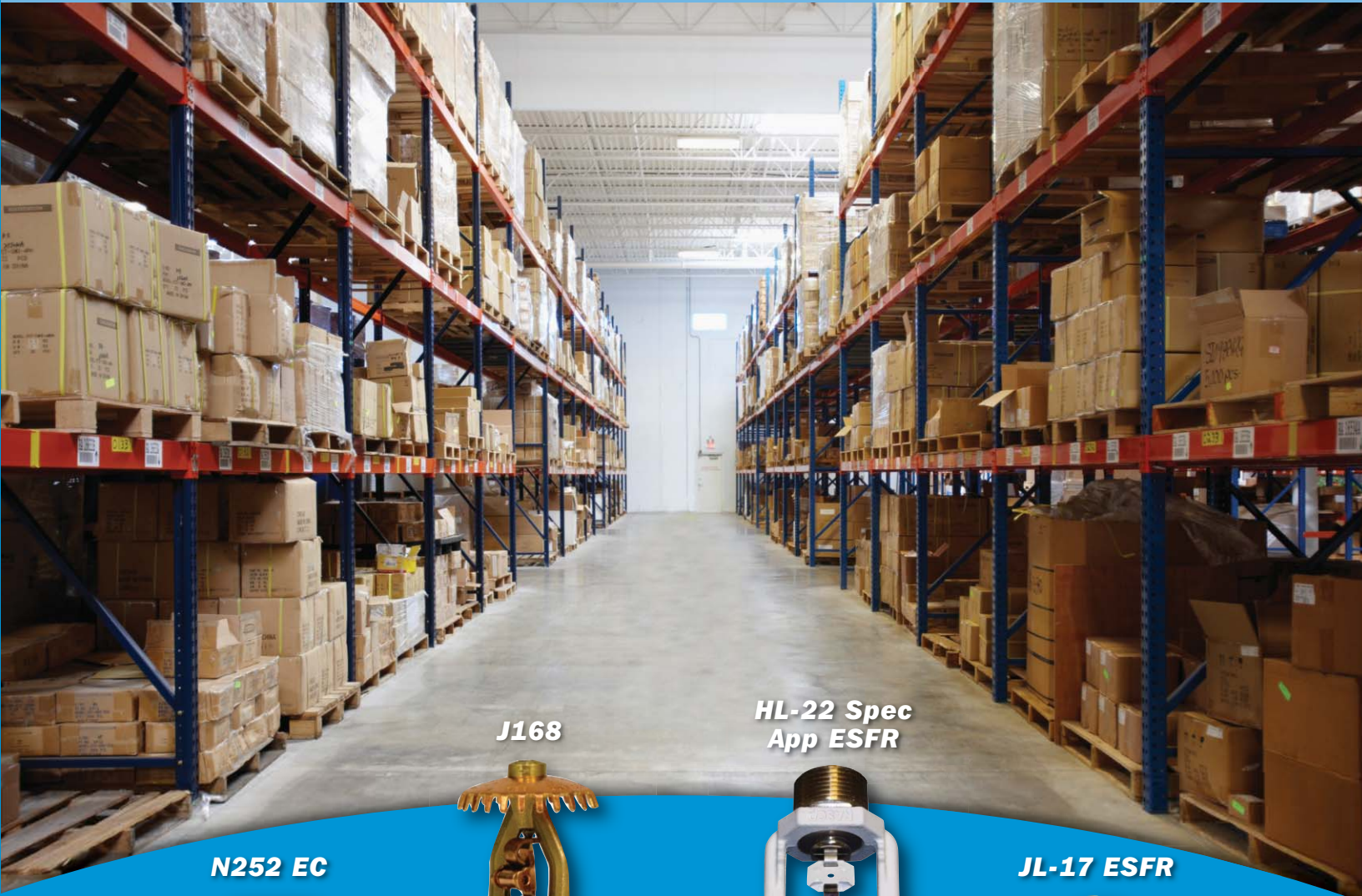


STORAGE

PRODUCT BROCHURE



J168

**HL-22 Spec
App ESRF**

N252 EC

JL-17 ESRF



- 14' x 14' coverage

- Control-mode, density area standard coverage

- Coverage for 48 ft high buildings

- Protection of encapsulated or non-encapsulated

Reliable[®]
TECHNOLOGY • QUALITY • SERVICE

Company Profile



Our new state-of-the-art manufacturing facility in Liberty, SC



Frank J. Fee



Frank J. Fee, Jr.

COMPANY

The Reliable Automatic Sprinkler Co., Inc. is one of the world's largest producers of automatic fire sprinklers and sprinkler system control equipment.

Reliable has undertaken a major expansion of its manufacturing capability with the construction of a new state-of-the-art plant located in Liberty, South Carolina, a short distance from Greenville. This new 300,000 square foot facility has been fully operational since summer 2006 and is ISO9001 certified.

In mid 2006 the company relocated its corporate headquarters to Elmsford, NY, which is also the Northeast regional sales and distribution center. Reliable also maintains sales and regional distribution centers in Washington, D.C., Atlanta, Orlando, Chicago, Minneapolis, Denver, Dallas, Houston, Los Angeles, Seattle, and Toronto, Canada. Reliable has sales offices in Boston, Philadelphia, Richmond, San Francisco, and Vancouver B.C. Reliable ships products to more than 50 countries worldwide, with international sales conducted from its offices in London, England, Hamburg, Germany, Shanghai and Hong Kong, China, Adelaide, Australia and Dubai, United Arab Emirates.

Reliable now offers fabrication in local areas. One Source Fabrication is operated and managed by individuals with over 30 years of fabrication experience. Local areas are now in Grand Prairie, Portland and Denver and soon to be in many other locations.

HISTORY

Reliable was founded in 1918 by Frank J. Fee, a mechanical contractor who began manufacturing sprinklers when he had trouble securing them for his own jobs. Frank J. Fee, Jr., succeeded his father as company President in 1945, and his son, Frank J. Fee III, became President in 1976. This puts Reliable today in its third generation of Fee family leadership. As part of senior management with Frank J. Fee III are his two brothers, Kevin T. Fee, Executive Vice President, and Michael R. Fee, Vice President, Marketing and Sales Operations. The family-run company also has many employees who have served in excess of 25 years, enhancing its team-family tradition.

PRODUCT OFFERINGS

The company is a manufacturer of automatic fire sprinklers, valve and accessory products, and a major distributor of sprinkler system components. Reliable produces both of the industry's two basic types of sprinklers, the solder type and the frangible bulb, which can be used for virtually every type of building applications. Reliable also produces a broad range of valves including alarm, dry, deluge, preaction, and check valve that control water flow to sprinkler systems and actuate alarm signaling.

FIRE PROTECTION INDUSTRY

Reliable has always been an industry-minded company. Reliable is an active participant in the

THE RELIABLE AUTOMATIC SPRINKLER CO., INC.



Frank J. Fee, III



Kevin T. Fee



Michael R. Fee

following industry associations: American Fire Sprinkler Association, American Society of Plumbing Engineers, British Automatic Fire Sprinkler Association, bvfa Bundesverband Technischer Brandschutz, Canadian Automatic Sprinkler Association, European Fire Sprinkler Network, Factory Mutual Advisory Board, Home Fire Sprinkler Coalition, International Fire Sprinkler Association, National Fire Protection Association, National Fire Sprinkler Association, National Fire Sprinkler Network, and Society of Fire Protection Engineers.

