



ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPOZYUMU ve SERGİSİ
İZMİR - 2021

FIRE AND EARTHQUAKE

SYMPOSIUM AND EXHIBITION WITH INTERNATIONAL PARTICIPATION
İZMİR - 2021

30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**



Endüstriyel Yapılarda Yangın Söndürme Sistem Tasarımları ve Montajı

Ercan ERGİÇAY



FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPZYUMU ve SERGİSİ
IZMİR - 2021

30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**



web: <http://yanginsempozyumu.org> - e-posta: bim-izmir@mno.org.tr



FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPOZYUMU ve SERGİSİ
IZMİR - 2021



30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**

Binaların Yangından
Korunması Hakkındaki
Yönetmelik

Avrupa Standartları(EN)

- TS EN 12845
- TS EN 12259
- TS EN 671 – 1,2,3

Uluslararası Standartlar NFPA(Amerika)

- NFPA 11
- NFPA 13
- NFPA 14
- NFPA 15
- NFPA 16
- NFPA 30





FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
İZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPOZYUMU ve SERGİSİ
İZMİR - 2021



Tasarım

30 EYLÜL SEPTEMBER - 01 EKİM OCTOBER 2021

Yapı Kullanım
Amacı

Depolanacak veya
Üretilen Malzeme

Yükseklik ve Alan

Kullanılacak Yöntem

Diğer Yangından
Korunma
Önlemleri(Senaryo)



web: <http://yanginsempozyumu.org> - e-posta: bim-izmir@mno.org.tr



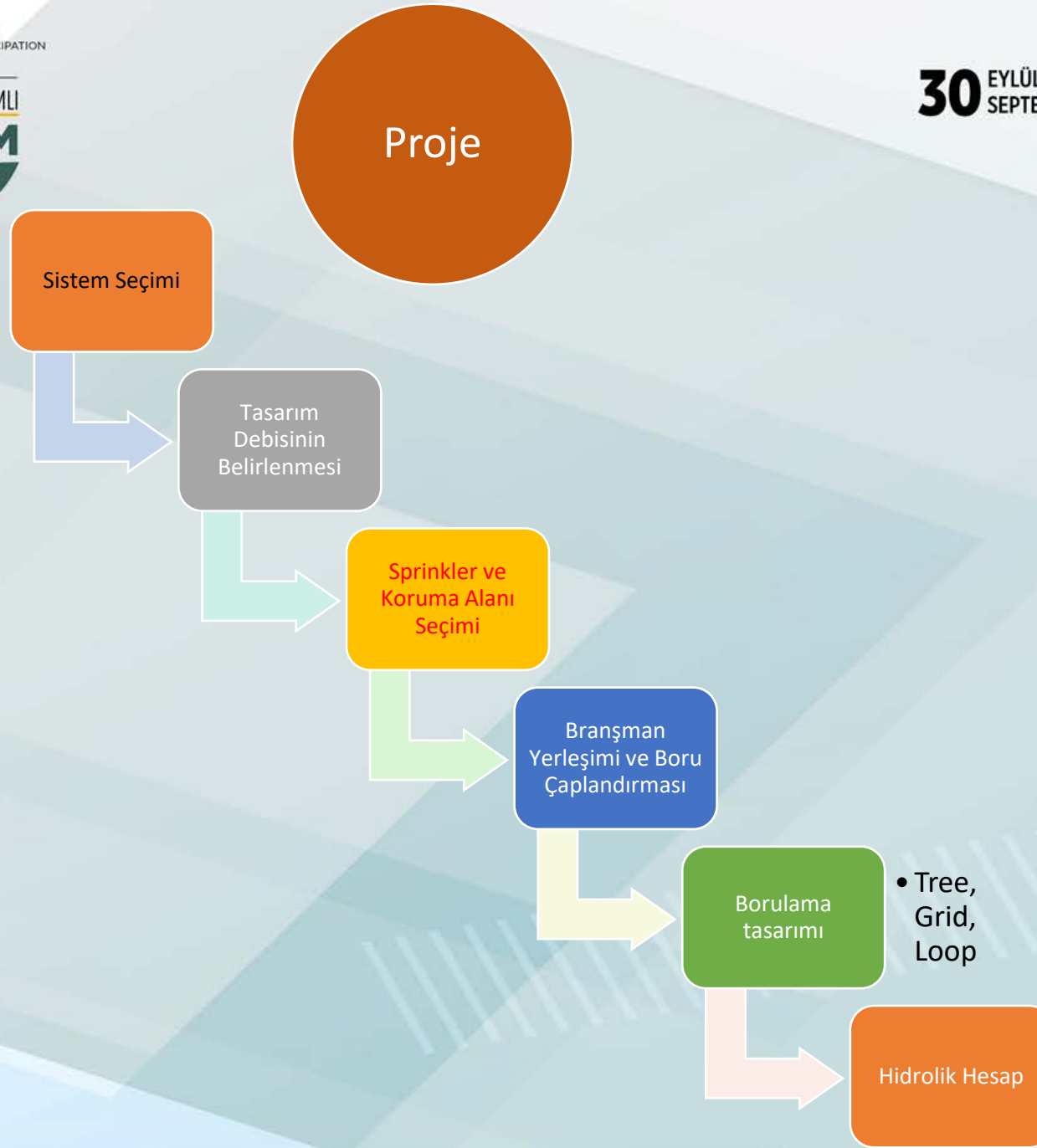
FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPOZYUMU ve SERGİSİ
IZMİR - 2021

