TECHNICAL DATA

ESFR DRY PENDENT SPRINKLER
VK512 K25.2 (GROOVED)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
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1. DESCRIPTION

Viking Early Suppression Fast Response (ESFR) Dry Pendent Sprinkler VK512 is a fast response fusible element type sprinkler designed for use in storage areas subject to freezing and supplied from a wet system only, in an adjacent heated area. With a 25.2 (363 metric) nominal K-Factor and special deflector, this sprinkler produces large, high-momentum water droplets in a hemispheric pattern below the deflector. This permits penetration of the fire plume and direct wetting of the burning fuel surface while cooling the atmosphere early in the development of a high-challenge fire.

The dry ESFR sprinkler consists of a fusible element style ESFR sprinkler permanently secured to a special supply nipple. The sprinkler assembly features a sealed brass inlet that's grooved. Also included with the ESFR dry sprinkler are two insulating boot assemblies (optional) to help seal the clearance space around the dry sprinkler barrel. The dry sprinkler boot assembly is intended to slow the exchange of air between the inside and outside of the freezer (or any dry sprinkler installation) to help mitigate condensation and humidity and temperature differentials in the area around the sprinkler. Condensation can lead to ice build-up, which could inhibit sprinkler operation or cause premature operation.

2. LISTINGS AND APPROVALS*

FM Approved: Class 2026

CE CPR: EAD 100002-00-1106 March 2016, Declaration of Performance DOP_VK512.

* Refer to the Approval Chart and Design Criteria for requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Available since 2022
Tube diameter: 1-11/16" (43.86 mm)
Minimum Operating Pressure: Refer to NFPA 13 and FM Loss Prevention Data Sheet 8-9.
Maximum Working Pressure: 175 psi (12 bar).
Factory tested hydrostatically to 500 psi (34.5 bar).
Connections: 1-1/2" grooved
Nominal K-Factor: 25.2 U.S. (363 metric*)

WARNING: Cancer and Reproductive Harm- www.P65Warnings.ca.gov

* Metric K-factor measurement shown is when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Deflector Diameter: 1-3/4" (44.5 mm)
Overall Length: Refer to Table 1.

Sprinkler Assembly Materials of Contruction:
Sprinkler Frame Casting: QM Brass or DZR Brass, ENT version fully coated
Deflector: Phosphor Bronze UNS-C51000, ENT version fully coated
Seat: Brass UNS-C36000
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Spring Base: Brass UNS-C31400 or UNS-C31600
Back-Up Nut: Brass UNS-C36000, ENT version fully coated
Compression Screw: Stainless Steel UNS-S31603
Trigger and Support: Stainless Steel UNS-S31600
Fusible Element Assembly: Beryllium Nickel, coated with black or white epoxy, polyurethane, or acrylic paint
Tube: Steel Tube ASTM A-513
Orifice: Brass UNS-C36000
Inlet: Brass UNS-C84400
Support (Internal): Brass UNS-C36000
Barrel: Steel Tube ASTM A-513, Electrodeposited Epoxy Base finish

Accessories: Sprinkler cabinet 01731A

Boot Assembly Materials of Contruction:
Seal: ASTM D1056 2A0/1 4015-EL EPDM-Butyl-PE Foam Rubber OR ASTM D1056 2A1 Neoprene/EPDM/SBR OR ASTM D1056 2C1 Neoprene/EPDM
Over Seal Ring and Under Seal Ring: Cold Rolled Steel Finish: White Paint; #10 Screws: Stainless Steel

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Ordering Instructions:

1. Choose a sprinkler part number/size (See Table 1),
2. add the suffix for the desired finish (See Table 2),
3. add the suffix for the desired temperature rating (See Table 3).

NOTE: Each sprinkler assembly includes 2 insulating boots.

EXAMPLE:

24853AC = VK512 at 25½" with a 165 °F (74 °C) temperature rating. This sprinkler is to be installed into an area with a maximum ambient temperature of 100 °F (38 °C) meaning if the area will experience temperatures above the maximum ambient rating, you shall use a higher temperature-rated sprinkler

TABLE 1: BASE PART NUMBER

Base Part Number	Nominal Length ("L"- See Figure 1)	Connection Style	Connection Size
24850	19½" (495 mm)	Grooved	1½"
24853	25½" (648 mm)		
24856	31½" (800 mm)		
24859	37½" (950 mm)		

TABLE 2: FINISHES

Suffix	Description
A	Brass
JN	Electroless Nickel PTFE (ENT)

