**Chapter 34 General Storage**

34.1 General

34.1.1 Application

This chapter shall apply to the indoor and outdoor storage of materials representing the broad range of combustibles, including plastics, rubber tires, and roll paper.

34.1.1.1

Storage configurations shall include palletized storage, solid-piled storage, and storage in bin boxes, on shelves, or on racks.

34.1.1.2

Chapter 34 shall not apply to the following:

Storage of commodities that, with their packaging and storage aids, would be classified as noncombustible

Unpackaged bulk materials such as grain, coal, or similar commodities but excluding wood chips and sawdust, which are addressed in Chapter 31

Inside or outside storage of commodities covered by this Code, except where specifically mentioned herein (e.g., pyroxylin plastics)

Storage of high-hazard materials covered by this Code, except where specifically mentioned herein

Storage on plastic shelves on racks

\* Miscellaneous tire storage

Combustible fiber storage, which is covered in Chapter 45

34.1.2 Permits

Permits, where required, shall comply with Section 1.12.

34.1.3\* Approved Storage Floor Plan

An approved storage floor plan that documents the permissible use of the storage area, based on the occupancy classification and the design basis of the automatic sprinkler system, shall be provided and mounted in an approved location.

34.2 Classification of Commodities

34.2.1\*

Commodity classification and the corresponding protection requirements shall be determined based on the makeup of individual storage units. [13:20.3.1]

34.2.1.1

The type and amount of materials used as part of the product and its primary packaging as well as the storage pallet shall be considered in the classification of the commodity. [13:20.3.1.1]

34.2.1.2

When specific test data of commodity classification by a nationally recognized testing agency are available, the data shall be permitted to be used in determining classification of commodities. [13:20.3.1.2]

34.2.2 Pallet Types

34.2.2.1 General

When loads are palletized, the use of wood or metal pallets, or listed pallets equivalent to wood, shall be assumed in the classification of commodities. [13:20.3.2.1]

34.2.2.2 Plastic Pallet

A pallet having any portion of its construction consisting of a plastic material that has not been listed as equivalent to wood shall increase the class of commodity determined for a storage load in accordance with NFPA 13. [13:20.3.2.2]

34.3\* Commodity Classes

34.3.1\* Class I

A Class I commodity shall be defined as a noncombustible product that meets one of the following criteria:

Placed directly on wood pallets

Placed in single-layer corrugated cartons, with or without single-thickness cardboard dividers, with or without pallets

Shrink-wrapped or paper-wrapped as a unit load with or without pallets [13:20.4.1]

34.3.2\* Class II

A Class II commodity shall be defined as a noncombustible product that is in slatted wooden crates, solid wood boxes, multiple-layered corrugated cartons, or equivalent combustible packaging material, with or without pallets. [13:20.4.2]

34.3.3\* Class III

34.3.3.1

A Class III commodity shall be defined as a product fashioned from wood, paper, natural fibers, or Group C plastics with or without cartons, boxes, or crates and with or without pallets. [13:20.4.3.1]

34.3.3.2

A Class III commodity shall be permitted to contain a limited amount (5 percent or less by weight of nonexpanded plastic or 5 percent or less by volume of expanded plastic) of Group A or Group B plastics. [13:20.4.3.2]

34.3.3.3

Class III commodities containing a mix of both Group A expanded and nonexpanded plastics shall comply with Figure 34.3.3.3(a) where they are within cartons, boxes, or crates or with Figure 34.3.3.3(b) where they are exposed. [13:20.4.3.3]

FIGURE 34.3.3.3(a) Commodities, Cartoned or Within a Wooden Container, Containing a Mixture of Expanded and Nonexpanded Group A Plastics. [13:Figure 20.4.3.3(a)]

FIGURE 34.3.3.3(b) Exposed Commodities Containing a Mixture of Expanded and Nonexpanded Group A Plastics. [13:Figure 20.4.3.3(b)]

34.3.4\* Class IV

34.3.4.1

A Class IV commodity shall be defined as a product, with or without pallets, that meets one of the following criteria:

