



TECHNICAL DATA

SPECIFIC APPLICATION ESFR PENDENT SPRINKLER VK514 (K28.0)

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 Specific Application Early Suppression Fast Response (ESFR) Pendent Sprinkler VK514 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. K28.0 sprinklers can:

- Provide flexibility of fire protection designs.
- Eliminate the use of in-rack sprinklers when protecting high piled storage of certain specified materials up to:

UL (Refer to Table 4): 43 ft. (13,1 m) with ceilings up to 48 ft. (14,6 m)*

FM (Refer to Table 5): 50 ft. (15,2 m) with ceilings up to 55 ft. (16,76 m)*

OR

45 ft. (13,5 m) with ceilings up to 50 ft. (15,2 m)*

Viking VK514 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, and portable open rack storage (no open-top containers or solid shelves). The VK514 is listed to utilize a minimum aisle width of 6'-0" (UL - 43' storage or FM - 45' storage) or 8'-0" (FM - 50' storage). Viking ESFR Pendent VK514 Sprinklers provide protection of most common storage materials, including:

- Encapsulated or unencapsulated Class I, II, III, and IV commodities*.
- UL 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.

2. LISTINGS AND APPROVALS*



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

FM Approved: Class 2035

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

3. PATENT INFORMATION

Please refer to PATVK.COM for all appropriate patents and patent information pertaining to the Model VK514 ESFR Sprinkler.

4. 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: 28.0 U.S. (404 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 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 a black epoxy, polyurethane (FM only), or acrylic paint

Ordering Information: Refer to Table 2

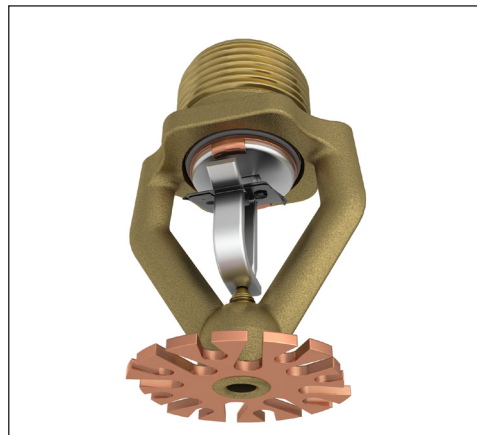


TABLE 1
SPRINKLER GENERAL INFORMATION

Item	Description
Sprinkler Identification Number (SIN)	VK514
K-factor, gpm/psi ^{1/2} (lpm/bar ^{1/2})	28.0 (404)
Thread Size	1" NPT (25 mm)
Sprinkler Orientation	Pendent
Maximum Working Pressure	175 psi (12 bar)



WARNING: Cancer and Reproductive Harm-
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5. INSTALLATION

NOTICE

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 guidelines described in the latest edition of the applicable FM Global Loss Prevention Data Sheets indicated for Storage sprinklers, the latest NFPA Standards indicated for ESFR sprinklers, the Authority Having Jurisdiction, and also with the provisions of government 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.

- A. Sprinklers must be handled with care. They must be stored in a cool, dry place in their original shipping container. Never install sprinklers that have been dropped or damaged in any way. Such sprinklers should be destroyed immediately.
- B. The sprinklers must be installed after the piping is in place to prevent mechanical damage. Before installing, be sure to have the appropriate sprinkler model and style, with the correct orifice size, temperature rating, and response characteristics.
- C. 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.
- D. **Use ONLY sprinkler wrench 13635W/B (shown in Figure 1) for installing VK514. With the sprinkler contained in the protective cap, install the sprinkler onto the piping by applying the sprinkler wrench to the sprinkler wrench flats only, while taking care not to damage the sprinkler operating parts.**
 - DO NOT use any other type of wrench, as this could damage the unit.
 - DO NOT use the sprinkler deflector or fusible element to start or thread the sprinkler into a fitting.
 - Hand tight plus 1 to 1-1/2 turns with wrench. Over tightening may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.
- E. 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.
- F. **After installation and testing and repairing of all leaks, remove the protective caps from the sprinklers. Do NOT use any type of tool to remove the cap. Remove the cap by hand: turn it slightly and pull it off the sprinkler. When removing caps, use care to prevent dislodging or damaging sprinkler fusible element. THE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE.**

6. 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.