30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**



Keşif

SIRA	MALZEME	BİRİM	MİKTAR
5			
6	İADE ÜRÜN DEPOLARI		
7	1 Otomatik Sprinkler Kafası	Ad.	618,00
8	Türü : Standart Tepkili, Standart Sprey		
9	K Faktörü : Metrik K=160 (ANSI K=11.2)		
10	Montaj Biçimi : Dik		
11	Malzeme : Piring		
12	Açılma Sıcaklığı : 141°C - 286°F		
13	Sıcaklık Elemanı : Cam Tüplü (Frangible Glass Bulb)		
14	Bağlantı : DN20 Dişli (3/4" NPT)		
15	Yedek : 18 Ad. (Dahil) – Orijinal Yedek Kutusu ve Spr. Anahtarı ile Birlikte		
16	Onay : UL Listeli, FM onaylı		
83	15 Boru Hattına Verilecek Ortalama Köpük Miktarı	Lt.	3.000,00
84	Köpük Sıvısı, Alçak Genleşmeli, Alkole Dayanımlı, %3 x 3		
85	Türü : Alçak Genleşme, AR-AFFF (alkole dayanıklı)		
86	Karışım Oranı : %3		
87	PH : 6,5...7,5		
88	Depolama Sıcaklığı : 5°C...50°C		
89	Raf Ömrü : En az 10 yıl		
90	Onaylar : UL Listeli, FM onaylı		



FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
İZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPOZYUMU ve SERGİSİ
İZMİR - 2021

30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**

Şartname

İçindekiler

- Teklif Hazırlama Şartnamesi
- Teknik Şartname
- Malzeme Listesi ve Teknik Özellikler
- Yer Görme Belgesi
- Çizimler

- 9.9. Kelepçeli bağlantıların sıkıştırma vidaları, havalı veya elle tork ayarlı anahtarla yapılacaktır; montaj öncesinde sıkma değerlerini gösteren malzemelere ait tabloların tarafımıza sunulduktan ve onay alındıktan sonra işlem yapılacaktır. Ayarsız anahtarla yapılmayacaktır.
- 9.10. Kelepçeli bağlantılar için açılacak yivler, özel yiv açma makinesinde ezme yoluyla (roll) açılacaktır. Kesme (cut) yiv kullanılmayacaktır. Tüm çalışmalar, sadece onaylanmış olan makinalar kullanılarak yapılacaktır.
- 9.11. Yüklenici, kelepçeli bağlantıları yapmaya başlamadan önce,
- kullanacağı yiv açma makinesinin kataloğunu,
 - yiv açan personel bilgilerini,
 - kullandığı üreticinin yiv tablosunu
 - projede kullanılacak her çap için bir adet örnek yaparak,
- İşveren'in onayına sunacaktır. Kelepçeli bağlantıların yapımı, örnek imalatın ve yiv açma makinesinin onaylanması sonrasında başlayacaktır.





FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPZYUMU ve SERGİSİ
İZMİR - 2021

Kurulum

30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**



web: <http://yanginsempozyumu.org> - e-posta: bim-izmir@mno.org.tr



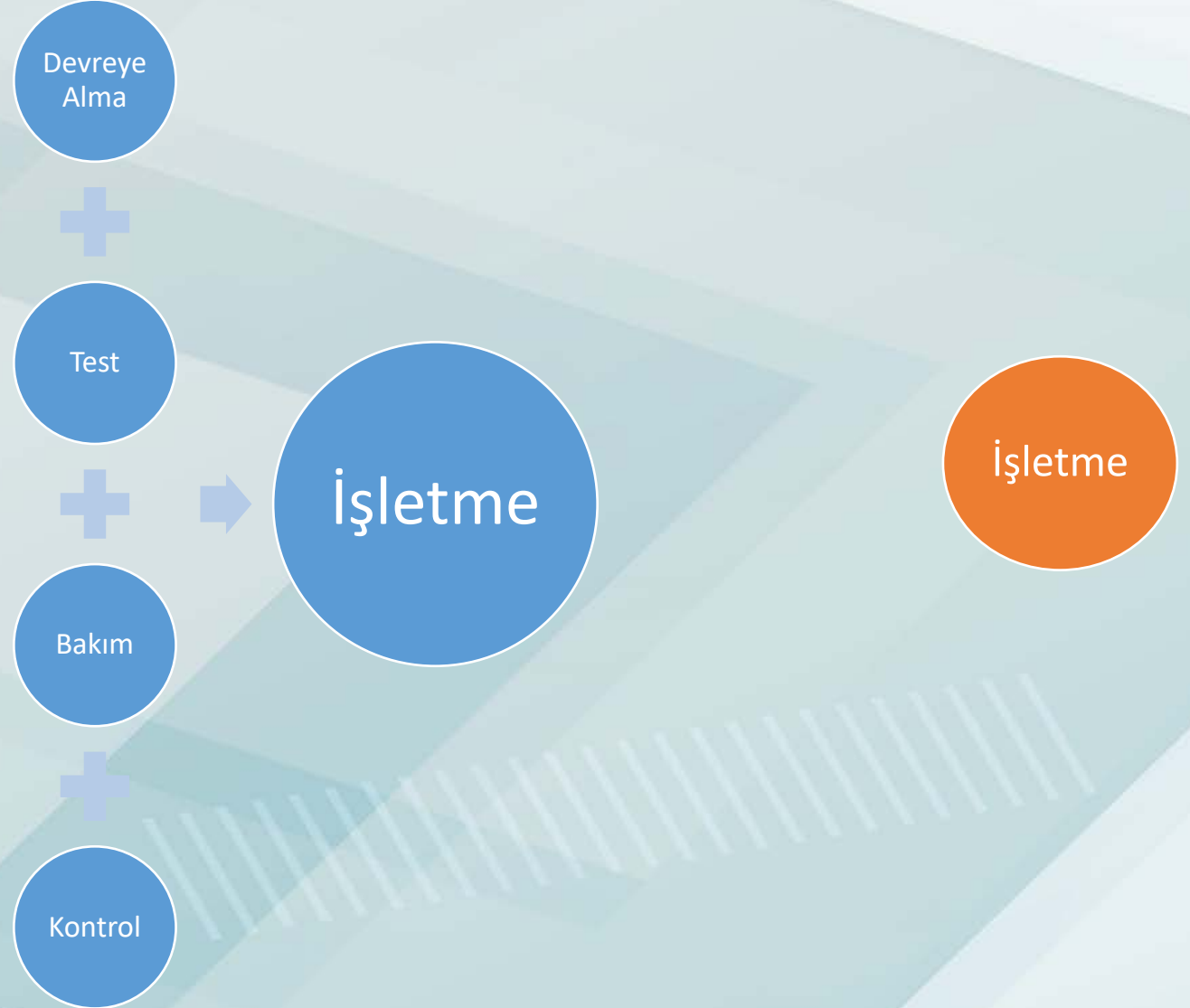
FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPZYUMU ve SERGİSİ
İZMİR - 2021

30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**



web: <http://yanginsempozyumu.org> - e-posta: bim-izmir@mno.org.tr

20.4.5.1* Group A. The following materials shall be classified as Group A:

