



## TECHNICAL BULLETIN

**ESFR PENDENT SPRINKLER**  
**UL: SPECIFIC APPLICATION ESFR SPRINKLER**  
**FM: STORAGE SPRINKLER**  
**NFPA: SPECIAL SPRINKLER**  
**VK510 (K25.2)**

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

Visit the Viking website for the latest edition of this technical data page [www.vikinggroupinc.com](http://www.vikinggroupinc.com)

### 1. DESCRIPTION

Viking Early Suppression Fast Response (ESFR) Pendent Sprinkler VK510 incorporates the capability to suppress specific high-challenge fires. The larger K-Factor allows protection of higher hazard commodities at greater ceiling heights with lower end-head pressures. K25.2 sprinklers can:

- Provide flexibility of fire protection designs.
- Reduce or eliminate the need for a system fire pump.
- Eliminate the use of in-rack sprinklers when protecting high piled storage of certain specified materials up to:

**UL (Refer to Table 4):** 40 ft. (12,2 m) with ceilings up to 45 ft. (13,7 m)\*

**FM (Refer to Table 5):** 45 ft. (13,7 m) with ceilings up to 50 ft. (15,2 m)\*

**NFPA 13 (Refer to Table 6):** The VK510 is a Special Sprinkler as defined by the National Fire Protection Association (NFPA 13, 2022 Ed.-Section 15.2).

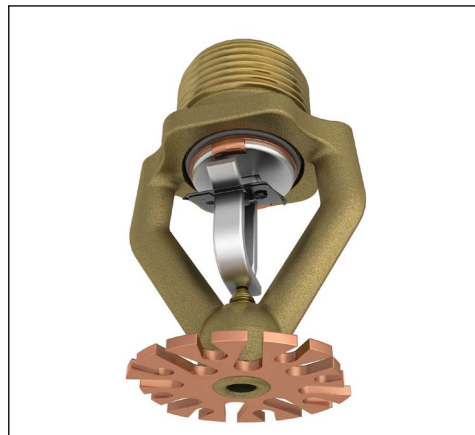
Viking ESFR Pendent Sprinklers VK510 are primarily intended to protect the following types of storage, which tend to produce severe-challenge fires: palletized and solid pile storage as well as single, double, multiple, and portable open rack storage (no open-top containers or solid shelves). The VK510 is listed to utilize a minimum aisle width of 6'-0" (UL - 40' storage or FM - 45' storage).

Viking ESFR Pendent Sprinklers VK510 provide protection of most common storage materials, including:

- Encapsulated or unencapsulated Class I, II, III, and IV commodities\*.
- cULus Listed for protection of cartoned nonexpanded\*\* Group A plastic commodities\*.
- FM Approved for protection of cartoned unexpanded\*\* plastic commodities.\*

\* Refer the Approval Chart and Commodity Selection and Design Criteria Overview for Listing and Approval requirements that must be followed.

\*\*The terms nonexpanded and unexpanded are equivalent.



**TABLE 1**  
**SPRINKLER GENERAL INFORMATION**

Item	Description
Sprinkler Identification Number (SIN)	VK510
K-factor, gpm/psi <sup>1/2</sup> (lpm/bar <sup>1/2</sup> )	25.2 (363)
Thread Size	1" NPT (25 mm)
Sprinkler Orientation	Pendent
Maximum Working Pressure	175 psi (12 bar)

### 2. LISTINGS AND APPROVALS\*



**cULus Listed:** Category VNWH (Listed as a Specific Application ESFR Sprinkler)



**FM Approved:** Class 2026



**VdS Approved:** Certificate G4040015



**LPCB Approved:** Ref. No. 096g/01

**China Approval:** Approved according to China GB Standard



**WARNING:** Cancer and Reproductive Harm-  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

\* Refer the Approval Chart and Commodity Selection and Design Criteria Overview for Listing and Approval requirements that must be followed.

**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.**



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### 3. TECHNICAL DATA

#### Specifications:

Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 1" NPT or 25 mm BSPT (Refer to Table 2)

Nominal K-factor: 25.2 U.S. (363 metric\*)

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

Overall Length: 3-3/16" (81 mm)

Deflector Diameter: 1-3/4" (45 mm)

#### Material Standards:

Frame Casting: Brass UNS-C84400

Deflector: Phosphor Bronze UNS-C51000

Seat: Copper UNS-C11000 and Stainless Steel UNS-S30400

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape

Compression Screw: Stainless Steel UNS-S31603

Trigger and Support: Stainless Steel UNS-S31600

Fusible Element Assembly: Beryllium nickel coated with black acrylic paint.

