

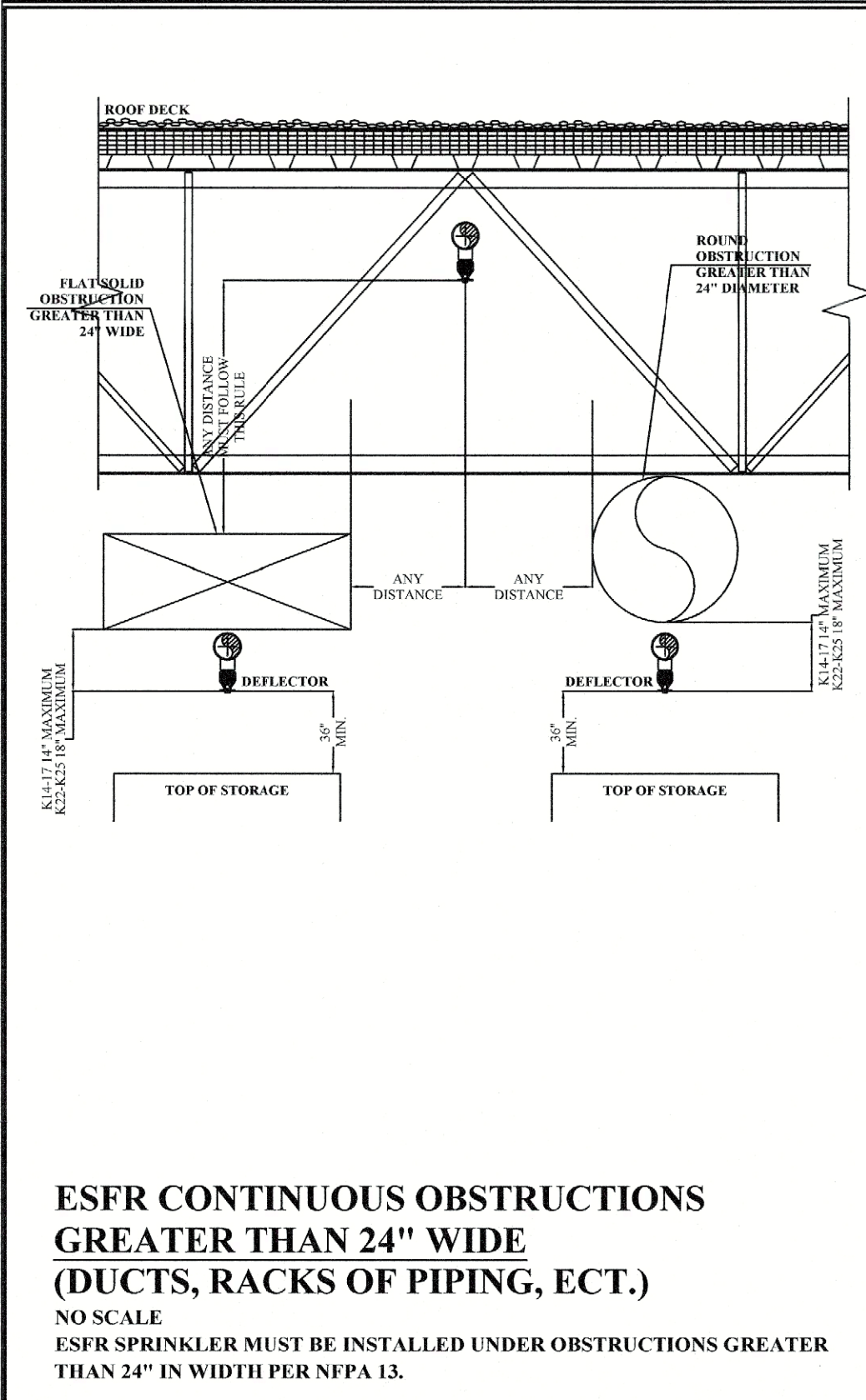
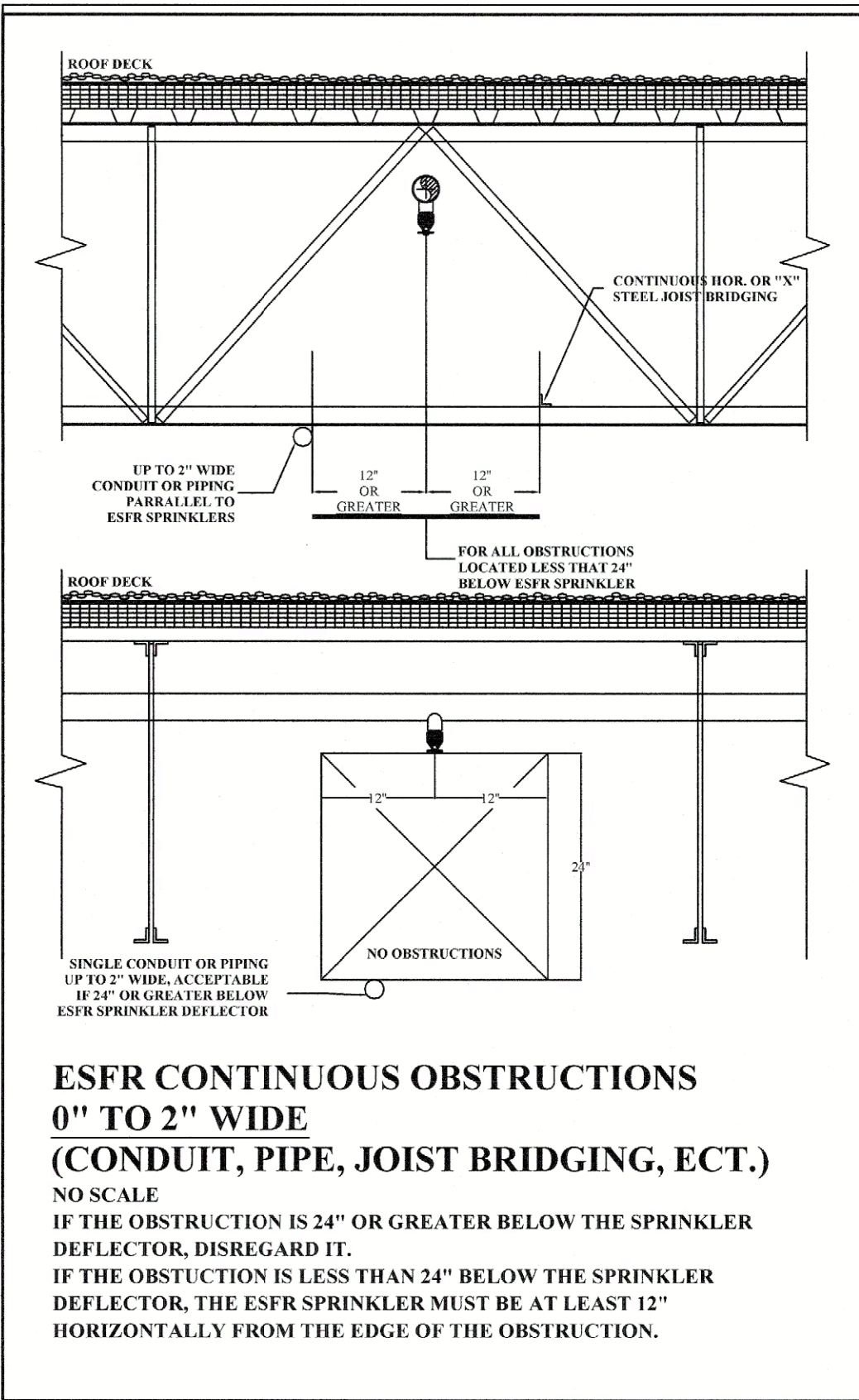


