapter 4 Fire Protection

4-1 Automatic Sprinkler Systems.

4-1.1 Automatic sprinklers, where provided, shall be installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

4-1.2* Sprinkler discharge densities and areas of application shall be in accordance with Table 4-1.2.

To use the graph in Figure 4-1.2, note the example indicated by the broken line. Read across the graph at a storage height of 14 ft (4.3 m) until the storage height intersects the storage height curve at a sprinkler density of 0.45 gpm/ft² [18.3 (L/min)/m²]. Then read down until the sprinkler density intersects the sprinkler operating area curves at 3,200 ft² (297 m²) for ordinary sprinklers and 2,000 ft² (186 m²) for high temperature sprinklers.

4-1.3 System Requirements.

4-1.3.1 For the purpose of selecting sprinkler spacings in hydraulically designed sprinkler systems, to obtain a stipulated density, 60 lb (4 atmospheres) /in.² (414 kPa) shall be the maximum discharge pressure used at the calculation starting point.

4-1.3.2 In buildings used in part for tire storage, for the purposes of this standard, the required sprinkler protection shall extend 15 ft (4.6 m) beyond the perimeter of the tire storage area.

4-1.4 In-rack Sprinkler System Requirements.

4-1.4.1 In-rack sprinklers, where provided, shall be installed in accordance with NFPA 231C, *Standard for Rack Storage of Materials*, except as modified by 4-1.4 through 4-1.4.5.

4-1.4.2 In-rack sprinkler deflectors shall be located at the same level as the bottom of the pallet support to maintain an unobstructed clear space of at least 4 in. (102 mm). In-rack sprinklers shall be located at least 2 ft (0.6 m) from rack uprights.

4-1.4.3 The maximum horizontal spacing of sprinklers in racks shall be 8 ft (2.4 m).

4-1.4.4 Sprinklers in racks shall discharge at not less than 30 psi (207 kPa).

4-1.4.5 Water demand for sprinklers installed in racks shall be based on simultaneous operation of the most hydraulically remote 12 sprinklers where only one level is installed in racks.

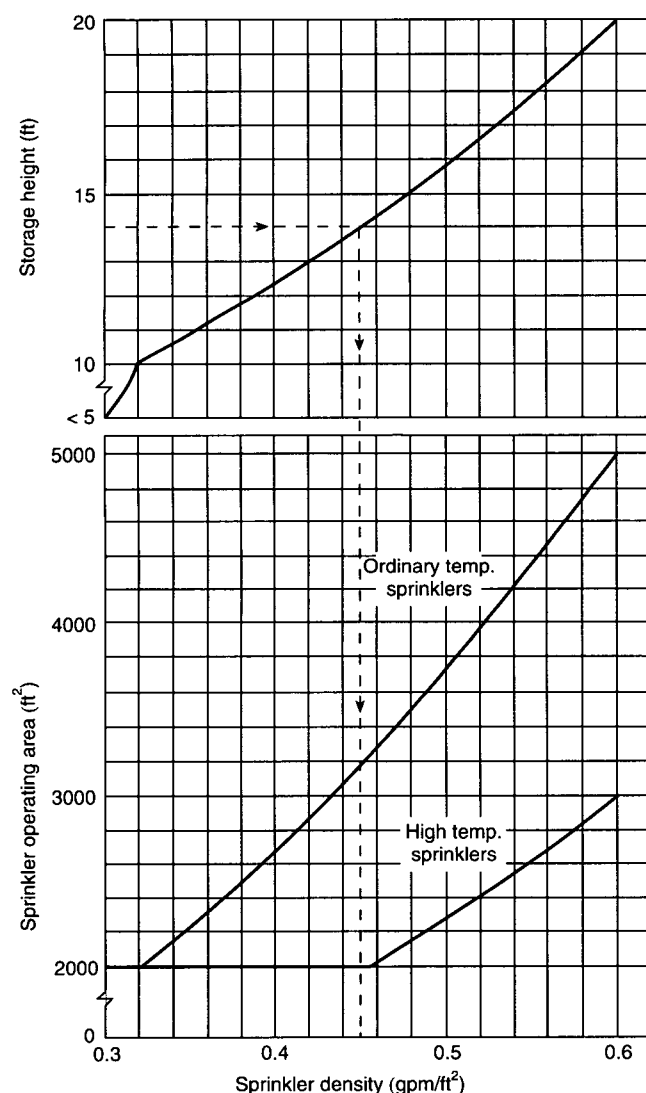


Figure 4-1.2 Sprinkler system design curves for palletized portable rack storage and fixed rack storage with pallets over 5 ft to 20 ft (1.5 m to 6 m) in height.

4-2 High-expansion Foam Systems.

4-2.1* High-expansion foam systems installed in accordance with NFPA 11A, *Standard for Medium-and High-Expansion Foam Systems*, as modified herein, shall be permitted to be installed in addition to automatic sprinklers. Where so installed, a reduction in sprinkler discharge density to one-half the density specified in Table 4-1.2 or 0.24 gpm/ft² [(9.78 L/min)/m²], whichever is higher, shall be allowed.

4-2.2 High-expansion foam systems shall be automatic in operation.

4-2.3 Detectors shall be listed and shall be installed at the ceiling at one-half listed spacing in accordance with NFPA 72, *National Fire Alarm Code*.

4-2.4 Detection systems, concentrate pumps, generators, and other system components essential to the operation of the system shall have an approved standby power source.

4-3 Water Supplies.

4-3.1 The rate of water supply shall be sufficient to provide the required sprinkler discharge density over the required area of application plus provision for generation of high-expansion foam and in-rack sprinklers where used.

4-3.2 Total water supplies shall include provision for not less than 750 gpm (2,835 L/min) for hose streams, in addition to that required for automatic sprinklers and foam systems. Water supplies shall be capable of supplying the demand for sprinkler systems and hose streams for not less than 3 hours.

