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22.1 General.

The criteria in Chapter 20 shall apply to storage protected with CMSA sprinklers.

22.1.1

Quick-response CMSA sprinklers designed to meet any criteria in Chapter 20 through Chapter 25 shall be permitted to protect any of the following:

- (1) Light hazard occupancies
- (2) Ordinary hazard occupancies

22.1.2

Standard-response CMSA sprinklers designed to meet any criteria in Chapter 20 through Chapter 25 shall be permitted to protect ordinary hazard occupancies.

22.1.3

When using CMSA, the design area shall meet the requirements of 28.2.4.3.1.

22.1.4

Protection shall be provided as specified in this chapter or appropriate NFPA standards in terms of minimum operating pressure and the number of sprinklers to be included in the design area.

22.1.5 Open Wood Joist Construction.

22.1.5.1

Where CMSA sprinklers are installed under open wood joist construction, one of the following shall be provided:

- (1) A minimum pressure of 50 psi (3.4 bar) for K-11.2 (160) sprinklers
- (2) A minimum pressure of 22 psi (1.5 bar) for K-16.8 (240) sprinklers
- (3) The pressure from Table 22.4 for K-19.6 (280) or larger sprinkler.
- (4) The pressure from Table 22.4 for K-11.2 (160) or K-16.8 (240) where each joist channel is fully separated with material equal to the joist material to its full depth at intervals not exceeding 20 ft (6.1 m).

22.1.5.2 Preaction Systems.

22.1.5.2.1

For the purpose of using Table 22.2, preaction systems shall be classified as dry pipe systems.

22 1 5 3

Building steel shall not require special protection where Table 22.2 are applied as appropriate for the storage configuration.

22.1.5.4 * Storage Conditions.

The design of the sprinkler system shall be based on those conditions that routinely or periodically exist in a building and create the greatest water demand, which include the following:

- (1) Pile height
- (2) Clearance to ceiling
- (3) Pile stability
- (4) Array

22.1.6 *

The ceiling design criteria for single-, double-, and multiple-row racks in Chapter 22 shall be based on open rack configurations as defined in 3.3.154.

22.1.7

Protection criteria for Group A plastics shall be permitted for the protection of the same storage height and configuration of Class I, II, and IV commodities.

22.2 Palletized and Solid-Piled Storage of Class I Through Class IV Commodities.

Protection of palletized and solid-piled storage of Class I through Class IV commodities shall be in accordance with Table 22.2.

Table 22.2 CMSA Sprinkler Design Criteria for Palletized and Solid-Piled Storage of Class I Through Class IV Commodities (Encapsulated and Nonencapsulated)

	Commodity	Sto	cimum orage eight	Ceili	ximum ng/Roof eight	K-Factor/	Type of	Number of Design	Oper	mum rating ssure
Configuration	Class	ft	m	ft	m	Orientation	System	Sprinklers	psi	bar
Palletized	Class I or II					11.2 (160)	Wet	15	25	1.7
						Upright	Dry	25	25	1.7
						16.8 (240)	Wet	15	10	0.7
				30	9.1	Upright	Dry	25	15	1.0
						19.6 (280) Pendent	Wet	15	16	1.1
		25	7.6			25.2 (360) Pendent	Wet	15	10	0.7
						11.2 (160)	Wet	15	25	1.7
				35	10.7	Upright	Dry	25	25	1.7
				33	10.7	16.8 (240)	Wet	15	15	1.0
						Upright	Dry	25	15	1.0
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		30	0.4	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
			9.1	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
					40.0	19.6 (280) Pendent	Wet	15	30	2.1
		35	10.7	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6

	Commodity	Sto	kimum orage eight	Ceili	kimum ng/Roof eight	K-Factor/	Type of	Number of Design	Oper	mum ating ssure
Configuration	•	ft	m	ft	m	Orientation	System	Sprinklers	psi	bar
	Class III					11.2 (160)	Wet	15	25	1.7
						Upright	Dry	25	25	1.7
						16.8 (240)	Wet	15	15	1.0
				30	9.1	Upright	Dry	25	15	1.0
						19.6 (280) Pendent	Wet	15	16	1.1
		25	7.6			25.2 (360) Pendent	Wet	15	10	0.7
						11.2 (160)	Wet	15	25	1.7
				35	10.7	Upright	Dry	25	25	1.7
				33	10.7	16.8 (240)	Wet	15	15	1.0
	_					Upright	Dry	25	15	1.0
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
				35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
		30	9.1	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
				40	12.2	19.6 (280) Pendent	Wet	15	30	2.1
		35	10.7	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
	Class IV					11.2 (160)		20	25	1.7
						Upright	Wet	15	50	3.4
						16.8 (240)	Wet	20	15	1.0
				30	9.1	Upright		15	22	1.5
		20	6.1			19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
	25			40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
					16.8 (240) Upright	Wet	15	22	1.5	
		7.0	30	9.1	19.6 (280) Pendent	Wet	15	16	1.1	
		25 7.6		_	25.2 (360) Pendent	Wet	15	10	0.7	
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6