TABLE 3: TEMPERATURE RATINGS

Suffix	Temperature Classification	Nominal Temperature Rating	Maximum Ambient Ceiling Temperature[1]	Frame Paint Color
C	Ordinary	165 °F (74 °C)	100 °F (38 °C)	None
E	Intermediate	205 °F (96 °C)	150 °F (65 °C)	White

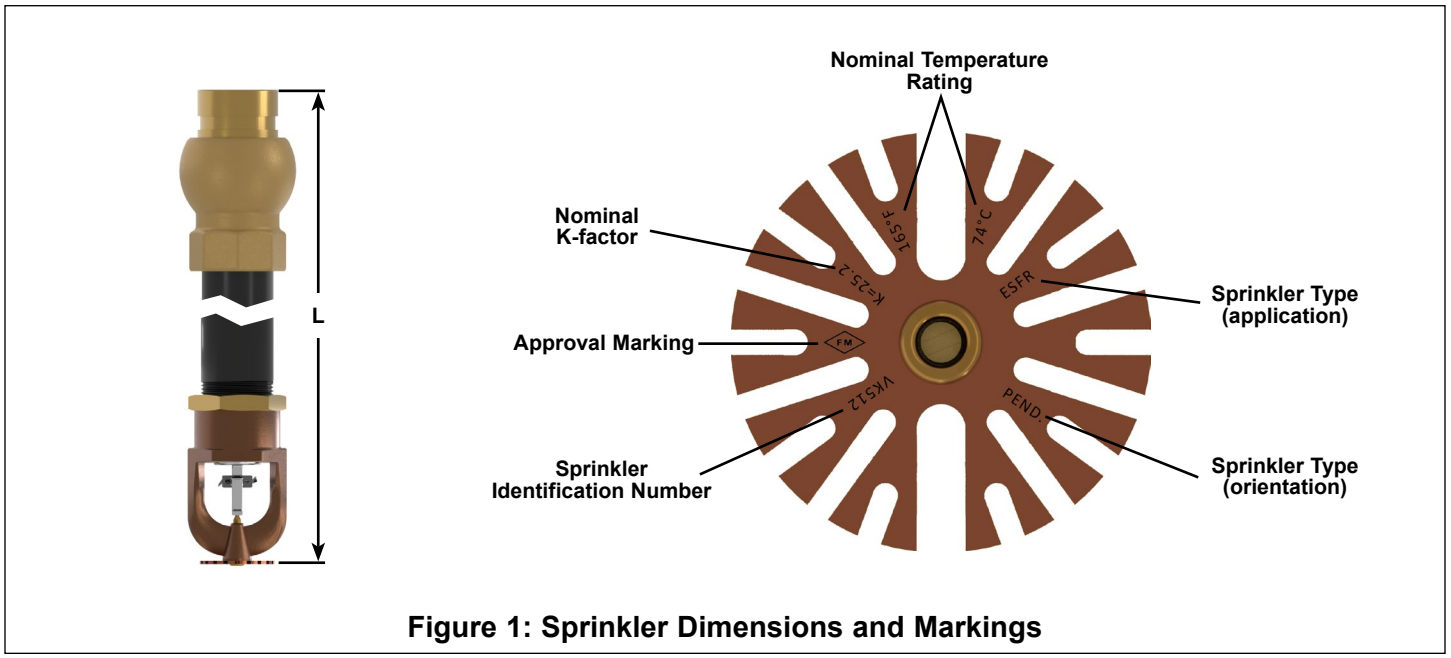

Figure 1: Sprinkler Dimensions and Markings

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4. INSTALLATION

Refer to appropriate FM Global and/or any other applicable installation standards.

NOTICE

FULLY READ AND UNDERSTAND THE INSTRUCTIONS BELOW BEFORE INSTALLING THESE SPRINKLERS.

NOTICE

Viking recommends using the included insulating boot assemblies in accordance with the installation instructions in this technical data page. The optional insulating boot assemblies shall be installed on smooth, flat, and clean surfaces. There are specific situations, such as corrugated ceiling panels, where alternative penetration sealing methods should be used. For additional information contact Viking Technical Services.

NOTICE

Wet pipe systems must be provided with adequate heat.

NOTICE

Viking ESFR Dry Sprinklers shall be installed into the 1-1/2" grooved run of tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150)The VK512 can be installed into welded outlets that meet the dimensional requirements of ANSI B16.11.