Exception: For on-floor storage up to and including 5 ft (1.5 m) in height, hose stream requirements shall be permitted to be 250 gpm (946 L/min), with a water supply duration of not less than 2 hours.

4-3.3* Where dry pipe systems are used, the area of sprinkler application shall be increased by not less than 30 percent.

4-4 Manual Inside Protection.

4-4.1 Where automatic sprinkler protection is provided, small hose [1½ in. (38 mm)] shall be provided to reach any portion of the storage area. Small hose shall be supplied from one of the following:

- (a) Hydrants;
- (b) A separate piping system for small hose stations;
- (c) Valved hose connections on sprinkler risers where such connections are made upstream of sprinkler control valves;
- (d) Adjacent sprinkler systems.

4-4.2 Portable Fire Extinguishers. Portable fire extinguishers shall be provided in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*. Up to one-half of the requirement complement of portable fire extinguishers for Class A fires shall be permitted to be omitted in storage areas where fixed, small hose lines [1½ in. (38 mm)] are available to reach all portions of the storage area.

4-5 Hydrants. At locations without public hydrants, or where hydrants are not within 250 ft (76 m), private hydrants shall be installed in accordance with NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*.

4-6 Alarm Service.

4-6.1 Automatic sprinkler systems and foam systems, where provided, shall have approved central station, auxiliary, remote station, or proprietary waterflow alarm service.

Exception: Local waterflow alarm service shall be permitted to be provided where recorded guard service also is provided.

NOTE: See NFPA 601, *Standard on Guard Service in Fire Loss Prevention*.

4-6.2 Alarm service shall comply with NFPA 72, *National Fire Alarm Code*.

4-7* Fire Emergency Organization. (Also see Appendix B.)

Table 4-1.2

Piling Method	Piling Height (ft)	Sprinkler Discharge Density (gpm/ft ²) (See Notes 1 and 2)	Areas of Application (ft ²) (See Note 1.)	
			Ordinary Temp.	High Temp.
(1) On-floor storage	Up to 5	0.19	2,000	2,000
(a) Pyramid piles on-side	Over 5 to 12	0.30	2,500	2,500
(b) Other arrangements such that no horizontal channels are formed (See Note 3.)	Over 12 to 18	0.60	N/A	2,500
(c) Tires on-tread (See Note 4.)	Up to 5	0.19	2,000	2,000
	Over 5 to 12	0.30	2,500	2,500
(2) Palletized portable rack storage	Up to 5	0.19	2,000	2,000
(a) On-side or on-tread	Over 5 to 20	See Figure 4-1.2		
	Over 20 to 30	0.30 plus high-expansion foam	3,000	3,000
(b) On-side	20 to 25	0.60 and 0.90 (see Note 5); or	N/A N/A	5,000 3,000
		0.60 with 1-hr fireproofing of roof and ceiling assembly; or	N/A	4,000
		0.75	N/A	4,000
(3) Open portable rack storage, on-side or on-tread	Up to 5	0.19	2,000	2,000
	Over 5 to 12	0.60	5,000	3,000
	Over 12 to 20	0.60 and 0.90 (see Note 5); or	N/A N/A	5,000 3,000
		0.30 plus high-expansion foam	3,000	3,000
(4) Single-, double-, and multi-row fixed rack storage on pallets, on-side or on-tread	Up to 5	0.19	2,000	2,000
	Over 5 to 20	See Figure 4-1.2; or		
		0.40 plus one level in-rack sprinklers; or	3,000	3,000
		0.30 plus high-expansion foam	3,000	3,000
	Over 20 to 30	0.30 plus high-expansion foam	N/A	3,000
(5) Single-, double-, and multi-row fixed rack storage without pallets or shelves, on-side or on-tread	Up to 5	0.19	2,000	2,000
	Over 5 to 12	0.60	5,000	3,000
	Over 12 to 20	0.60 and 0.90 (see Note 5); or	N/A N/A	5,000 3,000
		0.40 plus one level in-rack sprinklers; or	3,000	3,000
		0.30 plus high-expansion foam	3,000	3,000
	Over 20 to 30	0.30 plus high-expansion foam	N/A	3,000
(6) Laced tires in racks	See A-4-1.2.			

NOTE 1: Sprinkler discharge densities and areas of application are based on a maximum clearance of 10 ft (3.1 m) between sprinkler deflectors and the maximum available height of storage. The maximum clearance is noted from actual testing and should not be viewed as a definitive measurement. The authority having jurisdiction should use the appropriate judgement where this distance is modified.

NOTE 2: The densities and areas provided in the table are based on fire tests using standard response, standard orifice [$\frac{1}{2}$ in. (12.7 mm)], and large orifice [$\frac{17}{32}$ in. (13.5 mm)] sprinklers. The use of extra large orifice (ELO) ($\frac{5}{8}$ in.) sprinklers shall be permitted where listed for such use, and where installed at a minimum operating pressure of 10 psi (69 kPa). In buildings where "old style" sprinklers exist, discharge densities shall be increased by 25 percent. For use of other types of sprinklers, consult the authority having jurisdiction.

NOTE 3: * Laced tires on-floor, vertical stacking on-side (typically truck tires), and off-road tires.

NOTE 4: Piles shall not exceed 25 ft (7.6 m) in direction of wheel holes.

NOTE 5: Water supply shall fulfill both requirements.

NOTE 6: N/A = Not applicable.

For SI units: 1 sq ft = 0.0929 m²; 1 gpm/sq ft = 40.746 (L/min)/m².

4-7.1 Arrangements shall be made to permit rapid entry into the premises by the municipal fire department, police department, or other authorized personnel in case of fire or other emergency.