Constructed partially or totally of Group B plastics

Consists of free-flowing Group A plastic materials

Cartoned, or within a wooden container, that contains greater than 5 percent and up to 15 percent by weight of Group A nonexpanded plastic

Cartoned, or within a wooden container, that contains greater than 5 percent and up to 25 percent by volume of expanded Group A plastics

Cartoned, or within a wooden container, that contains a mix of Group A expanded and nonexpanded plastics and complies with Figure 34.3.3.3(a)

Exposed, that contains greater than 5 percent and up to 15 percent by weight of Group A nonexpanded plastic

Exposed, that contains a mix of Group A expanded and nonexpanded plastics and complies with Figure 34.3.3.3(b)

[13:20.4.4.1]

34.3.4.2

The remaining materials shall be permitted to be noncombustible, wood, paper, natural fibers, or Group B or Group C plastics. [13:20.4.4.2]

34.3.5\* Classification of Plastics, Elastomers, and Rubber

Plastics, elastomers, and rubber shall be classified as Group A, Group B, or Group C. [13:20.4.5]

34.3.5.1 Group A

The following materials shall be classified as Group A:

ABS (acrylonitrile-butadiene-styrene copolymer)

Acetal (polyformaldehyde)

Acrylic (polymethyl methacrylate)

Butyl rubber

Cellulosics (cellulose acetate, cellulose acetate butyrate, ethyl cellulose)

EPDM (ethylene-propylene rubber)

FRP (fiberglass-reinforced polyester)

Natural rubber

Nitrile-rubber (acrylonitrile-butadiene-rubber)

Nylon (nylon 6, nylon 6/6)

PET (thermoplastic polyester)

Polybutadiene

Polycarbonate

Polyester elastomer

Polyethylene

Polypropylene

Polystyrene

Polyurethane

PVC (polyvinyl chloride — highly plasticized, with plasticizer content greater than 20 percent) (rarely found)

PVF (polyvinyl fluoride)

SAN (styrene acrylonitrile)

SBR (styrene-butadiene rubber)

[13:20.4.5.1]

34.3.5.2\*

Group A plastics shall be further subdivided as either expanded or nonexpanded. [13:20.4.5.2]

34.3.5.3

A Group A expanded plastic commodity shall be defined as a product, with or without pallets, that meets one of the following criteria:

Cartoned, or within a wooden container, that contains greater than 40 percent by volume of Group A expanded plastic

Exposed, that contains greater than 25 percent by volume of Group A expanded plastic

[13:20.4.5.3]

34.3.5.4

A Group A nonexpanded plastic commodity shall be defined as a product, with or without pallets, that meets one of the following criteria:

Cartoned, or within a wooden container, that contains greater than 15 percent by weight of Group A nonexpanded plastic

Cartoned, or within a wooden container, that contains greater than 25 percent and up to 40 percent by volume of Group A expanded plastic

Cartoned, or within a wooden container, that contains a mix of Group A nonexpanded and expanded plastics, in compliance with Figure 34.3.3.3(a)

Exposed, that contains greater than 15 percent by weight of Group A nonexpanded plastic

Exposed, that contains greater than 5 percent and up to 25 percent by volume of Group A expanded plastic

Exposed, that contains a mix of Group A nonexpanded and expanded plastics, in compliance with Figure 34.3.3.3(b)

[13:20.4.5.4]

34.3.5.5

The remaining materials shall be permitted to be noncombustible, wood, paper, natural or synthetic fibers, or Group A, Group B, or Group C plastics. [13:20.4.5.5]

34.3.6 Group B

The following materials shall be classified as Group B:

Chloroprene rubber

Fluoroplastics (ECTFE — ethylene-chlorotrifluoroethylene copolymer; ETFE — ethylene tetrafluoroethylene copolymer; FEP — fluorinated ethylenetetrafluoroethylene-copolymer)

Silicone rubber

34.3.7 Group C

The following materials shall be classified as Group C:

Fluoroplastics (PCTFE — polychlorotrifluoroethylene; PTFE — polytetrafluoroethylene)

Melamine (melamine formaldehyde)

Phenolic

PVC (polyvinyl chloride — flexible — PVCs with plasticizer content up to 20 percent)

