



## TECHNICAL DATA

### FREEDOM® RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLER VK450 (K4.2)

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

#### 1. DESCRIPTION

Viking Freedom® Residential Horizontal Sidewall Sprinkler VK450 is a small, thermostatic, glass-bulb residential sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The sprinkler orifice design, with a K-Factor of 4.2, allows efficient use of available water supplies for the hydraulically designed fire-protection system. The glass bulb operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

#### 2. LISTINGS AND APPROVALS

 **cULus Listed:** Category VKKW

Refer to the Approval Charts on pages 143o-p and Design Criteria on page 143q for cULus Listing requirements that must be followed.

#### 3. TECHNICAL DATA

##### Specifications:

Minimum Operating Pressure: Refer to the Approval Charts.

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

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 4.2 U.S. (57 metric†)

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

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

Overall Length: 3" (76 mm)

##### Material Standards:

Frame Casting: Brass UNS-C84400

Deflector: Phosphor Bronze UNS-C51000

Bulb: Glass, nominal 3 mm diameter

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

Compression Screw: Brass UNS-C36000

Pip Cap: Leaded Bronze UNS-C31600

Bushing: Brass UNS-C36000

**Ordering Information:** (Also refer to the current Viking price list.)

**Sprinkler:** Base Part No. 12357

Order Sprinkler VK450 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome-Enloy® = F, White Polyester = M-/W, and Black Polyester

Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D

For example, sprinkler VK450 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 12357AB.

**Available Finishes And Temperature Ratings:** Refer to Table 1.

**Accessories:** (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

##### Sprinkler Wrenches:

A. Standard Wrench: Part No. 10896W/B (available since 2000)

B. Wrench for recessed sprinklers: Part No. 13655W/B†† (available since 2006)

††A 1/2" ratchet is required (not available from Viking).

##### Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

#### 4. INSTALLATION

Refer to appropriate NFPA Installation Standards. For NFPA 13D horizontal ceiling criteria and slopes, refer to TIA 1028R for slope ceiling criteria exceptions.



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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**5. OPERATION**

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

**6. INSPECTIONS, TESTS AND MAINTENANCE**

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

**7. AVAILABILITY**

The Viking Model VK450 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.

**TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES**

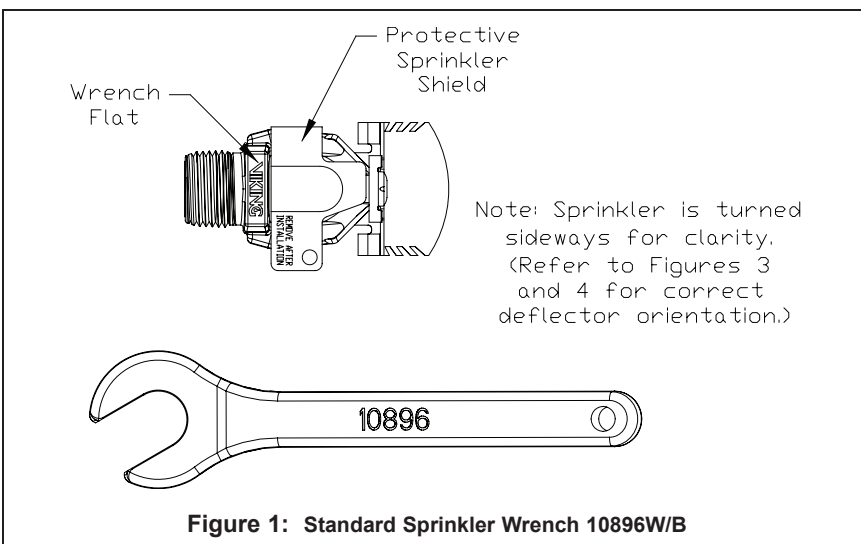
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating <sup>1</sup>	Maximum Ambient Ceiling Temperature <sup>2</sup>	Bulb Color
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow


**Sprinkler Finishes:** Brass, Chrome-Enloy® (patents pending), White Polyester, and Black Polyester

**Footnotes**

<sup>1</sup> The sprinkler temperature rating is stamped on the deflector.