Past President Frank J. Fee, Jr., attained many notable positions in the fire protection community, including Chairman of the National Fire Protection Association and Chairman of the National Automatic Sprinkler and Fire Control Association.

Frank J. Fee III is currently serving on the National Fire Protection Association's International Advisory Board and has held several Board of Directors positions for NFPA including Treasurer, Secretary, and Director. He was past Chairman of the Board and Director of the National Fire Sprinkler Association. Frank has been the recipient of the AFSA's "Henry S. Parmelee Award" (1990), the NFPA's "Distinguished Service Award" (1998), and the NFSAs "Golden Sprinkler Award" (1998), in recognition of his outstanding contributions to the fire sprinkler industry.

Kevin T. Fee is currently serving on the Board of Directors of the National Fire Sprinkler Association and has recently completed a term as Treasurer (2008-2012). Kevin has been the recipient of NFSAs "Golden Sprinkler Award" (2008). He was Vice Chairman (1986-1990) and Chairman (1990 - 1994). Kevin has been a Board member since 1981 and with over thirty years is the longest tenured Board member in the history of NFSAs. Kevin was a founding member of the International Fire Sprinkler Association and served as its first Chairman (2000 - 2003) and is presently a Board member. Kevin was also past Chairman of the American Fire Sprinkler Association's Manufacturer and Supplier Council and is a member of the National Fire Protection Association.

Michael R. Fee is currently serving on the American Fire Sprinkler Association's Manufacturer and Supplier Council, Legislative Committee, and Membership Committee. For many years, Michael has been on the Membership Committee and helped establish the local chapter development programs. Michael has been Chairman (2000-2004) of AFSA's Manufacturer and Supplier Council.

MISSION

Three goals are at the heart of the mission that the Fee family established long ago: first to be the leading worldwide manufacturer of innovative, quality-oriented fire sprinklers and systems devices; second, to be a leading supplier of fire sprinkler system components; and third, to be the leader in providing the highest level of operational excellence in customer service, exceeding all customer expectations. It is this mission that propels Reliable through the 21st Century and beyond in its service to the fire sprinkler industry.

LISTINGS AND APPROVALS

Reliable products are listed and approved by various fire protection product approval laboratories and organizations such as:



Refer to the product's Technical Bulletin for specific listing and approval information.

ENVIRONMENT

Reliable is pursuing a **GREEN POLICY** and is committed to protecting our environment by developing products that use recycled materials that reduce the use of natural resources.

Introduction

Storage configurations create unique and formidable challenges for sprinklers systems.

Reliable offers a complete line of Storage Sprinklers for Control Mode Density Area (CMDA) and Suppression applications with design options to help solve today's high challenge storage environments – high piled and rack storage, extra hazard occupancies, and Big Box retail stores. Installing larger orifice storage sprinklers provide opportunities for savings in design, installation, and building operations.

Control Mode Specific Application (CMSA) sprinkler technology utilizing a larger K-Factor with extended coverage capability for storage applications offer design and installation advantage over the majority of storage sprinklers on the market, including ESFR.

Superior fire protection performance with lower flow requirements offers opportunities to reduce – sizing requirements of system piping, underground piping, fire pumps, and storage tanks. For building owners, this means increased racking flexibility and faster installation times – less sprinklers to install.

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Application Guide

Storage Spray Sprinkler (CMDA) Design Density Applications Guide					
Sprinkler Model	G, F1 K=8.0 (115)	G XLO, K=11.2 (161)	G VELO, K=14.0 (200)	J168, K=16.8 (242)	N252 EC, K=25.2 (363)
Max. Spacing	100 ft ² (9.29 m ²)		100 ft ² (9.29 m ²) Wet Systems Only	100 ft ² (9.29 m ²)	196 ft ² (18.21 m ²) Wet Systems Only
DESIGN DENSITY					
0.20 gpm/ft ² (8.1 mm/min) or less	OK, UL only	OK	OK	OK	OK
0.25 gpm/ft ² (10.2 mm/min)	Yes, UL only (9.8 psi, 0.7 bar)	OK	OK	OK	OK
0.30 gpm/ft ² (12.2 mm/min)	Yes, UL only (14.1 psi, 1.0 bar)	Best (7.2 psi, 0.5 bar)	OK	OK	OK
0.34 gpm/ft ² (13.9 mm/min)	Yes, UL only (18.1 psi, 1.3 bar)	Yes (9.2 psi, 0.6 bar)	OK	OK	Best EC (7.0 psi, 0.48 bar)
0.37 gpm/ft ² (15.1 mm/min)	NP	Yes (10.9 psi, 0.8 bar)	Best (7.0 psi, 0.48 bar)	OK	Yes (8.3 psi, 0.6 bar)
0.40 gpm/ft ² (16.3 mm/min)	NP	Yes (12.8 psi, 0.9 bar)	Yes (8.2 psi, 0.6 bar)	OK	Yes (9.7 psi, 0.7 bar)
0.45 gpm/ft ² (18.3 mm/min)	NP	Yes (16.1 psi, 1.1 bar)	Yes (10.3 psi, 0.7 bar)	Best (7.2 psi, 0.5 bar)	Yes (12.3 psi, 0.9 bar)
0.60 gpm/ft ² (24.4 mm/min)	NP	Yes (28.7 psi, 2.0 bar)	Yes (18.4 psi, 1.3 bar)	Yes (12.8 psi, 0.9 bar)	Yes (21.8 psi, 1.5 bar)
0.80 gpm/ft ² (32.6 mm/min)	NP	Yes (51.02 psi, 3.5 bar)	Yes (32.7 psi, 2.3 bar)	Yes (22.7 psi, 1.6 bar)	Yes (38.7 psi, 2.7 bar)
0.90 gpm/ft ² (36.7 mm/min)	NP	Yes (64.6 psi, 4.5 bar)	Yes (41.3 psi, 2.8 bar)	Yes (28.7 psi, 2.0 bar)	Yes (49.0 psi, 3.4 bar)
1.15 gpm/ft ² (46.9 mm/min)	NP	Not recommended	Yes (67.5 psi, 4.7 bar)	Yes (46.9 psi, 3.2 bar)	Yes (80 psi, 5.5 bar)

OK = At 7 psi, these sprinklers will exceed the density required, but nothing prohibits their use. **NP** = Not Permitted by NFPA 13

This Guide is designed to provide general guidance in the selection of Reliable sprinklers for storage applications in accordance with NFPA 13. It is not intended to include all of the design requirements necessary for a particular storage application. Users shall consult the appropriate Reliable technical bulletin, NFPA standard or Factory Mutual Data Sheet for proper classification of commodity, listings/approvals and design criteria.