PVDC (polyvinylidene chloride)

PVDF (polyvinylidene fluoride)

Urea (urea formaldehyde)

[13:20.4.7]

34.3.8\*

Plastic commodities shall be protected in accordance with Figure 34.3.8. (See Section C.21 of NFPA 13.) [13:20.4.8]

FIGURE 34.3.8 Decision Tree. [13:Figure 20.4.8]

34.3.8.1

Group B plastics and free-flowing Group A plastics shall be protected the same as Class IV commodities. [13:20.4.8.1]

34.3.8.2

Group C plastics shall be protected the same as Class III commodities. [13:20.4.8.2]

34.3.9 Rubber Tires

Pneumatic tires for passenger automobiles, aircraft, light and heavy trucks, trailers, farm equipment, construction equipment (off-the-road), and buses shall be protected as rubber tire storage in accordance with Chapters 20 through 25 ofNFPA 13. [13:20.4.9]

34.3.10\* Classification of Rolled Paper Storage

For the purposes of this Code, the classifications of paper described in 34.3.10.1 through 34.3.10.4 shall apply and shall be used to determine the sprinkler system design criteria in accordance with Chapters 20 through 25 ofNFPA 13. [13:20.4.10]

34.3.10.1 Heavyweight Class

Heavyweight class shall be defined so as to include paperboard and paper stock having a basis weight [weight per 1000 ft2 (93 m2)] of 20 lb (9.1 kg). [13:20.4.10.1]

34.3.10.2 Mediumweight Class

Mediumweight class shall be defined so as to include all the broad range of papers having a basis weight [weight per 1000 ft2 (93 m2)] of 10 lb to 20 lb (4.5 kg to 9.1 kg). [13:20.4.10.2]

34.3.10.3 Lightweight Class

Lightweight class shall be defined so as to include all papers having a basis weight [weight per 1000 ft2 (93 m2)] of 10 lb (4.5 kg). [13:20.4.10.3]

34.3.10.4 Tissue

34.3.10.4.1

Tissue shall be defined so as to include the broad range of papers of characteristic gauzy texture, which, in some cases, are fairly transparent. [13:20.4.10.4.1]

34.3.10.4.2

For the purposes of this Code, tissue shall be defined as the soft, absorbent type, regardless of basis weight — specifically, crepe wadding and the sanitary class including facial tissue, paper napkins, bathroom tissue, and toweling. [13:20.4.10.4.2]

34.3.11\* Plastic Motor Vehicle Components

Group A plastic automotive components and associated packaging material consisting of exposed, expanded Group A plastic dunnage, instrument panels, and plastic bumper fascia shall be permitted to be protected as defined in Chapter 23 of NFPA 13. [13:20.4.11]

34.3.12 Retail Display/Storage of Up to Cartoned Group A Plastics

Group A plastics combined with Class I through IV in a retail/storage environment (big box retail) that combines customer picking areas with storage above within the retail area shall be permitted to be protected in accordance with retail display/storage of up to cartoned group A plastics in Chapters 20 to 23 of NFPA 13. [13:20.4.12]

34.3.12.1 Baled Cotton

A natural seed fiber wrapped and secured in industry-accepted materials, usually consisting of burlap, woven polypropylene, or sheet polyethylene, and secured with steel, synthetic or wire bands, or wire; also includes linters (lint removed from the cottonseed) and motes (residual materials from the ginning process) shall be protected as baled cotton in accordance with Chapter 21 of NFPA 13. (See Table A.3.3.13 of NFPA 13.) [13:20.4.12.1]

34.3.13 Carton Records Storage

A Class III commodity consisting predominantly of paper records in cardboard cartons shall be permitted to be protected as cartoned record storage in accordance with Chapter 21 or 23 of NFPA 13. [13:20.4.13]

34.3.14 Mixed Commodities

34.3.14.1

Protection requirements shall not be based on the overall commodity mix in a fire area. [13:20.4.14.1]

34.3.14.2

Unless the requirements of 34.3.14.3 or 34.3.14.4 are met, mixed commodity storage shall be protected by the requirements for the highest classified commodity and storage arrangement. [13:20.4.14.2]

34.3.14.3

The protection requirements for the lower commodity class shall be permitted to be utilized where all of the following are met:

Up to 10 pallet loads of a higher hazard commodity, as described in 34.3.1 and 34.3.7, shall be permitted to be present in an area not exceeding 40,000 ft2 (3720 m2).