**NOTICE: DO NOT DISASSEMBLE SPRINKLER**

Image is not to scale.

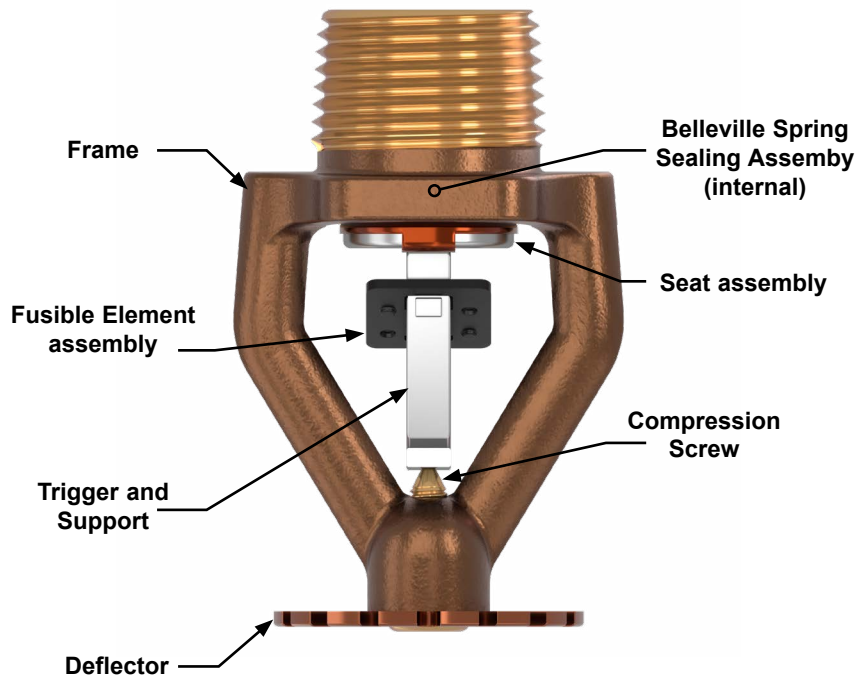


Figure 1:  
Sprinkler Components



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### Ordering Instructions

1. Choose a sprinkler base part number with the required thread size and listing or approval (refer to the approval chart).
2. Add the suffix for the desired finish.
3. Add the suffix for the desired temperature rating.

**EXAMPLE:** 12080AC = VK510 with brass finish and 165 °F (74 °C) nominal temperature rating. This sprinkler is to be installed into an area with a maximum ambient temperature of 100 °F (38 °C).

**NOTE:** The “-TQ” suffix for the part numbers below indicates a special protective cap (Figure 2-B) intended for use with InstaSeal® fittings. When ordering sprinklers with TQ suffixes in combination with InstaSeal® fittings, refer to Form No. F\_021223 for installation instructions.

Sprinkler Base Part Number	
Part Number	Thread Size
12080	1" NPT
12080XX-TQ*	1" NPT
12200	25 mm BSPT
12200XX-TQ*	25 mm BSPT
20373	25 mm BSPT

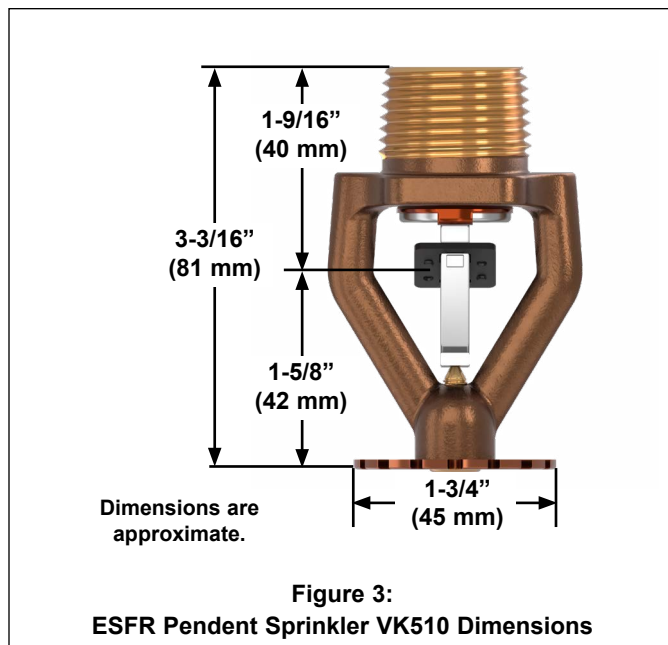
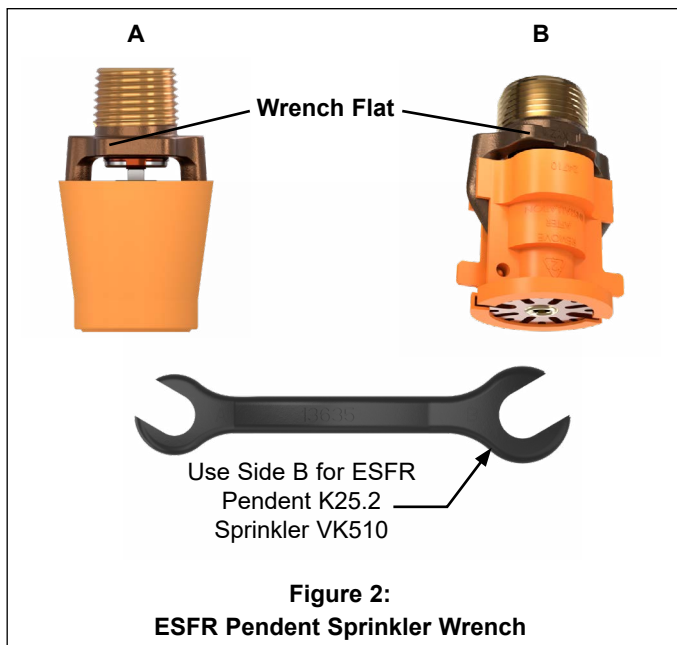
Finish	
Description	Suffix
Brass	A