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 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 Specific Application 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.



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- 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.

8. AVAILABILITY

The Viking Model VK514 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.

9. GUARANTEE

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

TABLE 2: ORDERING INFORMATION
 Instructions: Using the sprinkler base part number,
 (1) add the suffix for the desired Finish
 (2) add the suffix for the desired Temperature Rating.

Sprinkler Base Part No.	Size		1: Finishes		2: Temperature Ratings ¹				
	NPT Inch	BSPT mm	Description	Suffix	Nominal Rating	Frame Paint Color	Temperature Classification	Max. Ambient Ceiling Temperature ²	Suffix
19591	1	--	Brass	A	165 °F (74 °C)	None	Ordinary	100 °F (38 °C)	C
19592	--	25			205 °F (96 °C)	White	Intermediate	150 °F (65 °C)	E
22894	1	--			Example: 19591AC = VK514 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) meaning if the area will experience temperatures above the maximum ambient rating, you shall use a higher temperature-rated sprinkler.				
22958	--	25							

Accessories

Sprinkler Wrenches (see Figure 1):

Standard Wrench: Part No. 13635W/B (double-ended wrench - Use Side B ONLY.)

Sprinkler Cabinet:

Up to 6 sprinklers: Part number 01731A

Footnotes

- The sprinkler temperature rating is stamped on the deflector.
- Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

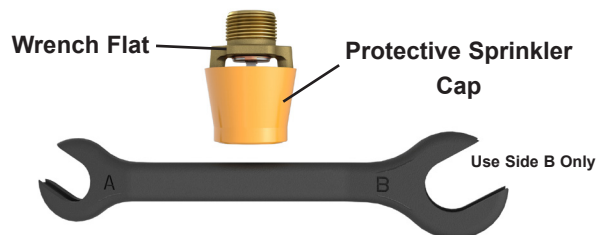


Figure 1: ESFR Pendent Sprinkler Wrench

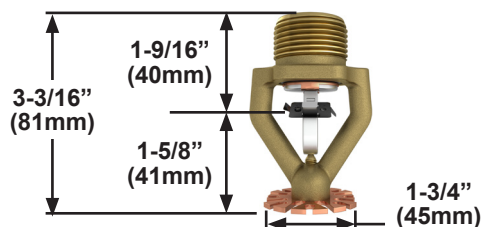


Figure 2: ESFR Pendent Sprinkler VK514 Dimensions



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Approval Chart								
ESFR Pendent Sprinkler VK514								
Maximum 175 PSI (12 bar) WWP								
<div><div><div>Temperature</div><div>Finish</div><div>Escutcheon (if applicable)</div></div><div>A1X</div><div>KEY</div></div>								
Base Part Number ¹	SIN	Thread Size	Nominal K-Factor		Overall Length		Listings and Approvals ^{3,4} (Refer also to Tables 3 and 4.)	
			U.S.	metric ²	Inches	mm	UL ⁵	FM ⁶
19591	VK514	1" NPT	28.0	404	3-3/16	81	A1	--
19592	VK514	25 mm BSPT	28.0	404	3-3/16	81	A1	--
22894	VK514	1" NPT	28.0	404	3-3/16	81	A1	A1
22958	VK514	25 mm BSPT	28.0	404	3-3/16	81	A1	A1
Approved Temperature Ratings A - 165 °F (74 °C) and 205 °F (96 °C)							Approved Finish 1 - Brass	
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 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. as a Specific Application ESFR Sprinkler (refer to the deflector position requirements).								
6. FM Approved as a quick response pendent Storage sprinkler. Refer toTables 3 & 5.								