	Commodity	Sto	cimum orage eight	Ceili	kimum ng/Roof eight	K-Factor/	Type of	Number of Design	Ope	mum rating ssure
Configuration	•	ft	m	ft	m	Orientation	System	Sprinklers	psi	bar
		30	9.1	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
		30	9.1	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		25	10.7	40	12.2	19.6 (280) Pendent	Wet	15	30	2.1
		35	10.7	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
Solid piled	Class I or II					11.2 (160)	Wet	15	25	1.7
						Upright	Dry	25	25	1.7
			16.8 (240) Wet	Wet	15	10	0.7			
	20			30 9.1 Upright Dry	Dry	25	15	1.0		
		20	6.1			19.6 (280) Pendent	Wet	15	16	1.1
				25.2 (360) Wet Pendent	15	10	0.7			
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
						16.8 (240) Upright	Wet	15	10	0.7
		0.5	7.0	30	9.1	19.6 (280) Pendent	Wet	15	16	1.1
		25	7.6			25.2 (360) Pendent	Wet	15	10	0.7
		30		40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
			0.1	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
	30	9.1	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6	
		25	10.7	40	10.0	19.6 (280) Pendent	Wet	15	30	2.1
	35	10.7	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6	

	Commodity	Sto	cimum orage eight	Ceili	kimum ng/Roof eight	K-Factor/	Type of	Number of	Ope	mum rating ssure
Configuration	_	ft	m	ft	m	Orientation	System	Sprinklers	psi	bar
	Class III					11.2 (160)	Wet	15	25	1.7
						Upright	Dry	Design Sprinklers 15 25 15 25 15 15 15 15 15 15 15 15 15 15 15 15 15	25	1.7
						16.8 (240)	Wet	15	15	1.0
				30	9.1	Upright	Dry	25	15	1.0
		20	6.1			19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
						16.8 (240) Upright	Wet	15	22	1.5
		25	7.6	30	9.1	19.6 (280) Pendent	Wet	15	16	1.1
		25	7.0			25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		00	0.4	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
		30	9.1	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		25	40.7	40	40.0	19.6 (280) Pendent	Wet	15	30	2.1
		35	10.7	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
	Class IV					11.2 (160) Upright	Wet	15	50	3.4
				30	9.1	16.8 (240) Upright	Wet	15	22	1.5
		20	6.1	30	9.1	19.6 (280) Pendent	Wet	15	16	1.1
		25				25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
						16.8 (240) Upright	Wet	15	22	1.5
				30	9.1	19.6 (280) Pendent	Wet	15	16	1.1
			7.6		-	25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6

	Commodity	Sto	imum orage eight	Ceili	ximum ng/Roof eight	. K-Factor/	Type of	Number of Design	Minimum Operating Pressure	
Configuration	Class	ft	m	ft	m	Orientation	System	Sprinklers	psi	bar
		20	0.1	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
		30	9.1	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		35	10.7	40		19.6 (280) Pendent	Wet	15	30	2.1
	35	10.7	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6	

22.3 Palletized and Solid-Piled Storage of Nonexpanded and Expanded Group A Plastic Commodities.

Protection of palletized and solid-piled storage of nonexpanded and expanded Group A plastic commodities shall be in accordance with Table 22.3.

Table 22.3 CMSA Sprinkler Design Criteria for Palletized and Solid-Piled Storage of Group A Plastic Commodities

Storage	Commodity	Sto	imum orage eight	Ceili	kimum ng/Roof eight	K-	Type of	Number of Design	Oper	mum rating ssure
Arrangement		ft	m	ft	m	Factor/Orientation	System	_	psi	bar
						11.2 (160) Upright	Wet	25	25	1.7
				30	9.1	16.8 (240) Upright	Wet	15	22	1.5
		20	6.1	30	9.1	19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
	Cartoned				9.1	16.8 (240) Upright	Wet	15	22	1.5
Palletized	nonexpanded	25	7.6	30		19.6 (280) Pendent	Wet	15	16	1.1
	plastics	23	7.0			25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		30	9.1	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
			9.1	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
			35 10.7	40	12.2	19.6 (280) Pendent	Wet	15	30	2.1
		33		40	12.2	25.2 (360) Pendent	Wet	15	23	1.6