Table 8.12.5.1.1 Position of Sprinklers to Avoid Obstructions to Discharge (ESFR Sprinkler)

Distance from Sprinkler to Side of Obstruction (A)	Maximum Allowable Distance of Deflector above Bottom of Obstruction (in.) (B)
Less than 1 ft	0
1 ft to less than 1 ft 6 in.	1 1/2
1 ft 6 in. to less than 2 ft	3
2 ft to less than 2 ft 6 in.	5 1/2
2 ft 6 in. to less than 3 ft	8
3 ft to less than 3 ft 6 in.	10
3 ft 6 in. to less than 4 ft	12
4 ft to less than 4 ft 6 in.	15
4 ft 6 in. to less than 5 ft	18
5 ft to less than 5 ft 6 in.	22
5 ft 6 in. to less than 6 ft	26
6 ft	31

Figure 8.12.5.1.1 Positioning of sprinkler to avoid obstructions to discharge (ESFR Sprinkler).

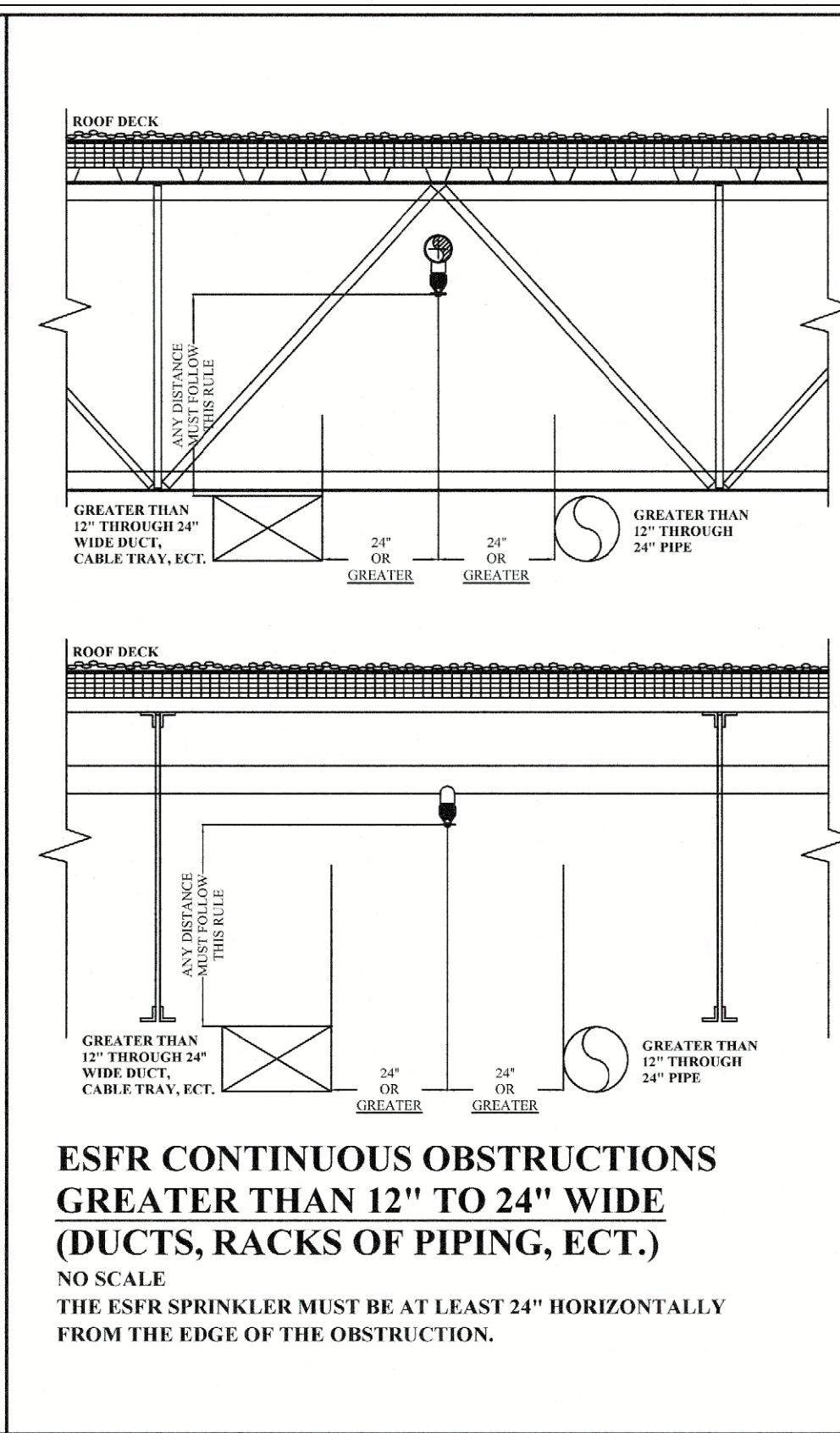


Table 16.6.3.1 ESFR Sprinkler Protection of Rack Storage of Class I Through Class IV Commodities Stored Over 25 ft (7.6 m) in Height

Storage Arrangement	Commodity	Maximum Storage Height ft	Maximum Storage Height m	Minimum Ceiling Height ft	Minimum Ceiling Height m	Minimum K-Factor	Orientation	Minimum Operating Pressure psi	Minimum Operating Pressure bar	In-Rack Sprinkler Requirements	Flow Screen Allowance gpm	Water Supply Pressure (feet)
Single, double, and multiple-row racks (no open-top containers)	Class I, II, III, or IV encapsulated or nonencapsulated commodities	35	10.7	10.7	3.3	14.0 (200)	Upright/pendent	75	5.2	No		
						16.8 (240)	Upright/pendent	52	3.6	No		
						22.4 (320)	Pendent	35	2.4	No		
						25.2 (360)	Pendent	30	1.4	No		
		39	9.1	12.2	3.7	16.8 (240)	Pendent	52	3.6	No		
						22.4 (320)	Pendent	40	2.8	No		
						25.2 (360)	Pendent	25	1.7	No		
						14.0 (200)	Pendent	90	6.2	Yes		
		45	13.7	13.7	4.2	16.8 (240)	Pendent	63	4.3	Yes		
						22.4 (320)	Pendent	40	2.8	No		
						25.2 (360)	Pendent	40	2.8	No		
						14.0 (200)	Pendent	90	6.2	Yes	300	916
		75	10.7	13.7	4.2	16.8 (240)	Pendent	52	3.6	No		
						22.4 (320)	Pendent	40	2.8	No		
						25.2 (360)	Pendent	25	1.7	No		
						14.0 (200)	Pendent	90	6.2	Yes		
		45	13.7	13.7	4.2	16.8 (240)	Pendent	63	4.3	Yes		
						22.4 (320)	Pendent	40	2.8	No		
						25.2 (360)	Pendent	40	2.8	No		
						14.0 (200)	Pendent	90	6.2	Yes		
		40	12	15.7	4.8	16.8 (240)	Pendent	63	4.3	Yes		
						22.4 (320)	Pendent	40	2.8	No		
						25.2 (360)	Pendent	40	2.8	No		
						14.0 (200)	Pendent	90	6.2	Yes		

