



TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK494 K70.6 (K4.9 U.S.) LPCB

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

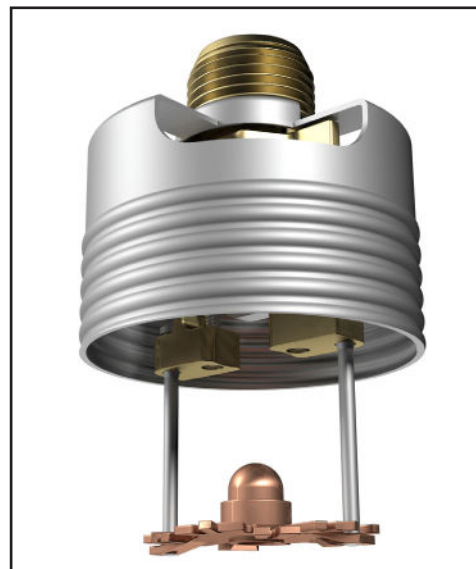
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Viking Freedom® Residential Concealed Pendent Sprinkler VK494 is a small thermosensitive, glass-bulb residential sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The orifice design, with a K-factor of 70.6 metric* (4.9 U.S.), allows the sprinkler's efficient use of available water supplies for the hydraulically designed fire-protection system. The fast response glass bulb operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile small-diameter cover assembly installed flush to the ceiling. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on" and "thread-on" designs of the concealed cover plate assemblies allow easy installation of the cover plate after the system has been tested and the ceiling finish has been applied, while also providing up to 13 mm (1/2") of vertical adjustment. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler. The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive atmospheres and is C-UL-US-EU Listed as corrosion resistant as indicated in the Approval Charts. The ENT finish is only available for the sprinkler assembly, the cover plate is not plated.



2. LISTINGS AND APPROVALS



LPCB Approved: Ref. No. 096y/02



UL Listed (C-UL-US-EU): Category VKKW



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

Refer to the Approval Charts and Design Criteria for Listing/Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: Refer to the Approval Chart.

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

Thread size: 1/2" NPT

Nominal K-Factor: 70.6 metric* (4.9 U.S.)

Glass-bulb fluid temperature rated to -55 °C (-65 °F)

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

Material Standards:

Sprinkler Body: Brass UNS-C84400 or QM Brass

Deflector: Phosphor Bronze UNS-C51000

Deflector Pins: Stainless Steel UNS-S30200

Button: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and SS UNS-S30400

Compression Screw: 18-8 Stainless Steel

Yoke: Phosphor Bronze UNS-C51000

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

Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating

Shipping Cap: Polyethylene

Cover Plate Materials:

Cover Plate Assembly: Copper UNS-C11000 and Brass UNS-C26800

Spring: Beryllium Nickel

Solder: Eutectic

Ordering Information: The sprinkler and cover plate must be ordered separately. Refer to Tables 1 and 2.

4. INSTALLATION

Refer to appropriate NFPA or EN Installation Standards.



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5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches, releasing the deflector. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand, causing the glass to shatter, releasing the yoke and pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the deflector, forming a uniform spray pattern over a specific area of coverage determined by the water supply pressure at the sprinkler to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

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

7. AVAILABILITY

Viking Sprinkler Model VK494 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.

TABLE 1: SPRINKLER ORDERING INFORMATION

Instructions:

- (1) Select a Sprinkler Base Part Number
- (2) Add the suffix for the desired Finish
- (3) Add the suffix for the desired Sprinkler Temperature Rating
- (4) Order a cover plate (refer to Table 2)

Example:

23103AB = 68 °C (155 °F) Temperature Rated Sprinkler with a standard Brass finish.

Sprinkler Base Part Number ¹	Size	1: Finishes		2: Temperature Ratings ⁷			
	NPT Inch	Description	Suffix	Nominal Rating	Bulb Color	Max. Ambient Ceiling Temperature ²	Suffix
23103	1/2	Brass ⁸	A	68 °C (155 °F)	Red	38 °C (100 °F)	B
		ENT ^{5,6}	JN	93 °C (200 °F)	Green	65 °C (150 °F)	E
		Corrosion Resistant Sprinkler Finish: ENT					

Accessories

Sprinkler Wrenches and tools:

- A. Heavy Duty Part Number: 14047W/B³ (available since 2006)
- B. Head Cabinet Wrench Part Number: 14031^{3,4} (available since 2006)
- C. Optional Concealed Cover Plate Installer Tool Part Number: 14412⁹ (available since 2007)
- D. Optional Large Concealed Cover Plate Installer Tool Part No. 14867⁹ (available since 2007)

Sprinkler Cabinet:

Holds up to 6 sprinklers: Part number 01731A (available since 1971).