Storage	Commodity	Sto	imum orage eight	Ceili	kimum ng/Roof eight	K-	Type of	Number of Design	Oper	mum rating ssure
Arrangement	•	ft	m	ft	m	Factor/Orientation	System	Sprinklers	psi	bar
						11.2 (160) Upright	Wet	15	50	3.4
				30	9.1	16.8 (240) Upright	Wet	15	22	1.5
		20	6.1	30	9.1	19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
	Cartoned					16.8 (240) Upright	Wet	15	22	1.5
Solid piled	nonexpanded	25	7.6	30	9.1	19.6 (280) Pendent	Wet	15	16	1.1
	plastics	23	7.0			25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		30	9.1	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
		30	9.1	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		35	10.7	40	12.2	19.6 (280) Pendent	Wet	15	30	2.1
		33	10.7	40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
	Exposed	20	6.1	30	9.1	11.2 (160) Upright	Wet	25	25	1.7
	nonexpanded	20	0.1	30	9.1	16.8 (240) Upright	Wet	15	22	1.5
Palletized	plastics	25	7.6	30	9.1	16.8 (240) Upright	Wet	15	22	1.5
i alletizeu	Cartoned or exposed	18	5.5	26	7.9	11.2 (160) Upright	Wet	15	50	3.4
	expanded plastics	10	J.Ü		7.8	16.8 (240) Upright	Wet	15	22	1.5
Solid piled	Cartoned or exposed	20	6.1	30	9.1	11.2 (160) Upright	Wet	15	50	3.4
Joliu pileu	nonexpanded plastics	25	7.6	30	9.1	16.8 (240) Upright	Wet	15	22	1.5

22.4 Single-, Double-, and Multiple-Row Rack Storage for Class I Through Class IV Commodities.

Protection of single-, double-, and multiple-row rack storage for Class I through Class IV commodities shall be in accordance with Table 22.4.

Table 22.4 CMSA Sprinkler Design Criteria for Rack Storage of Class I Through Class IV Commodities (Encapsulated and Nonencapsulated)

Storage	Commodity	Sto	imum orage eight	Ceili	kimum ng/Roof eight	K-	Type of	Number of Design	•	mum ating ssure
Arrangement	•	ft	m	ft	m	Factor/Orientation	, , .	_	psi	bar

Storage	Commodity	Sto	kimum orage eight	Ceili	ng/Roof		Type of	Number of Design	Oper	mum rating ssure
Arrangement	_	ft	m	ft	m	Factor/Orientation		_	psi	bar
Single, double,						11.2 (160) Upright	Wet	15	25	1.7
and multiple-row racks				Ceiling/Roof Height K- Type of System System Factor/Orientation Wet 15	25	25	1.7			
					0.1	16.8 (240) Upright	Wet	15	10	0.7
		20	6.1		0.1	10.0 (240) Oplight	Dry	25	15	1.0
						19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
						11 2 (160) Upright	Wet	20	25	1.7
						11.2 (100) Oprigit	Dry	30	25	1.7
				30	9.1	16.8 (240) Upright	Wet	15	10	0.7
		25	7.6	30	3.1	10.0 (240) Opright	Dry	30	15	1.0
						19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
		30		40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
	Class I or II	30	9.1	35	10.7		Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
						11.2 (160) Upright	Dry	In-rack sprinkler option available. See Chapter 25.	NA	NA
							Dry*	36	55	3.8
							Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
					16.8 (240) Upright	·	In-rack sprinkler option available. See Chapter 25.	NA	NA	
							36	22	1.5	
								15	25	1.7
								36	55	3.8
		35	10.7	40	12.2			36	22	1.5
								15	30	2.1
						25.2 (360) Pendent	Wet	15	23	1.6

Storage	Commodity	Sto	imum orage eight	Ceilir	kimum ng/Roof eight	K-	Type of	Number of Design	Oper	mum ating ssure
Arrangement		ft	m	ft	m	Factor/Orientation	, , .	Sprinklers	psi	bar
	Class III				11.2 (160) Upright	Wet	15	25	1.7	
						11.2 (160) Oprignt	Dry	25	25	1.7
				30	9.1	16.8 (240) Upright Wet	15	15	1.0	
		20 6.	6.1	30	9.1	10.8 (240) Oprignt	Dry	25	15	1.0
						19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6