The higher hazard commodity shall be randomly dispersed with no adjacent loads in any direction (including diagonally).

Where the ceiling protection is based on Class I or Class II commodities, the allowable number of pallet loads for Class IV or Group A plastics shall be reduced to five. [13:20.4.14.3]

34.3.14.4 Mixed Commodity Segregation

The protection requirements for the lower commodity class shall be permitted to be utilized in the area of lower commodity class, where the higher hazard material is confined to a designated area and the area is protected to the higher hazard in accordance with the requirements of this Code. [13:20.4.14.4]

34.4 Building Construction

34.4.1\* Construction Type

Buildings used for storage of materials that are stored and protected in accordance with this chapter shall be permitted to be of any of the types described in NFPA 220.

34.4.2 Fire-Fighting Access

Access shall be provided to all portions of the premises for fire-fighting purposes.

34.4.3\* Emergency Smoke and Heat Venting

34.4.3.1

Protection outlined in this chapter shall apply to buildings with or without smoke and heat vents.

34.4.3.2

Protection outlined in this chapter shall apply to buildings with or without draft curtains.

34.4.3.3

Where local codes require smoke and heat vents in buildings protected by early suppression fast response (ESFR) sprinklers, the vents shall be manually operated or have an operating mechanism with a standard response fusible element rated not less than 360°F (182°C).

34.5 Storage Arrangement

34.5.1\* Piling Procedures and Precautions

34.5.1.1

Any commodities that are hazardous in combination with each other shall be stored so they cannot come into contact with each other.

34.5.1.2

Safe floor loads shall not be exceeded.

34.5.1.3

Where storing water-absorbent commodities, normal floor loads shall be reduced to take into account the added weight of water that can be absorbed during fire-fighting operations.

34.5.2 Commodity Clearance

34.5.2.1

The clearance between top of storage and sprinkler deflectors shall conform to NFPA 13.

34.5.2.2\*

If the commodity is stored above the lower chord of roof trusses, not less than 1 ft (0.3 m) of clear space shall be maintained to allow wetting of the truss, unless the truss is protected with 1-hour fireproofing.

34.5.2.3

Storage clearance from ducts shall be maintained in accordance with NFPA 91.

34.5.2.4

The clearance between stored materials and unit heaters, radiant space heaters, duct furnaces, and flues shall not be less than 3 ft (0.9 m) in all directions or shall be in accordance with the clearances shown on the approval agency label.

34.5.2.5\*

Clearance shall be maintained to lights or light fixtures to prevent ignition.

34.5.2.6

Clearance shall be maintained around the path of fire door travel to ensure the door's proper operation and inspection.

34.5.2.7

Operation and inspection clearance shall be maintained around fire-extinguishing and fire protection equipment.

34.5.3 Aisles

34.5.3.1

For the storage of commodities that expand with the absorption of water, such as roll paper, wall aisles not less than 24 in. (0.6 m) wide shall be provided.

34.5.3.2

Aisles shall be maintained to retard the transfer of fire from one pile to another and to allow convenient access for fire fighting, salvage, and removal of storage.

34.5.4 Flammable and Combustible Liquids

Storage of flammable or combustible liquids shall be in accordance with Chapter 60.

34.6 General Fire Protection

34.6.1\* Sprinkler Systems

Sprinkler systems installed in buildings used for storage shall be in accordance with Section 13.3.

34.6.2 High-Expansion Foam

34.6.2.1

High-expansion foam systems installed in addition to automatic sprinklers shall be installed in accordance with NFPA 11 except where modified by other requirements in this chapter.

34.6.2.2

High-expansion foam used to protect idle pallets shall have a fill time of not more than 4 minutes.

34.6.2.3

High-expansion foam systems shall be automatic in operation.

