

Store your idle pallets according to NFPA standards



Many businesses that store and ship goods or supplies use pallets at their facilities. These pallets are often stored when not in use, but stockpiling them could present a fire hazard. That's because wood pallets often dry out, and their edges become frayed and splintered.

When stacked wood pallets become dry, even a small ignition source can spark a quickly spreading fire that may cause a devastating loss. However, you can help reduce this risk by strictly limiting the number of pallets you store indoors, or by employing a sprinkler system when it's called for. There's also the option of moving idle pallets outside and away from your building.



The NFPA is the recognized authority on how to prevent fires involving idle wood and plastic pallets.

The National Fire Protection Association (NFPA) is a recognized authority on how to help prevent fires involving idle wood and plastic pallets, and Nationwide® encourages you to familiarize yourself with NFPA guidelines. The tables featured in this brochure are reprinted with permission from NFPA 13-2016, Standard for the Installation of Sprinkler Systems, Copyright © 2015, and NFPA 1-2018, Fire Code, Copyright © 2017, National Fire Protection Association, Quincy, MA. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standards in their entirety which can be obtained through [NFPA](https://www.nfpa.org).

General storage tips

The NFPA Fire Code states that pallet storage arrangements should be either outside, in a detached structure, or in a properly sprinklered facility.

There are exceptions to the sprinklering requirement, however, as detailed on Page 2, in the section titled "When storing wood pallets indoors."

In general, the NFPA advises that you:

- Store idle pallets flat, arranged in stable piles and in an orderly fashion
- Immediately remove and scrap any pallets found to be damaged
- Choose an area for pallet storage that's separate from other storage areas
- Locate pallet storage away from compressed gas cylinder or propane tank storage
- Store pallets away from your building's structural supports
- Never allow piles of pallets to block a means of egress

When storing wood pallets indoors

According to the NFPA Fire Protection Handbook (16-85 and 16-86), it's not essential that a facility be sprinklered if indoor wood pallet quantities are very limited and all the following criteria are met:

- Pallets are made of wood and not plastic
- Stacks are no higher than six feet
- Pile groups don't exceed four stacks
- Piles are separated from other pallet piles by at least eight feet of clear space or 25 feet of commodity

If you're storing a significant number of pallets indoors – whether temporary or long-term – and these criteria can't be met, you need to equip your facility with a properly designed sprinkler system.



Wood pallets often dry out, and their edges become frayed and splintered.

The undersides of wood slats or planks, shielded from the discharge of automatic sprinklers, can make controlling or extinguishing a fire difficult. For that reason, you should contact a qualified fire sprinkler contractor to determine the system design, which will depend on variables such as pallet stack height, building ceiling height and water flow capacities.

You should store pallets on racks only if the racks are open and protected with an Early Suppression Fast Response (ESFR) sprinkler system, in accordance with NFPA standards.

There should be no shelving or other materials covering the pallets that would prevent adequate sprinkler protection.

NFPA guidance for safe indoor wood pallet storage

Refer to the tables below and at the top of Page 3 from NFPA 13-2016, *Standard for the Installation of Sprinkler Systems*, to see how the storage of wood pallets can impact sprinkler system design.

Table 12.12.1.2(a) Control Mode Density/Area (CMDA) Sprinkler Protection for Indoor Storage of Idle Wood Pallets

Type of sprinkler	Location of storage	Nominal k-factor	Maximum storage height (ft)	Maximum ceiling/roof height (ft)	Sprinkler density		Areas of operation (feet ²)
					gpm/ft ²	mm/min	
Control mode density/area	On floor	8 (115) or larger	Up to 6	20	0.20	8.1	3000*
	On floor	11.2 (160) or larger	Up to 8	30	0.45	18.3	2500
	On floor or rack without solid shelves	11.2 (160) or larger	8 to 12	30	0.6	24.4	3500
			12 to 20	30	0.6	24.4	4500
On floor	16.8 (240) or larger	Up to 20	30	0.6	24.4	2000	

*The area of sprinkler operation should be permitted to be reduced to 2000 ft² when sprinklers having a nominal K-factor of 11.2 or larger are used or if high temperature-rated sprinklers with a nominal K-factor of 8.0 are used.