<sup>2</sup> 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.



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<b>Approval Chart 1</b> Residential Horizontal Sidewall Sprinkler VK450 For systems designed to NFPA 13D <sup>6</sup> or NFPA 13R. For systems designed to NFPA 13, refer to the design criteria on page 143q.	<table border="1" style="border-collapse: collapse;"> <tr> <td style="text-align: center;">Temperature</td> <td style="text-align: center;">KEY</td> </tr> <tr> <td style="text-align: center;">Finish</td> <td></td> </tr> <tr> <td style="text-align: center;">A1X ← Escutcheon (if applicable)</td> <td></td> </tr> </table>	Temperature	KEY	Finish		A1X ← Escutcheon (if applicable)	
Temperature	KEY						
Finish							
A1X ← Escutcheon (if applicable)							

Sprinkler Base Part Number <sup>1</sup>	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Overall Length	
		Inches	mm	U.S.	metric <sup>2</sup>		Inches	mm
12357	VK450	1/2	15	4.2	57	175 psi (12 bar)	3	76

Maximum Areas of Coverage <sup>4</sup>	Deflector Distance Below the Ceiling	Minimum Water Supply Requirements <sup>4</sup>	Listings and Approvals <sup>3</sup> (Refer also to Design Criteria on page 143q.)		
			cULus <sup>5</sup>	NYC <sup>8</sup>	NSF <sup>9</sup>

<b>Installed 4" to 6" below smooth, flat, horizontal ceilings, includes ceilings with slopes up to and including 2/12 (9.5°).</b>						
12 ft. x 12 ft. (3.7 m x 3.7 m)	4" to 6" (102 mm to 152 mm)	12 gpm @ 8.2 psi (45.4 L/min @ 0.56 bar)		A1X	A1X	A1X
14 ft. x 14 ft. (4.3 m x 4.3 m)	4" to 6" (102 mm to 152 mm)	14 gpm @ 11.1 psi (53.0 L/min @ 0.76 bar)		A1X	A1X	A1X
16 ft. x 16 ft. (4.9 m x 4.9 m)	4" to 6" (102 mm to 152 mm)	18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)		A1X	A1X	A1X
16 ft. x 18 ft. (4.9 m x 5.5 m)	4" to 6" (102 mm to 152 mm)	18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)		A1X	A1X	A1X
16 ft. x 20 ft. (4.9 m x 6.1 m)	4" to 6" (102 mm to 152 mm)	22 gpm @ 27.4 psi (83.3 L/min @ 1.89 bar)		A1X	A1X	A1X
16 ft. x 22 ft. (4.9 m x 6.7 m)	4" to 6" (102 mm to 152 mm)	26 gpm @ 38.3 psi (98.4 L/min @ 2.64 bar)		B1Y	B1Y	B1Y

<b>Installed 6" to 12" below smooth, flat, horizontal ceilings, includes ceilings with slopes up to and including 2/12 (9.5°).</b>						
16 ft. x 16 ft. (4.9 m x 4.9 m)	6" to 12" (152 mm to 305 mm)	20 gpm @ 22.7 psi (75.7 L/min @ 1.56 bar)		A1X	A1X	A1X
16 ft. x 18 ft. (4.9 m x 5.5 m)	6" to 12" (152 mm to 305 mm)	20 gpm @ 22.7 psi (75.7 L/min @ 1.56 bar)		A1X	A1X	A1X
16 ft. x 20 ft. (4.9 m x 6.1 m)	6" to 12" (152 mm to 305 mm)	25 gpm @ 35.4 psi (94.6 L/min @ 2.44 bar)		A1X	A1X	A1X