4-7.2 Plant emergency organizations, where provided, shall be instructed and trained in the following procedures:

- (a) Maintenance of the security of the premises;
- (b) Means of summoning outside aid immediately in an emergency;
- (c) Use of portable extinguishers and small hose lines or small fires and mop-up operations;
- (d) Operation of the sprinkler system and water supply equipment;
- (e) Use of material handling equipment while sprinklers are still operating to effect final extinguishment;
- (f) Supervision of sprinkler valves after the system is turned off so that the system can be reactivated if rekindling occurs.

4-7.3 A fire watch shall be maintained when the sprinkler system is not in service.

Chapter 5 Building Equipment, Maintenance, and Operations

5-1 Mechanical Handling Equipment.

5-1.1 Industrial Trucks. Power-operated industrial trucks shall comply with NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Maintenance, and Operation*.

5-2 Storage of Empty Wood Pallets. Wood pallets shall be stored in accordance with the requirements of NFPA 231, *Standard for General Storage*, Section 4-4.

5-3 Cutting and Welding Operations.

5-3.1 Where welding or cutting operations are necessary, the requirements of NFPA 51B, *Standard for Fire Prevention in Use of Cutting and Welding Processes*, shall be followed. Where possible, work shall be removed to a safe area.

5-3.2 Welding, soldering, brazing, and cutting shall be permitted to be performed on rack or building components that cannot be removed, provided no storage is located below and within 25 ft (7.6 m) of the working area and provided flame-proof tarpaulins enclose this area. During any of these operations, the sprinkler system shall be in service. Extinguishers suitable for Class A fires with a minimum rating of 2A and charged inside hose lines, where provided, shall be located in the working area. A fire watch shall be maintained during these operations and for not less than 30 minutes following completion of open-flame operation.

5-4 Waste Disposal. Rubbish, trash, and other waste material shall be disposed of at regular intervals.

NOTE: See NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*.

5-5 Smoking. Smoking shall be strictly prohibited. "No Smoking" signs shall be posted in prohibited areas.

Exception: Locations prominently designated as smoking areas.

5-6 Maintenance and Inspection.

5-6.1 Fire walls, fire doors, and floors shall be maintained in good repair at all times.

5-6.2 The sprinkler system and the water supplies shall be inspected, tested, and maintained in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

Chapter 6 Referenced Publications

6-1 The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

6-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 10, *Standard for Portable Fire Extinguishers*, 1994 edition.

NFPA 11A, *Standard for Medium- and High-Expansion Foam Systems*, 1994 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1994 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, 1992 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 1992 edition.

NFPA 51B, *Standard for Fire Prevention in Use of Cutting and Welding Processes*, 1994 edition.

NFPA 72, *National Fire Alarm Code*, 1993 edition.

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Materials*, 1992 edition.

NFPA 220, *Standard on Types of Building Construction*, 1992 edition.

NFPA 231, *Standard for General Storage*, 1990 edition.

NFPA 231C, *Standard for Rack Storage of Materials*, 1991 edition.

NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Maintenance, and Operation*, 1994 edition.

Appendix A Explanatory Material

This Appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.

A-1-2 Miscellaneous Storage. The limitations on the type and size of storage are intended to identify those situations where tire storage is present in limited quantities and incidental to the main use of the building. Occupancies such as aircraft hangars, automobile dealers, repair garages, retail storage facilities, automotive and truck assembly plants, and mobile home assembly plants are types of facilities where miscellaneous storage could be

present. The fire protection sprinkler design densities specified by NFPA 13, *Standard for the Installation of Sprinkler Systems*, are adequate to provide protection for the storage heights indicated. Storage beyond these heights or areas presents hazards that are properly addressed by this standard and are outside the scope of NFPA 13.

A-2-1 Smoke removal is important to manual fire fighting and overhaul. Since most fire tests were conducted without smoke and heat venting, protection specified in Section 4-1 was developed without the use of such venting. However, venting through eave/line windows, doors, monitors, gravity, or mechanical exhaust systems is essential to smoke removal after control of the fire is achieved.

A-2-1.1 Building codes and insurance requirements affect the type of construction selected.

A-3-1 It is not the intent to limit the pile length.

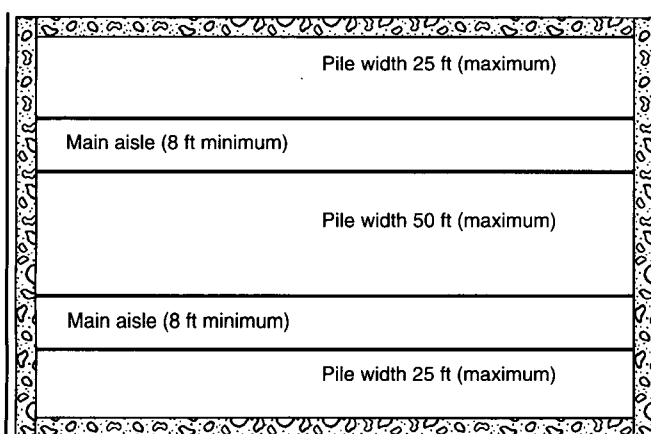


Figure A-3-1 Typical piling arrangement in accordance with Section 3-1.

A-3-2.5 Incandescent light fixtures should have shades or guards to prevent ignition of commodity from hot bulbs where possibility of contact with storage exists.

A-4-1.2 Density and areas of application in Table 4-1.2 have been developed from fire test data. Protection requirements for other storage methods are beyond the scope of this standard at the present time. From recent fire testing with densities of 0.45 gpm/ft² [18.3L/min/m²] and higher, there have been indications that large orifice sprinklers at greater than 50-ft² (4.6-m²) spacing produce better results than the 1/2-in. (12.7-mm) orifice sprinklers at 50-ft² (4.6-m²) spacing.

Table 4-1.2 is based on operation of standard sprinklers. Use of "quick response" or other special sprinklers should be based on appropriate tests as approved by the authority having jurisdiction.