Temperature Ratings			
Temperature Rating	Frame Color	Maximum Ambient Ceiling Temperature	Suffix
165 °F (74 °C)	None	100 °F (38 °C)	C
205 °F (96 °C)	White	150 °F (66 °C)	E

\* Where “XX” is shown in the base part number, enter the desired suffixes for Finish and Temperature Rating (EXAMPLE: 12080AE-TQ)

### Accessories

Sprinkler wrench: 13635W/B (Use side B)





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## 4. INSTALLATION

### NOTICES

Risk of mechanical damage.

- Installing sprinklers into piping that is not in place can cause permanent damage. Prior to installing any sprinklers, verify that the piping is in place and properly supported.
- Using a tool other than the approved wrench specified in this document can cause permanent damage to the unit. Use **ONLY** the designated sprinkler wrench.
- Take care not to damage the sprinkler operating parts.
- **DO NOT** use the sprinkler deflector or fusible link element to start or thread the sprinkler into a fitting.
- **DO NOT** exceed 30 ft.lbs. of torque (hand tight, plus approximately 2 full turns with the wrench) to install these sprinklers. Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.
- If the sprinkler will be installed into an InstaSeal® IS-W2 fitting, refer to Form No. F\_021223.

### 4.1 Installation Instructions

1. With the sprinkler contained in the plastic protective cap, apply a small amount of pipe-joint compound or tape to the male threads only, while taking care not to allow a build-up of compound in the sprinkler orifice.
2. With the sprinkler contained in the protective cap, install the sprinkler onto the piping by applying the sprinkler wrench to the sprinkler wrench flats.
3. Refer to section "4.2 After Sprinkler Installation".