The following standards and data sheets should be further consulted for storage protection of:

Storage Type	NFPA	FM
Idle Pallet Storage	NFPA 13, Chapter 12	FM 2-0, 8-9 and 8-24
Rubber Tire Storage	NFPA 13, Chapter 18	FM 2-0 and 8-9
Rolled Paper Storage	NFPA 13, Chapter 19	FM 8-21
Flammable Liquids Storage	NFPA 30	N/A
Aerosol Storage	NFPA 30B	FM 7-31

Application Guide STORAGE CONFIGURATION

Storage Sprinkler	Applications	Storage Arrangement	
N252 EC Pendent 25.2 K (363) (See Note 4)	Control Mode Specific Application (CMSA) Wet Systems Only Ceiling-Level Only	Solid-Piled, Palletized, Shelf or Bin Box Storage Single, Double, Multiple Row Open Frame Rack Storage	
N252 EC Pendent 25.2 K (363)	Control Mode Density Area (CMDA) Wet Systems Only NFPA 13 Area/Density Design Curves for high-density, high-piled storage applications where design densities exceed 0.34 gpm/ft ² (13.9 mm/min)	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
	Big Box Retail Storage Wet Systems Only	Single and Double Row Open Frame Rack Storage Gondola Rack	
HL-22 ESFR Pendent 22.4 K (320) (See Note 5)	Suppression Mode Wet Systems Only Suppression Mode Ceiling Level Sprinklers Only to Building Ht. of 45 ft.	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
HL-22 Specific Application ESFR Pendent 22.4 K (320) (See Note 5)	Specific Application Suppression Mode Wet Systems Only Ceiling Level Sprinklers Only to Building Ht. of 48 ft.	Solid-Piled, Palletized, Shelf or Bin Box Storage Single, Double, Multiple Row Open Frame Rack Storage	
JL-17 ESFR Pendent 16.8 K (242) (See Note 5)	Suppression Mode Wet Systems Only Ceiling Level Sprinklers Only to Building Ht. of 40 ft.	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
JL-14 ESFR Pendent 14.0 K (200) (See Note 5)	Suppression Mode Wet Systems Only Ceiling Level Sprinklers Only to Building Ht. of 40 ft.	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
J 168 Upright 16.8 K (242) (See Note 2)	Control Mode Density Area (CMDA) Wet Systems, Dry Systems NFPA 13 Area/Density Design Curves for high-density, high-piled storage applications where design densities exceed 0.34 gpm/ft ² (13.9 mm/min) Ceiling level only for storage heights up to 25 ft (7.6 m) and a maximum ceiling height of 30 ft. (9.1 m)	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
G VELO Pendent 14.0 K (200)	Control Mode Density Area (CMDA) Wet Systems Only NFPA 13 Area/Density Design Curves for high-density, high-piled storage applications where design densities exceed 0.34 gpm/ft ² (13.9 mm/min) Ceiling level only for storage heights up to 20 ft (6.1 m) and a maximum ceiling height of 27 ft. (8.2 m)	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	

Commodity (See Note 3)	NFPA 13/UL	FM (See Note 1)	Maximum Coverage Area
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded	See Note 4	FM 2-0 and 8-9 Reliable Bulletin 908	Extended Coverage 144 ft² and 196 ft²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned Unexpanded, Uncartoned Expanded	NFPA 13, Chapters 14 and 15	FM 2-0	Extended Coverage 196 ft²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned Unexpanded	NFPA 13, Chapters 16 and 17		
Group A Plastics Cartoned Unexpanded Uncartoned Unexpanded	NFPA 13, Chapter 20		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ft ²
Class 1, 2, 3, 4 encapsulated Group A Plastics Cartoned Unexpanded, Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded	Reliable Bulletin 177 UL Listed	N/A	Standard Coverage 100 ft ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ft ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded Cartoned Expanded (Up to and Including 25 ft only) Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ft ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded Uncartoned (Exposed) Expanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ft ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded Uncartoned (Exposed) Expanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ft ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		

Application Guide STORAGE CONFIGURATION cont.

Storage Sprinkler	Applications	Storage Arrangement	
G XLO Upright 11.2 K (160)	Control Mode Density Area (CMDA) Wet Systems Dry Systems NFPA 13 Area/Density Design Curves for high-density, high-piled storage applications where design densities exceed 0.34 gpm/ft ² (13.9 mm/min) Ceiling level only for storage heights up to 20 ft (6.1 m) and a maximum ceiling height of 27 ft. (8.2 m)	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
GL 112 QR 11.2 K (160)	Control Mode Density Area (CMDA) Wet Systems NFPA 13 Area/Density Design Curves for high-density, high-piled storage applications where design densities exceed 0.34 gpm/ft ² (13.9 mm/min) Ceiling level only for storage heights up to 20 ft (6.1 m) and a maximum ceiling height of 27 ft. (8.2 m)	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
G 8.0 K (115)	Control Mode Density Area (CMDA) Wet Systems Dry Systems (Upright Only) NFPA 13 Area/Density Design Curves where required densities are greater than 0.20 gpm/ft ² to 0.34 gpm/ft ² (8.2 mm/min to 13.9 mm/min)	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
F1 8.0 K (115)	Control Mode Density Area (CMDA) Wet Systems Dry Systems (Upright Only) NFPA 13 Area/Density Design Curves where required densities are greater than 0.20 gpm/ft ² to 0.34 gpm/ft ² (8.2 mm/min to 13.9 mm/min)	Solid-Piled, Palletized, Shelf or Bin Box Storage	
		Single, Double, Multiple Row Open Frame Rack Storage	
Intermediate Sprinklers G - 5.6K (80), 8.0K (115) GFR - 5.6K (80), 8.0K (115) F1 - 5.6K (80) F156 - 5.6K (80) F1FR - 8.0K (115) F1FR56 - 5.6K (80) GL 112 QR - 11.2K (160)	For use in rack storage sprinkler systems where thermally sensitive elements must be shielded from the water spray of higher elevation sprinklers that could operate earlier during a fire. Also used in other applications such as beneath open-gridded catwalks. NFPA 13 Area/Density Design Curves where in-rack sprinklers are required	Single, Double, Multiple Row Open Frame Rack Storage	

This Guide is designed to provide general guidance in the selection of Reliable sprinklers for storage applications in accordance with NFPA 13. It is not intended to include all of the design requirements necessary for a particular storage application. Users shall consult the appropriate Reliable technical bulletin, NFPA standard or Factory Mutual Data Sheet for proper classification of commodity, listings/approvals and design criteria.

The following standards and data sheets should be further consulted for storage protection of:

Storage Type	NFPA	FM
Idle Pallet Storage	NFPA 13, Chapter 12	FM 2-0, 8-9 and 8-24
Rubber Tire Storage	NFPA 13, Chapter 18	FM 2-0 and 8-9
Rolled Paper Storage	NFPA 13, Chapter 19	FM 8-21
Flammable Liquids Storage	NFPA 30	N/A
Aerosol Storage	NFPA 30B	FM 7-31

Commodity (See Note 3)	NFPA 13/UL	FM (See Note 1)	Maximum Coverage Area
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded Uncartoned (Exposed) Expanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ff ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded Uncartoned (Exposed) Expanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ff ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded Uncartoned (Exposed) Expanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ff ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded Uncartoned (Exposed) Expanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ff ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded, Cartoned Expanded Uncartoned (Exposed) Unexpanded Uncartoned (Exposed) Expanded	NFPA 13, Chapters 14 and 15	FM 2-0 and 8-9	Standard Coverage 100 ff ²
Class 1, 2, 3, 4 encapsulated, non-encapsulated Group A Plastics Cartoned Unexpanded Cartoned Expanded Uncartoned (Exposed) Unexpanded	NFPA 13, Chapters 16 and 17		
As Required	NFPA 13, Chapters 16 and 17	FM 2-0 and FM 8-9	As Required

Notes:

1. FM does not use the terms, CMDA, CMSA, or Suppression Mode. FM categorizes all sprinklers used for storage protection as "Storage Sprinklers."
2. No commodity class increase required with plastic pallets when used for ceiling-only sprinkler protection.
3. The commodity classification is based on the combination of the product, its packaging material, the storage or shipping container within which it is stored, and the material handling aid on which it is stored and transported. Its classification is dependent on how the product burns and how the burning product responds to the application of water from discharging sprinklers.
4. The N252 EC CMSA complies with NFPA 13 requirements in accordance with the following paragraphs of the standard: New Technology/Sprinkler Definitions - Specific Application Control Mode Sprinkler/Application of Sprinkler Types - Specific Application Control Mode Sprinklers (New to 2007 edition).
5. Care must be taken when selecting a particular suppression mode sprinkler to assure that it is listed/approved for the intended application. Refer to the appropriate technical bulletin or applicable design criteria.