<b>Installed 4" to 6" below sloped ceilings with slopes up to and including a 4/12 (18.4°) pitch<sup>7</sup>. Sprinklers <u>must</u> be installed <u>at the side</u> with spray directed <u>across</u> the slope. Refer to Figure 6 on page 143t.</b>						
				<b>UL</b>	<b>NYC<sup>8</sup></b>	<b>NSF<sup>9</sup></b>
16 ft. x 18 ft. (4.9 m x 5.5 m)	4" to 6" (102 mm to 152 mm)	18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)		A1X	A1X	A1X

<b>Approved Temperature Ratings</b> A - 155 °F (68 °C) and 175 °F (79 °C) B - 155 °F (68 °C)	<b>Approved Finishes</b> 1 - Brass, Chrome-Enloy®, White Polyester, and Black Polyester <sup>10</sup>	<b>Approved Escutcheons</b> X - Standard surface-mounted escutcheons, the Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Micromatic® Model E-1 or E-2 Recessed Escutcheon, or G-1 Recessed Escutcheon Y - Standard surface-mounted escutcheons
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**Footnotes**

<sup>1</sup> Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.

<sup>2</sup> Metric K-factor shown is for use 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 the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

<sup>4</sup> For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" for the next larger area listed. Flows and pressures listed are per sprinkler.

<sup>5</sup> Listed by Underwriter's Laboratories for use in the U.S. and Canada.

<sup>6</sup> Refer to TIA 1028R slope ceiling criteria exceptions.

<sup>7</sup> Areas under sloped ceilings must be measured along the ceiling slope. Actual floor coverage in the horizontal plane under sloped ceilings will be less than the listed area of coverage.

<sup>8</sup> Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 30.

<sup>9</sup> Tested and Certified by NSF (National Sanitation Foundation) to NSF/ANSI Standard 61, Drinking Water System Components.

<sup>10</sup> Other paint colors are available on request with the same cULus Listings as the standard finish colors.

	<h2 style="margin: 0;">TECHNICAL DATA</h2>	<h3 style="margin: 0;">FREEDOM® RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLER VK450 (K4.2)</h3>
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<h3 style="margin: 0;">Approval Chart 2</h3> <p style="margin: 0;">Residential Horizontal Sidewall Sprinkler VK450                  For systems designed to NFPA 13D<sup>5</sup> or NFPA 13R.</p>	<table border="1" style="border-collapse: collapse;"> <tr> <td style="padding: 2px;">—</td> <td>Temperature</td> <td rowspan="3" style="text-align: center; vertical-align: middle;"><b>KEY</b></td> </tr> <tr> <td style="padding: 2px;">▼</td> <td>Finish</td> </tr> <tr> <td style="padding: 2px;">A1X ←</td> <td>Escutcheon (if applicable)</td> </tr> </table>	—	Temperature	<b>KEY</b>	▼	Finish	A1X ←	Escutcheon (if applicable)
—	Temperature	<b>KEY</b>						
▼	Finish							
A1X ←	Escutcheon (if applicable)							

Sprinkler Base Part Number <sup>1</sup>	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Overall Length	
		Inches	mm	U.S.	metric <sup>2</sup>		Inches	mm
12357	VK450	1/2	15	4.2	57	175 psi (12 bar)	3	76

Maximum Areas of Coverage <sup>4</sup>	Deflector Distance Below the Ceiling	Minimum Water Supply Requirements <sup>4</sup>	Listings <sup>3</sup> (Refer also to Design Criteria on pg 143q.)		
			UL	NYC <sup>8</sup>	NSF <sup>9</sup>

Installed 6" to 12" below sloped ceilings with slopes up to and including a 4/12 (18.4°) pitch<sup>6</sup>.  
 Sprinklers **must** be installed at the **side** with spray directed **across** the slope. Refer to Figure 6 on page 143t.