⚠ WARNING

Viking sprinklers are manufactured and tested to meet the rigid requirements of the approving agency. The sprinklers are designed to be installed in accordance with recognized installation standards. Deviation from the standards or any alteration to the sprinkler after it leaves the factory including, but not limited to: painting, plating, coating, or modification, may render the sprinkler inoperative and will automatically nullify the approval and any guarantee made by The Viking Corporation.

General Information:

- Sprinklers must be handled with care.
- Sprinklers must be stored in a cool, dry place in the original shipping container.
- Never install sprinklers that have been dropped or damaged in any way. Dropped or damaged sprinklers should be destroyed immediately.
- Before installing, be sure to have the appropriate sprinkler model and style, with the correct orifice size, temperature rating, and response characteristics.

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INSTALLATION TIP:

Prior to final installation, temporarily install all components described in the procedure below to verify the correct measurements have been achieved.

Procedure:

1. Inspect the sprinkler assembly for damage.
2. Install all piping before installing the sprinkler.
3. Drill a 3½" hole for the sprinkler.
4. Verify the protective cap is installed and insert the sprinkler into the pre-drilled hole.
5. Lubricate or seal the gaskets on the grroved coupling as necessary.
6. Secure the sprinkler in place with a suitable grooved coupling.
7. Clean the contact surfaces for the insulating boot.

NOTE: When installing insulating boots, pilot holes are required in metallic ceilings.

8. Carefully pull apart the rubber rings (A) to install onto the barrel.
9. Place the 2 halves of the seal casing (B) on either side of the barrel and hold in place, then install and tighten the screws (C).

NOTICE: Specific situations and conditions may exist that require alternative sealing methods. A few of these methods are shown in Figure 3. Additional sealing methods may also be used; however, the material(s) used must not break down, drip, over-spray, or otherwise interfere with or impede the operation of the sprinkler—especially during fire conditions.