- (1) ABS (acrylonitrile-butadiene-styrene copolymer)
- (2) Acetal (polyformaldehyde)
- (3) Acrylic (polymethyl methacrylate)
- (4) Butyl rubber
- (5) Cellulosics (cellulose acetate, cellulose acetate butyrate, ethyl cellulose)
- (6) EPDM (ethylene-propylene rubber)
- (7) FRP (fiberglass-reinforced polyester)
- (8) Natural rubber
- (9) Nitrile-rubber (acrylonitrile-butadiene-rubber)
- (10) Nylon (nylon 6, nylon 6/6)
- (11) PET (thermoplastic polyester)
- (12) Polybutadiene
- (13) Polycarbonate
- (14) Polyester elastomer
- (15) Polyethylene
- (16) Polypropylene
- (17) Polystyrene
- (18) Polyurethane
- (19) PVC (polyvinyl chloride — highly plasticized, with plasticizer content greater than 20 percent) (rarely found)
- (20) PVF (polyvinyl fluoride)
- (21) SAN (styrene acrylonitrile)
- (22) SBR (styrene-butadiene rubber)

The Technical Committee on Sprinkler System Discharge modified some of the listings for Group A, Group B, and Group C plastics in the 2016 edition to be consistent with their indicated heat of combustion. That change resulted in cellulosics, natural rubber (not expanded), and nylon being moved from Group B to Group A, along with polyvinyl fluoride (PVF) being moved from Group C to Group A. Although some of the listings were changed, it is important to understand that these listings are generally for plastics in their



FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMIR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPZYUMU ve SERGİSİ
IZMİR - 2021

Örnek

30 EYLÜL - 01 EKİM
SEPTEMBER - OCTOBER 2021

TABLE A.20.4.5.1 Continued

Product Heading	Product	Expanded/ Nonexpanded
	EPDM (ethylene-propylene rubber)	Nonexpanded
	Ethyl Cellulose	Nonexpanded
	FRP (fiberglass-reinforced polyester)	Nonexpanded
	Nitrile Rubber (acrylonitrile-butadiene rubber)	Nonexpanded
	Nylon (nylon 6, nylon 6/6)	Nonexpanded
	PET (Polyethylene Terephthalate - thermoplastic polyester)	Nonexpanded
	Polybutadiene	Nonexpanded
	Polycarbonate	Nonexpanded
	Polyester elastomer	Nonexpanded
	Polyethylene	Nonexpanded
	Polypropylene	Nonexpanded
	Polystyrene; foam products (e.g., plates, cups, etc.)	Expanded
	Polystyrene; rigid products	Nonexpanded
	Polyurethane	Expanded
	PVC (polyvinyl chloride) products, greater than 20 percent plasticizer	Nonexpanded
	PVF (polyvinyl fluoride)	Nonexpanded
	Rubber; natural in blocks; cartoned	Nonexpanded
	Rubber; natural; expanded	Expanded
	Rubber; natural; nonexpanded	Nonexpanded
	Rubber; synthetic (santoprene)	Nonexpanded
	SAN (styrene acrylonitrile)	Nonexpanded
	SBR (styrene-butadiene rubber)	Nonexpanded





FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMIR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPOZYUMU ve SERGİSİ
İZMİR - 2021

