TECHNICAL DATA

ESFR PENDENT SPRINKLER VK506 (K22.4)

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

1. DESCRIPTION

Viking Early Suppression Fast Response (ESFR) Pendent Sprinkler VK506 incorporates the capability to suppress specific high-challenge fires. The addition of a larger K-Factor allows ESFR performance at lower end-head pressures than ESFR K14 sprinklers. K22.4 ESFR sprinklers can:

- Eliminate the use of in-rack sprinklers when protecting high-piled storage of certain specified materials up to*:

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

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

- Reduce or eliminate the need for a system fire pump.
- Provide flexibility when sizing system piping.

Viking VK506 ESFR Pendent Sprinklers are primarily intended to protect the following types of storage, which tend to produce severe-challenge fires: palletized and solid pile storage and single, double, multiple row, and portable open rack storage (no open-top containers or solid shelves).

Viking ESFR Pendent VK506 Sprinklers provide protection of most common storage materials, including:

- Encapsulated or unencapsulated Class I, II, III, and IV commodities*.
- cULus Listed for protection of cartoned unexpanded plastic commodities and FM Approved for protection of cartoned and uncartoned unexpanded plastic commodities*.
- FM Approved for protection of exposed expanded polystyrene and exposed expanded polyurethane commodities*.

* Refer the Approval Charts and Commodity Selection and Design Criteria Overview (Table 2) for cULus Listing and FM Approval requirements that must be followed.

In addition, some storage arrangements of rolled paper, flammable liquids, aerosols, and rubber tires may be protected by Viking ESFR Pendent Sprinkler VK506.

TABLE 1
SPRINKLER GENERAL INFORMATION

Item	Description
Sprinkler Identification Number (SIN)	VK506
K-factor, gpm/psi½ (lpm/bar½)	22.4 (320)
Thread Size	1” NPT (25mm BSPT)
Sprinkler Orientation	Pendent
Maximum Working Pressure PSI (bar)	175 psi (12 bar)

2. LISTINGS AND APPROVALS

cULus Listed: Category VNWH
(Listed as a Specific Application ESFR Sprinkler)
Successfully meets UL 199 test standard and compliance program for ESFR sprinklers installed in rack storage with high clearances to ceiling (20 ft or greater)

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

FM Approved: Class 2026

CE CPR: EAD 100002-00-1106 March 2016, Declaration of Performance DOP_VK506.

NOTE: Other International approval certificates are available upon request.

Refer to Approval Charts and Design Criteria for 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.

3. TECHNICAL DATA

Specifications:
Available since 2013.
Minimum Operating Pressure: Refer to NFPA 13 or FM Global Loss Preven-tion Data Sheets.
Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).
Thread size: 1” NPT for Sprinkler 18493, 25 mm BSPT for Sprinkler 18494
Nominal K-Factor: 22.4 U.S. (320 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” (44.5 mm)

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Material Standards:
Frame Casting: Brass UNS-C84400 or CW602N
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 or white epoxy, polyurethane, or acrylic paint.

NOTICE: DO NOT DISASSEMBLE SPRINKLER

Image is not to scale.

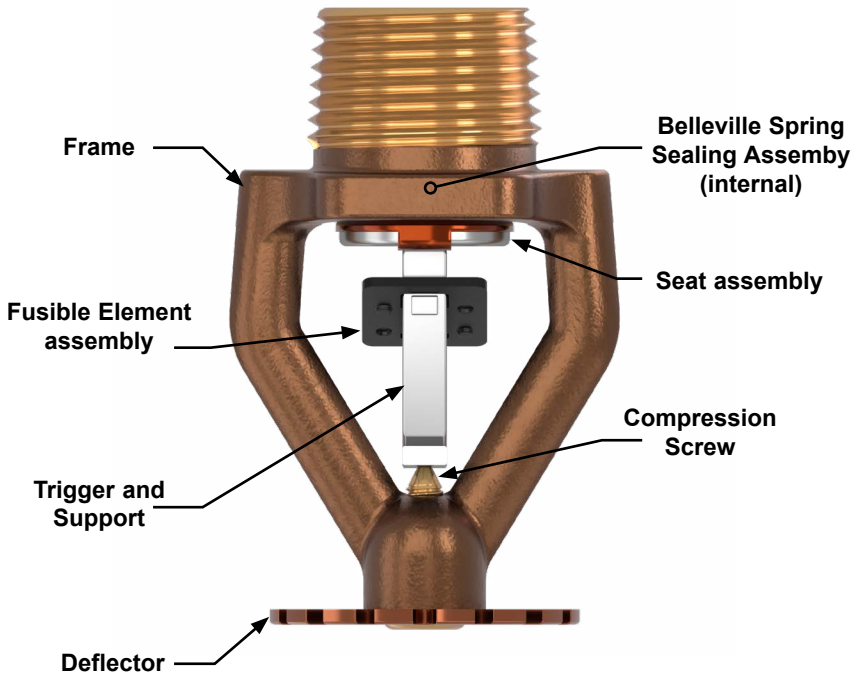

Figure 1:
Sprinkler Components

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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: 18493AC = VK506 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**
18493	1" NPT
18493XX-TQ*	1" NPT
18494	25 mm BSPT
18494XX-TQ*	25 mm BSPT