TABLE 3: COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR MODEL VK514 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) °F (°C)	165 °F (74 °C) and 205 °F (96 °C)	165 °F (74 °C) and 205 °F (96 °C)
Open Frame Single, Double, 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.
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, 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 MODEL VK514
SPECIFIC APPLICATION LISTING - UL**

Description	 48 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 ² (9,3 m ²)
Minimum Area of Coverage	64 ft ² (5,9 m ²)
Maximum Ceiling Slope	2 in 12
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	For all building heights: 6–14 in. (152–356 mm).
Maximum Ceiling Height	48 ft. (14,6 m)
Maximum Storage Height	43 ft. (13,1 m)
Storage Arrangement	Single- and double-row rack storage (no open top containers or solid shelves) and palletized and solid pile storage (no open top containers or solid shelves).
Commodity	Class I-IV commodities encapsulated or nonencapsulated and cartoned, nonexpanded Group A plastics.
Sprinkler System Design	NFPA 13 for ESFR Sprinklers based upon 35 psi (2,4 bar) design pressure 166 gpm (628,4 lpm) with 12 sprinkler remote area (4x3)
Obstruction Criteria	Refer to NFPA 13 Chapter 8.
Minimum Aisle Width	6 ft. (1,8 m)
Hose Stream Allowance and Water Supply Duration	250 gpm (946 lpm) for 60 minutes
* The maximum coverage area must not exceed 100 ft ² (9,29 m ²). **Does not include the protection of multiple-row racks.	





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**TABLE 5:
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR MODEL VK514
SPECIFIC APPLICATION LISTING - FM**

Description	 50 Ft. (15,2 m) Ceilings	 55 Ft. (16,76 m) Ceilings
Sprinkler Type	QR Storage**	QR Storage**
Temperature Rating	165 °F (74 °C) and 205 °F (96 °C)	165 °F (74 °C) and 205 °F (96 °C)
Response Type	QR	QR
Sprinkler Position	Pendent, frame arms aligned with pipe, deflectors parallel to floor.	Pendent, frame arms aligned with pipe, deflectors parallel to floor.
System Type	Wet Pipe System only	Wet Pipe System only
Maximum Area of Coverage*	100 ft ² (9,29m ²) Refer to FM 2-0, Table 17	100 ft ² (9,29m ²) Refer to FM 2-0, Table 17
Minimum Area of Coverage	64 ft ² (5,9 m ²) Refer to FM 2-0, Table 17	64 ft ² (5,9 m ²) Refer to FM 2-0, Table 17
Maximum Ceiling Slope	Up to 10° Refer to FM 2-0, Section 2.2.1.6	Up to 10° Refer to FM 2-0, Section 2.2.1.6
Maximum Spacing	10 ft. (3,0 m)	10 ft. (3,0 m)
Minimum Spacing	8 ft. (2,4 m)	8 ft. (2,4 m)
Deflector Distance from Walls	Refer to FM 2-0, Section 2.2.3.3	Refer to FM 2-0, Section 2.2.3.3
Deflector to Top of Storage	Minimum of 36 inches (914 mm) Refer to FM 2-0 Section 2.2.2.1 and FM 8-9, Section 2.2.6	Minimum of 36 inches (914 mm) Refer to FM 2-0 Section 2.2.2.1 and FM 8-9, Section 2.2.6
Ceiling Sprinkler Installation Guidelines	As per FM 2-0 (DS 2-0), Installation Guidelines for Automatic Sprinklers with the following exception: Vertical distance from underside of the ceiling to the centerline of the sprinkler's thermal element - no more than 13 inches (325 mm)	As per FM 2-0 (DS 2-0), Installation Guidelines for Automatic Sprinklers with the following exception: Vertical distance from underside of the ceiling to the centerline of the sprinkler's thermal element - no more than 13 inches (325 mm)
Maximum Ceiling Height	50 ft. (15,2 m)	55 ft. (16,76 m)
Maximum Storage Height	45 ft. (13,5 m)	50 ft. (15,2 m)
Storage Arrangement	Solid-piled, palletized, shelf, bin-box, as well as single, double, and multi row racks that qualify as open-frame	Solid-piled, palletized, shelf, bin-box, as well as single-row and double-row racks that qualify as open-frame
Storage Aisles Between Racks	Minimum 6 ft (1,8 m) wide	Minimum 8 ft (2,4 m) wide
Commodity	Class 1-4 Cartoned unexpanded plastics	Class 1-4 Cartoned unexpanded plastics
Sprinkler System Design	QR Storage Sprinkler based upon 10 @ 40 psi (2.8 bar) design pressure @177 gpm (670 Lpm) with 9 sprinkler remote area (3x3) on 3 branchlines and 1 sprinkler on 1 branchline. Exception: a sprinkler design of 9 (3x3) @ 40 psi (2.8 bar) design pressure @177 gpm (670 Lpm) when the water supply can also provide a design of 4 (2x2) @ 80 psi (5.5 bar) design pressure @250 gpm (950 Lpm)	QR Storage Sprinkler based upon 9 @ 80 psi (5.5 bar) design pressure with 250 gpm (950 Lpm) with 9 sprinkler remote area (3x3) on 3 branchlines.
Obstruction Criteria	Refer to FM 2-0 Section 2.2	Refer to FM 2-0 Section 2.2
Hose Stream Allowance and Water Supply Duration	250 gpm (950 Lpm) for 60 minutes	250 gpm (950 Lpm) for 60 minutes