The current changes to Table 4-1.2 represent test results from rubber tire fire tests performed at the Factory Mutual Research Center.

Storage heights and configurations, or both, [e.g., laced tires, automated material handling systems above 30 ft (9.1 m), etc.] beyond those indicated in the table have not had sufficient test data developed to establish recommended criteria. Detailed engineering reviews of the protection should be conducted and approved by the authority having jurisdiction.

A-4-1.2 Note 3 to Table 4-1.2. Laced tires are not stored to a significant height by this method due to the damage inflicted on the tire (i.e., bead).

A-4-2.1 In existing buildings used for tire storage, high-expansion foam might be used to augment an existing sprinkler system whose calculated density is below that required for the proposed storage height. For example, an existing system calculated to provide 0.25 gpm/ft² [(10.2 L/min)/m²] could be used for storages requiring up to 0.50 gpm/ft² [(20.3 L/min)/m²] with the addition of a high-expansion foam system. An alternative might be to reinforce or redesign the sprinkler system.

A-4-3.3 Wet systems are recommended for tire storage occupancies. Dry systems may be permitted only where it is impracticable to provide heat.

A-4-7 Information on emergency organization is provided in NFPA 600, *Standard on Industrial Fire Brigades*. (Also see Appendix B.)

Appendix B Recommendations for Fighting Rubber Tire Fires in Sprinklered Buildings

This Appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.

B-1 Introduction.

It is essential that the steps necessary for fighting rubber tire fires be understood by both the building occupant and the fire service to prevent unnecessary injury or loss of life and to prevent loss of fire control during overhaul. This necessitates emergency preplanning with the local fire department, building occupant, and others as deemed necessary.

Fire tests of rubber tire storage have indicated that smoke can quickly obstruct the visibility within a building and obscure the burning materials; plans for the attack and extinguishment of the fire should be prepared in advance.

Because the products of combustion are harmful, all personnel assigned to interior functions should use breathing apparatus even before obscuration occurs.

Ventilation efforts should be carefully controlled. Drafts from open doors and windows allow fresh air to reach the fire and make control of the fire difficult. Doors and windows should be closed as soon as possible to limit the air supply to the fire and to allow control by automatic systems to be established.

Fire brigades should be trained and equipped with the necessary tools and equipment to respond to a fire emergency and, if possible, attack the fire prior to the arrival of the fire department.

Review of building and fire protection system plans should be part of the ongoing training of both the on-site personnel and fire departments.

A tire fire can progress quickly through the phases described in the following paragraphs, and each phase presents different conditions to responding emergency personnel. Items for consideration in the emergency preplanning program are provided for inclusion in such plans.

Observations at tire fire tests and accounts of actual fires have indicated that, while automatic sprinklers with adequate densities in approved configurations can control a fire, extinguishment by sprinklers alone normally does not

occur. The four tests used also indicate that sprinkler protection can be overcome by:

(a) Storage exceeding the heights indicated in this standard; and

(b) Storage configurations that inhibit the movement of heat to the roof, slowing sprinkler operation, and inhibit the waterflow to the seat of the fire, reducing sprinkler effectiveness.

Incipient Stage. This stage occurs within 2 to 5 minutes of ignition.

Important: Drafts from open doors increase the intensity of the fire and make control difficult. Doors should be closed as quickly as possible to isolate the fire area.

Important: Fire tests indicate that smoke obscuration occurs within 6 to 9 minutes of ignition, even when the fire is sprinkler controlled. Breathing apparatus might be needed even before obscuration occurs.

If caught in the incipient stage, control can be achieved using interior hand hose and portable extinguishers. Quick reaction is essential, as this window of opportunity no longer exists within 2 to 5 minutes of actual ignition, since the generation of heat and smoke make the area untenable. Dry chemical extinguishers have been found to be most effective but should be backed up with small hose, as the "knock-down" is only temporary.

Tires in the affected area should be removed from storage. Tires removed from storage should be taken out of doors, thoroughly soaked, and left where they cannot expose other combustibles. The area where the fire occurred should be closely watched for several hours for rekindling.

While the first sprinkler can be expected to operate within the first 2 to 5 minutes of ignition, the updraft from the fire can disrupt the sprinkler pattern to such an extent that the water might not get to the seat of the fire. After the first 4 minutes, the fire has generally progressed beyond the stage where portable extinguishers are effective and, within minutes, the smoke and carbon monoxide make the area untenable. Vision is obscured, and any personnel without breathing apparatus is at risk.

Active Stage. The active stage of the fire follows the initial stage and is generally defined as that period where the sprinkler system is establishing control over the fire.

Important: Even though the fire is sprinkler controlled, roof temperatures resulting from the tire fires can reach temperatures high enough to cause steel joints to deflect and possibly fail. In recent fire tests, gas temperatures at roof level ranged between 1,110°F and 1,450°F (593°C and 788°C) for 10 minutes. Roof steel exposed to this high gas temperature could deflect or fail if subjected to additional loading. **DO NOT** place personnel on roof to attempt ventilation.

Important: Local fire departments attempting to draft from the sprinkler supply system will decrease the sprinkler effectiveness. If possible, separate municipal hydrants should be identified for fire department use.

Important: As the sprinklers gain control of the fire, the smoke will turn from black to gray. A return to black smoke is an indication that the sprinklers are not controlling the fire. Pump and system pressure also should be

monitored. Loss of system pressure is an indication of more sprinklers operating, pump failure, or loss of control.

Responding local fire departments should be arriving by this time. Building personnel should advise arriving fire personnel of the location of all occupants of the building. At this point, there is little for the fire department to do except to connect to the municipal water supply and prepare to supplement the fire protection system through the fire department connection.