Table 12.12.1.2(b) Control Mode Special Applications (CMSA) Sprinkler Protection for Indoor Storage of Idle Wood Pallets

Storage arrangement	Maximum storage height (feet)	Maximum ceiling/roof height (feet)	K-factor/ orientation	Type of system	Number of design sprinklers	Minimum operating pressure		
						psi	bar	
On floor	20	30	11.2 (160) Upright	Wet	15	25	1.7	
			11.2 (160) Upright	Dry	25	25	1.7	
			16.8 (240) Upright	Wet	15	15	1.0	
			16.8 (240) Upright	Dry	25	15	1.0	
		35	19.6 (280) Pendent	Wet	15	16	1.1	
			19.6 (280) Pendent	Wet	15	25	1.7	
			40	19.6 (280) Pendent	Wet	15	30	2.1
				19.6 (280) Pendent	Wet	15	30	2.1

Table 12.12.1.2(c) ESFR Sprinkler Protection for Indoor Storage of Idle Wood Pallets

Type of sprinkler (orientation)	Location of storage	Nominal k-factor	Maximum storage height (feet)	Maximum ceiling/roof height (feet)	Minimum operating pressure	
					psi	bar
ESFR (pendent)	On floor or rack without solid shelves	14.0 (200)	25	30	50	3.4
			25	32	60	4.1
		16.8 (240)	25	30	35	2.4
			25	32	42	2.9
			35	40	52	3.6
		22.4 (320)	25	30	25	1.7
			30	35	35	2.4
			35	40	40	2.7
			25	30	15	1.0
		25.2 (360)	30	35	20	1.4
35	40		25	1.7		
ESFR (upright)	On floor		14.0 (200)	20	30	50
		20		35	75	5.2
		16.8 (240)	20	30	35	2.4
			20	35	52	3.6

Designating an outdoor pallet storage area

When designating an outside storage area for your pallets, make sure the location is protected from unauthorized access and that it's clean and well-maintained. Idle pallet stacks should not exceed 15 feet in height or cover an area greater than 400 square feet. A minimum distance of 8 feet should be maintained between separate stacks of wood pallets, and stacks should be no closer than 8 feet to any property line.

NFPA guidance for safe outdoor pallet storage

Refer to the tables below and at the top of p. 4 from NFPA 1-2018, *Fire Code*, to understand the required clearances for stacking pallets in their outdoor storage area.

Table 34.10.3.2(a) Required Clearance Between Outside Idle Pallet Storage and Other Yard Storage

Pile Size	Under 50 pallets	50 - 200 pallets	Over 200 pallets
Minimum Distance (Feet)	20	30	50

Table 34.10.3.2(b) Required Clearance Between Outside Idle Pallet Storage and Building

Wall Construction	Minimum Distance of Wall from Storage		
	Under 50 Pallets (Feet)	50 to 200 Pallets (Feet)	Over 200 Pallets (Feet)
Masonry with no openings	0	0	15
Masonry with wired glass in openings, outside sprinklers, and 1-hour doors	0	10	20
Masonry with wired or plain glass, outside sprinklers, and ¾-hour doors	10	20	30
Wood or metal with outside sprinklers	10	20	30
Wood, metal, or other	20	30	50

Plastic pallets may be a greater hazard

Plastic pallets, other than non-expanded polyethylene solid deck pallets, can present an even greater fire hazard than the wood variety. For this reason, plastic pallets stored inside a sprinkled facility should not be stacked higher than four to a pile. Each pallet pile should be separated from other pallet piles by at least eight feet of clear space or 25 feet of commodity.

There's also the option of constructing a specialized storage room within your facility that's sprinklered and has three-hour-rated firewalls. This specialized room, or cutoff room, should be installed by a fire equipment professional to NFPA design specifications.

Some basic requirements for installing a cutoff room include:

- Pallets in the room stacked no higher than 12 feet
- Steel columns protected by a one-hour, fire-rated covering
- Walls with a three-hour fire resistance rating
- Rack storage protected by an ESFR sprinkler system
- Pallets stored outside the room limited to 10 feet high and protected by an automatic sprinkler system



NFPA guidance for safe indoor plastic pallet storage

To see how indoor plastic pallet storage can impact sprinkler system design, refer to p. 153 of NFPA 13-2016, where you'll find a table like the one for indoor wooden pallet storage that appears on Page 3 of this brochure.



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