Finish	
Description	**Suffix**
Brass	A

*** Where "XX" is shown in the base part number, enter the desired suffixes for Finish and Temperature Rating (EXAMPLE: 18493AE-TQ)**

Temperature Ratings			
Temperature Rating	**Fusible Element Paint Color**	**Maximum Ambient Ceiling Temperature**	**Suffix**
165 °F (74 °C)	Black	100 °F (38 °C)	C
205 °F (96 °C)[1]	White	150 °F (66 °C)	E

[1] The entire 205°F (96°C) fusible element is painted white.

Accessories
Sprinkler wrench: 13635W/B (Use side B)
Sprinkler wrench: 26519M/B (use Side B)
Sprinkler cabinet: 01731A

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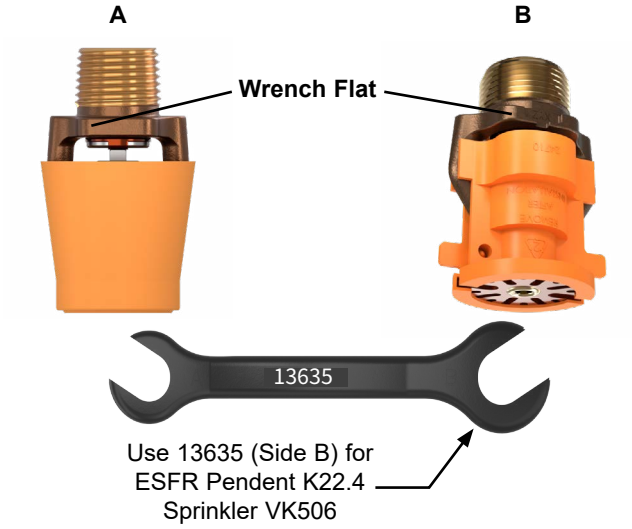

Figure 2:
ESFR Pendent Sprinkler Wrench

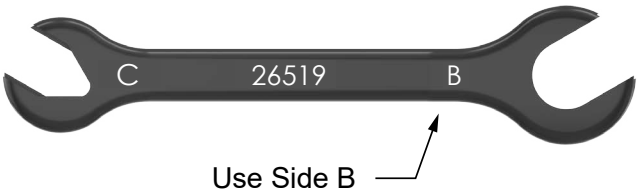

Figure 3:
ESFR Sprinkler Wrench 26519M/B

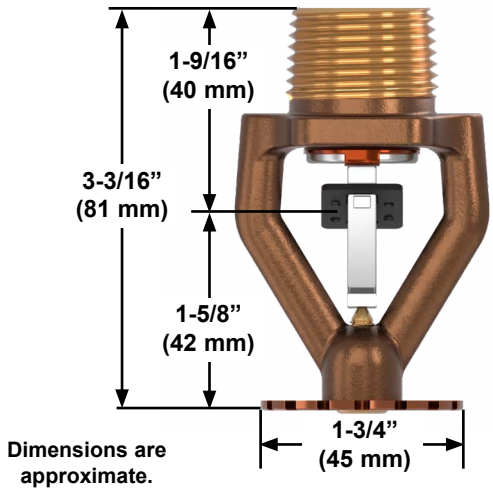

Figure 4:
ESFR Pendent Sprinkler VK506 Dimensions

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4. INSTALLATION

⚠ WARNINGS

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.

System design must be based on ESFR design guidelines described in the latest edition of NFPA Standards, the Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards whenever applicable. 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.

Installation by insufficiently qualified personnel poses the risk of fatal consequences.

- **This sprinkler must be installed properly by qualified personnel familiar with safe practices and applicable and recognized design and installation standards issued, for example, by NFPA, FM, VdS, or LPCB, and trained how to properly perform the installation procedures.**

A damaged or compromised sprinkler poses the risk of fatal consequences. Damaged or compromised sprinklers will not operate properly which could lead to loss of life.

- **NEVER use a sprinkler that has been exposed to temperatures exceeding the maximum allowed ambient temperature.**
- **NEVER use a sprinkler with a loss of liquid from the glass bulb or damage to the fusible element. A small bubble should be visible within the glass bulb; rotate the sprinkler to a horizontal position while observing the bulb to see the bubble.**
- **NEVER use a sprinkler that has been dropped or damaged.**
- **ALWAYS protect the sprinkler from mechanical damage during storage, transport, and handling.**
- **NEVER use sprinklers that have been painted by anyone other than the manufacturer.**
- **ALWAYS protect sprinklers from being painted during installation or replacement in accordance with the installation standards.**
- **NEVER clean sprinklers with anything other than 7 psi or lower compressed air.**
- **NEVER apply soap, water, ammonia, adhesives, solvents or any other fluids on sprinklers.**
- **Destroy every damaged or compromised sprinkler.**
- **ALWAYS provide adequate heat to wet pipe systems.**

NOTES:

- **Use ONLY the designated sprinkler wrench. DO NOT use any other type of wrench; doing so may damage the sprinkler.**
- **Install the sprinklers AFTER the piping is installed. Installing sprinklers on loose pipe can lead to damage.**
- **The sprinkler is designed to be installed while the protective cap is in place.**
- **DO NOT use the sprinkler deflector or fusible link to start or thread the sprinkler into a fitting.**
- **If the sprinkler will be installed into an InstaSeal® IS-W2 fitting, refer to Form No. F_021223.**

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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”.