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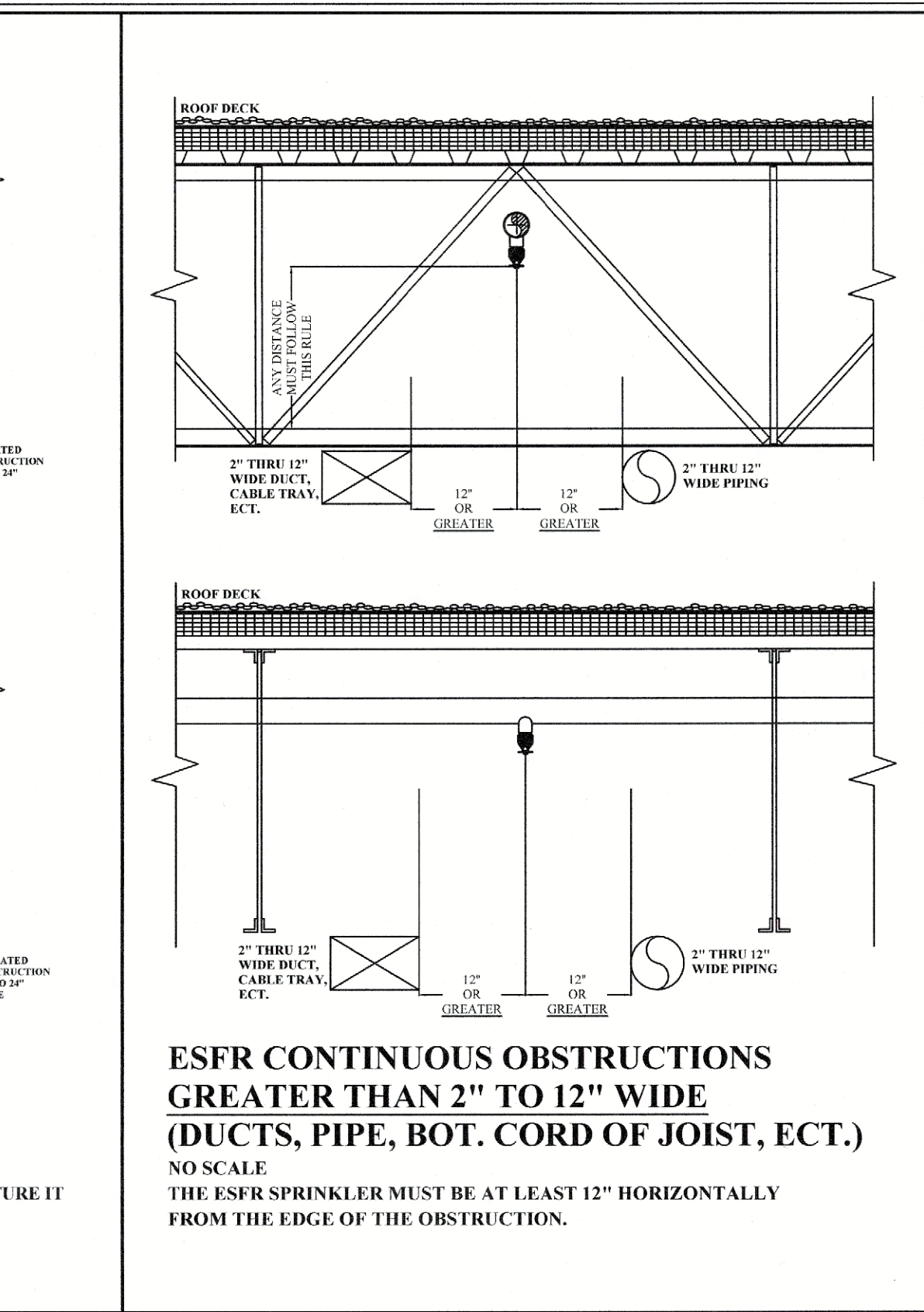
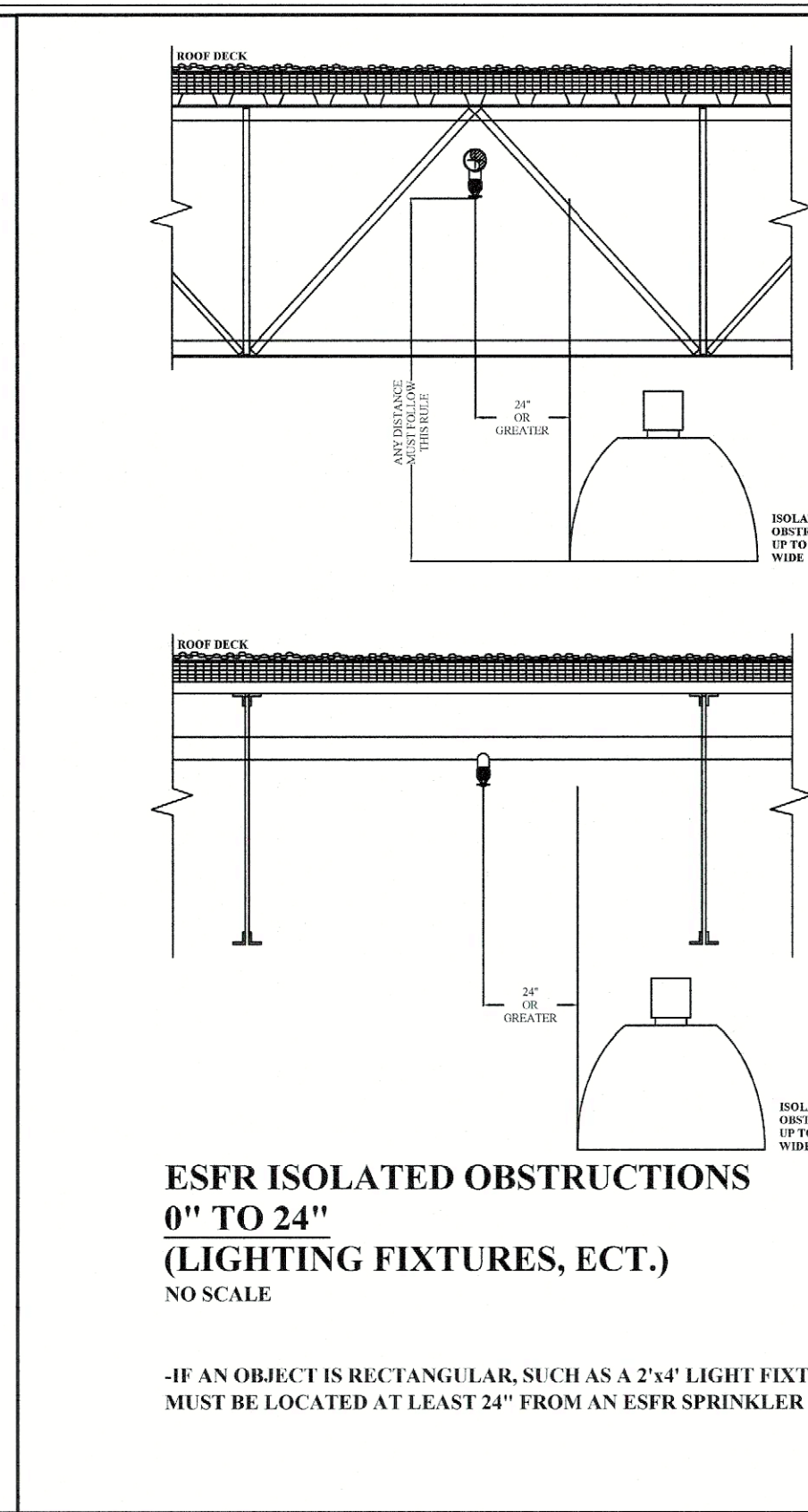