Fire department personnel or maintenance personnel, or both, should respond to the fire pump room and work to maintain operation of the fire pump. System discharge pressure should be observed to determine if the pressure is stable. Unstable or decreasing discharge pressure indicates changes in the operating conditions of the fire protection system.

During this stage, the building is untenable, and obscured vision makes the use of hose streams questionable. It should be noted that, in buildings with smoke vents, longer use of fire hose might be possible, but at some risk to personnel. It is best to allow the sprinklers to take control of the fire. Most of the sprinklers will begin to operate within 15 to 20 minutes of ignition, if sprinkler control is effected. Sprinklers should be allowed to operate at least 60 to 90 minutes to gain control. Successful fire tests indicate that waterflow stabilizes within the first 20 minutes of the fire.

The building is best left unventilated at this time. As control is gained, the smoke will change from black to gray and will diminish in intensity. During this period, at least six charged 1½-in. (38.1-mm) hose lines should be laid out preparatory to entering the building. Portable flood lights should be secured as well as turn-out gear, breathing apparatus, and forklifts for the overhaul crew.

Critical Stage. The critical stage occurs between the final extinguishment and the ventilation of the building.

Important: Ventilation should be done slowly, and the sprinklers should be left in operation. A return to black smoke is an indication that control is being lost. If this happens, ventilation should cease, the building should be closed, and the sprinkler system should be allowed to regain control. It should be understood that, during the attempt to ventilate the building, the fire intensity can increase due to the addition of outside air. Additional sprinklers can be expected to operate during the ventilation effort. If control has been gained, extra sprinklers might make no difference in overall performance. If control has not been gained or is marginal, this increase in the number of operating sprinklers could make regaining control more difficult due to the overall increase in sprinkler demand. Unless there is a system failure, the sprinklers should regain control. If there is any doubt that control of the fire has been gained, the sprinkler system should be allowed to "soak" the fire for longer than 90 minutes.

Important: The officer in charge should have a contingency plan if control is lost due to a system failure. In the event that control of the fire is lost, as evidenced by such indicators as increasing smoke generation, loss of pressure at the fire pump discharge (indicating massive sprinkler operation), or collapsing roof, efforts should be directed toward preventing the spread of the fire beyond the area bounded by the fire walls. At this point, consideration

should be given to shutting off the sprinklers in the fire area to provide water for protecting the exposures.

After 60 to 90 minutes and when the smoke intensity has diminished, the building should be ventilated around the periphery of the fire area. If control has been gained, the roof temperature will usually have cooled sufficiently to allow roof vents to be opened manually if they have not already opened automatically.

Overhaul. Although visible fire is no longer present, overhaul of the area of the fire should be conducted to be certain of complete extinguishment.

Important: Care should be taken that the hose streams do not lower the pressure or water supply to the sprinkler system. Sprinkler operation should cease only when the fire chief is certain that hose can control the fire.

Important: Caution should be used, as the tire piles will be unstable.

As soon as the smoke clears to the extent that the building can be entered, entry should be made using small hose streams that should be directed into the burning tires. Sprinklers should be kept in operation during this period.

Forklifts and other means should be used to remove the tires from the fire area to outside the building. It usually is necessary to keep the sprinklers in operation during this procedure at least until there is no evidence of flame. Patrols should be made of the affected area for at least 24 hours following the fire.

Following fire extinguishment, all fire protection systems should be restored to service as quickly as possible. These systems include, but are not limited to:

- (a) Sprinkler systems
- (b) Alarm systems
- (c) Pumps
- (d) Water supplies.

Use of High-expansion Foam. If a high-expansion foam system is used in connection with automatic sprinklers, sprinklers may be permitted to be shut off 1 hour after ignition, and foam may be permitted to soak the fire for an additional 1 hour before the building is opened and overhaul is begun. Limited tests with high-expansion foam indicate that fire extinguishment is largely complete after a period of soaking in foam. As a precautionary measure, charged hose streams should be available when foam is drained away.

After the initial fill, foam generators should be operated periodically during the soaking period to maintain the foam level. This is necessary, since sprinklers and products of combustion will cause partial foam breakdown.

Appendix C Guidelines for Outdoor Storage of Scrap Tires

C-1 General. The intent of these recommendations is to provide fire protection guidance to minimize the fire hazard in areas for outside scrap tire storage. Each individual property has its own special conditions of tire handling, exposure, and topography. For this reason, only basic fire protection principles that are intended to be applied with

due consideration of the local factors involved are covered in this appendix. The authority having jurisdiction should be consulted in all cases.

Rubber has a heat combustion of about 15,000 Btus per pound, or roughly twice that of ordinary combustibles (e.g., paper and wood). Once ignited, fire development is rapid, and high temperatures can be expected due to the large exposed surface area of tires. Burning is likely to persist for hours. In cases where the fire is controlled, rekindling is a possibility.

These recommendations are not intended to apply to storage of shredded tires (chips, granules, etc.).

C-2 Definitions. Unless expressly stated elsewhere, for the purpose of these recommendations, the following terms are defined as indicated:

Aisle. An accessible clear space between storage piles or groups of piles suitable for housekeeping operations, visual inspection of piling areas, and initial fire-fighting operations.

Clear Space. Any area free of combustible materials. This does not preclude the storage of noncombustible materials that will not transmit an exposure fire.

Fire Lane. A clear space suitable for fire-fighting access and operations by motorized fire apparatus.

Scrap Tire. A tire that is no longer suitable for vehicular use.

Units (equivalent passenger). One average size passenger tire weighing approximately 25 lb (11 kg).

Yard. The outdoor areas where scrap tires are stored.

C-3 Fire Experience.