Örnek

30 EYLÜL SEPTEMBER - 01 EKİM OCTOBER 2021

TABLE 23.6.1 Continued

Storage Arrangement	Commodity	Maximum Storage Height		Maximum Ceiling/Roof Height		Nominal K-Factor	Orientation	Minimum Operating Pressure			
		ft	m	ft	m			psi	bar		
Single-, double-, and multirow racks (no open-top containers)	Cartoned nonexpanded	30	9.1	35	11	14 (200)	Upright/pendent	75	5.2		
						16.8 (240)	Upright/pendent	52	3.6		
						22.4 (320)	Pendent	35	2.4		
						25.2 (360)	Pendent	20	1.4		
				16.8 (240)	Pendent	52	3.6				
				22.4 (320)	Pendent*	40	2.7				
				25.2 (360)	Pendent*	25	1.7				
				45	14	14 (200)	Pendent*	NA	NA		
						16.8 (240)	Pendent*	NA	NA		
						22.4 (320)	Pendent	40	2.7		
						25.2 (360)	Pendent	40	2.7		
				40	12	16.8 (240)	Pendent	52	3.6		
		25.2 (360)	Pendent			25	1.7				
		14 (200)	Pendent*			NA	NA				
		16.8 (240)	Pendent*			NA	NA				
		35	11	45	14	22.4 (320)	Pendent	40	2.7		
						25.2 (360)	Pendent	40	2.7		
				40	12	14 (200)	Pendent*	NA	NA		
						16.8 (240)	Pendent*	NA	NA		
		40	12	45	14	22.4 (320)	Pendent	40	2.7		
						25.2 (360)	Pendent	40	2.7		
						14 (200)	Pendent*	NA	NA		
						16.8 (240)	Pendent*	NA	NA		
		Cartoned Expanded	20	6.1	25	7.6	14 (200)	Upright/pendent	50	3.4	
	16.8 (240)						Upright/pendent	35	2.4		
	30				9.1	14 (200)	Upright/pendent	50	3.4		
						16.8 (240)	Upright/pendent	35	2.4		
	25				7.6	30	9.1	14 (200)	Upright/pendent	50	3.4
								16.8 (240)	Upright/pendent	35	2.4
	25		7.6	32	10	14 (200)	Pendent	60	4.1		
						16.8 (240)	Upright/pendent	42	2.9		
				20	6.1	25	7.6	14 (200)	Pendent	50	3.4
								16.8 (240)	Pendent	35	2.4
						30	9.1	14 (200)	Pendent	50	3.4
								16.8 (240)	Pendent	35	2.4
	Exposed nonexpanded	20	6.1	25	7.6	14 (200)	Pendent	50	3.4		
16.8 (240)						Pendent	35	2.4			
30						9.1	14 (200)	Pendent	50	3.4	
							16.8 (240)	Pendent	35	2.4	
35				11	14 (200)	Pendent	75	5.2			
					16.8 (240)	Pendent	52	3.6			
					40	12	16.8 (240)	Pendent	52	3.6	
							14 (200)	Pendent*	NA	NA	
45				14	16.8 (240)	Pendent*	NA	NA			

(Continues)





FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPOZYUMU ve SERGİSİ
İZMİR - 2021

30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**



Group A Plastic Storage

Cartoned	Unexpanded and expanded		≤5	≤1.5	—	—	OH2		0, 50, 100	0, 189, 379	250	946	90
		Solid-piled, palletized, bin box, shelf, rack, and back-to-back shelf storage	>5 to ≤10	>1.5 to ≤3.0	15	4.6	EH1		0, 50, 100	0, 189, 379	500	1893	120
			>5 to ≤10	>1.5 to ≤3.0	20	6.1	EH2		0, 50, 100	0, 189, 379	500	1893	120
			>10 to ≤12	>3.0 to ≤3.7	17	5.2	EH2		0, 50, 100	0, 189, 379	500	1893	120
		Solid-piled, palletized, bin box, shelf, and back-to-back shelf storage	>10 to ≤12	>3.0 to ≤3.7	32	9.8	EH2		0, 50, 100	0, 189, 379	500	1893	120
		Rack	>10 to ≤12	>3.0 to ≤3.7	32	9.8	OH2	+ 1 level of in-rack	0, 50, 100	0, 189, 379	250	946	90

(continues)



Örnek

25.2.3.5* Rack Storage of Group A Plastic Commodities Stored Over 25 ft (7.6 m) in Height. Where rack storage of Group A plastic commodities, encapsulated or nonencapsulated, over 25 ft (7.6 m) in height are protected by in-rack sprinklers in accordance with **25.9.4**, ceiling-level sprinkler designs, in terms of density [gpm/ft² (mm/min)] and area of operation [ft² (m²)], shall be selected from **Table 25.2.3.5** based on the storage height of commodity above the top level of in-rack sprinklers.

TABLE 25.2.3.5 *CMDA Ceiling-Level Sprinkler Design Criteria for Rack Storage of Group A Plastic Commodities with Storage Over 25 ft (7.6 m) in Height, Clearance to Ceiling Up to and Including 10 ft (3.0 m) Supplemented with In-Rack Sprinklers*

Storage Height Above Top Level of In-Rack Sprinklers		Ceiling-Level Sprinkler Design Criteria	
ft	m	gpm/ft ² over ft ²	mm/min over m ²
Up to and including 5 ft	Up to and including 1.5 m	0.30/2000	12.2/185 m ²
Over 5 ft and up to and including 10 ft	Over 1.5 m and up to and including 3.0 m	0.45/2000	18.3/185 m ²

The required discharge density at the ceiling for CMDA designs over 25 ft (7.6 m) is fixed as provided in **Table 25.2.3.5**. This density is based on the storage height above the top level of in-rack sprinklers, with the in-rack sprinklers providing primary fire control within the rack structure from the height of the installed in-rack sprinklers down. The ceiling sprinklers protect the storage above and provide cooling for the structure.