* The maximum coverage area must not exceed 100 ft² (9,29 m²).

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



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!**General Handling and Storage:**

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

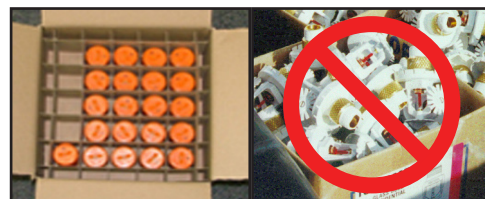
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
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! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



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PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

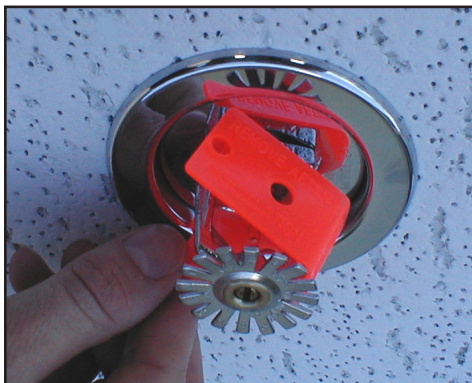


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



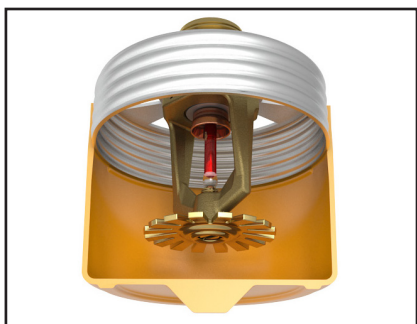
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OF SPRINKLERS

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



CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)



Cover Plate Assembly
 (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



TECHNICAL DATA

SPRINKLER OVERVIEW

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1. DESCRIPTION

Viking fire sprinklers consist of a threaded frame with a specific waterway or orifice size and a deflector for distributing water in a specified pattern. A closed or sealed sprinkler refers to a complete assembly, including the thermosensitive operating element. An open sprinkler does not use an operating element and is open at all times. The distribution of water is intended to extinguish a fire or to control its spread.

Viking sprinklers are available in several models and styles. Refer to specific sprinkler technical data pages for available styles, finishes, temperature ratings, thread sizes, and nominal K-Factors for the particular model selected.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.



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

3. TECHNICAL DATA

Pressure Ratings:

Maximum allowable water working pressure is 175 psig (12 Bar) unless rated and specified for high water working pressure [250 psig (17.2 bar)].