Application Guide RUBBER TIRE STORAGE

Storage Arrangement	Control-Mode Density Area (CMDA)			
	Maximum Bldg./Storage Height See NFPA 13	Storage Ht. Up to:	Bldg Ht. Up to:	Special Application
On Floor Storage on-side or on-tread Open Portable or Palletized Portable Rack Storage On-Side or On-Tread	F1 or G , K-8.0 (115) for densities ≤ 0.34 gpm/ft ² (13.9 mm/min) G XLO , K-11.2 (160) for densities ≥ 0.30 gpm/ft ² (13.9 mm/min) G VELO , K-14.0 (200) for densities ≥ 0.37 gpm/ft ² (15.1 mm/min) Wet Systems Only J168 , K-16.8 (242) for densities ≥ 0.45 gpm/ft ² (18.3 mm/min) N252 EC , K-25.2 (363) for densities ≥ 0.34 gpm/ft ² (13.9 mm/min) Wet Systems Only / Coverage Area - 196 ft ² (18.2 m ²)	----	----	-----
Single-, Double-, and Multiple Row Fixed Rack Storage on Pallets, On-Side or On-Tread without Solid Shelves OR Single-, Double-, and Multiple Row Fixed Rack Storage without Pallets, On-Side or On-Tread without Solid Shelves	F1 or G , K-8.0 (115) for densities ≤ 0.34 gpm/ft ² (13.9 mm/min) G XLO , K-11.2 (160) for densities ≥ 0.30 gpm/ft ² (13.9 mm/min) G VELO , K-14.0 (200) for densities ≥ 0.37 gpm/ft ² (15.1 mm/min) (Wet Systems Only) J168 , K-16.8 (242) for densities ≥ 0.45 gpm/ft ² (18.3 mm/min) N252 EC , K-25.2 (363) for densities ≥ 0.34 gpm/ft ² (13.9 mm/min) (Wet Systems Only) Coverage Area - 196 ft ² (18.2 m ²) Intermediate Level (In-rack sprinklers) may be required G SSU , K-5.6 (80), K-8.0 (115) / G SSP , K-5.6 (80), K-8.0 (115) GFR SSU , K-5.6 (80), K-8.0 (115) / GFR SSP , K-5.6 (80), K-8.0 (115) F1 SSU , K-5.6 (80), K-8.0 (115) / F1 SSP , K-5.6 (80), K-8.0 (115) F1FR SSU , K-5.6 (80), K-8.0 (115) / F1FR SSP , K-5.6 (80), K-8.0 (115)	----	----	-----
IDLE PALLET STORAGE				
On Floor or Rack without Solid Shelves (Wood Pallets)	F1 or G , K-8.0 (115) for densities ≤ 0.34 gpm/ft ² (13.9 mm/min) G XLO , K-11.2 (160) for densities ≥ 0.30 gpm/ft ² (13.9 mm/min) G VELO , K-14.0 (200) for densities ≥ 0.37 gpm/ft ² (15.1 mm/min) Wet Systems Only J168 , K-16.8 (242) for densities ≥ 0.45 gpm/ft ² (18.3 mm/min) N252 EC , K-25.2 (363) for densities ≥ 0.34 gpm/ft ² (13.9 mm/min) Wet Systems Only / Coverage Area - 196 ft ² (18.2 m ²)	----	----	-----
On Floor or Rack without Solid Shelves (Plastic Pallets)	See NFPA 13	10 ft (3.0 m)	30 ft (9.1 m)	NFPA 13 Design Criteria- 0.60 gpm/ft ² /2000 ft ² (25.5 mm/min/185.8 m ²) J168 , K-16.8 (242)
ROLLED PAPER STORAGE (Wet Systems Only)				
Mediumweight	F1 or G , K-8.0 (115) for densities ≤ 0.34 gpm/ft ² (13.9 mm/min) G XLO , K-11.2 (160) for densities ≥ 0.30 gpm/ft ² (13.9 mm/min) G VELO , K-14.0 (200) for densities ≥ 0.37 gpm/ft ² (15.1 mm/min) Wet Systems Only	----	----	-----
Heavyweight	J168 , K-16.8 (242) for densities ≥ 0.45 gpm/ft ² (18.3 mm/min) N252 EC , K-25.2 (363) for densities ≥ 0.34 gpm/ft ² (13.9 mm/min) Wet Systems Only / Coverage Area - 196 ft ² (18.2 m ²)	----	----	-----

* Refer to notes 1 through 5 located at the bottom of page 9.

Application Guide RUBBER TIRE STORAGE cont.

Storage Arrangement	Suppression-Mode (ESFR)		
	Max Storage Ht.	Max Bldg Ht.	Wet Systems Only
On-Side or On-Tread, in Palletized Portable Racks, Open Portable Racks, or Fixed Racks without Solid Shelves	25 ft (7.6 m)	30 ft (9.1 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242) HL-22, K-22.4 (320)
Single-, Double-, and Multiple Row Fixed Rack Storage on Pallets, On-Side or On-Tread without Solid Shelves OR Single-, Double-, and Multiple Row Fixed Rack Storage without Pallets, On-Side or On-Tread without Solid Shelves	25 ft (7.6 m)	35 ft (10.7 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242) HL-22, K-22.4 (320)
	25 ft (7.6 m)	30 ft (9.1 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242)
	25 ft (7.6 m)	40 ft (12.2 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242)
IDLE PALLET STORAGE			
On Floor or Rack without Solid Shelves (Wood Pallets)	35 ft (10.7 m)	40 ft (12.2 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242) HL-22, K-22.4 (320)
On Floor or Rack without Solid Shelves (Plastic Pallets)	35 ft (10.7 m)	40 ft (12.2 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242)
ROLLED PAPER STORAGE (Wet Systems Only)			
Mediumweight	25 ft (7.6 m)	30 ft (9.1 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242) HL-22, K-22.4 (320)
Heavyweight	25 ft (7.6 m)	30 ft (9.1 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242) HL-22, K-22.4 (320)
	30 ft (9.1 m)	35 ft (10.7 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242)
	30 ft (9.1 m)	40 ft (12.2 m)	JL-14, K-14.0 (200) JL-17, K-16.8 (242) HL-22, K-22.4 (320)
	30 ft (9.1 m)	45 ft (13.7 m)	HL-22, K-22.4 (320)

Control Mode Specific Application SPRINKLERS

N252 EC

Control Mode Specific Application
(CMSA)
Pendent Extended Coverage Sprinkler



SIN: RA0842
Technical Bulletin: 908

Applications:

- High Piled and Rack Storage

Features:

- Control-Mode Specific Application Sprinkler for storage and for the protection of encapsulated and non-encapsulated Class I-IV commodities and cartoned unexpanded Group A plastics.
- May be used for Solid Piled, Palletized, Shelf, Bin Box, or Open Frame Rack Storage.
- Extended Coverage to a maximum of 14' x 14' (4.3 m x 4.3 m) spacing or 196 ft² (18.2 m²) maximum coverage area.
- Provides a cost-effective installation alternative to ESFR sprinklers using control mode sprinkler technology, eliminating in-rack sprinklers for storage heights up to 30 ft in buildings having a maximum ceiling height of 35 ft.
- Draft curtains not required to separate storage areas from other hazard occupancies within the same building.
- Significantly reduces the amount of sprinklers to be installed.
- Reliable levered fusible alloy solder link technology.
- Significant reduction in hydraulic demand compared to other storage sprinkler alternatives. Lower flow requirements offers opportunities to reduce sizing requirements of system piping, underground piping, fire pumps, and storage tanks.