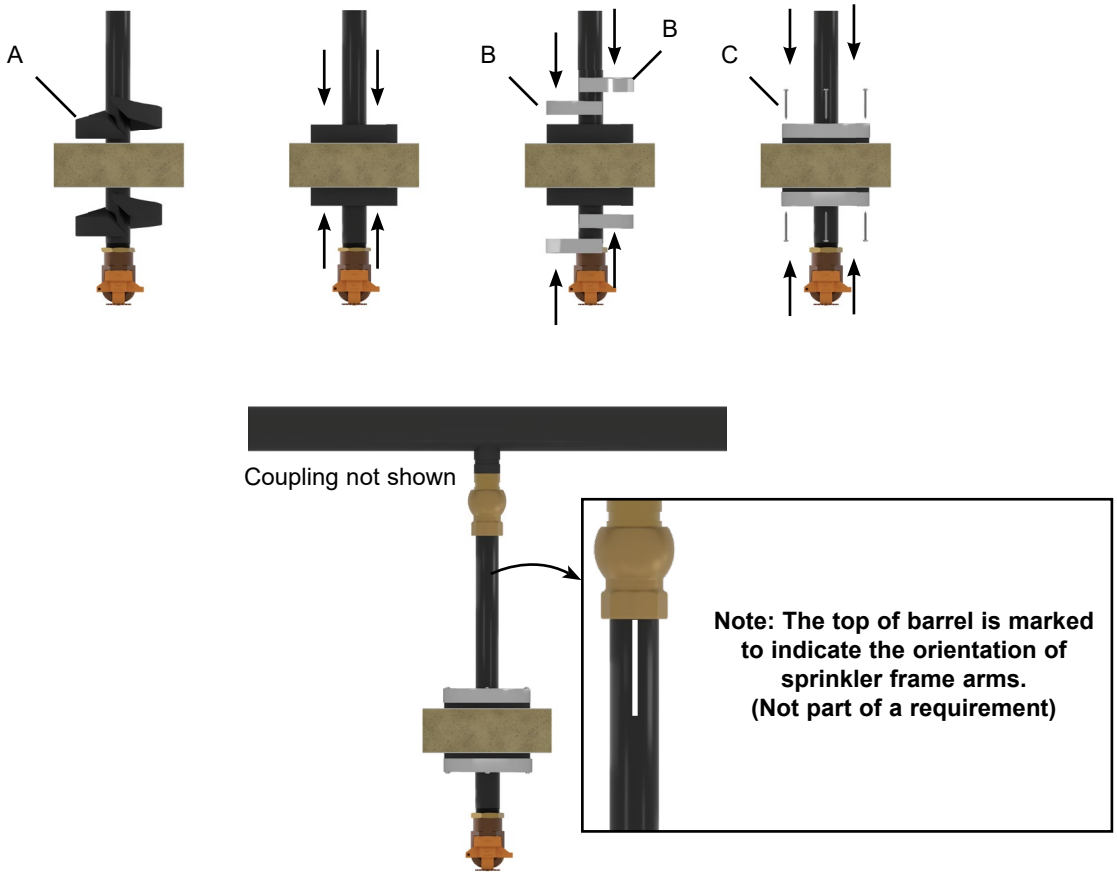

Figure 2: Sprinkler Installation

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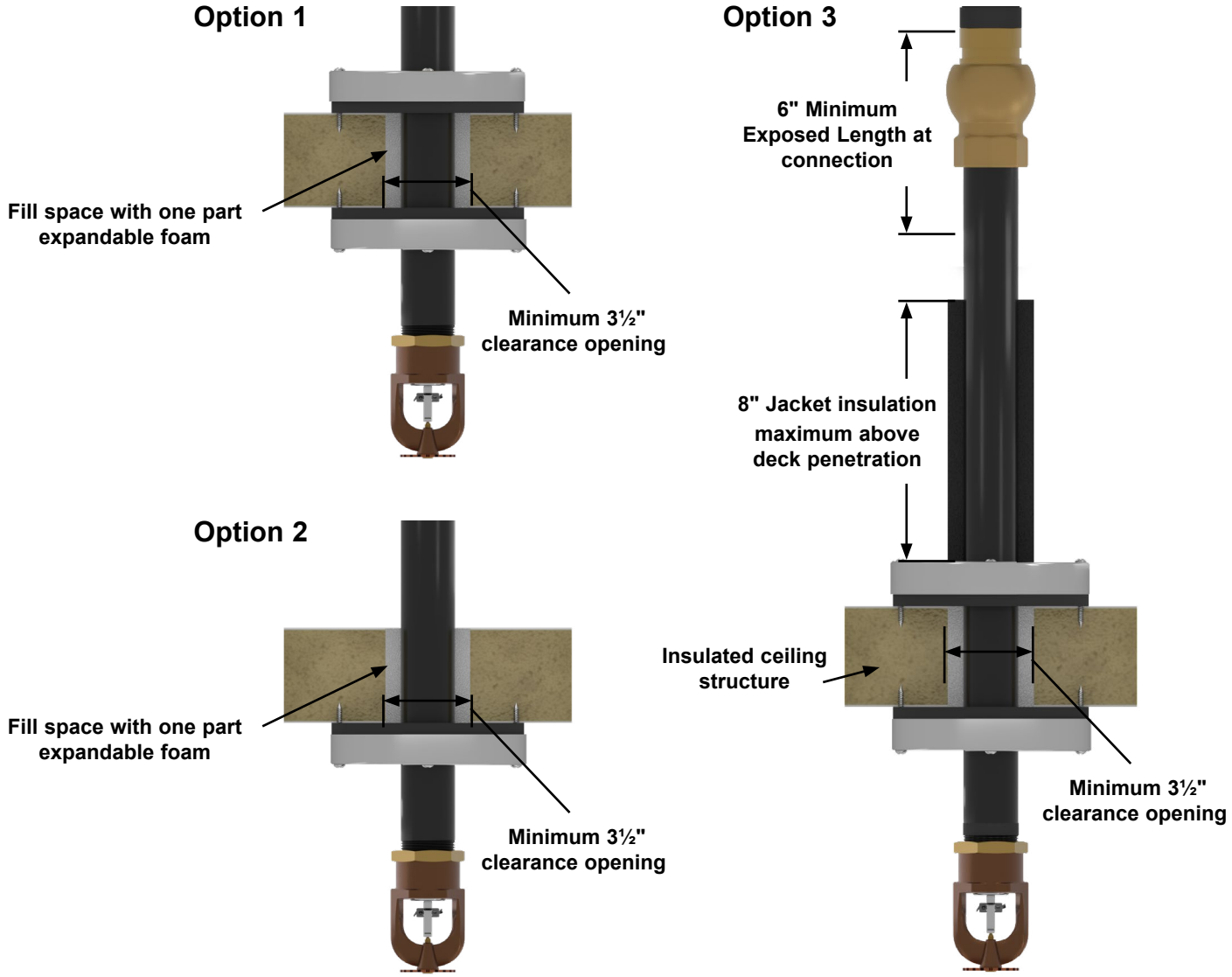

Figure 3: Recommended Sealing Methods

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5. APPROVAL DESIGN REQUIREMENTS

5.1 FM Approval Requirements

The VK512 is FM Approved as a quick response pendent Storage sprinkler. Sprinklers are to be installed in accordance with the latest edition of Viking technical data, the latest standards of FM Global Loss Prevention Data Sheets including 2-0 and 8-9 and any other Authorities Having Jurisdiction, and also with provisions of governmental codes, ordinances, and standards whenever applicable.