Sprinkler Identification:

Viking sprinklers are identified and marked with the word "Viking", the sprinkler identification number (SIN) consisting of "VK" plus a three digit number*, the model letter, and the year of manufacture.

Available Finishes:

Viking sprinklers are available in several decorative finishes. Some models are available with corrosion-resistant coatings or are fabricated from non-corrosive material. Refer to the sprinkler technical data page for additional information.

Available Temperature Ratings:

Viking sprinklers are available in several temperature ratings that relate to a specific temperature classification. Applicable installation rules mandate the use and limitations of each temperature classification. In selecting the appropriate temperature classification, the maximum expected ceiling temperature must be known. When there is doubt as to the maximum temperature at the sprinkler location, a maximum-reading thermometer should be used to determine the temperature under conditions that would show the highest readings to be expected. In addition, recognized installation rules may require a higher temperature classification, depending upon sprinkler location, occupancy classification, commodity classification, storage height, and other hazards. In all cases, the maximum expected ceiling temperature dictates the lowest allowable temperature classification. Sprinklers located immediately adjacent to a heat source may require a higher temperature rating.

K-Factors:

Viking sprinklers are available in several orifice sizes with related K-Factors. The orifice is a tapered waterway and, therefore, the K-Factor given is nominal. Nominal U.S. K-Factors are provided in accordance with the 1999 edition of NFPA 13, Section 3-2.3. Refer to the specific data page for appropriate K-Factor information.

Available Styles:

Viking sprinklers are available for installation in several positions as indicated by a stamping on the deflector. The deflector style dictates the appropriate installation position of the sprinkler; it breaks the solid stream of water issuing from the sprinkler orifice to form a specific spray pattern. The following list indicates the various styles and identification of Viking sprinklers.

UPRIGHT SPRINKLER: A sprinkler intended to be installed with the deflector above the frame so water flows upward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSU" (Standard Sprinkler Upright) or "UPRIGHT" on the deflector.

PENDENT SPRINKLER: A sprinkler intended to be oriented with the deflector below the frame so water flows downward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSP" (Standard Sprinkler Pendent) or "PENDENT" on the deflector.

CONVENTIONAL SPRINKLER: An "old style" sprinkler intended to be installed with the deflector in either the upright or pendent position. The deflector provides a spherical type pattern with 40 to 60 percent of the water initially directed downward and a proportion directed upward. Must be installed in accordance with installation rules for conventional or old style sprinklers. DO NOT USE AS A REPLACEMENT FOR STANDARD SPRAY SPRINKLERS. Marked "C U/P" (Conventional Upright/Pendent) on the deflector.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



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VERTICAL SIDEWALL (VSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The deflector provides a water spray pattern outward in a quarter-spherical pattern and can be installed in the upright or pendent position with the flow arrow in the direction of discharge. Marked "SIDEWALL" on the deflector with an arrow and the word "FLOW". (Note: Some vertical sidewall sprinklers can only be installed in the upright or pendent position—in this case, the sprinkler will also be marked "UPRIGHT" or "PENDENT".)

HORIZONTAL SIDEWALL (HSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The special deflector provides a water spray pattern outward in a quarter-spherical pattern. Most of the water is directed away from the nearby wall with a small portion directed at the wall behind the sprinkler. The top of the deflector is oriented parallel with the ceiling or roof. The flow arrows point in the direction of discharge. Marked "SIDEWALL" and "TOP" with an arrow and the word "FLOW".

EXTENDED COVERAGE (EC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listings. Maximum area of coverage, minimum flow rate, orifice size, and nominal K-Factor are specified in the individual listings. EC sprinklers are intended for Light-Hazard occupancies with smooth, flat, horizontal ceilings unless otherwise specified. In addition to the above markings, the sprinkler is marked "EC".

QUICK RESPONSE (QR) SPRINKLER: A spray sprinkler with a fast-actuating operating element. The use of quick response sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction (AHJ) prior to installing.