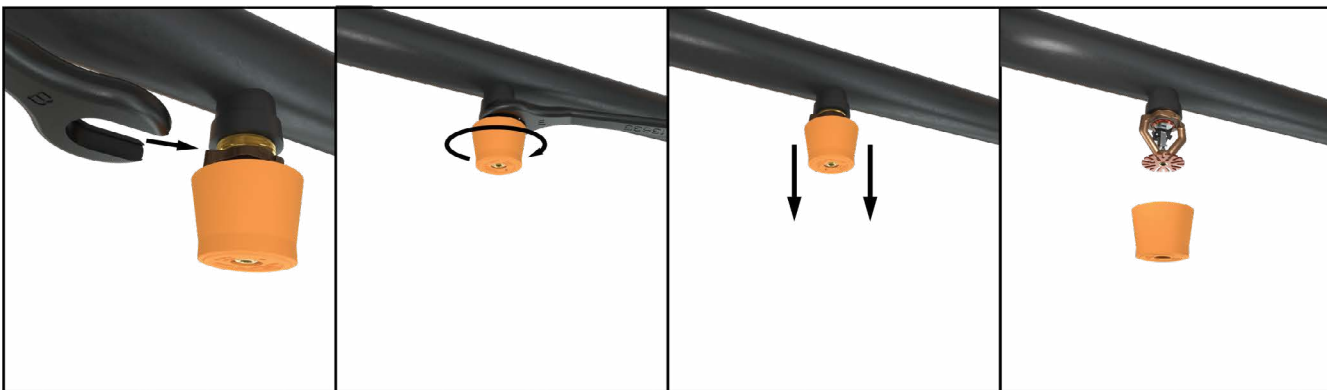


Figure 4:  
Sprinkler Installation

### 4.2 After Sprinkler Installation

1. After installation, 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. If a thread leak occurs, normally the unit must be removed, new pipe-joint compound or tape applied, and then reinstalled. This is due to the fact that when the joint seal is damaged, the sealing compound or tape is washed out of the joint. Immediately replace any damaged units, using the special sprinkler wrench only.
2. After installation and testing and repairing of all leaks, remove the protective caps from the sprinklers.  
**NOTICE:** When removing caps, use care to prevent dislodging or damaging sprinkler fusible element.
  - **Do NOT** use any type of tool to remove the cap.
  - Remove the cap by hand.
  - **THE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE.**



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### 5. OPERATION

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

### 6. 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 the NFPA standard that describes care and maintenance of sprinkler systems. In addition, the Authorities Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.**

**NOTE: Wet pipe systems must be provided with adequate heat.**

- 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 atmosphere, 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. For Viking ESFR Pendent Sprinklers, refer to the Installation Standards and the Authorities 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. Therefore, nothing should be hung from, attached to, 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.
- E. Remove the system from service, drain all water, and relieve all pressure on the piping.
- F. Using the special sprinkler wrench, 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. A fully stocked spare sprinkler cabinet should be provided for this purpose.
- G. Place the system back in service and secure all valves. Check the replaced sprinklers and repair all leaks.
- H. 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.

### 7. AVAILABILITY

The Viking Model VK510 Sprinkler is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

### 8. GUARANTEE

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



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Approval Chart								<div><div><div>Temperature</div><div>Finish</div><div>Escutcheon (if applicable)</div></div><div>KEY</div></div>			
ESFR Pendent Sprinkler VK510											
Maximum 175 PSI (12 bar) WWP											
Base Part Number <sup>1</sup>	SIN	Thread Size	Nominal K-Factor		Overall Length		Listings and Approvals <sup>3,4,6</sup> (Refer also to Tables 2 & 3.)				
			U.S.	metric <sup>2</sup>	Inches	mm	cULus <sup>5</sup>	VdS	LPCB	FM	China Approval
12080	VK510	1" NPT	25.2	363	3-3/16	81	A1	A1	A1	A1	--
12080XX-TQ	VK510	1" NPT	25.2	363	3-3/16	81	A1	--	--	A1	--
12200	VK510	25 mm BSPT	25.2	363	3-3/16	81	A1	A1	A1	A1	--
12200XX-TQ	VK510	25 mm BSPT	25.2	363	3-3/16	81	A1	--	--	A1	--
20373	VK510	25 mm BSPT	25.2	363	3-3/16	81	B1	--	--	B1	B1
Approved Temperature Ratings A - 165 °F (74 °C) and 205 °F (96 °C) B - 165 °F (74 °C)							Approved Finish 1 - Brass				
Footnotes											
<sup>1</sup> Base part number shown. For complete part number, refer to the price list.											
<sup>2</sup> 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.											
<sup>3</sup> This chart shows listings and approvals available at the time of printing. Other approvals may be in process.											
<sup>4</sup> Refer to the latest standards of NFPA 13, FM Global Loss Prevention Data Sheets, LPCB Loss Prevention Standards, and the latest VdS standards.											
<sup>5</sup> Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada as a Specific Application ESFR Sprinkler (refer to the deflector position requirements on page 7).											
<sup>6</sup> FM Approved as a quick response pendent Storage sprinkler. Refer to Tables 2 & 3.											
IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Viking ESFR Pendent Sprinklers are to be installed in accordance with the latest edition of Viking technical data, the latest standards of NFPA, FM Global Loss Prevention Data Sheets including 2-0 and 8-9, VdS, LPCB, and any other Authorities Having Jurisdiction, and also with provisions of governmental codes, ordinances, and standards whenever applicable.											