Footnotes

1. Part number shown is the base part number. For complete part number, refer to the current Viking price list schedule.
2. 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.
3. Requires a 13 mm (½") ratchet (not available from Viking).
4. Also optional for removal of the protective cap. Ideal for sprinkler cabinets.
5. cULusEU Listed as corrosion resistant.
6. The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway. For ENT coated sprinklers, the Belleville spring is exposed.
7. The sprinkler temperature rating is stamped on the deflector.
8. LPCB Listed - Brass Only.
9. The installer tool is for push-on style cover plates only.



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TABLE 2: COVER PLATE ORDERING INFORMATION

Instructions:

- (1) Select a Cover Plate Base Part Number
- (2) Add the suffix for the desired Finish
- (3) Add the suffix for the required Cover Plate Nominal Rating.

Example:

23199MC/W = 165 °F (74 °C) Temperature Rated, 2-3/4" (70 mm) diameter, Thread-On style, Round Cover Plate with a Painted White finish.

1: Select a Cover Plate Base Part Number ³						2: Select a Finish	
Thread-On Style			Push-On Style				
Base Part Number ¹	Size Inch (mm)	Type	Base Part Number	Size Inch (mm)	Type	Description	Suffix ⁵
23199	2-3/4 (70)	Round	23459	2-3/4 (70)	Round	Polished Chrome	F
23187	3-5/16 (84)	Round	23479	3-5/16 (84)	Round	Brushed Chrome	F-/B
						Bright Brass	B
						Antique Brass	B-/A
						Brushed Brass	B-/B
						Brushed Copper	E-/B
						Painted White	M-/W
						Painted Ivory	M-/I
						Painted Black	M-/B
						3: Temperature Rating Matrix ^{1,2}	
Cover Plate Nominal Rating (Required)	Temperature Classification	Sprinkler Nominal Rating	Sprinkler Maximum Ambient Ceiling Temperature ²	Suffix			
cULusEU: 57 °C (135 °F) LPCB: 59 °C (139 °F)	Ordinary	68 °C (155 °F)	38 °C (100 °F)	A			
	Intermediate	93 °C (200 °F)	65 °C (150 °F)				
Footnotes							
1. Part number shown is the base part number. For complete part number, refer to the current Viking price list schedule.							
2. The sprinkler temperature rating is stamped on the deflector.							
3. 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.							
4. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.							



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Approval Chart - UL¹

Viking VK494, 70.6 (4.9 U.S) K-Factor Residential Concealed Pendent Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the design criteria.

For Ceiling types refer to current editions of NFPA 13, 13R or 13D

Sprinkler Base Part Number ²	SIN	Thread Size		Nominal K-Factor		Maximum Water Working Pressure
		NPT Inch		metric ³	U.S.	
23103	VK494	1/2		70.6	4.9	12 bar (175 psi)
Max. Coverage Area ⁷ W X L m X m (Ft. X Ft.)	Flow LPM (GPM)	Pressure bar (PSI)	Deflector to Ceiling	Installation Type	Listings and Approvals ^{4,6} 	Minimum Spacing m (Ft.)
3.7 X 3.7 (12 X 12)	49.2 (13)	0.48 (7.0)	Refer to Figure 2	Concealed with Cover Plate Assembly. See Footnote 9.	See Footnotes 8,10, 11	2.4 (8)
4.3 X 4.3 (14 X 14)	49.2 (13)	0.48 (7.0)				
4.9 X 4.9 (16 X 16)	49.2 (13)	0.48 (7.0)				
5.5 X 5.5 (18 X 18)	64.4 (17)	0.83 (12.0)				
6.1 X 6.1 (20 X 20)	75.7 (20)	1.15 (16.7)				

Footnotes

- For North American Markets only.
- Part number shown is the base part number. For complete part number, refer to current Viking price schedule.
- 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.
- This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals. Refer also to Design Criteria.
- Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.
- Meets New York City requirements, effective July 1, 2008.
- For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum "Flow" and "Pressure" used.
- Cover Temperature Rating is 57 °C (135 °F) for cULusEU Listing and 59 °C (139 °F) for LPCB approval. Cover Part No. 23187/23479 (large diameter), or 23199/23459.
- Other paint colors are available on request with the same listings as the standard finish colors. Stainless Steel cover plates are not available with any finishes or paint. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 3.
- Accepted Cover Plate Finishes are: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black ⁸.
- C-UL-US-EU Listed as corrosion resistant - Electroless Nickel PTFE (ENT)