QUICK RESPONSE EXTENDED COVERAGE (QREC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listing. This is a sprinkler with an operating element that meets the criteria for quick response. QREC sprinklers are only intended for Light Hazard occupancies. The sprinkler is marked "QREC".

FLUSH SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The unit is mounted flush with the ceiling or wall, with the fusible link exposed. Upon actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

CONCEALED SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The sprinkler is hidden from view by a cover plate installed flush with the ceiling or wall. During fire conditions, the cover plate detaches, and upon sprinkler actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

RECESSED SPRINKLER: A spray sprinkler assembly intended for installation with a concealed piping system. The assembly consists of a sprinkler installed in a decorative adjustable recessed escutcheon that minimizes the protrusion of the sprinkler beyond the ceiling or wall without adversely affecting the sprinkler distribution or sensitivity. Refer to the appropriate technical data page for allowable sprinkler models, temperature ratings, and occupancy classifications. DO NOT RECESS ANY SPRINKLER NOT LISTED FOR USE WITH THE ESCUTCHEON.

CORROSION-RESISTANT SPRINKLER: A special service sprinkler with non-corrosive protective coatings, or that is fabricated from non-corrosive material, for use in atmospheres that would normally corrode sprinklers.

DRY SPRINKLER: A special-service sprinkler intended for installation on dry pipe systems or wet pipe systems where the sprinkler is subject to freezing temperatures. The unit consists of a sprinkler permanently secured to an extension nipple with a sealed inlet end to prevent water from entering the nipple until the sprinkler operates. The unit MUST be installed in a tee fitting. Dry upright sprinklers are marked with the "B" dimension [distance from the face of the fitting (tee) to the top of the deflector]. Dry pendent and sidewall sprinklers are marked with the "A" dimension [the distance from the face of fitting (tee) to the finished surface of the ceiling or wall].

LARGE DROP SPRINKLER: A type of special application sprinkler used to provide fire control of specific high-challenge fire hazards. Large drop sprinklers are designed to produce an umbrella-shaped spray pattern downward with a higher percentage of "large" water droplets than standard spray sprinklers. The sprinkler has an extra-large orifice with a nominal K-Factor of 11.2. Marked "HIGH CHALLENGE" and "UPRIGHT".

EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER: A sprinkler intended to provide fire suppression of specific high-challenge fire hazards through the use of a fast response fusible link, 14.0, 16.8, or 25.2 nominal K-Factor, and special deflector. ESFR sprinklers are designed to produce high-momentum water droplets in a hemispherical 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. Marked "ESFR" and "UPRIGHT" or "PEND".

INTERMEDIATE LEVEL/RACK STORAGE SPRINKLER: A standard spray sprinkler assembly designed to protect its operating element from the spray of sprinklers installed at higher elevations. The assembly consists of a standard or large orifice upright or pendent sprinkler with an integral upright or pendent water shield and guard assembly. Use only those sprinklers that have been tested and listed for use with the assembly. Refer to the technical data page for allowable sprinkler models.

RESIDENTIAL SPRINKLER: A sprinkler intended for use in the following occupancies: one- and two-family dwellings with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; and where allowed by the Authority Having Jurisdiction in residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13.



TECHNICAL DATA

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Residential sprinklers have a unique distribution pattern and utilize a “fast response” heat sensitive operating element. They enhance survivability in the room of fire origin and are designed to provide a life safety environment for a minimum of ten minutes. For this reason, residential sprinklers must not be used to replace standard sprinklers unless tested for and approved by the Authority Having Jurisdiction. In addition to standard markings, the unit is identified as “RESIDENTIAL SPRINKLER” or “RES”.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

Refer to the appropriate sprinkler technical data page(s).

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. 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.

8. GUARANTEE

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

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers and the appropriate sprinkler general care, installation, and maintenance guide. Vikings sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. The sprinkler technical data page may contain installation requirements specific for the sprinkler model selected. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.