Style:	Pendent
K-Factor:	25.2 (363)
Temp:	165°F (74°C), 212°F (100°C)
Max Pressure:	175 psi (12.1 bar)
Thread Size:	1" NPT (R1)
Finish:	Bronze, Chrome, White Polyester, Custom
Wrench:	Model N
Approvals:	FM

Technical Data: N252 EC Pendent

Max. Storage Ht.	Max. Ceiling Ht.	Max. Spacing	Minimum Pressure	Min. Design Area	Hose Stream	Water Supply Duration
20 ft (6.0 m)	25 ft (7.6 m)	196 ft ² (18.2 m ²)	25 psi (1.7 bar)	6 sprinklers	250 gpm (946.3 Lpm)	1 hr
25 ft (7.6 m)	30 ft (9.1 m)	196 ft ² (18.2 m ²)	30 psi (2.1 bar)	6 sprinklers	250 gpm (946.3 Lpm)	1 hr
30 ft (9.1 m)	35 ft (10.7 m)	144 ft ² (13.4 m ²)	40 psi (2.8 bar)	8 sprinklers	250 gpm (946.3 Lpm)	1 hr

Choose the right Sprinkler for the Lowest System Water Demand

Max. Storage Ht.	Max. Ceiling Ht.	Design Approach	Type of Sprinkler	System Demand	Hose Stream	Total Water Demand
20 ft	25 ft	CMDA - .6/2000	K-11.2 thru K-25.2	1200 gpm	500 gpm	1700 gpm
20 ft	25 ft	CMSA - 6 @ 25 psi	N252 EC	1010 gpm	250 gpm	1260 gpm
20 ft	27 ft	CMDA - .6/2000	K-11.2 thru K-25.2	1200 gpm	500 gpm	1700 gpm
20 ft	27 ft	CMSA - 6 @ 30 psi	N252 EC	1080 gpm	250 gpm	1330 gpm
25 ft	30 ft	CMDA - .8/2000	K-16.8	1600 gpm	500 gpm	2100 gpm
25 ft	30 ft	CMSA - 6 @ 30 psi	N252 EC	1080 gpm	250 gpm	1330 gpm

GREEN IS BETTER!!

For more detailed information including approval data, please refer to the technical bulletin specified.

Suppression Mode SPRINKLERS

HL-22 ESFR

Early Suppression Fast Response
Sprinkler



SIN: RA1011
Technical Bulletin: 010

Applications:

- High Piled and Rack Storage

Features:

- Suppression-mode sprinkler for the protection of encapsulated or non-encapsulated Class I-IV commodities and Group A plastics, including cartoned unexpanded and exposed unexpanded plastics.
- Optimized performance for solid piled, palletized and rack storage heights up to 40 ft (12.2 m) and maximum ceiling heights to 45 ft (13.7 m).
- Improved performance at lower pressures than K-14.0 (200) and K-16.8 (242) ESFR sprinklers.
- Increases ceiling to deflector distance to 18" (457 mm) from 14" associated with lower K-factor ESFRs.
- Eliminates the need for in-rack sprinklers in buildings up to 45 ft (13.7 m).
- Reliable levered fusible alloy solder link technology.
- Lower pressure and flow requirements offer opportunities to reduce sizing requirements of system piping, underground piping, fire pumps, and storage tanks.

Style: Pendent

K-Factor: 22.4 (320)

Temp: 165°F (74°C), 212°F (100°C)

Max Pressure: 175 psi (12.1 bar)

Thread Size: 1" NPT (R1)

Finish: Bronze

Wrench: Model H1

Approvals: cULus, FM, VdS, LPC

HL-22 Specific Application ESFR



SIN: RA7711
Technical Bulletin: 177

Features:

- Specific Application, Early Suppression, Fast Response sprinkler for the protection of high-piled storage
- Eliminates in-rack sprinklers for 48' high buildings
- Lower flows offer opportunities to reduce interior piping, fire pump sizes, underground pipe, and tank sizes
- Maximum deflector distance from ceiling (roof) is 14" (356mm)
- Utilizes fusible alloy solder link
- Delivers approximately 166 gpm (632 L/min) of water at 55 psi (3,8 bar)

Style: ESFR Pendent

K-Factor: 22.4 (320)

Temp: 212°F (100°C)

Max Pressure: 175 psi (12.1 bar)

Thread Size: 1" NPT (R1)

Finish: Bronze*

Wrench: Model H1

Approvals: cULus

*Sprinkler frame is painted White in order to provide a visual identifier of the temperature rating

For more detailed information including approval data, please refer to the technical bulletin specified.

Suppression Mode SPRINKLERS cont.

JL-17 ESFR

Early Suppression Fast Response Sprinkler



SIN: RA1914
Technical Bulletin: 019

Applications:

- High Piled and Rack Storage

Features:

- Suppression-mode sprinkler for the protection of encapsulated or non-encapsulated Class I-IV commodities and Group A plastics, including cartoned expanded/unexpanded and exposed unexpanded plastics.
- May be used for solid piled, palletized and rack storage heights up to 35 ft (12.2 m) and maximum ceiling heights to 40 ft (13.7 m) without in-rack sprinklers.
- May protect storage heights up to 40 ft (12.2 m) with ceiling heights up to 45 ft (13.7 m) when used in combination with one level of in-rack sprinklers.
- Designed to provide equivalent protection at lower pressures when compared to K-14.0 (200) ESFR sprinklers.
- Reliable levered fusible alloy solder link.
- Lower pressure and flow requirements offer opportunities to reduce sizing requirements of system piping, underground piping, fire pumps, and storage tanks.

Style: Pendent

K-Factor: 16.8 (242)

Temp: 165°F (74°C), 212°F (100°C)

Max Pressure: 175 psi (12.1 bar)

Thread Size: 3/4" NPT (R3/4)

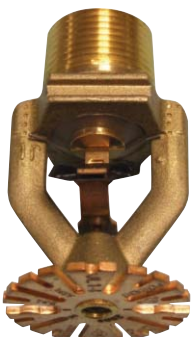
Finish: Bronze

Wrench: Model J1

Approvals: cULus, FM

JL-14 ESFR

Early Suppression Fast Response Sprinkler



SIN: RA1812
Technical Bulletin: 018

Applications:

- High Piled and Rack Storage

Features:

- Traditional suppression-mode sprinkler for the protection of encapsulated or non-encapsulated Class I-IV commodities and Group A plastics, including cartoned expanded/unexpanded and exposed unexpanded plastics.
- May be used to protect solid piled, palletized and rack storage heights up to 35 ft (12.2 m) and maximum ceiling heights to 40 ft (13.7 m) without in-rack sprinklers. (This may be changing with the publication of the 2013 edition of NFPA #13).
- Protects storage heights up to 40 ft (12.2 m) with ceiling heights up to 45 ft (13.7 m) when used in combination with one level of in-rack sprinklers.
- Reliable levered fusible alloy solder link.
- Extremely low profile provides flexible installation and pendent style can assist in minimizing seismic bracing requirements, offering the opportunity for pipe support using hangers less than 6" in length.