C-3.1 Fire experience in outdoor storage of scrap tires reveals a number of concerns, including the generation of large amounts of black smoke; the fact that the storage is often too close to buildings on the same or adjacent premises, which causes fires in these exposed buildings; the generation of oil during a fire where the oil contributes to the fire or where the runoff contaminates the surrounding area; delays in reporting fires; and the lack of fire-fighting capabilities. The fire hazards inherent in scrap rubber tire storage are best controlled by a positive fire prevention program that includes the objectives that a fire be contained to the pile of origin and that the exposures to other piles or associated structures be limited.

C-3.2 Fire Prevention.

C-3.2.1 The fire hazard potential inherent in scrap rubber tire storage operations can best be controlled by a positive fire prevention program. The method of stacking should be solid piles in an orderly manner and should include:

- (a) Fire lanes to separate piles and to provide access for effective fire-fighting operations.
- (b) Separation of yard storage from buildings and other exposures.
- (c) An effective fire prevention maintenance program including control of weeds, grass, and other combustible materials within the storage area.

(d) Consideration of topography, since oil accumulations or runoff can be expected in fire conditions. Scrap tire storage preferably should be on a level area.

C-3.2.2 Appropriate steps should be taken to limit access to the tire storage area. Acceptable access should be provided for fire-fighting equipment.

C-4 Exposure Protection.

C-4.1 For 500 units or less, the minimum separation between scrap rubber tires and structures should be 25 ft (7.6 m) or as reduced by Chapter 3, "Means of Protection," and Chapter 4, "Application of Means of Protection," of NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*.

C-4.2 For More than 500 Units.

C-4.2.1 The minimum distance between outside scrap rubber tire storage and buildings should be determined in accordance with NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*. Since the minimum distance is based on exposure from a burning building, restrictions are needed for application to an outside storage configuration.

(a) The height of exposing fire from burning trees should be considered as 1.5 times the height of the tire pile, since flames extending above the burning tires contribute to the size of the radiation surface area. In accordance with NFPA 80A, the height of the exposing fire equals the building height. The height of combustibles stored within the building is not covered; it depends on the severity of the exposure fire. A comparative building height would have to exceed the height of piling by several feet at least, and it could be substantially higher. Furthermore, the height (and width) of flames above a fire-penetrated roof would be substantially influenced by the debris of the fire-damaged or collapsed roof, whereas flame height above yard storage would have no such restriction.

(b) The width of the exposing fire should be taken as the combined width of piles facing the exposed building, disregarding the nominal separation between piles provided by narrow access aisles and roadways. In order for storage piles to be considered isolated piles, the minimum separation distance between piles should be in accordance with Table C-4.2.3. This distance can be reduced to that necessary to provide a dirt berm at least 1.5 times the height of the pile.

(c) The percent of opening in the exposing wall area should be considered to be 100 percent.

(d) The severity of the exposing fire should be considered as severe.

C-4.2.2 Means of protecting a building exposed by burning tire storage should be selected from NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*, Chapter 3, and separation adjustments should be based on building construction and protective measures as provided in NFPA 80A, Chapter 4, except that the separation should never be reduced below that necessary for fire-fighting access. (See Section C-4.3.)

C-4.2.3 Table C-4.2.3 provides representative separations between the exposed building and piles or between isolated piles.

C-4.2.4 Because of the extensive fire expected in scrap tire storage, some form of exposure protection for adjoining

Table C-4.2.3 Representative Exposure Separation Distances¹
Tire Storage Pile Height (ft)

		8	10	12	14	16	18	20
Exposed Face Dimensions (ft)	25	56	62	67	73	77	82	85
	50	75	84	93	100	107	113	118
	100	100	116	128	137	146	155	164
	150	117	135	149	164	178	189	198
	200	130	149	167	183	198	212	226
	250	140	162	181	198	216	231	245

¹Separation distances are based on NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*, Chapter 2, using a factor of 1.5 in accordance with C-4.2.1(a).

For SI units: 1 ft = 0.305 m.

properties should be considered. If the clear space as recommended in Table C-4.2.3 cannot be provided, provide a dirt berm 1.5 times the height of the tire storage.

C-4.2.5 The distance between storage and grass, weeds, and brush should be 50 ft (15 m).

C-4.3 Fire-fighting Access.

C-4.3.1 Maximum pile height should be 20 ft (6 m). Pile width and length should not exceed 250 ft (76.2 m) without a separation according to Table C-4.2.3. Dirt berms may be permitted to be used in lieu of cross aisles in accordance with C-4.2.1(b). (See Figure C-4.3.1.)

C-4.3.2 The fire department should be consulted for advice on provision of all-weather roadways to and within the storage area. Depending on such factors as storage area configuration and size, access obstruction (e.g., rivers, railroad yards), prevailing wind direction, and alternative tactics, fire-fighting strategy might necessitate that one or more aisles be wider than those described in C-4.3.1.

C-4.3.3 Pre-emergency planning should be made with the local fire protection agency so that fire emergencies can be properly handled in the tire storage facility.

C-5 General Fire Protection.

C-5.1 General.

C-5.1.1 Weeds, grass, and similar vegetation should be eliminated throughout the entire yard. Combustibles should be removed as they accumulate.

C-5.1.2 Smoking should be prohibited within the tire storage area. Other types of potential ignition sources such as cutting and welding, heating devices, and open fires should be prohibited.

C-5.1.3 Suitable safeguards should be provided to minimize the hazard of sparks from such equipment as refuse burners, boiler stacks, and vehicle exhaust.

C-5.2 Water Supplies.

C-5.2.1 A public or private fire main and hydrant system should be provided. A water system should be provided to supply a minimum of 1,000 gpm (3,780 L/min) for less than 10,000 units storage, or 2,000 gpm (7,560 L/min) for 10,000 units or more for a duration of 3 hours.

C-5.2.2 If there is access to a lake, stream, pond, or other body of water in the vicinity of the storage area, a fire department suction connection should be provided.