Storage	Commodity	Sto	imum orage eight	Ceili	kimum ng/Roof eight	K-	Type of	Number of Design	Oper	mum rating ssure
Arrangement	_	ft	m	ft	m	Factor/Orientation		Sprinklers	psi	bar
						11.2 (160) Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
				30	9.1	11.2 (100) Oprignt	Dry	In-rack sprinklers required. See Chapter 25.	NA	NA
							Wet	15	22	1.5
						16.8 (240) Upright	Dry	In-rack sprinklers required. See Chapter 25.	NA	NA
						19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
		25	7.6			44.2 (460) Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
						11.2 (160) Upright	Dry	In-rack sprinklers required. See Chapter 25.	NA	NA
				35	10.7	40.0 (040) 11 14	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
						16.8 (240) Upright	Dry	In-rack sprinklers required. See Chapter 25.	NA	NA
						19.6 (280) Pendent	Wet	15	25	1.7
				40	10.0	19.6 (280) Pendent	Wet	15	30	2.1
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		30	9.1	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
		35	10.7	40	12.2	19.6 (280) Pendent	Wet	15	30	2.1
						25.2 (360) Pendent	Wet	15	23	1.6

Storage	Commodity	Sto	kimum orage eight	Ceilir	kimum ng/Roof eight	К-	Type of	Number of Design	Oper	mum ating sure
Arrangement	_	ft	m	ft	m	Factor/Orientation	System	_	psi	bar
						11.2 (160) Upright	Wet	15	50	3.4
				25	7.6	16.8 (240) Upright	Wet	15	22	1.5
						19.6 (280) Pendent	Wet	15	16	1.1
						11 2 (160) Upright	Wet	20	50	3.4
		20	6.1			11.2 (160) Upright	vvet	15	75	5.2
				30	9.1	16.8 (240) Upright	Wet	15	22	1.5
						19.6 (280) Pendent	Wet	15	16	1.1
						25.2 (360) Pendent	Wet	15	10	0.7
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
				30	9.1	11.2 (160) Upright	In-rack sprinklers required. See Chapter 25.	NA	NA	
						16.8 (240) Upright	Wet Wet	15	22	1.5
						19.6 (280) Pendent		15	16	1.1
						25.2 (360) Pendent		15	10	0.7
	Class IV	as IV				44.0 (400) Herinkt		In-rack sprinklers required. See Chapter 25.	NA	NA
			7.6		10.7	11.2 (160) Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
				35		10.7	16.9 (240) Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA
						16.8 (240) Upright	vvet	In-rack sprinklers required. See Chapter 25.	NA	NA
					19.6 (280) Pendent	Wet	15	25	1.7	
			40	40.0	19.6 (280) Pendent	Wet	15	30	2.1	
				40	12.2	25.2 (360) Pendent	Wet	15	23	1.6
		30	9.1	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
		35	10.7	40	12.2	19.6 (280) Pendent	Wet	15	30	2.1
						25.2 (360) Pendent	Wet	15	23	1.6

NA: Not applicable.

*High temperature-rated sprinklers are used. Dry system water delivery is required in accordance with 8.2.4 with a maximum time of water delivery of 30 seconds with four sprinklers initially open.

22.5 Rack Storage of Group A Plastic Commodities.

Protection of single-, double-, and multiple-row rack storage for nonexpanded Group A plastic commodities shall be in accordance with Table 22.5.

Table 22.5 CMSA Sprinkler Design Criteria for Rack Storage of Group A Plastic Commodities Stored Up to and Including 35 ft (10.7 m) in Height

Storage	Commodity	Sto	imum orage eight	Ceili	ximum ng/Roof eight	K-Factor/	Type of	Number of Design	Minimum Operating Pressure	
Arrangement	Class	ft	m	ft	m	Orientation	J .	Sprinklers	psi	bar