16 ft. x 16 ft. (4.9 m x 4.9 m)	6" to 12" (152 mm to 305 mm)	20 gpm @ 22.7 psi (75.7 L/min @ 1.56 bar)	A1X	A1X	A1X
16 ft. x 18 ft. (4.9 m x 5.5 m)	6" to 12" (152 mm to 305 mm)	20 gpm @ 22.7 psi (75.7 L/min @ 1.56 bar)	A1X	A1X	A1X

Installed 4" to 6" below sloped ceilings with slopes up to and including an 8/12 (33.7°) pitch<sup>6</sup>. Sprinklers **must** be installed at the **side** with spray directed **across** the slope. Refer to Figure 6 on page 143t. Hydraulically calculate up to three sprinklers per compartment<sup>7</sup>.

16 ft. x 16 ft. (4.9 m x 4.9 m)	4" to 6" (102 mm to 152 mm)	18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)	A1X	A1X	A1X
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Installed 4" to 6" below ceilings with slopes up to and including an 8/12 (33.7°) pitch<sup>6</sup>.  
 Sprinklers **must** be installed at the **peak** with spray directed **down** the slope<sup>10</sup>. See Figure 5 on page 143s.

12 ft. x 12 ft. (3.7 m x 3.7 m)	4" to 6" (102 mm to 152 mm)	12 gpm @ 8.2 psi (45.4 L/min @ 0.56 bar)	A1X	A1X	A1X
14 ft. x 14 ft. (4.3 m x 4.3 m)	4" to 6" (102 mm to 152 mm)	14 gpm @ 11.1 psi (53.0 L/min @ 0.76 bar)	A1X	A1X	A1X
16 ft. x 16 ft. (4.9 m x 4.9 m)	4" to 6" (102 mm to 152 mm)	18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)	A1X	A1X	A1X
16 ft. x 18 ft. (4.9 m x 5.5 m)	4" to 6" (102 mm to 152 mm)	18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)	A1X	A1X	A1X
16 ft. x 20 ft. (4.9 m x 6.1 m)	4" to 6" (102 mm to 152 mm)	22 gpm @ 27.4 psi (83.3 L/min @ 1.89 bar)	A1X	A1X	A1X

Installed 6" to 12" below ceilings with slopes up to and including an 8/12 (33.7°) pitch<sup>6</sup>.  
 Sprinklers **must** be installed at the **peak** with spray directed **down** the slope<sup>10</sup>. See Figure 5 on page 143s.

16 ft. x 16 ft. (4.9 m x 4.9 m)	6" to 12" (152 mm to 305 mm)	20 gpm @ 22.7 psi (75.7 L/min @ 1.56 bar)	A1X	A1X	A1X
16 ft. x 18 ft. (4.9 m x 5.5 m)	6" to 12" (152 mm to 305 mm)	20 gpm @ 22.7 psi (75.7 L/min @ 1.56 bar)	A1X	A1X	A1X
16 ft. x 20 ft. (4.9 m x 6.1 m)	6" to 12" (152 mm to 305 mm)	25 gpm @ 35.4 psi (94.6 L/min @ 2.44 bar)	A1X	A1X	A1X

<b>Approved Temperature Ratings</b> A - 155 °F (68 °C) and 175 °F (79 °C)	<b>Approved Finishes</b> 1 - Brass, Chrome-Enloy®, White Polyester, and Black Polyester	<b>Approved Escutcheons</b> X - Standard surface-mounted escutcheons, the Micro-fast® Model F-1 Adjustable Escutcheon, or recessed with the Micromatic® Model E-1, E-2, or G-1 <sup>10</sup> Recessed Escutcheon
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**Footnotes**