Style: Pendent

K-Factor: 14.0 (200)

Temp: 165°F (74°C), 212°F (100°C)

Max Pressure: 175 psi (12.1 bar)

Thread Size: 3/4" NPT (R3/4)

Finish: Bronze

Wrench: Model J1

Approvals: cULus, FM

For more detailed information including approval data, please refer to the technical bulletin specified.

Control Mode Density Area SPRINKLERS

N252 EC

Control Mode Density Area
(CMDA)
Pendent/Recessed Pendent
Extended Coverage Sprinkler



Applications:

- High Piled and Rack Storage, Extra Hazard Occupancies/Big Box Retail

Features:

- Maximum spacing of 14' x 14' or maximum 196 ft² coverage area. NFPA 13 permits 15 ft spacing with a maximum coverage area of 144 ft².
- Optimized for density/area applications of 0.34 gpm/ft² and greater.
- Approved for unobstructed and obstructed construction.
- Significantly reduces the amount of sprinklers to be installed.
- Meets NFPA 13 requirements for the use of K-11.2 storage sprinklers and complies with the special design criteria for retail stores.
- As a pendent sprinkler, it provides the opportunity to minimize seismic bracing requirements.
- Reliable levered fusible alloy solder link technology.
- Sprinkler demand based on actual spacing and coverage area (S x L rule).
- May be installed in finished ceilings utilizing the Model FP recessed escutcheon, which provides 1/2" of adjustment.



SIN: RA0842
Technical Bulletin: 008

Style: Pendent, Recessed Pendent

K-Factor: 25.2 (363)

Temp: 165°F (74°C), 212°F (100°C)

Max Pressure: 175 psi (12.1 bar)

Thread Size: 1" NPT (R1)

Finish: Bronze, Chrome, White Polyester

Wrench: Model N

Approvals: cULus, FM

J168

Control Mode Density Area
(CMDA)
Upright Sprinkler



SIN: RA1124
Technical Bulletin: 011

Applications:

- High Piled and Rack Storage, Extra Hazard Occupancies

Features:

- Control-mode, density area standard coverage upright sprinkler.
- Reliable center strut fusible alloy solder element - the only solder element for a K-16.8 (242) CMDA storage sprinkler in the industry.
- Meets NFPA 13 requirements for the use of K-11.2 (160) storage sprinklers.
- Eliminates the need for in-rack sprinklers protecting Class I-IV commodities and Group A plastics in 30 ft (9.1 m) high buildings with storage up to 25 ft (7.6 m) and in 27 ft (8.2 m) high buildings with storage up to 20 ft (6.1 m) per NFPA 13.
- Optimized for density/area applications of 0.45 gpm/ft² (18.3 mm/min) and greater.
- No increase in commodity classification (density increase) required for plastic pallets.
- Lower pressure requirements offers opportunities to reduce sizing requirements of system piping, underground piping, fire pumps, and storage tanks.

Style:	Upright
K-Factor:	16.8 (242)
Temp:	165°F (74°C), 212°F (100°C), 286°F (141°C)
Max Pressure:	175 psi (12.1 bar)
Thread Size:	3/4" NPT (R3/4)
Finish:	Bronze, Special finishes available upon request
Wrench:	Model J1
Approvals:	cULus, FM

G VELO

Control Mode Density Area
(CMDA)

Pendent Sprinkler



SIN: R4613

Technical Bulletin: 146

Applications:

- High Piled and Rack Storage, Extra Hazard Occupancies

Features:

- Control-mode, density area standard coverage pendent sprinkler.
- Reliable center strut fusible alloy solder element.
- Very extra large orifice for use in high challenge storage occupancies.
- May be installed in drops or directly in the branch line fitting.
- Meets NFPA 13 requirements for the use of K-11.2 (160) storage sprinklers.
- Eliminates the need for in-rack sprinklers in 27 ft (8.2 m) high buildings with storage up to 20 ft (6.1 m) when protecting Class I-IV commodities, Group A Plastics per NFPA 13.
- Pendent sprinklers can assist in minimizing seismic bracing requirements, offering the opportunity for pipe support using hangers less than 6" (152.4 mm) in length.
- Optimized for density/area applications of 0.37 gpm/ft² (15.1 mm/min) and greater.
- Lower pressure requirements offers opportunities to reduce sizing requirements of system piping, underground piping, fire pumps, and storage tanks.

Style:	Pendent
K-Factor:	14.0 (200)
Temp:	165°F (74°C), 212°F (100°C), 286°F (141°C)
Max Pressure:	175 psi (12.1 bar)
Thread Size:	3/4" NPT (R3/4)
Finish:	Bronze, Special finishes available upon request
Wrench:	Model H
Approvals:	cULus, FM

Control Mode Density Area SPRINKLERS cont.

G XLO

Control Mode Density Area
(CMDA)
Upright Sprinkler



SIN: R2921
Technical Bulletin: 129

Applications:

- High Piled and Rack Storage, Extra Hazard Occupancies

Features:

- Control-mode, density area standard coverage pendent sprinkler.
- Reliable center strut fusible alloy solder element.
- Extra large orifice for use in high challenge storage occupancies.
- Meets NFPA 13 requirements for the use of K-11.2 (160) storage sprinklers.
- Eliminates the need for in-rack sprinklers in 27 ft (8.2 m) high buildings with storage up to 20 ft (6.1 m) when protecting Class I-IV commodities, Group A Plastics per NFPA 13.
- Available with 1/2" NPT for retro-fit applications.
- Optimized for density/area applications of 0.30 gpm/ft² (12.2 mm/min) and greater.
- Lower pressure requirements offers opportunities to reduce sizing requirements of system piping, underground piping, fire pumps, and storage tanks.

Style:	Upright
K-Factor:	11.2 (160)
Temp:	165°F (74°C), 212°F (100°C), 286°F (141°C)
Max Pressure:	175 psi (12.1 bar)
Thread Size:	1/2" NPT (R1/2), 3/4" NPT (R3/4)
Finish:	Bronze, Special finishes available upon request
Wrench:	Model H
Approvals:	cULus, FM

GL 112 QR

Quick Response
Upright Sprinkler



SIN: R3266
Technical Bulletin: 132

Applications:

- High Piled and Rack Storage

Features:

- Complies with the FM requirements for QR Sprinklers to be used in Racks
- Lower pressure requirements offers opportunities to reduce sizing requirements of system piping, underground piping, fire pumps, and storage tanks.
- Increasing densities with existing systems

Style:	Upright
K-Factor:	11.2 (160)
Temp:	165°F (74°C), 212°F (100°C)
Max Pressure:	175 psi (12.1 bar)
Thread Size:	3/4" NPT (R3/4)
Finish:	Bronze, Special finishes available upon request
Wrench:	Model H
Approvals:	FM

Control Mode Density Area **SPRINKLERS** cont.