Storage	Commodity Class	Maximum Storage Height		Maximum Ceiling/Roof Height		K-Factor/	Type of	Number of Design	Minimum Operating Pressure	
Arrangement		ft	m	ft	m	Orientation	System	Sprinklers	psi	bar
						11.2 (160) Upright	Wet	15	50	3.4
Single-, double-, and multiple-row racks				25	7.6	16.8 (240) Upright	Wet	15	22	1.5
			0.4			19.6 (280) Pendent	Wet	15	16	1.1
		20	6.1			11.2 (160)	Wet	30	50	3.4
						Upright	Wet	20	75	5.2
				30	9.1	16.8 (240) Upright	Wet	15*	22	1.5
						19.6 (280) Pendent	Wet	15	16	1.1
	Cartoned nonexpanded plastics	25	7.6	30		11.2 (160) Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
					9.1	16.8 (240) Upright) Wet 15*	22	1.5	
						19.6 (280) Pendent Wet 15	15	16	1.1	
						25.2 (360) Pendent	Wet	15	10	0.7
		25	7.6	35	10.7	11.2 (160) Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
							Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
						16.8 (240)	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
						Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
						19.6 (280) Pendent	Wet	15	25	1.7
		30	9.1	35	10.7	19.6 (280) Pendent	Wet	15	25	1.7
		35	10.6	40	40.0	19.6 (280) Pendent	Wet	15	30	2.1
					12.2	25.2 (360) Pendent	Wet	15	23	1.6

Storage	Commodity Class	Maximum Storage Height		Maximum Ceiling/Roof Height		K-Factor/	Type of	Number of Design	Minimum Operating Pressure	
Arrangement		ft	m	ft	m	Orientation	System	Sprinklers	psi	bar
		20	6.1	25	7.6	11.2 (160) Upright	Wet	15	50	3.4
		20				16.8 (240) Upright	Wet	15	22	1.5
			6.1		9.1	11.2 (160)	Wet	30	50	3.4
		20		30		Upright	Wet	20	75	5.2
				30		16.8 (240) Upright	Wet	15*	22	1.5
		25	7.6	30	9.1	11.2 (160) Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
	Exposed					16.8 (240) Upright	Wet	15*	22	1.5
	nonexpanded plastics				10.7	11.2 (160) Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
		25	7.6	0.5			Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
				35		16.8 (240)	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA
						Upright	Wet	In-rack sprinklers required. See Chapter 25.	NA	NA

NA: Not applicable.

22.6 Rubber Tires.

Protection of rubber tires with CMSA sprinklers shall be in accordance with Table 22.6.

Table 22.6 Control Mode Specific Application (CMSA) Protection for Rubber Tires

	Sto	imum rage ight	Maximum Ceiling/Roof Height		K-	Type of	Number of	Operating	
Piling Method	ft	m	ft	m	Factor	System	Sprinklers	Pressure	
Rubber tire storage, on-side or on-tread, in palletized portable	25	7.6	32	9.8	11.2 (160)	Wet	15	75 psi (5.2 bar)	
racks, or open portable racks, or fixed racks without solid shelves	25	7.6	32	9.8	16.8 (240)	Wet	15	35 psi (2.4 bar)	

^{*}Limited to single- and double-row racks with minimum 8 ft (2.4 m) aisles.

22.7 Roll Paper Storage.

Protection of roll paper storage with CMSA sprinklers shall be in accordance with Table 22.7.

Table 22.7 Control Mode Specific Application (CMSA) Protection of Roll Paper Storage [Number of Sprin

		Max	imum				I	Heavyweigh	t		
Storage Building Height Height		ilding			Closed Array	Standa	ard Array	Ope	n Array	Closed Array	
ft	m	ft	m	Nominal K- Factor	Type of System	Banded or Unbanded	Banded	Unbanded	Banded	Unbanded	Banded or Unbanded
20	6.1	30	9.1	11.2 (160)	Wet	15 at 50(3.4)	15 at 50(3.4)	15 at 50(3.4)	15 at 50(3.4)	NA	15 at 50(3.4)
20	6.1	30	9.1	11.2 (160)	Dry	25 at 50(3.4)	25 at 50(3.4)	25 at 50(3.4)	NA	NA	25 at 50(3.4)
26	7.9	60	18.3	11.2 (160)	Wet	15 at 50(3.4)	15 at 50(3.4)	15 at 50(3.4)	15 at 50(3.4)	NA	NA
20	6.1	30	9.1	16.8 (240)	Wet	15 at 22(1.5)	15 at 22(1.5)	15 at 22(1.5)	15 at 22(1.5)	NA	15 at 22(1.5)
20	6.1	30	9.1	16.8 (240)	Dry	25 at 22(1.5)	25 at 22(1.5)	25 at 22(1.5)	NA	NA	25 at 22(1.5)
26	7.9	60	18.3	16.8 (240)	Wet	15 at 22(1.5)	15 at 22(1.5)	15 at 22(1.5)	15 at 22(1.5)	NA	NA

Note: Base design on 25 sprinklers at 75 psi (5.2 bar) for K-11.2 (160) sprinklers or 25 sprinklers at 35 psi (240) for K-16.8 (240) sprinklers when storage is in closed or standard array; other arrays not applicable (NA).