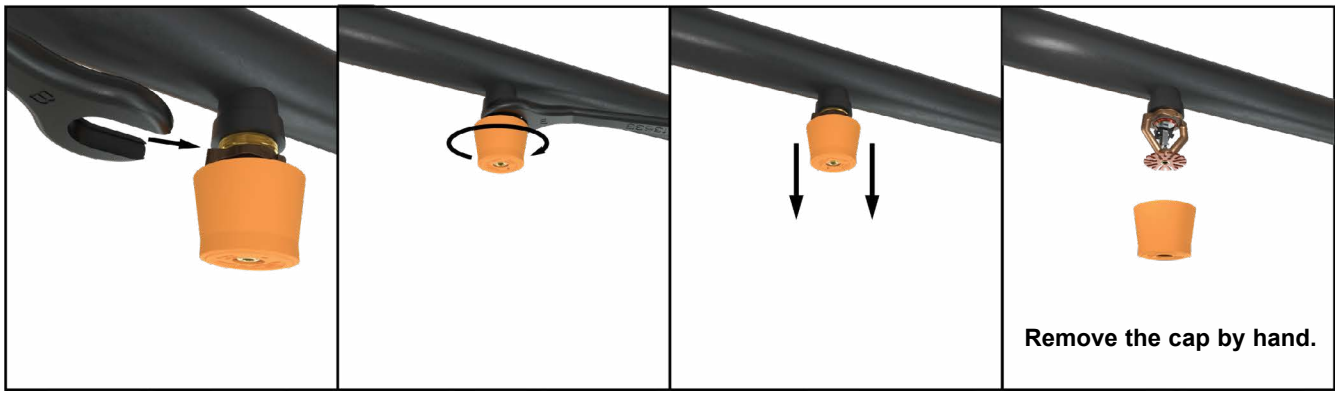

Figure 5:
Sprinkler Installation

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.

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 (e.g., NFPA 25) 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.
    1. Remove the system from service, drain all water, and relieve all pressure on the piping.
    2. 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.
    3. 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.

7. AVAILABILITY

The Viking Model VK506 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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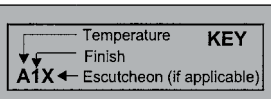
Approval Chart 1 (UL)

ESFR Pendent Sprinkler VK506
Maximum 175 PSI (12 bar) WWP



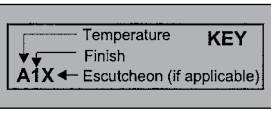
Base Part Number[1]	SIN	Thread Size	Nominal K-factor		Overall Length		UL Listings[3,4] (Refer also to Design Criteria)	CE
			U.S.	metric[2]	Inches	mm		
18493	VK506	1” NPT	22.4	320	3-3/16	81	A1	A1
18493XX-TQ	VK506	1” NPT	22.4	320	3-3/16	81	A1	A1
18494	VK506	25 mm BSPT	22.4	320	3-3/16	81	A1	A1
18494XX-TQ	VK506	25 mm BSPT	22.4	320	3-3/16	81	A1	A1

Approved Temperature Ratings	Approved Finish
A - 160 °F (71 °C) and 205 °F (96 °C)	1 - Brass

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 shown by 10.0.
3. This chart shows listings and approvals available at the time of printing. Other approvals may be in process.
4. Refer to the latest standards of NFPA 13.
5. Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada as a Specific Application ESFR Sprinkler (refer to the UL Design Criteria).

Approval Chart 2 (FM)

ESFR Pendent Sprinkler VK506
Maximum 175 PSI (12 bar) WWP



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18493XX-TQ	VK506	1” NPT	22.4	320	3-3/16	81	A1
18494	VK506	25 mm BSPT	22.4	320	3-3/16	81	A1
18494XX-TQ	VK506	25 mm BSPT	22.4	320	3-3/16	81	A1

Approved Temperature Ratings	Approved Finish
A - 160 °F (71 °C) and 205 °F (96 °C)	1 - Brass

[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 shown by 10.0.
[3] This chart shows the FM Approvals available at the time of printing. Other approvals may be in process.
[4] FM Approved as a quick response pendent **Storage** sprinkler. Refer to design criteria below.

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TABLE 3
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR MODEL VK506 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)
Deflector Distance from Ceiling	Refer to NFPA 13.	Refer to FM 8-9.
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

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, VdS, LPCB, and any other Authorities Having Jurisdiction, and also with provisions of governmental codes, ordinances, and standards whenever applicable.

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.

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