34.6.2.4

Detectors for high-expansion foam systems shall be listed and shall be installed at the ceiling at not more than one-half the listed spacing in accordance with NFPA 72.

34.6.2.5

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

34.6.3 Manual Protection

34.6.3.1 Portable Fire Extinguishers

34.6.3.1.1

Portable fire extinguishers shall be provided in accordance with Section 13.6, unless 34.6.3.1.2 applies.

34.6.3.1.2

Where 11/2 in. (38 mm) hose lines are available to reach all portions of areas with Class A fire loads, up to one-half of the portable fire extinguishers required by Section 13.6 shall be permitted to be omitted.

34.6.3.2 Hydrants

At locations without public hydrants, or where hydrants are not within 250 ft (75 m), private hydrants shall be installed in accordance with Section 13.5.

34.6.4 Fire Organization

34.6.4.1

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

34.6.4.2\*

Due to the unique nature of storage fires and the hazards associated with fighting such fires, facility emergency personnel shall be trained to have knowledge of the following:

Pile and building collapse potential during fire-fighting and mop-up operations due to sprinkler water absorption, use of hose streams, and the undermining of piles by fire that is likely to cause material or piles to fall (especially roll tissue paper), resulting in injury

Operation of sprinkler systems and water supply equipment

Location of the controlling sprinkler valves so that the correct sprinkler system can be turned on or off as necessary

Correct operation of emergency smoke and heat vent systems where they have been provided

Use of material-handling equipment while sprinklers are operating to effect final extinguishment

Procedure for summoning outside aid immediately in an emergency

Maintenance of the security features of the premises

Operation of foam systems, evacuation procedures, and safety precautions during all foam operations

34.6.4.3

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

34.6.5 Alarm Service

34.6.5.1

Automatic sprinkler systems and foam systems, where provided, shall have approved central station, auxiliary, remote station, or proprietary waterflow alarm service unless otherwise permitted by 34.6.5.1.1 or 34.6.5.1.2.

34.6.5.1.1

Local waterflow alarm service shall be permitted when recorded guard service also is provided.

34.6.5.1.2

Local waterflow alarm service shall be permitted where the storage facilities are occupied on a 24-hour basis.

34.6.5.2

Alarm service shall comply with NFPA 72.

34.6.6 Security Service

Security service, where provided, shall comply with NFPA 601.

34.7 Building Equipment, Maintenance, and Operations

34.7.1 Industrial Trucks

34.7.1.1

Power-operated industrial trucks and their use shall comply with NFPA 505.

34.7.1.2

Industrial trucks using liquefied petroleum gas (LPGas) or liquid fuel shall be refueled outside of the storage building at a location designated for the purpose.

34.7.2 Building Service Equipment

Electrical equipment shall be installed in accordance with the provisions of Section 11.1.

34.7.3 Cutting and Welding Operations

34.7.3.1

Where welding or cutting operations are necessary, the requirements of Chapter 41 shall apply.

34.7.3.2\*

Welding, soldering, brazing, and cutting shall be permitted to be performed on building components or contents that cannot be removed, provided that no storage is located below and within 25 ft (7.6 m) of the working area and flameproof tarpaulins enclose the area.

34.7.3.3

During any of the operations identified in 34.7.3.2, all of the following shall apply:

The sprinkler system shall be in service.

Extinguishers suitable for Class A fires with a minimum rating of 2-A shall be located in the working area.

Where inside hose lines are available, charged and attended inside hose lines shall be located in the working area.

A fire watch shall be maintained during the operations specified in 34.7.3.2 and for not less than 30 minutes following completion of open-flame operation.

34.7.4 Waste Disposal

34.7.4.1

Approved containers for rubbish and other trash materials shall be provided.

34.7.4.2

Rubbish, trash, and other waste material shall be disposed of at regular intervals.

34.7.5 Smoking

34.7.5.1

Smoking shall be prohibited except in locations designated as smoking areas.

34.7.5.2

Signs that read "No Smoking" shall be posted in prohibited areas.

34.7.6\* Maintenance and Inspection

34.7.6.1

Fire walls, fire doors, and floors shall be maintained in functional condition at all times.