- <sup>1</sup> Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
- <sup>2</sup> Metric K-factor shown is for use 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 the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.
- <sup>4</sup> For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" for the next larger area listed. Flows and pressures listed are per sprinkler.
- <sup>5</sup> Refer to TIA 1028R slope ceiling criteria exceptions.
- <sup>6</sup> Areas under sloped ceilings must be measured along the ceiling slope. Actual floor coverage in the horizontal plane under sloped ceilings will be less than the listed area of coverage.
- <sup>7</sup> With sprinklers installed at the **side** with spray directed **across** slopes having a pitch between 2/12 and 8/12, and with the deflector 4" to 6" below the ceiling, if there are more than two sprinklers present in a compartment, three sprinklers in the compartment must be included in the hydraulic calculation.
- <sup>8</sup> Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 30.
- <sup>9</sup> Tested and Certified by NSF (National Sanitation Foundation) to NSF/ANSI Standard 61, Drinking Water System Components.
- <sup>10</sup> Recessed horizontal sidewall sprinkler VK450 installed at the **peak** of sloped ceilings with spray directed **down** the slope must use the Model G-1 Recessed Escutcheon.



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**DESIGN CRITERIA**

(Also refer to the Approval Charts on pages 143o-p.)

**cULus Listing Requirements:**

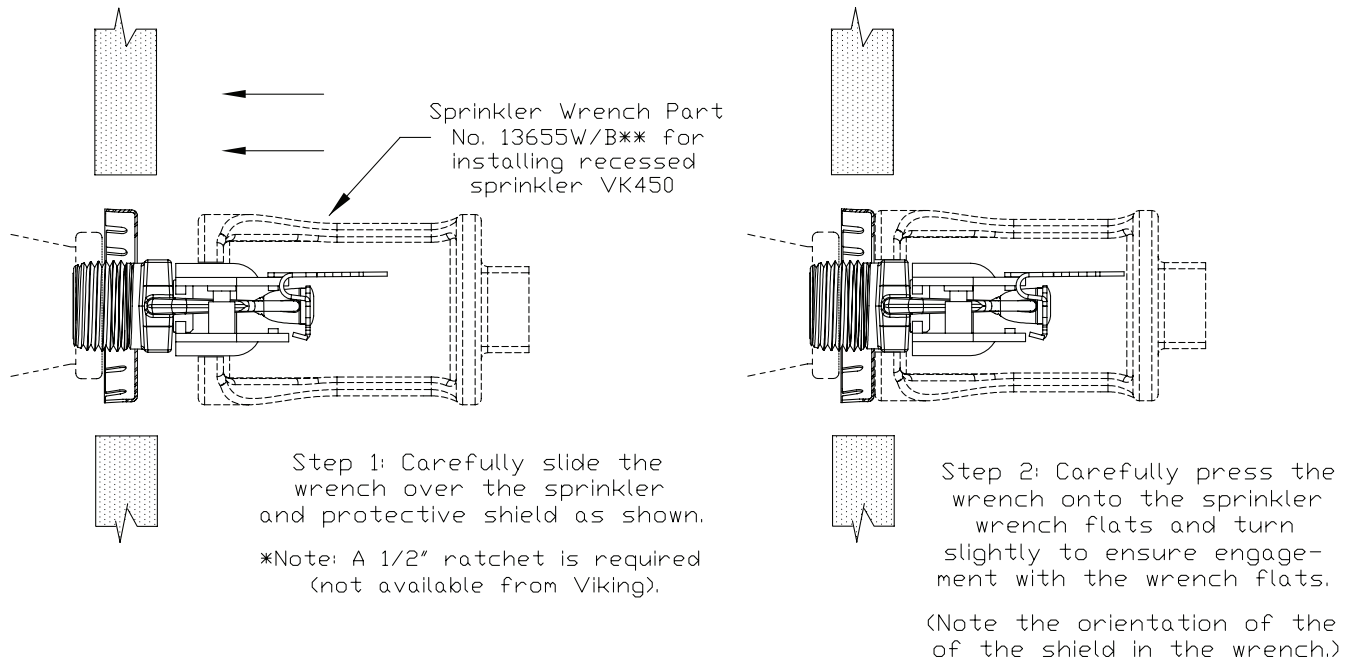
When using Viking Residential Sprinkler VK450 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Charts on pages 143o-p.