5.5.1 Protecting Dry Pendent Sprinklers

Refer to FM 2-0 and Figure 4. Maintain a minimum 12” (300 mm) vertical distance between the top of the area’s ceiling and the overhead sprinkler piping that will feed the dry-pendent sprinklers.

5.5.2 NFPA Requirement for Minimum Exposed Barrel Lengths

Refer to the latest edition of NFPA 13. Where dry sprinklers are connected to wet pipe sprinkler systems protecting areas subject to freezing temperatures, the minimum exposed length of the barrel of the dry sprinkler shall be in accordance with Table 3 below.

Table 3: NFPA Exposed Barrel Lengths For Dry Sprinklers

Ambient Temperature of the Protected Area at the discharge end of the Sprinkler	Exposed Barrel Ambient Temperature		
	40 °F (4 °C)	50 °F (10 °C)	60 °F (16 °C)
	Minimum Exposed Barrel Lengths (based on ambient temperaures above)		
	Inches (mm)	Inches (mm)	Inches (mm)
40 °F (4 °C)	0	0	0
30 °F (-1 °C)	0	0	0
20 °F (-7 °C)	4 (100)	0	0
10 °F (-12 °C)	8 (200)	1 (25)	0
0 °F (-18 °C)	12 (300)	3 (75)	0
-10 °F (-23 °C)	14 (350)	4 (100)	1 (25)
-20 °F (-29 °C)	14 (350)	6 (150)	3 (75)
-30 °F (-34 °C)	16 (400)	8 (200)	4 (100)
-40 °F (-40 °C)	18 (450)	8 (200)	4 (100)
-50 °F (-46 °C)	20 (500)	10 (250)	6 (150)
-60 °F (-51 °C)	20 (500)	10 (250)	6 (150)

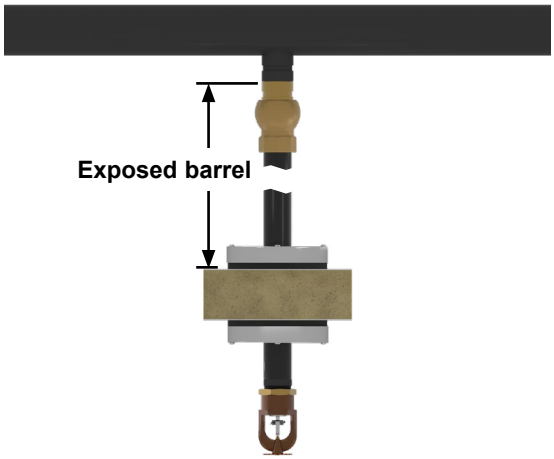

Figure 4: Minumum Exposed Barrel Length

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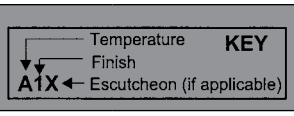
Listing and Approval Specifications

ESFR Dry Pendent Sprinkler VK512
Maximum 175 PSI (12 bar) WWP



Base Part Number[1]	Nominal Length	SIN	Connection Size	Nominal K-Factor		Approval Specification[3]	
				U.S.	metric[2]	FM	CE
24850	19½" (495 mm)	VK512	1½"	25.2	363	A1, A2	A1
24853	25½" (648 mm)						
24856	31½" (800 mm)						
24859	37½" (950 mm)						

Approved Temperature Ratings	Approved Finish
A - 165 °F (74 °C) and 205 °F (96 °C)	1 - Brass 2 - ENT

Footnotes

[1] Base part number shown. For complete part number, refer to the price list.
[2] Metric K-Factor measurement shown is when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-Factor by 10.0.
[3] This chart shows listings and approvals available at the time of printing. Other approvals may be in process.

IMPORTANT: Refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Table 2.