34.7.6.2\*

All water-based fire protection systems and the water supplies shall be inspected, tested, and maintained in accordance with NFPA 25.

34.7.6.3 Storage Plan Maintenance

34.7.6.3.1

Storage shall comply with the approved storage floor plan.

34.7.6.3.2

Compliance with the approved storage floor plan required by 34.1.3 shall be evaluated and verified not less than once per year.

34.7.6.3.3

Modifications or changes to the approved storage floor plan shall be approved by the AHJ prior to any modifications or changes.

34.7.7 Refrigeration Systems

Refrigeration systems, if used, shall be in accordance with ASHRAE 15, Safety Code for Mechanical Refrigeration.

34.7.8 Lighting

Where metal halide lighting is installed, it shall be selected, installed, and maintained such that catastrophic failure of the bulb shall not ignite materials below.

34.8 Protection of Rack Storage

34.8.1 Application

Section 34.8 shall apply to the indoor storage of normal combustibles (Class I through Class IV) and plastics that are stored on racks.

34.8.2 Building Construction

34.8.2.1

Fire protection of roof steel shall not be required when sprinkler systems are installed in accordance with Section 13.3.

34.8.2.2

Fire protection of steel building columns and vertical rack members that support the building shall not be required when ceiling sprinklers and in-rack sprinklers are installed in accordance with Section 13.3.

34.8.2.3

For sprinklered buildings with rack storage of over 15 ft (4.6 m) in height and only ceiling sprinklers installed, steel building columns within the rack structure and vertical rack members that support the building shall have a fire resistance rating not less than 1 hour, unless the installation meets the requirements of 16.1.4 of NFPA 13.

34.8.3 Storage Arrangement

34.8.3.1\* Rack Structure

Rack configurations shall be approved.

34.8.3.2\* Rack Loading

Racks shall not be loaded beyond their design capacity.

34.8.3.3\* Aisle Widths

34.8.3.3.1

Aisle widths and depth of racks shall be determined by material-handling methods.

34.8.3.3.2

The width of aisles shall be considered in the design of the protection system.

34.8.3.3.3\*

Aisle widths shall be maintained by either fixed rack structures or control in placement of portable racks.

34.8.3.3.4

Any decrease in aisle width shall require a review of the adequacy of the protection system.

34.8.3.4 General Fire Protection

34.8.3.4.1 High-Expansion Foam

34.8.3.4.1.1\*

Where high-expansion foam systems are installed, they shall be automatic in operation and shall be in accordance with NFPA 11, except when modified by 34.8.3.4.

34.8.3.4.1.2

When high-expansion foam systems are used in combination with ceiling sprinklers, in-rack sprinklers shall not be required.

34.8.3.4.1.3

Detectors shall be listed and shall be installed in one of the following configurations:

At one-half listed linear spacing [e.g., 15 ft x 15 ft (4.6 m x 4.6 m) rather than 30 ft x 30 ft (9.1 m x 9.1 m)] when the following conditions exist:

Detectors are installed at the ceiling only.

The clearance from the top of storage does not exceed 10 ft (3 m).

The height of storage does not exceed 25 ft (7.6 m).

At the ceiling at listed spacing and on racks at alternate levels

Where listed for rack storage installation and installed in accordance with ceiling detector listing to provide response within 1 minute after ignition using an ignition source equivalent to that used in a rack storage testing program

34.8.3.4.2 High-Expansion Foam Submergence

34.8.3.4.2.1

The following requirements shall apply to storage of Class I, Class II, Class III, and Class IV commodities, as classified in Section 34.2, up to and including 25 ft (7.6 m) in height:

\* When high-expansion foam systems are used without sprinklers, the submergence time shall be not more than 5 minutes for Class I, Class II, or Class III commodities.

When high-expansion foam systems are used without sprinklers, the submergence time shall be not more than 4 minutes for Class IV commodities.

When high-expansion foam systems are used in combination with ceiling sprinklers, the submergence time shall be not more than 7 minutes for Class I, Class II, or Class III commodities.

When high-expansion foam systems are used in combination with ceiling sprinklers, the submergence time shall be not more than 5 minutes for Class IV commodities.