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 Charts on data pages 143o-p for NFPA 13D and NFPA13R 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: 8 ft. (2.4 m).
- The VK450 horizontal sidewall sprinkler deflector shall be located a minimum of 1-3/4" (44.5 mm) and a maximum of 6" (152 mm) from the wall on which it is installed.

**DEFLECTOR POSITION:** Install Viking Residential Horizontal Sidewall Sprinkler VK450 with the leading edge of the deflector and the centerline axis of the sprinkler frame oriented parallel with the ceiling. Refer to the Approval Charts on pages 143o-p for the required distance between the top of the deflector and the ceiling.

**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to pages RES1-17 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.**



**Figure 2:  
Wrench 13655W/B for Recessed Sprinkler VK450**

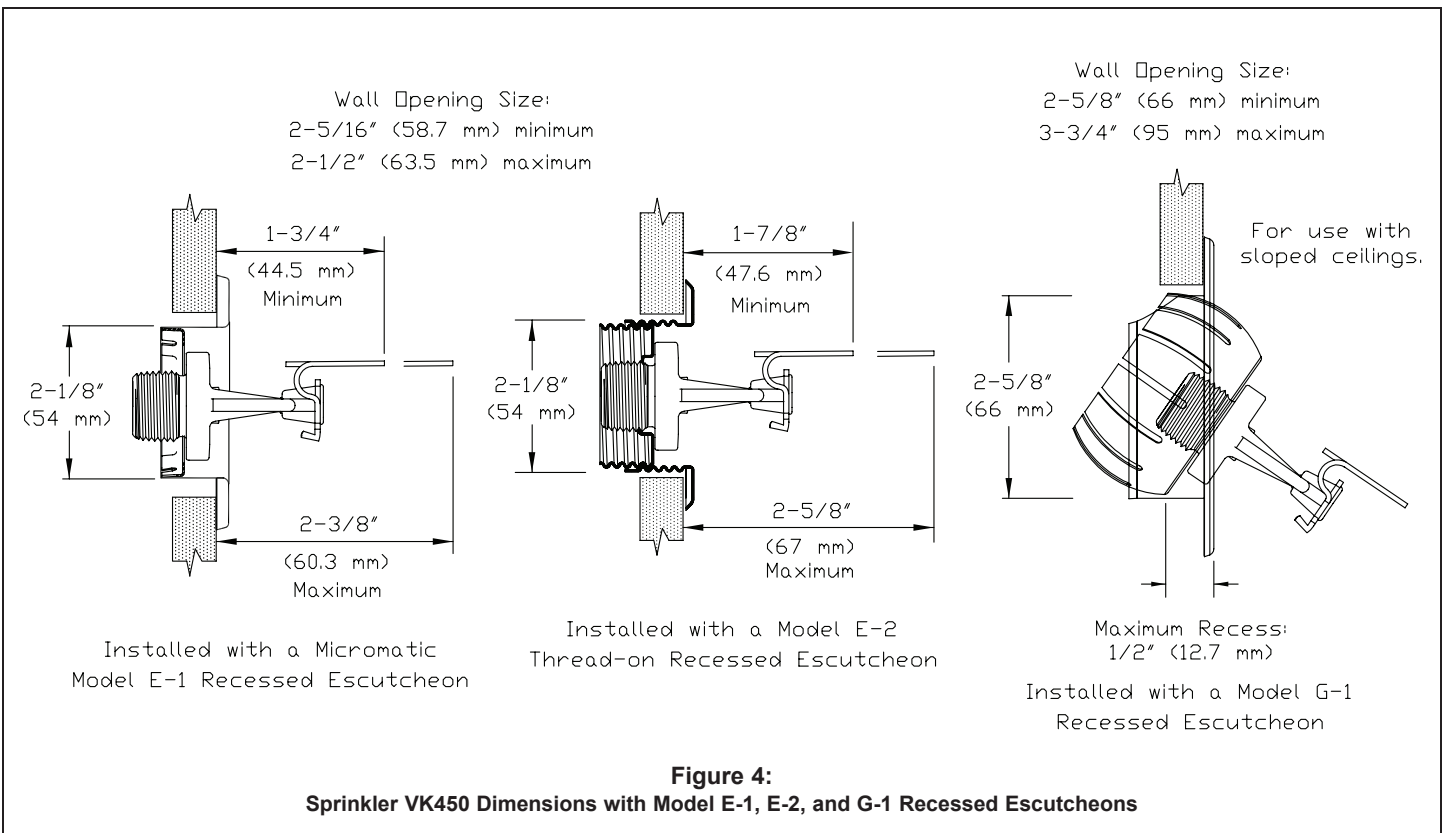
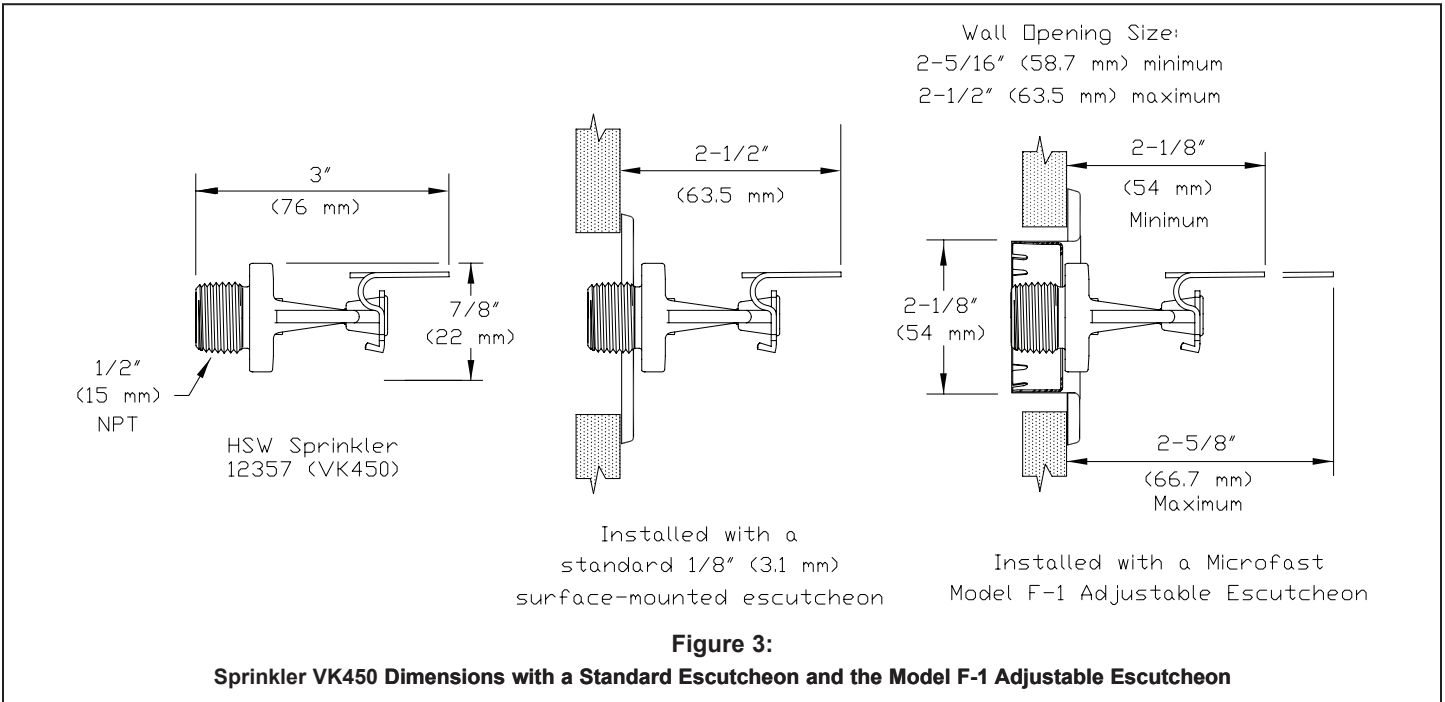