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Approval Chart - LPCB¹ Viking VK494, K71 Residential Concealed Pendent Sprinkler For systems designed according to EN16925 including UK National Annex and BS9251 68°C & 93°C sprinkler with 59°C cover plate²

Sprinkler Base Part Number ³	SIN		Thread Size		Nominal K-Factor (metric)		Maximum Working Pressure (bar)	Minimum Spacing (m)
23103	VK494		1/2" NPT (15 mm BSPT)		70.6		12.0	2.4
Max. Coverage Area ⁴ W x L (m x m)	Minimum Design Criteria ⁵		Nominal ^{6,7} 2.1mm/min		Nominal ^{6,7} 2.8mm/min		Nominal ^{6,7} 4.0mm/min	
	Flow (L/min)	Pressure (bar)	Flow (L/min)	Pressure (bar)	Flow (L/min)	Pressure (bar)	Flow (L/min)	Pressure (bar)
3.7 x 3.7	49.1	0.5	49.1	0.5	49.1	0.5	54.8	0.6
4.3 x 4.3	52.9	0.6	52.9	0.6	52.9	0.6	74.0	1.1
4.9 x 4.9	52.9	0.6	52.9	0.6	67.2	0.9	96.0	1.9
5.5 x 5.5	64.3	0.8	64.3	0.8	84.7	1.4	121.0	2.9
6.1 x 6.1	75.6	1.1	78.1	1.2	104.2	2.2	148.8	4.4

- Not for North American markets. The VK494 is a vented style concealed sprinkler. Do not install embedded in concrete ceilings.
- Accepted Cover Plate Finishes are: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black. Other paint colors are available on request with the same listings as the standard finish colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.
- Part number shown is the base part number. For complete part number, contact Viking.
- For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum "Flow" and "Pressure" used. For detailed guidance on obstructions please refer to the relevant EN16925, NFPA13, 13R or 13D design and installation standards. The minimum flow for each sprinkler shall be selected such that both the actual width and length dimensions are equal to or less than those given in the table above.
- Minimum LPCB approved flow and pressure for each room size.
- Flow and pressure required to achieve nominal density, or minimum approved flow and pressure if higher.
- The nominal density is that used for design purposes and required by the installation standard. As a proportion of the flow is required to wet the walls the actual density on the floor will be lower than nominal. Product testing and approvals are carried out at the minimum values given above and so design should be based on the values given above and does not need to be adjusted to take account of wall-wetting.



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DESIGN CRITERIA

(Also refer to the Approval Chart on page 3.)

UL Listing Requirements (C-UL-US-EU):

When using Viking Residential Concealed Pendent Sprinkler VK494 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

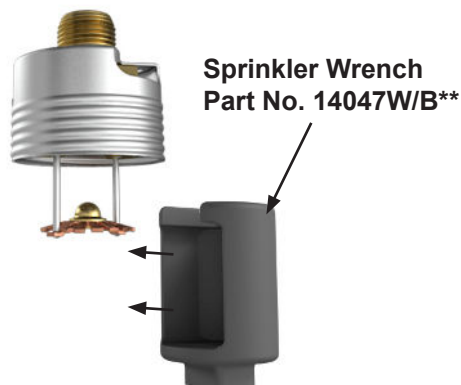
- The flow rates given in the Approval Chart for NFPA 13D and NFPA 13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13.
- Minimum distance between residential sprinklers: 2.4 m (8 ft.).

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

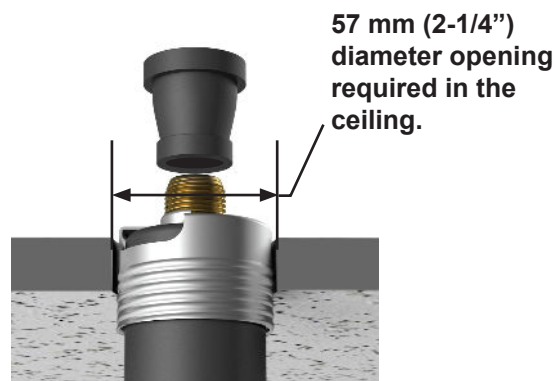
IMPORTANT: Always refer to Bulletin Form No. F_080415 - Best Practices for Residential Sprinkler Handling and Installation. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.