34.8.3.4.2.2

The following requirements shall apply to storage of Class I, Class II, Class III, and Class IV commodities stored over 25 ft (7.6 m) high up to and including 35 ft (10.7 m) in height:

Ceiling sprinklers shall be used in combination with the high-expansion foam system.

The submergence time for the high-expansion foam shall be not more than 5 minutes for Class I, Class II, or Class III commodities.

The submergence time for the high-expansion foam shall be not more than 4 minutes for Class IV commodities.

34.9 Protection of Rubber Tires

34.9.1\* Application

34.9.1.1

Section 34.9 shall apply to new facilities with indoor storage of usable tires and to existing facilities being converted to the indoor storage of usable tires.

34.9.1.2

Existing buildings storing rubber tires shall be exempted from complying with Section 34.9.

34.9.1.3

This section shall not apply to scrap tire storage.

34.9.2 Building Arrangement

34.9.2.1 Steel Columns

Steel columns shall be protected as follows unless protected in accordance with 16.1.4 of NFPA 13:

For storage exceeding 15 ft to 20 ft (4.6 m to 6 m) in height, columns shall have 1-hour fireproofing.

For storage exceeding 20 ft (6 m) in height, columns shall have 2-hour fireproofing for the entire length of the column, including connections with other structural members.

34.9.2.2 Fire Walls

34.9.2.2.1

Four-hour fire walls shall be provided between the tire warehouse and tire manufacturing areas.

34.9.2.2.2

Fire walls shall be designed in accordance with NFPA 221.

34.9.2.3\* Travel Distance to Exits

Travel distance to exits shall be in accordance with NFPA 101.

34.9.3 Storage Arrangement

34.9.3.1 Piling Procedures

34.9.3.1.1\*

Piles that are not adjacent to or located along a wall shall be not more than 50 ft (15 m) in width.

34.9.3.1.2

Tires stored adjacent to or along one wall shall not extend more than 25 ft (7.6 m) from the wall.

34.9.3.1.3

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).

34.9.3.1.4

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

34.9.3.2 Clearances

34.9.3.2.1

Storage clearance from roof structures shall be not less than 18 in. (470 mm) in all directions.

34.9.3.2.2

A clearance of not less than 24 in. (610 mm) shall be maintained around the path of fire door travel unless a barricade is provided.

34.9.3.2.3

Where protection in accordance with this chapter is provided, stored tires shall be segregated from other combustible storage by aisles not less than 8 ft (2.4 m) wide.

34.10 Protection of Roll Paper

34.10.1 Application

Section 34.10 shall apply to new facilities with indoor storage of roll paper, and to existing facilities being converted to the indoor storage of roll paper, except for the following types of roll paper:

Waxed paper

Synthetic paper

Palletized roll paper storage other than that stored on a single floor pallet or raised floor platform

34.10.2\* Building Construction

The protection outlined in Section 34.10 shall apply to buildings with or without fireproofing or other modes of steel protection, unless modified by the requirements of 34.5.2.2.

34.10.3 Storage Arrangement

The floor load design shall take into account the added weight of water that could be absorbed by the commodity during fire-fighting operations.

34.11 Storage of Idle Pallets

34.11.1\* General

Idle pallets shall be stored outside or in a separate building designated for pallet storage, unless permitted by 34.11.2.

34.11.2 Indoor Storage

Idle pallets shall be permitted to be stored in a building used for other storage or other purpose if the building is sprinklered in accordance with Section 13.3.

34.11.3\* Outdoor Storage

34.11.3.1

The storage of wood and wood composite pallets or listed pallets equivalent to wood at pallet manufacturing and pallet recycling facility sites shall comply with 34.11.4.

34.11.3.2

Idle pallets stored outside shall be stored in accordance with Table 34.11.3.2(a) and Table 34.11.3.2(b).