TECHNICAL DATA

USE OF CORRECT INSTALLATION WRENCHES FOR ESFR SPRINKLERS (VK500, VK503, VK510, VK514 AND VK520)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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Visit the Viking website for the latest edition of this technical data page.

CORRECT INSTALLATION WRENCHES FOR USE WITH VIKING ESFR SPRINKLERS

ESFR sprinklers must be installed using the manufacturer's special installation wrench only, while taking care not to over-tighten or damage the sprinkler operating parts. Figure 1 below shows an example of correct use of a designated ESFR sprinkler wrench. Use of any other wrench, such as those shown in Figures 2 through 4 below, could damage the unit.

- Viking ESFR Upright Sprinklers: Use Viking Wrench Part Number 05118CW/B.
- Viking ESFR Pendent K14 and K16.8 Sprinklers: Use Viking Wrench Part Number 10285W/B or double-ended 13635W/B (Side A).
- Viking ESFR Pendent K25.2 Sprinklers: Use Viking Wrench Part Number 12143W/B or double-ended 13635W/B (Side B).
- Viking ESFR Pendent K28 Sprinklers: Viking Wrench Part Number (double-ended) 13635W/B (Side B only).

The sprinkler is contained in a plastic cap for protection during shipping and installation. With the sprinkler contained in the plastic cap, apply a small amount of pipe-joint compound or tape to the male threads of the sprinkler and then install the ESFR sprinkler by applying the wrench to the sprinkler wrench flats only. **DO NOT** use the deflector or fusible element to start or thread the sprinkler into a fitting.

Take care not to over-tighten the sprinkler and/or damage its operating parts!

Maximum Torque: 3/4" NPT: 20 ft-lbs. (27.1 N-m) 1" NPT: 30 ft-lbs. (40.7 N-m)

DO NOT install sprinklers onto piping at the floor level. Install sprinklers after the piping is in place at the ceiling to prevent mechanical damage.



Figure 1: Correct use of designated installation wrench with ESFR Pendent K14 Sprinkler SIN VK500 and sprinkler cap

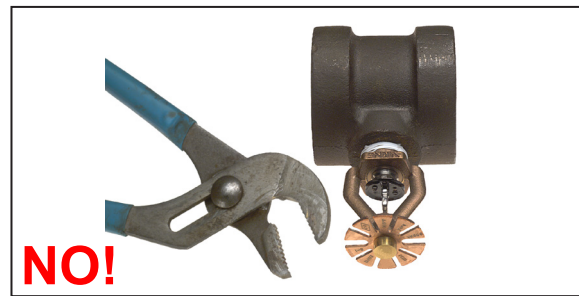


Figure 2: Incorrect installation wrench (ESFR sprinkler shown with Channel Locks)

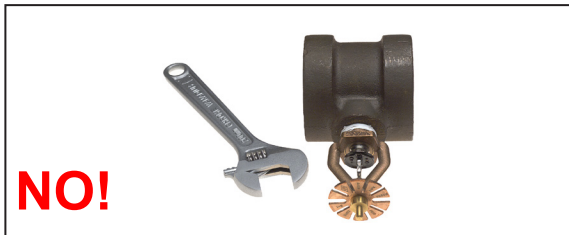


Figure 3: Incorrect installation wrench (ESFR sprinkler shown with a crescent wrench)



Figure 4: Incorrect installation wrench (ESFR sprinkler shown with a pipe wrench)



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

NOTE: The sprinklers are contained in plastic caps for protection during shipping and installation. Remove the caps from the sprinklers **AFTER** installation. Use care when removing the caps to prevent dislodging the ejector spring or damaging the fusible element. The caps **MUST** be removed from sprinklers **BEFORE** placing the system in service!

Refer to the latest appropriate technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Viking Web site at www.vkinggroupinc.com.

WARNING

Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed. Any sprinkler with damage to the operating element should be destroyed.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

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1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

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