Table 17.3.3.1 ESFR Protection of Rack Storage of Group A Plastic Commodities Stored Over 25 ft (7.6 m) in Height

Storage Arrangement	Commodity	Maximum Storage Height		Maximum Ceiling/Roof Height		Nominal K-Factor	Orientation	Minimum Operating Pressure		In-Rack Sprinkler Requirements
		ft	m	ft	m			psi	bar	
Single, double, and multiple-row racks (no open-top containers)	Cartoned, unexpanded	30	9.1	40	12	14.0 (200)	Upright/pendent	75	5.2	No
						16.8 (240)	Upright/pendent	52	3.6	No
						22.4 (320)	Pendent	35	2.4	No
						25.2 (360)	Pendent	20	1.4	No
		45	13.7	45	14	16.8 (240)	Pendent	52	3.6	No
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	25	1.7	No
						14.0 (200)	Pendent	90	6.2	Yes
		35	11	45	14	16.8 (240)	Pendent	63	4.3	Yes
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	25	1.7	No
						14.0 (200)	Pendent	90	6.2	Yes
		40	12	45	14	16.8 (240)	Pendent	63	4.3	Yes
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	40	2.7	No
						14.0 (200)	Pendent	90	6.2	Yes

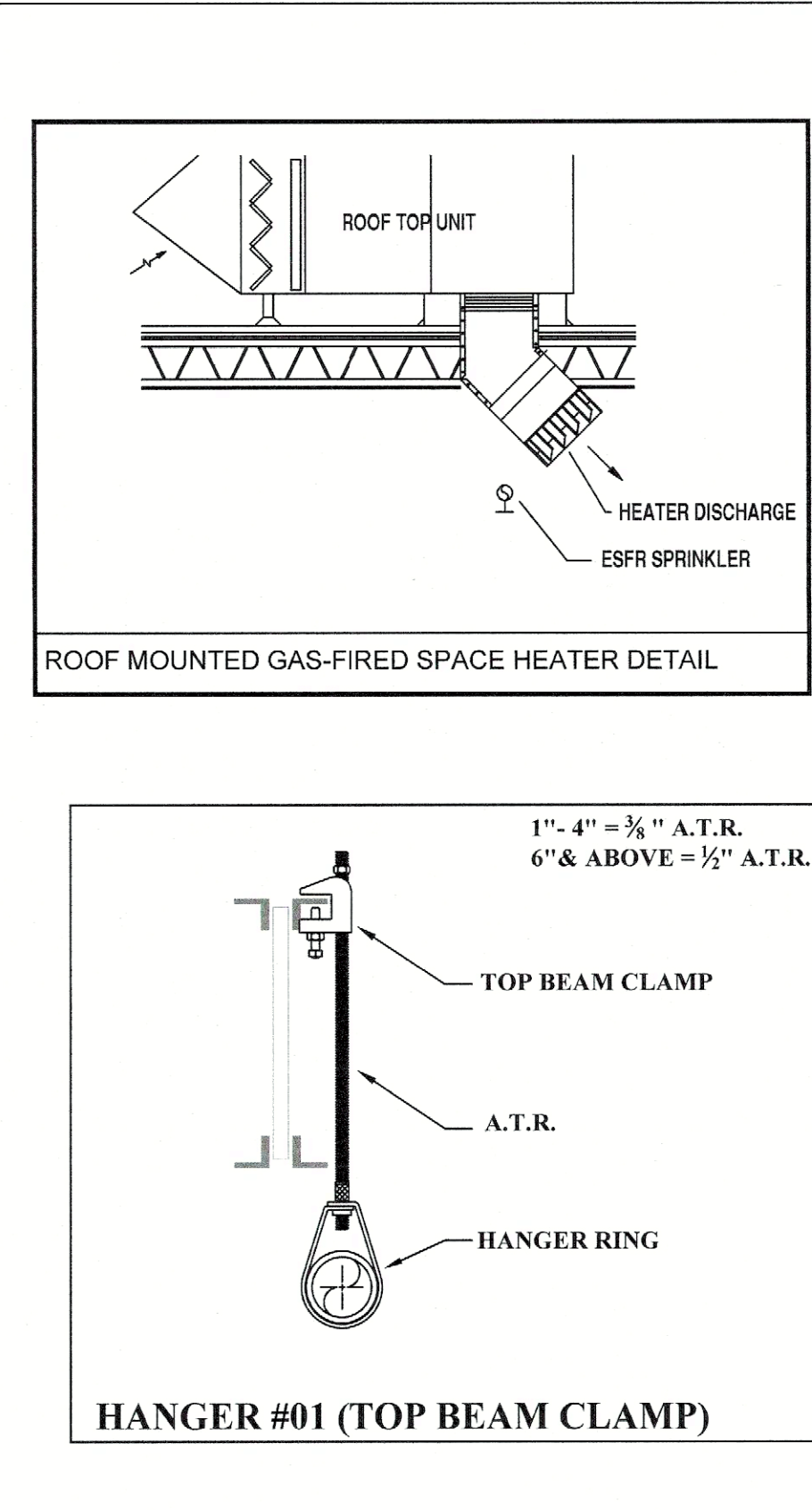
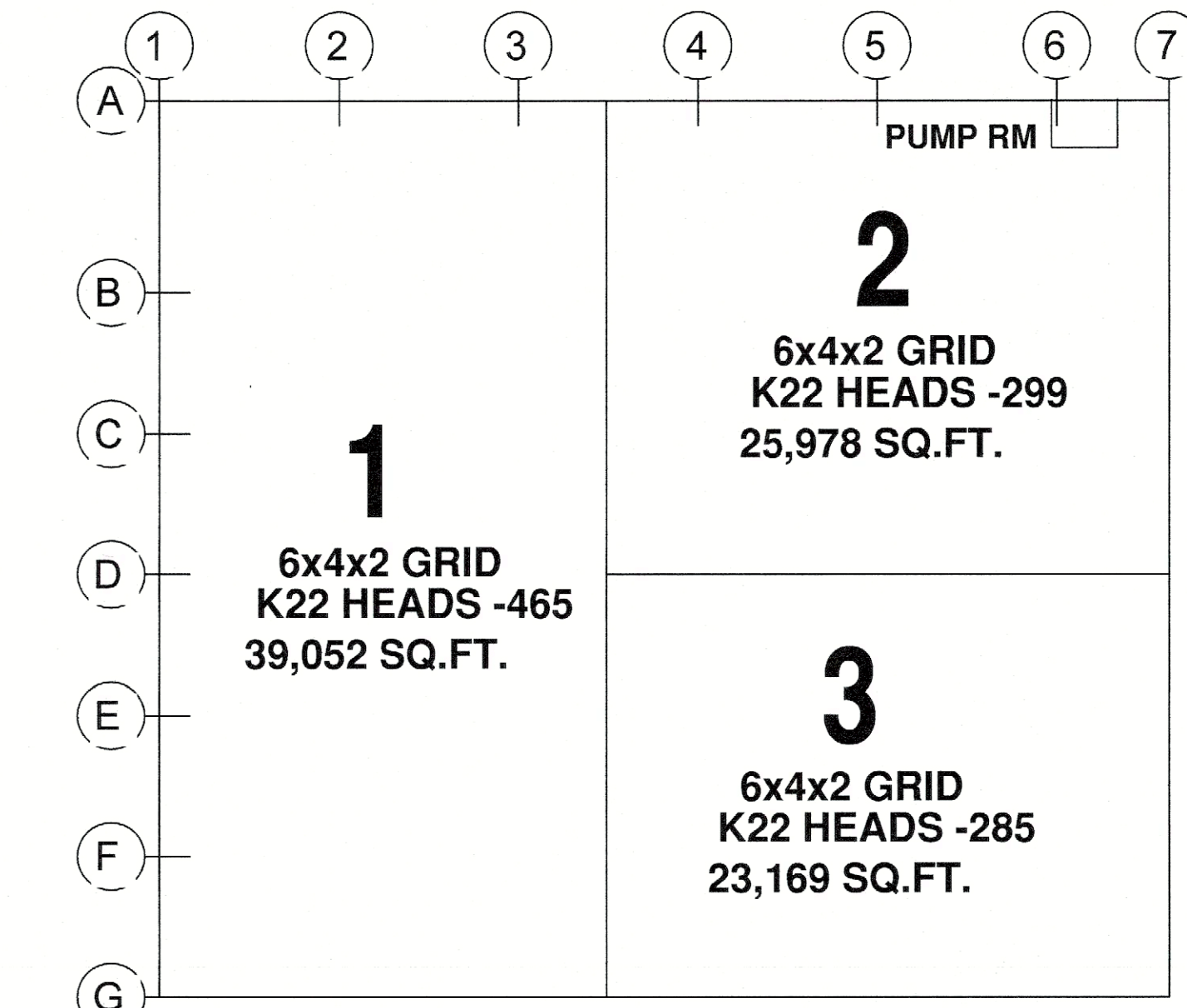