G



SIN: R1027, R1017
Technical Bulletin: 110

Applications:

- High Piled and Rack Storage, Extra Hazard Occupancies

Features:

- Solder-type fusible element

Style: Upright, Pendent

K-Factor: 8.0 (115)

Temp: 135°F (57°C), 165°F (74°C), 212°F (100°C), 286°F (141°C)

Max Pressure: 175 psi (12.1 bar)

Thread Size: 1/2" NPT (R1/2), 3/4" NPT (R3/4), 10 mm, 20 mm

Finish: Bronze, Special finishes available upon request

Wrench: Model D

Approvals: cULus, FM

F1



SIN: R1722, R1712
Technical Bulletin: 117

Applications:

- High Piled and Rack Storage, Extra Hazard Occupancies

Features:

- 5 mm glass bulb
- Available in standard coverage

Style: Upright, Pendent

K-Factor: 8.0 (115)

Temp: 135°F (57°C), 155°F (68°C), 175°F (79°C), 200°F (93°C), 286°F (141°C), 360°F (182°C)

Max Pressure: 175 psi (12.1 bar)

Thread Size: 3/4" NPT (R3/4)

Finish: Bronze, Special finishes available upon request

Wrench: Model GFR2

Approvals: cULus, FM

Intermediate Level (In-Rack) SPRINKLERS

G Standard Response

Pendent and Upright Intermediate Level Sprinklers



Technical Bulletin: 114

STORAGE SPRINKLERS - INTERMEDIATE LEVEL (In-Rack) SPRINKLERS:

Intermediate level sprinklers are installed in addition to ceiling sprinklers within rack storage systems where required by NFPA 13 or FM Data Sheets. These sprinklers have a water shield to protect the thermal element from spray discharge of operating ceiling sprinklers.

Applications:

- Multi-level rack installations and beneath open-gridded catwalks

Features:

- Upright (factory assembled) and pendent installations (field assembly required).
- Reliable center strut fusible alloy solder link.
- Can be used whenever there is a concern of inhibiting or adversely affecting operation of a sprinkler due to wetting from an overhead or ceiling sprinkler.
- Shield is constructed of galvanized zinc.
- Available with corrosion resistant finishes.

Style: Upright, Pendent

Temp: 135°F (57°C), 165°F (74°C), 212°F (100°C), 286°F (141°C)

Max Pressure: 175 psi (12.1 bar)

Finish*: Bronze, Special finishes available upon request

Wrench: Model D - Upright, Model RC1 - Pendent

Approvals: cULus, FM

*Note: For corrosion resistant finishes, only the sprinkler is lead plated or wax coated; shield finish remains galvanized zinc.

Technical Data: G Standard Response

Sprinkler Type	SIN Number	K-Factor	Thread Size
Pendent	R1015	5.6 (80)	1/2" NPT (R1/2)
Upright	R1425	5.6 (80)	1/2" NPT (R1/2)
Pendent	R1017	8.0 (115)	3/4" NPT (R3/4)
Upright	R1427	8.0 (115)	3/4" NPT (R3/4)

For more detailed information including approval data, please refer to the technical bulletin specified.

Intermediate Level (In-Rack) SPRINKLERS cont.

GFR Quick Response

Pendent and Upright Intermediate Level Sprinklers



Technical Bulletin: 131

Applications:

- Multi-level rack installations and beneath open-gridded catwalks

Features:

- Upright and pendent installations (field assembly required).
- Reliable levered fusible alloy solder link.
- Can be used whenever there is a concern of inhibiting or adversely affecting operation of a sprinkler due to wetting from an overhead or ceiling sprinkler.
- Shield is constructed of galvanized zinc.

Style: Upright, Pendent

Temp: 165°F (74°C), 212°F (100°C)

Max Pressure: 175 psi (12.1 bar)

Finish: Bronze, Special finishes available upon request

Wrench: Model D

Approvals: cULus, FM

Technical Data: GFR Quick Response

Sprinkler Type	SIN Number	K-Factor	Thread Size
Pendent	R3115	5.6 (80)	1/2" NPT (R1/2)
Upright	R3195	5.6 (80)	1/2" NPT (R1/2)
Pendent	R3117	8.0 (115)	3/4" NPT (R3/4)
Upright	R3197	8.0 (115)	3/4" NPT (R3/4)

Intermediate Level (In-Rack) SPRINKLERS cont.

F1, F156, F1FR, F1FR56

Standard and Quick Response Intermediate Level Sprinklers



Technical Bulletin: 031

Applications:

- Multi-level rack installations and beneath open-gridded catwalks

Features:

- Upright (factory assembled) and pendent installations (field assembly required).
- Available as either standard response (5mm glass bulb) or quick response (3 mm glass bulb).
- Can be used whenever there is a concern of inhibiting or adversely affecting operation of a sprinkler due to wetting from an overhead or ceiling sprinkler.
- Shield is constructed of galvanized zinc.
- Available with corrosion resistant finishes.

Style: Upright, Pendent

K-Factor: 5.6 (80), 8.0 (115)

Temp:

F156: 135° F (57°C), 155° F (68°C), 175° F (79°C), 200° F (93°C), 286° F (141°C), 360° F (182°C)

F1FR, F1FR56: 135° F (57°C), 155° F (68°C), 175° F (79°C), 200° F (93°C), 286° F (141°C)

Max Pressure: 175 psi (12.1 bar)

Thread Size: 1/2" NPT (R1/2), 3/4" NPT (R3/4)

Finish: Bronze, Custom

Approvals: cULus, FM

*Note: For corrosion resistant finishes, only the sprinkler is lead plated or wax coated; shield finish remains galvanized zinc.

Technical Data: F1

Sprinkler Type	SIN Number	K-Factor	Thread Size
Pendent	R1712	8.0 (115.3)	3/4" NPT (R3/4)
Upright	R7022	8.0 (115.3)	3/4" NPT (R3/4)

Technical Data: F156

Sprinkler Type	SIN Number	K-Factor	Thread Size
Pendent	RA1314	5.6 (80)	1/2" NPT (R1/2)
Upright	RA3125	5.6 (80)	1/2" NPT (R1/2)

Technical Data: F1FR

Sprinkler Type	SIN Number	K-Factor	Thread Size
Pendent	R3612	8.0 (115.3)	3/4" NPT (R3/4)
Upright	R7092	8.0 (115.3)	3/4" NPT (R3/4)

Technical Data: F1FR56

Sprinkler Type	SIN Number	K-Factor	Thread Size
Pendent	RA1414	5.6 (80)	1/2" NPT (R1/2)
Upright	RA3195	5.6 (80)	1/2" NPT (R1/2)

For more detailed information including approval data, please refer to the technical bulletin specified.

Intermediate Level (In-Rack) SPRINKLERS cont.

Separate Sprinkler Guard and Water Shield Kits

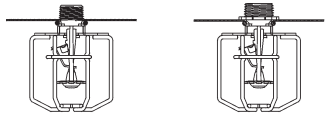
Model C-5

Cage Size: 2-7/8" (73 mm) H
x 2-3/4" (70 mm) Dia.



Model D-4

Cage Size: 2-5/8" (67 mm) H
x 3" (76 mm) Dia.



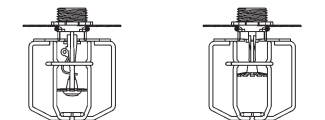
SHOWN MODEL GFR 1/2" NPT SPRINKLER
PENDING APPROVALS

SHOWN MODEL F1 3/4" NPT SPRINKLER
PENDING APPROVALS

2008-1-C

Model D-5

Cage Size: 2-5/8" (67 mm) H
x 3" (76 mm) Dia.