A.25.2.3.5 In this application ordinary-, intermediate-, or high-temperature ceiling-level sprinklers can be used. There are no data to support temperature rating restrictions for this section.



Table 17b. Quick-Response, 160°F (70°C) Nominally Rated, Standard-Coverage Pendent Storage Sprinkler Ceiling-Only Designs for Ceiling Heights Over 40 ft (12.0 m)

Storage Arrangement	Commodity	Max. Storage Height, ft (m)	Max. Ceiling Height, ft (m)	Ceiling Sprinkler K-Factor	Max. Vertical Distance from Ceiling to Sprinkler's Thermal Element, in. (mm)	Min. Aisle Width, ft (m)	Sprinkler System Design		
							Ceiling Sprinkler System, No. of AS @ psi (bar)	Hose Demand, gpm (L/min)	System Duration, min
Solid-Piled, Palletized, Bin-Box, Shelf, and Open-Frame Racks*	Class 1, 2, 3, 4 and Cartoned Unexpanded Plastics	45 (13.7)	50 (15.2)	22.4 (320)	13 (325)	6 (1.8)	10 @ 63 (4.3)	250 (950)	60
				25.2 (360)	13 (325)	6 (1.8)	10 @ 50 (3.5)		
					17 (425)	6 (1.8)	10 @ 75 (5.2)		
				28.0** (400**)	13 (325)	6 (1.8)	10 @ 40 (2.8)		
			33.6 (480)	6 (1.8)	9 @ 55 (3.8)				
		50 (15.2)	55 (16.8)	28.0 (400)	13 (325)	8 (2.4)	9 @ 80 (5.5)		
				33.6 (480)	17 (425)	6 (1.8)	9 @ 55 (3.8)		

* See the [guidelines in Section 2.2.3.2](#) to confirm that any multiple-row racks being protected in accordance with this table meet the requirements to be considered open-frame.

** The design of 10 AS @ 40 psi (2.8 bar) can be reduced to 9 AS @ 40 psi (2.8 bar) when the water supply can also provide a minimum pressure of 80 psi (5.5 bar) from the most remote 4 sprinklers (2 sprinklers on 2 lines).

2.3.6.9.7 Commodities Up to and Including Uncartoned Unexpanded Plastics: Ceiling Heights up to 45 ft (13.5 m)

Protect maximum 25 ft (7.5 m) high **solid-piled, palletized, shelf, or bin-box** storage of commodity hazards up to and including uncartoned unexpanded plastics maintained under a maximum ceiling height of 45 ft (13.5 m) as follows:

- The sprinkler system must be a wet system (pre-action sprinkler systems do not qualify).
- Sprinklers are quick response, 160°F (70°C) nominally rated, minimum K25.2 (K360) pendent Storage sprinklers and installed in accordance with FM Global Property Loss Prevention Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*.
- The sprinkler design is a minimum of 12 sprinklers operating at a minimum pressure of 60 psi (4.1 bar) allowing for a hose demand of 250 gpm (950 L/min) and a sprinkler system duration of 60 minutes.





FIRE AND EARTHQUAKE
SYMPOSIUM AND EXHIBITION
WITH INTERNATIONAL PARTICIPATION
IZMİR - 2021

ULUSLARARASI KATILIMLI

YANGIN VE DEPREM

SEMPOZYUMU ve SERGİSİ
İZMİR - 2021

30 EYLÜL
SEPTEMBER - **01** EKİM
OCTOBER **2021**

Teşekkürler...

Mak. Müh. Ercan ERGİÇAY
[pimech Mühendislik Danışmanlık]
e-posta: e.ergicay@pimech.net
Tel: 0538 481 80 53



web: <http://yanginsempozyumu.org> - e-posta: bim-izmir@mno.org.tr