Table 17.3.3.1 ESFR Protection of Rack Storage of Group A Plastic Commodities Stored Over 25 ft (7.6 m) in Height

Storage Arrangement	Commodity	Maximum Storage Height		Maximum Ceiling/Roof Height		Nominal K-Factor	Orientation	Minimum Operating Pressure		In-Rack Sprinkler Requirements
		ft	m	ft	m			psi	bar	
Single, double, and multiple-row racks (no open-top containers)	Cartoned, unexpanded	30	9.1	40	12	14.0 (200)	Upright/pendent	75	5.2	No
						16.8 (240)	Upright/pendent	52	3.6	No
						22.4 (320)	Pendent	35	2.4	No
						25.2 (360)	Pendent	20	1.4	No
		45	13.7	45	14	16.8 (240)	Pendent	52	3.6	No
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	25	1.7	No
						14.0 (200)	Pendent	90	6.2	Yes
		35	11	45	14	16.8 (240)	Pendent	63	4.3	Yes
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	25	1.7	No
						14.0 (200)	Pendent	90	6.2	Yes
		40	12	45	14	16.8 (240)	Pendent	63	4.3	Yes
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	40	2.7	No
						14.0 (200)	Pendent	90	6.2	Yes

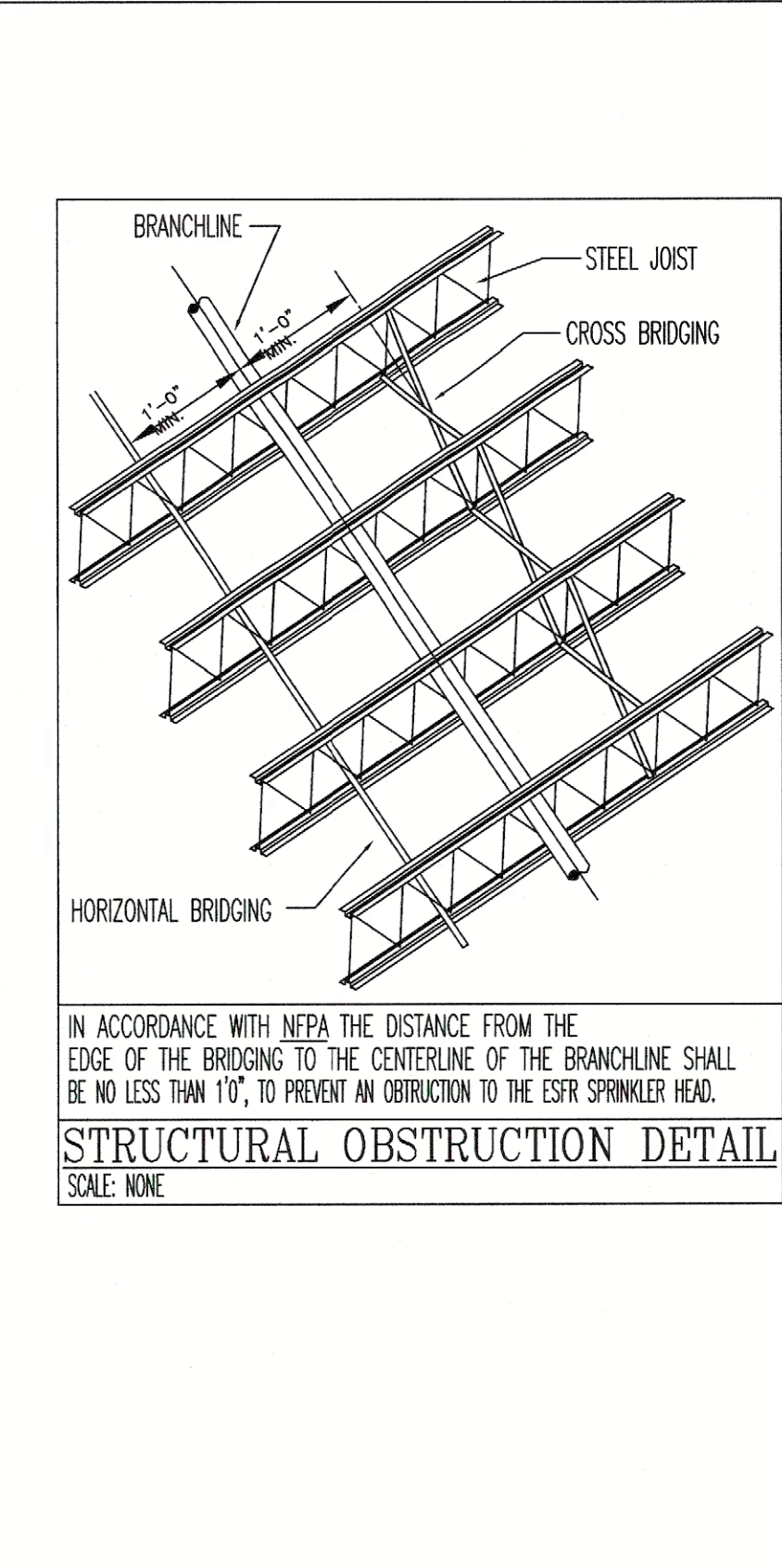
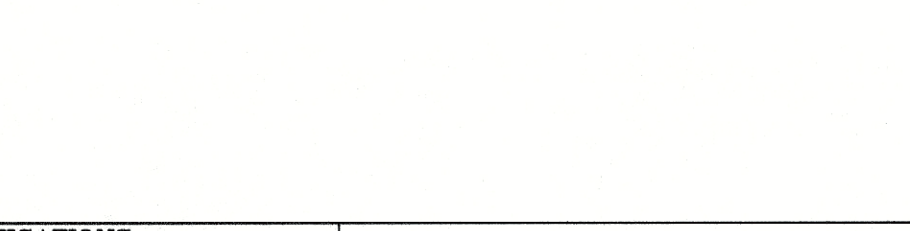


Table 17.3.3.1 ESFR Protection of Rack Storage of Group A Plastic Commodities Stored Over 25 ft (7.6 m) in Height

Storage Arrangement	Commodity	Maximum Storage Height		Maximum Ceiling/Roof Height		Nominal K-Factor	Orientation	Minimum Operating Pressure		In-Rack Sprinkler Requirements
		ft	m	ft	m			psi	bar	
Single, double, and multiple-row racks (no open-top containers)	Cartoned, unexpanded	30	9.1	40	12	14.0 (200)	Upright/pendent	75	5.2	No
						16.8 (240)	Upright/pendent	52	3.6	No
						22.4 (320)	Pendent	35	2.4	No
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		45	13.7	45	14	16.8 (240)	Pendent	52	3.6	No
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	25	1.7	No
						14.0 (200)	Pendent	90	6.2	Yes
		35	11	45	14	16.8 (240)	Pendent	63	4.3	Yes
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	25	1.7	No
						14.0 (200)	Pendent	90	6.2	Yes
		40	12	45	14	16.8 (240)	Pendent	63	4.3	Yes
						22.4 (320)	Pendent	40	2.7	No
						25.2 (360)	Pendent	40	2.7	No
						14.0 (200)	Pendent	90	6.2	Yes