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**TABLE 4:**  
**COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR**  
**UL SPECIFIC APPLICATION VK510**

Description	 45 ft. (14.6 m) Ceilings
Sprinkler Type	ESFR
Temperature Rating	165 °F (74 °C) and 205 °F (96 °C)
Response Type	ESFR
Sprinkler Position	Pendent, frame arms aligned with pipe, deflectors parallel with ceiling or roof
System Type	Wet Pipe System only
Maximum Area of Coverage	100 ft <sup>2</sup> (9,3 m <sup>2</sup> )
Minimum Area of Coverage	64 ft <sup>2</sup> (5,9 m <sup>2</sup> )
Maximum Ceiling Slope	Refer to NFPA 13.
Maximum Spacing	10 ft. spacing (3,0 m)
Minimum Spacing	8 ft. spacing (2,4 m)
Deflector Distance from Walls	Minimum of 4 in. (102 mm) from walls but no more than 1/2 the allowable distance permitted between sprinklers
Deflector to Top of Storage	Minimum of 36 in. (914 mm)
Deflector to Ceiling Distance	Ceiling/roof heights up to 40 ft. (12,2 m): 6-18 in. (152-457 mm) Ceiling/roof heights of 40-45 ft. (12,2-13,7 m): 6-14 in. (152-356 mm)
Maximum Ceiling Height	45 ft. (13,7 m)
Maximum Storage Height	40 ft. (12,2 m)
Storage Arrangement	Palletized, solid piled, open frame; single row, double row, or multiple row and portable rack arrangement
Commodity	Class I-IV, Cartoned unexpanded plastic
Sprinkler System Design	Refer to NFPA 13.
Obstruction Criteria	Refer to NFPA 13 Chapter 14.
Minimum Aisle Width	Refer to NFPA 13.
Hose Stream Allowance and Water Supply Duration	250 gpm (946 lpm) for 60 minutes or as determined by the listing
* The maximum coverage area must not exceed 100 ft <sup>2</sup> (9,29 m <sup>2</sup> ).	

**TABLE 5:**  
**DESIGN CRITERIA FOR**  
**FM STORAGE SPRINKLER VK510**

Refer to the most current editions of FM Data Sheets 2-0 and 8-9  
 for the VK510 FM Storage Sprinkler design criteria.




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**TABLE 6:  
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR  
NFPA 13 SPECIAL SPRINKLER VK510**

Description	 50 Ft. (15,2 m) Ceilings
Sprinkler Type	QR Storage**
Temperature Rating	165 °F (74 °C) and 205 °F (96 °C)
Response Type	QR
Sprinkler Position	Pendent, frame arms aligned with pipe, deflectors parallel to floor.
System Type	Wet Pipe System only
Maximum Area of Coverage*	100 ft <sup>2</sup> (9,29m <sup>2</sup> ) Refer to FM 2-0, Table 17
Minimum Area of Coverage	64 ft <sup>2</sup> (5,9 m <sup>2</sup> ) Refer to FM 2-0, Table 17
Maximum Ceiling Slope	10° slope Refer to FM 2-0, Section 2.2.1.6
Maximum Spacing	10 ft. spacing (3,0 m)
Minimum Spacing	8 ft. spacing (2,4 m)
Deflector Distance from Walls	Minimum of 4 in. (102 mm) from walls but no more than 1/2 the allowable distance permitted between sprinklers
Deflector to Top of Storage	Minimum of 36 inches (914 mm)
Ceiling to Sprinkler's Thermal Element (Maximum vertical distance)	13 inches (325 mm) for 10@50 psi (3.5 bar) design 17 inches (425 mm) for 10@75 psi (5.2 bar) design
Maximum Ceiling Height	50 ft. (15,2 m)
Maximum Storage Height	45 ft. (13,5 m)
Storage Arrangement	Single, double, and multiple row racks
Storage Aisles Between Racks	Minimum 6 ft (1,8 m) wide
Commodity	Class I-IV, Cartoned unexpanded plastics
Sprinkler System Design	Based on maximum vertical distance shown above 10 @50 psi (3.5 bar) for 13 inch (325 mm) maximum 10 @75 psi (5.2 bar) for 17 inch (425 mm) maximum
Obstruction Criteria	Refer to FM 2-0
Hose Stream Allowance and Water Supply Duration	250 gpm (950 Lpm) for 60 minutes or as determined by the approval

\* The maximum coverage area must not exceed 100 ft<sup>2</sup> (9,29 m<sup>2</sup>).

\*\* For FM, the measurement is from the centerline of the thermal sensing element to the ceiling.

\*\*\* Approved storage sprinklers are also FM Approved for use as non-storage sprinklers.

**NOTE: Viking sprinklers are manufactured and tested to meet rigid requirements of the approving agencies. The sprinklers are designed to be installed in accordance with recognized installation standards or FM Global Loss Prevention Data Sheets. System design must be based on ESFR design guidelines described in the latest edition of the applicable FM Global Loss Prevention Data Sheets, the latest NFPA Standards, the Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards whenever applicable. Wet pipe systems must be supplied with adequate heat.**