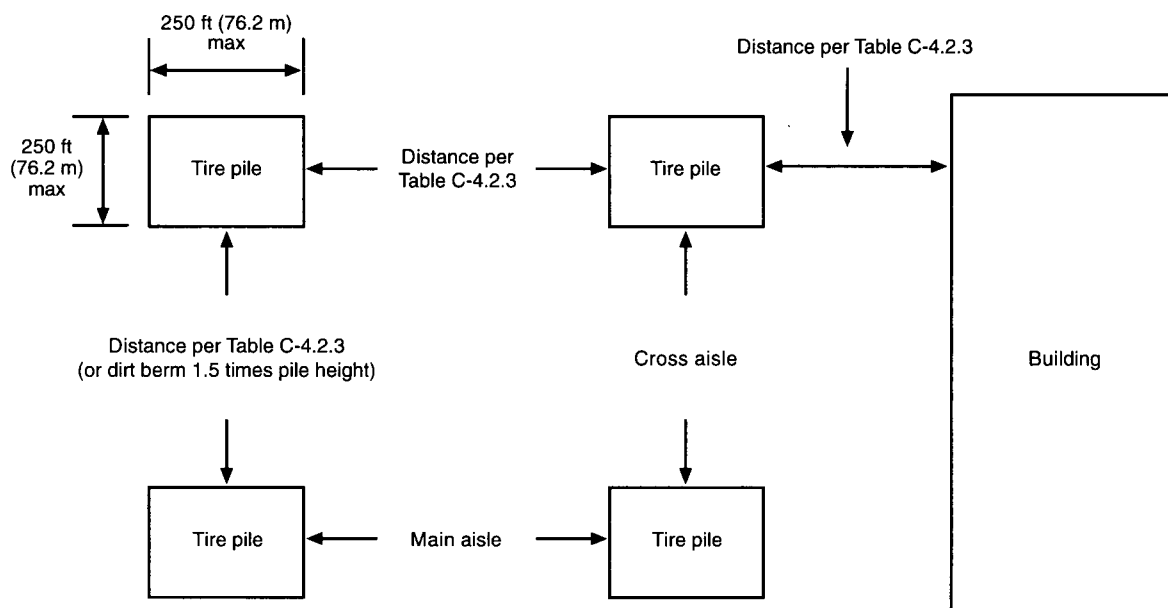


Figure C-4.3.1 Tire pile arrangement.

C-5.2.3 If fire hoses are not immediately available from responding public fire departments, on-site storage of 1,000 ft (304.8 m) of 2½-in. (63-mm) hose and sufficient nozzles should be provided.

C-5.2.4 Bulldozers, front-end loaders, and similar equipment may be permitted to be used to move tires not yet involved in the fire, to create breaks in the tire pile, or to cover burning tires with soil.

Appendix D Referenced Publications

D-1 The following documents or portions thereof are referenced within this standard for informational purposes only and thus are not considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

D-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1994 edition.

NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*, 1993 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 1994 edition.

NFPA 231C, *Standard for Rack Storage of Materials*, 1991 edition.

NFPA 600, *Standard on Industrial Fire Brigades*, 1992 edition.

NFPA 601, *Standard on Guard Service in Fire Loss Prevention*, 1992 edition.

D-1.2 Other Publication.

FMRC J. I. OWIR3.RR, "Rubber Tires: Investigation of Common Protection for Three Types of Storage," March 1993, prepared for Rubber Manufacturers Association, 1400 K Street NW, Washington, DC 20005.

Index

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-A-	
Access, fire fighting	4-7.1, C-4.3
Aisles	2-2.1
Definition	C-2
Alarm service	4-6
Approved (definition)	1-2
Authority having jurisdiction (definition)	1-2
Available height for storage (definition)	1-2

-B-	
Buildings	
Arrangement of	Chap. 2, A-2.1
Equipment	5-1.1
Maintenance and inspection	5-6
Sprinklered, fire fighting in	App. B
Bundled tires (definition)	1-2