TABLE 4
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR MODEL VK512 ESFR PENDENT SPRINKLERS

Storage Type	NFPA	FM
Sprinkler Type	ESFR	Storage
Response Type	ESFR	QR
System Type	Wet Pipe system only	Wet Pipe system only
Temperature Rating(s) ºF (ºC)	165 ºF (74 ºC) and 205 (96 ºC)	165 ºF (74 ºC) and 205 (96 ºC)
Open Frame Single, Double, Multiple-Row, or Portable Rack Storage of Class I-IV and Group A or B Plastics	Refer to NFPA 13.	Refer to FM 2-0 and 8-9.
Solid Pile or Palletized Storage of Class I-IV and Group A or B Plastics	Refer to NFPA 13.	Refer to FM 2-0 and 8-9.
Idle Pallet Storage	Refer to NFPA 13.	Refer to FM 2-0, 8-9, and 8-24.
Rubber Tire Storage	Refer to NFPA 13.	Refer to FM 2-0 and 8-3.
Rolled Paper Storage (Refer to the standard.)	Refer to NFPA 13.	Refer to FM 8-21.
Flammable Liquid Storage (Refer to the standard.)	Refer to NFPA 30.	Refer to FM 7-29
Aerosol Storage (Refer to the standard.)	Refer to NFPA 30B	Refer to FM 7-31
Automotive Components in Portable Racks (Control mode only, refer to the standard.)	Refer to NFPA 13.	N/A
Minimum exposed barrel length	Refer to NFPA 13.	Refer to FM 2-0

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After Installation:

1. The entire sprinkler system must be tested. The test must be conducted to comply with the Installation Standards. Make sure the sprinkler has been properly tightened. Repair any leaks as necessary. Air testing the sprinkler piping prior to testing with water may be considered in areas where leakage during testing must be prevented. Refer to the appropriate technical data and the AHJ prior to air testing the sprinkler piping. Immediately replace any damaged units.
2. After installation and testing and repairing of all leaks, remove the protective shields from the sprinklers by hand. **Do NOT** use any type of tool to remove the shield. When removing shields, use care to prevent damaging sprinkler fusible element. **NOTICE: THE SHIELDS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**
3. System design must be based on ESFR design guidelines described in the latest standards and the Authorities Having Jurisdiction. All requirements of recognized ESFR storage sprinkler system design standards apply to systems utilizing Viking ESFR Dry Pendent Sprinklers.

6. OPERATION

During fire conditions, the heat-sensitive fusible element assembly disengages, releasing the internal parts to open the waterway. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to suppress the fire.

7. INSPECTIONS, TESTS AND MAINTENANCE

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition. For minimum maintenance and inspection requirements, refer to NFPA 25 or FM 2-81 for Inspection, Testing and Maintenance requirements. In addition, the Authority Having Jurisdiction may have additional maintenance requirements that must be followed.

A. The sprinklers must be inspected on a regular basis for corrosion, mechanical damage, obstructions, paint, etc. The frequency of inspections may vary due to corrosive atmospheres, water supplies, and activity around the device.
B. Sprinklers that have been painted or mechanically damaged must be replaced immediately. Sprinklers showing signs of corrosion shall be tested and/or replaced immediately as required. Installation standards require sprinklers to be tested and, if necessary, replaced after a specified term of service. Refer to the installation standards and the Authority Having Jurisdiction for the specified period of time after which testing and/or replacement is required. Sprinklers that have operated cannot be reassembled or reused, but must be replaced. When replacing sprinklers, use only new sprinklers.
C. The sprinkler discharge pattern is critical for proper fire protection. Nothing should be hung from the sprinkler, attached to it, or otherwise obstruct the discharge pattern. All obstructions must be immediately removed or, if necessary, additional sprinklers installed.
D. When replacing existing sprinklers, the system must be removed from service. Refer to the appropriate system description and/or valve instructions. Prior to removing the system from service, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected area.
    1. Remove the system from service, drain all water, and relieve all pressure on the piping.
    2. Remove the ESFR dry sprinkler insulating boot assemblies.
    3. Remove the old sprinkler and install the new unit. Care must be taken to ensure that the replacement sprinkler is the proper model and style, with the correct orifice size, temperature rating, and response characteristics.
    4. Install new ESFR dry sprinkler boot assemblies.
    5. Place the system back in service and secure all valves. Check the replaced sprinklers and repair all leaks.
E. Sprinkler systems that have been subject to a fire must be returned to service as soon as possible. The entire system must be inspected for damage and repaired or replaced as necessary. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced. Refer to the Authorities Having Jurisdiction for minimum replacement requirements.

8. AVAILABILITY

Viking Sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

9. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.