Table 34.11.3.2(a) Required Clearance Between Outside Idle Pallet Storage and Other Yard Storage

Pile Size Minimum Distance

ft m

Under 50 pallets 20 6

50-200 pallets 30 9

Over 200 pallets 50 15

Table 34.11.3.2(b) Required Clearance Between Outside Idle Pallet Storage and Building

Wall Construction Minimum Distance of Wall from Storage

Under 50 Pallets 50 to 200 Pallets Over 200 Pallets

ft m ft m ft m

Masonry with no openings 0 0 0 0 15 4.6

Masonry with wired glass in openings, outside sprinklers, and 1-hour doors

0 0 10 3 20 6

Masonry with wired or plain glass, outside sprinklers, and 3/4-hour doors

10 3 20 6 30 9

Wood or metal with outside sprinklers 10 3 20 6 30 9

Wood, metal, or other 20 6 30 9 50 15

34.11.3.3

Idle pallet stacks shall not exceed 15 ft (4.6 m) in height nor shall cover an area of greater than 400 ft2 (37 m2). Pallet stacks shall be arranged to form stable piles. A distance of not less than 8 ft (2.4 m) shall separate stacks. Piles shall be no closer than 8 ft (2.4 m) to any property line.

34.11.4 Outside Storage at Pallet Manufacturing and Pallet Recycling Facilities

34.11.4.1\*

The outside storage of wood and wood composite pallets or listed pallets equivalent to wood on the same site as a pallet manufacturing or pallet recycling facility shall comply with 34.11.4.

34.11.4.2

Each site shall maintain a current site plan. The site plan shall be submitted to the authority having jurisdiction for review and approval and shall include all of the following:

Lot lines

Utilities

Size, location, and type of construction of the buildings on the property

Presence of fire protection systems

Water supply sources for fire-fighting purposes

Locations of hazardous material storage areas

Location of pallet storage

Equipment protected with a dust collection system

Fire department access routes

Designated smoking areas

Locations of fire alarm control panels

34.11.4.3

The owner or designated representative shall submit a fire prevention plan for review and approval by the authority having jurisdiction that includes all of the following:

Frequency of walk-through inspections to verify compliance with the approved fire prevention plan

Hot work permit process in accordance with Chapter 41

Preventive maintenance program for equipment associated with the pallet activities

Inspection, testing, and maintenance of fire protection systems in accordance with Chapter 13

Frequency of walk-through inspections to verify pallet stack height, area, and setbacks are in compliance with 34.11.4

34.11.4.4

The owner or designated representative shall prepare and train employees in an approved emergency action plan in accordance with Section 10.8.

34.11.4.5

The owner or designated representative shall prepare a security management plan based on a security risk assessment and shall make the plan and assessment available to the AHJ upon request.

34.11.4.6

Unless permitted by 34.11.4.11, stacks of pallets shall not be stored within 0.75 times the stack height or 8 ft (2.4 m), whichever is greater, of any property line.

34.11.4.7

Unless permitted by 34.11.4.11, stacks of pallets shall not be stored within 0.75 times the stack height of any important building on site.

34.11.4.8

Pallet stacks shall not exceed 20 ft (6 m) in height.

34.11.4.9\*

The size of pallet arrays shall comply with one of the following:

Where the access to the pallet array is less than 20 ft (6 m) in width but at least 8 ft (2.4 m) in width, the nearest edge of any individual pallet stack shall be no more than 30 ft (9 m) from the access.

Where the access to the pallet array is by a fire department access route complying with Section 18.2, the nearest edge of any individual pallet stack shall be no more than 50 ft (15 m) from the access.

The individual pallet stack depth from access within pallet arrays at existing facilities that exceed 34.11.4.9(1) or 34.11.4.9(2) shall be as approved by the AHJ.

34.11.4.10\*

Fire flow requirements for the site shall be determined by the AHJ.

34.11.4.11

Portable fire extinguishers shall be selected, installed, and maintained in accordance with Section 13.6.

34.11.4.12

The AHJ shall be permitted to allow pallet stacks closer to a property line or structure on site where additional fire protection is provided, including, but not limited to, the following:

The storage yard areas and materials-handling equipment selection, design, and arrangement are based upon an risk assessment.

Automatic fire detection transmits an alarm signal to a supervising station in accordance with NFPA 72.

Fire apparatus access roads are provided around all storage areas.