Sprinkler and Adapter Assembly

- Protective cap removed
- Use wrench 14047W/B**



Step 1:
Carefully slide the wrench sideways around the deflector and pins



Step 2:
Carefully press the wrench upward and turn slightly to ensure engagement with the sprinkler wrench flats.

NEVER install the sprinkler by applying the installation wrench across the frame arms. **DO NOT** overtighten. Use only the designated sprinkler wrenches, Viking Part Numbers 14047W/B** or 14031**. A leak tight seal should be achieved by turning the sprinkler clockwise 1 to 1-1/2 turns beyond finger tight.

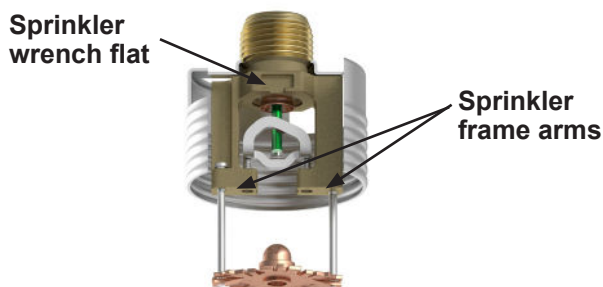


Figure 1: Sprinkler Installation and Proper Wrench Usage
** A 13mm (1/2") ratchet is required (Not available from Viking)



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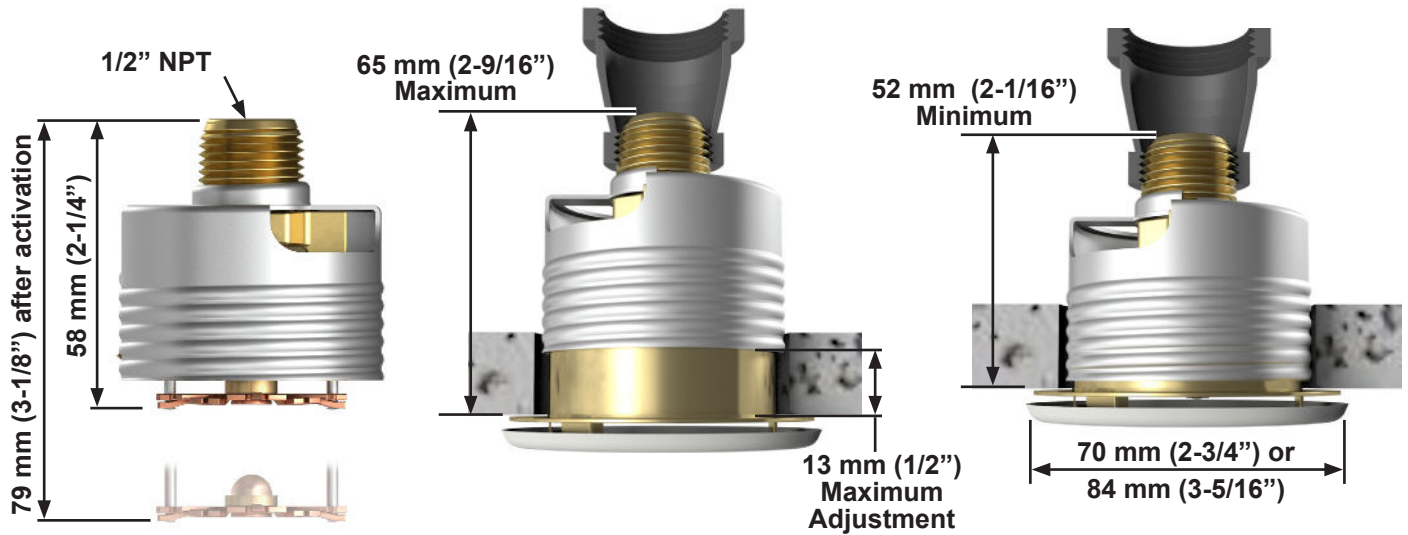
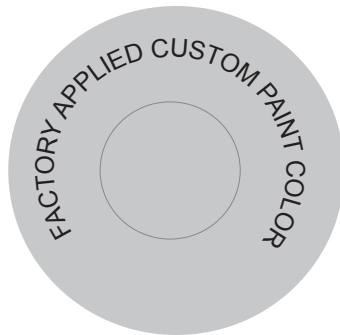


Figure 2: Sprinkler Dimensions and Cover Installation



All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 3: Identification of Custom Paint for Concealed Covers