-C-	
Clear space (definition)	C-2
Clearances	3-2, A-3-2.5
Columns, steel, protection of	2-1.2
Construction of building	2-1, A-2-1
Conventional pallets (definition)	1-2
Cutting and welding operations	5-3
-D-	
Definitions	1-2, A-1-2
Detection systems	4-2.3 to 4-2.4
Dry pipe sprinkler systems	4-3.3, A-4-3.3
-E-	
Encapsulated (definition)	1-2
Equipment, building	5-1.1
-F-	
Fire doors	5-6.1
Fire emergency organization	4-7, A-4-7, C-4.3.3
Fire extinguishers, portable	4-4.2, App. B
Fire fighting	
Outdoor storage of scrap tires	C-4.3
In sprinklered buildings	App. B
Fire lane (definition)	C-2
Fire prevention, for outdoor storage of scrap tires	C-3.2, C-5.1
Fire protection	Chap. 4, A-4-1.2, A-4-2.1, A-4-3.3, A-4-7
Manual inside	4-4
Outdoor storage of scrap tires	C-5.2
Fire walls	2-2, 5-6.1
Floors	5-6.1
-H-	
Hand hose, use of	App. B
High-expansion foam systems	4-2, 4-3.1 to 4-3.2, A-4-2.1, App. B
Horizontal channel (definition)	1-2
Hose, small	4-4.1
Hydrants	4-5
-I-	
Illustrations of storage configurations	1-3
Industrial trucks	5-1.1
Inspection	5-6
-L-	
Labeled (definition)	1-2
Laced storage	Fig. 1-3(g), 3-3.2(e), A-4-1.2
Definition	1-2
Light fixtures	3-2.5, A-3-2.5
Listed (definition)	1-2
-M-	
Maintenance	5-6
Mechanical handling equipment	5-1
Miscellaneous storage	3-3
Definition	1-2, A-1-2
-O-	
On-floor storage	3-3.2
On-tread	Fig. 1-3(f)
On-side storage	3-3.2(a)
Definition	1-2
Palletized portable rack	Fig. 1-3(e)
-P-	
Palletized storage	
Conventional pallets (definition)	1-2
Definition	1-2
Empty wood pallets, storage of	5-2
Portable rack on-side storage	Fig. 1-3(e)
Portable rack unit	Fig. 1-3(b)
Piling procedures	3-1, A-3-1
Pyramid storage (definition)	1-2
-R-	
Rack storage	3-3.2
Definition	1-2
Double-row fixed rack	Fig. 1-3(d)
In-rack sprinkler systems	2-1.2, 4-1.4, 4-3.1
Open portable rack	Fig. 1-3(c)
Open portable rack unit	Fig. 1-3(a)
Palletized portable rack on-side	Fig. 1-3(e)
Palletized portable rack unit	Fig. 1-3(b)
Referenced publications	Chap. 6, App. D
Rubber, combustion of	C-1
Rubber tires	
Definition	1-2
Fire fighting in sprinklered buildings	App. B
-S-	
Scope of standard	1-1
Scrap tires	
Definition	C-2
Outdoor storage of	see Outdoor storage of scrap tires
Shall (definition)	1-2
Should (definition)	1-2
Smoke removal	A-2-1
Smoking	5-5
Sprinkler systems	4-1, A-4-1.2
Dry pipe systems	4-3.3, A-4-3.3
Fire fighting in sprinklered buildings	App. B
In-rack system requirements	2-1.2, 4-1.4, 4-3.1
Maintenance and inspection	5-6.2
Out of service	4-7.3
Sidewall sprinkler heads	2-1.2
Training in operation of	4-7.2
Water supplies	4-3
Wet pipe systems	A-4-3.3
Sprinkler temperature rating (definition)	1-2
Storage	see also Palletized storage; Rack storage
Arrangement	Chap. 3
Available height for storage (definition)	1-2
Clearances	3-2
Empty wood pallets	5-2
Illustrations of storage configurations	1-3
Outdoor, scrap tires	see Outdoor storage of scrap tires
Storage aids (definition)	1-2
-T-	
Tires	
Rubber	
Definition	1-2
Fire fighting in sprinklered buildings	App. B

1994 Edition

The NFPA Codes and Standards Development Process

Since 1896, one of the primary purposes of the NFPA has been to develop and update the standards covering all areas of fire safety.

Calls for Proposals

The code adoption process takes place twice each year and begins with a call for proposals from the public to amend existing codes and standards or to develop the content of new fire safety documents.

Report on Proposals

Upon receipt of public proposals, the technical committee members meet to review, consider, and act on the proposals. The public proposals – together with the committee action on each proposal and committee-generated proposals – are published in the NFPA's Report on Proposals (ROP). The ROP is then subject to public review and comment.

Report on Comments

These public comments are considered and acted upon by the appropriate technical committees. All public comments – together with the committee action on each comment – are published as the Committee's supplementary report in the NFPA's Report on Comments (ROC).

The committee's report and supplementary report are then presented for adoption and open debate at either of NFPA's semi-annual meetings held throughout the United States and Canada.

Association Action

The Association meeting may, subject to review and issuance by the NFPA Standards Council, (a) adopt a report as published, (b) adopt a report as amended, contingent upon subsequent approval by the committee, (c) return a report to committee for further study, and (d) return a portion of a report to committee.

Standards Council Action

The Standards Council will make a judgement on whether or not to issue an NFPA document based upon the entire record before the Council, including the vote taken at the Association meeting on the technical committee's report.

Voting Procedures

Voting at an NFPA Annual or Fall Meeting is restricted to members of record for 180 days prior to the opening of the first general session of the meeting, except that individuals who join the Association at an Annual or Fall Meeting are entitled to vote at the next Fall or Annual Meeting.

"Members" are defined by Article 3.2 of the Bylaws as individuals, firms, corporations, trade or professional associations, institutes, fire departments, fire brigades, and other public or private agencies desiring to advance the purposes of the Association. Each member shall have one vote in the affairs of the Association. Under Article 4.5 of the Bylaws, the vote of such a member shall be cast by that member individually or by an employee designated in writing by the member of record who has registered for the meeting. Such a designated person shall not be eligible to represent more than one voting privilege on each issue, nor cast more than one vote on each issue.

Any member who wishes to designate an employee to cast that member's vote at an Association meeting in place of that member must provide that employee with written authorization to represent the member at the meeting. The authorization must be on company letterhead signed by the member of record, with the membership number indicated, and the authorization must be recorded with the President of NFPA or his designee before the start of the opening general session of the Meeting. That employee, irrespective of his or her own personal membership status, shall be privileged to cast only one vote on each issue before the Association.

Sequence of Events Leading to Publication of an NFPA Committee Document

Call for proposals to amend existing document or for recommendations on new document.



Committee meets to act on proposals, to develop its own proposals, and to prepare its report.



Committee votes on proposals by letter ballot. If two-thirds approve, report goes forward.
Lacking two-thirds approval, report returns to committee.



Report is published for public review and comment. (Report on Proposals - ROP)



Committee meets to act on each public comment received.



Committee votes on comments by letter ballot. If two-thirds approve, supplementary report goes forward. Lacking two-thirds approval, supplementary report returns to committee.



Supplementary report is published for public review. (Report on Comments - ROC).



NFPA membership meets (Annual or Fall Meeting) and acts on committee report (ROP and ROC).



Committee votes on any amendments to report approved at NFPA Annual or Fall Meeting.



Complaints to Standards Council on Association action must be filed
within 20 days of the NFPA Annual or Fall Meeting.



Standards Council decides, based on all evidence, whether or not to issue standard
or to take other action, including hearing any complaints.



Appeals to Board of Directors on Standards Council action must be filed
within 20 days of Council action.