SHOWN MODEL GFR 3/4" NPT SPRINKLER
PENDING APPROVALS

SHOWN MODEL F1 1/2" NPT SPRINKLER
PENDING APPROVALS

Combination Sprinkler Guard and Water Shield Kits

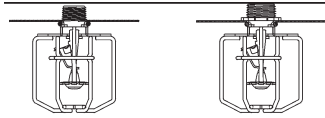
Model C-3

Cage Size: 2-7/8" (73 mm) H
x 2-3/4" (70 mm) Dia.



Model D-3

Cage Size: 2-5/8" (67 mm) H
x 3" (76 mm) Dia.

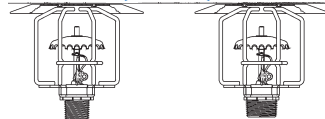


SHOWN MODEL GFR 1/2" NPT SPRINKLER
PENDING APPROVALS

SHOWN MODEL F1 3/4" NPT SPRINKLER
PENDING APPROVALS

Model D-6

Cage Size: 2-5/8" (67 mm) H
x 3" (76 mm) Dia.



MODEL G 3/0225 1/2" NPT SPRINKLER
PENDING APPROVALS

MODEL G 3/0231 3/4" NPT SPRINKLER
PENDING APPROVALS

Sprinkler Guards and Combination Guards and Water Shields:

Intermediate level sprinklers and sprinklers in areas with low ceilings in a storage environment can be exposed to field damage. Reliable has a variety of sprinkler guards and combination sprinkler guard and shield assemblies for several of our spray and storage sprinklers. Each guard type is fabricated of heavy gauge wire welded to steel mounting plates and finished with zinc-with-chromate dip plating. Sprinkler guards are listed and approved for use with specific sprinklers.

Applications:

- Multi-level installations, beneath open-gridded catwalks and grated mezzanines, and low clearance areas where sprinklers are subject to damage.

Features:

- Available as separate sprinkler guard and water shield kits, or as combination sprinkler guard and shield assemblies.
- Constructed of heavy gauge wire welded to steel mounting plates and finished with zinc plating.
- Model C series guards are designed to be assembled onto installed sprinklers.
- Model D guard kits are designed to be assembled to the sprinkler in the field prior to sprinkler installation. Model D series guards are available factory assembled on the sprinkler upon request.
- Water shield kits include water shield, locknuts and O-rings.
- Standard Finish-Zinc with chromate dip. Other finishes available on request.

Sprinkler Guards Approved⁽¹⁾ for Reliable Storage Sprinklers

Sprinkler Guard Model	Sprinkler Model Application	Sprinkler Type	Sprinkler K-Factor	Approvals	
				cULus	FM
C-3	G, GFR, F1, F1FR	Upright Intermediate	K-5.6, K-8.0	R3625, R3622, R3125, R3127, R1725, R1722, R1025, R1026, R1027	R3625, R1725, R1025, R1027
C-5	G, F1, F1FR	Pendent Intermediate	K-5.6, K-8.0		R1015, R1017, R3615, R1715, R1712, R3612
D-3	G, GFR, F1, F1FR	Upright Intermediate	K-5.6, K-8.0	R3625, R3622, R3125, R3127, R1725, R1722, R1025, R1026, R1027	
D-4	G, GFR, F1, F1FR	Pendent Intermediate (Large Shield)	K-5.6, K-8.0	R3115, R3117	
D-5	G, F1, F1FR	Pendent Intermediate (Small Shield)	K-5.6, K-8.0	R3615, R3612, R1715, R1712, R1015, R1016, R1017	
D-6	G XLO	Upright Intermediate	K-11.2	R2921	

⁽¹⁾ Sprinkler guards are listed and approved only for use with specific sprinklers. The use of any other sprinkler guards on these sprinklers may adversely affect their operation or spray distribution, negating all approvals and warranties

Technical Bulletin: 208

International SPRINKLERS

F1FR-FS56 Flat Spray



SIN: RA2214
Technical Bulletin: 022

Features:

- VdS Approved and CE Certified – for International market only
- Excellent choice for applications with lower clearance above the suspended open ceilings and in racks
- 3mm glass bulb

Style:	Pendent, Pendent with shield
K-Factor:	80 metric (5.6 US)
Temp:	57°C (135°F), 68°C (155°F), 79°C (175°F), 93°C (200°F), 141°C (286°F)
Max Pressure:	12.1 bar (175 psi)
Thread Size:	R1/2" BSPT (1/2" NPT)
Finish:	Sprinkler: Bronze Shield: Galvanized
Wrench:	Model D
Approvals:	VdS

F1FR-FS LO Large Orifice Flat Spray



SIN: RA3717
Technical Bulletin: 037

Features:

- VdS Approved and CE Certified – for International market only
- Excellent choice for applications with lower clearance above the suspended open ceilings and in racks
- 3mm glass bulb

Style:	Pendent, Pendent with shield
K-Factor:	115 metric (8.0 US)
Temp:	57°C (135°F), 68°C (155°F), 79°C (175°F), 93°C (200°F), 141°C (286°F)
Max Pressure:	12.1 bar (175 psi)
Thread Size:	R1/2" BSPT (1/2" NPT)
Finish:	Sprinkler: Bronze Shield: Galvanized
Wrench:	Model D
Approvals:	VdS

F1FR LO Large Orifice Flat Spray



SIN: RA3812
Technical Bulletin: 038

Features:

- VdS Approved and CE Certified – for International market only
- Combines the durability of standard sprinklers with the attractive low profile of a decorative sprinkler
- 3mm glass bulb

Style:	Upright, Pendent, Recessed Pendent
K-Factor:	115 metric (8.0 US)
Temp:	57°C (135°F), 68°C (155°F), 79°C (175°F), 93°C (200°F), 141°C (286°F)
Max Pressure:	12.1 bar (175 psi)
Thread Size:	R1/2" BSPT (1/2" NPT)
Escutcheon:	F1, F2, FP Push-on/Thread-off
Finish:	Bronze, Chrome, White, Custom
Wrench:	Model D
Approvals:	VdS

For more detailed information including approval data, please refer to the technical bulletin specified.

F1S5-FS56 Flat Spray



SIN: RA2314
Technical Bulletin: 023

Features:

- VdS Approved and CE Certified – for International market only
- Excellent choice for applications with lower clearance above the suspended open ceilings and in racks
- 5mm glass bulb

Style: Pendent, Pendent with shield

K-Factor: 80 metric (5.6 US)

Temp: 57°C (135°F), 68°C (155°F), 79°C (175°F), 93°C (200°F), 141°C (286°F)

Max Pressure: 12.1 bar (175 psi)

Thread Size: R1/2" BSPT (1/2" NPT)

Finish: Sprinkler: Bronze Shield: Galvanized

Wrench: Model D & GF2

Approvals: VdS

F1S5 Standard Spray



SIN: RA2414
Technical Bulletin: 024

Features:

- VdS Approved – for International market only
- Combines the durability of standard sprinklers with the attractive low profile of a decorative sprinkler
- 5mm glass bulb

Style: Upright, Pendent, Conventional, Recessed Pendent

K-Factor: 80 metric (5.6 US)

Temp: 57°C (135°F), 68°C (155°F), 79°C (175°F), 93°C (200°F), 141°C (286°F)

Max Pressure: 12.1 bar (175 psi)

Thread Size: R1/2" BSPT (1/2" NPT)

Escutcheon: F1, F2, FP Push-on/Thread-off

Finish: Bronze, Chrome, Custom

Wrench: Model D & GFR2

Approvals: VdS



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