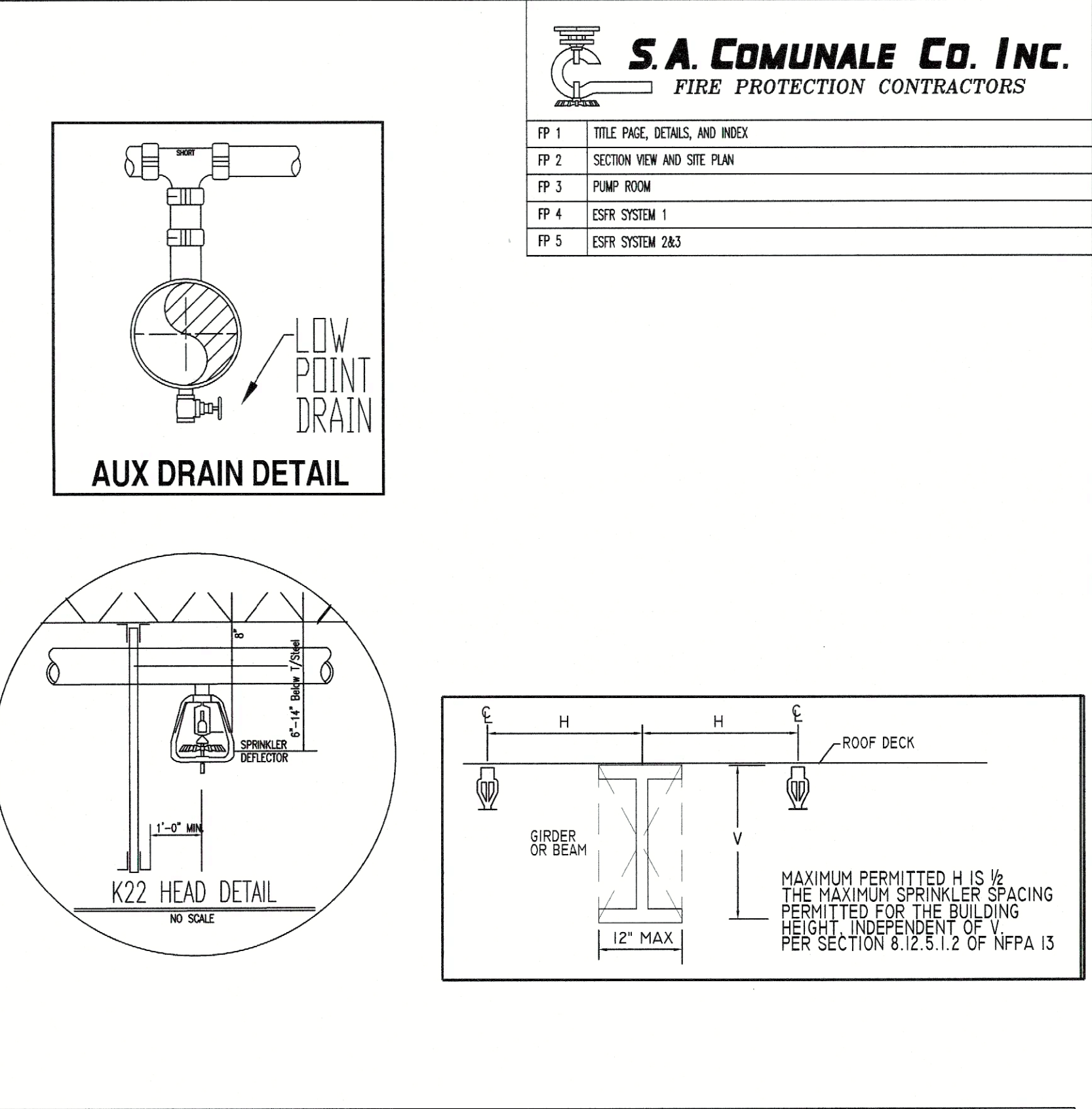
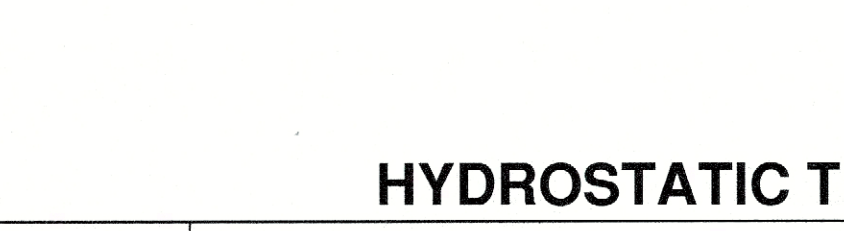


Table 17.3.3.1 ESFR Protection of Rack Storage of Group A Plastic Commodities Stored Over 25 ft (7.6 m) in Height

OBSTRUCTIONS ARE NOT PERMITTED IN THIS AREA EXCEPT AS INDICED BY THE DETAILS BELOW

1-0\"/>

MINIMUM

EDGE OF BAR JOIST

12\"/>

MAX.

ROOF DECK

GURDOR OR BEAM

V

MAXIMUM PERMITTED H IS THE MAXIMUM SPACING OF STRUCTURAL STEEL JOISTS LESS THAN 12\"/>

HEIGHT, INDEPENDENT OF V.

DOUBLE BAR JOIST AT EXPANSION JOINTS (REFER TO STRUCTURAL DRAWINGS FOR LOCATIONS AND DETAILS)

24\"/>

MAX

W

MIN

IF $C_1 \geq 30$, THEN TREAT EACH AS AN INDIVIDUAL CONTINUOUS OBSTRUCTION

IF $18 \leq C_1 \leq 24$, THEN $H \geq 18$

IF $12 \leq C_1 \leq 24$, THEN $H \geq 24$

24\"/>

MIN

24\"/>

MIN

24\"/>

MIN

LOCATE ESFR SYSTEM CROSS MAIN OR FEED MAIN ON OPPOSITE SIDE OF BAR JOIST FROM SPRINKLER

GROUPED CONTINUOUS OBSTRUCTIONS - MAXIMUM 24\"/>

TOP BEAM CLAMP
ATTACHED WITHIN 6\"/>

OF JOIST PANEL POINT