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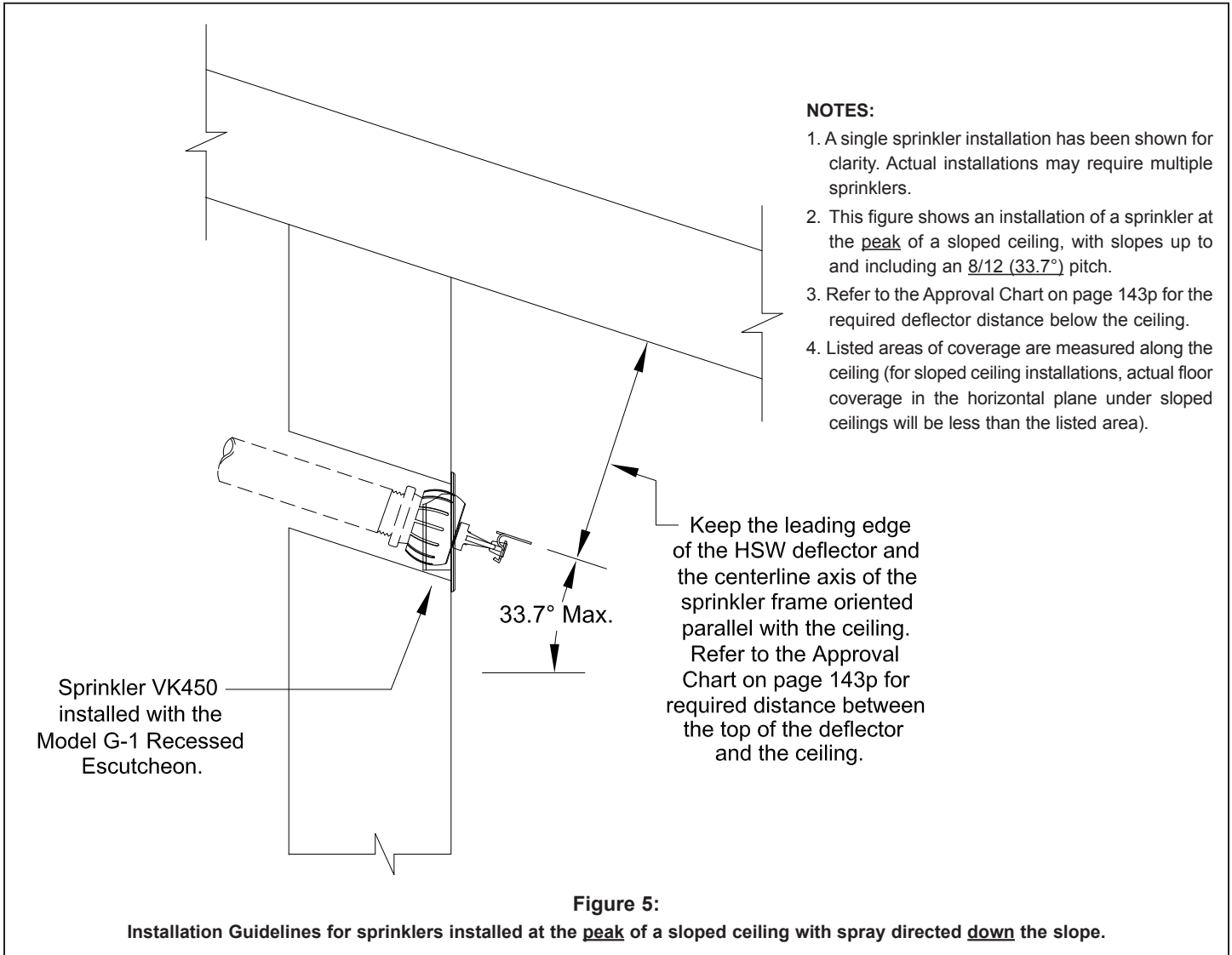


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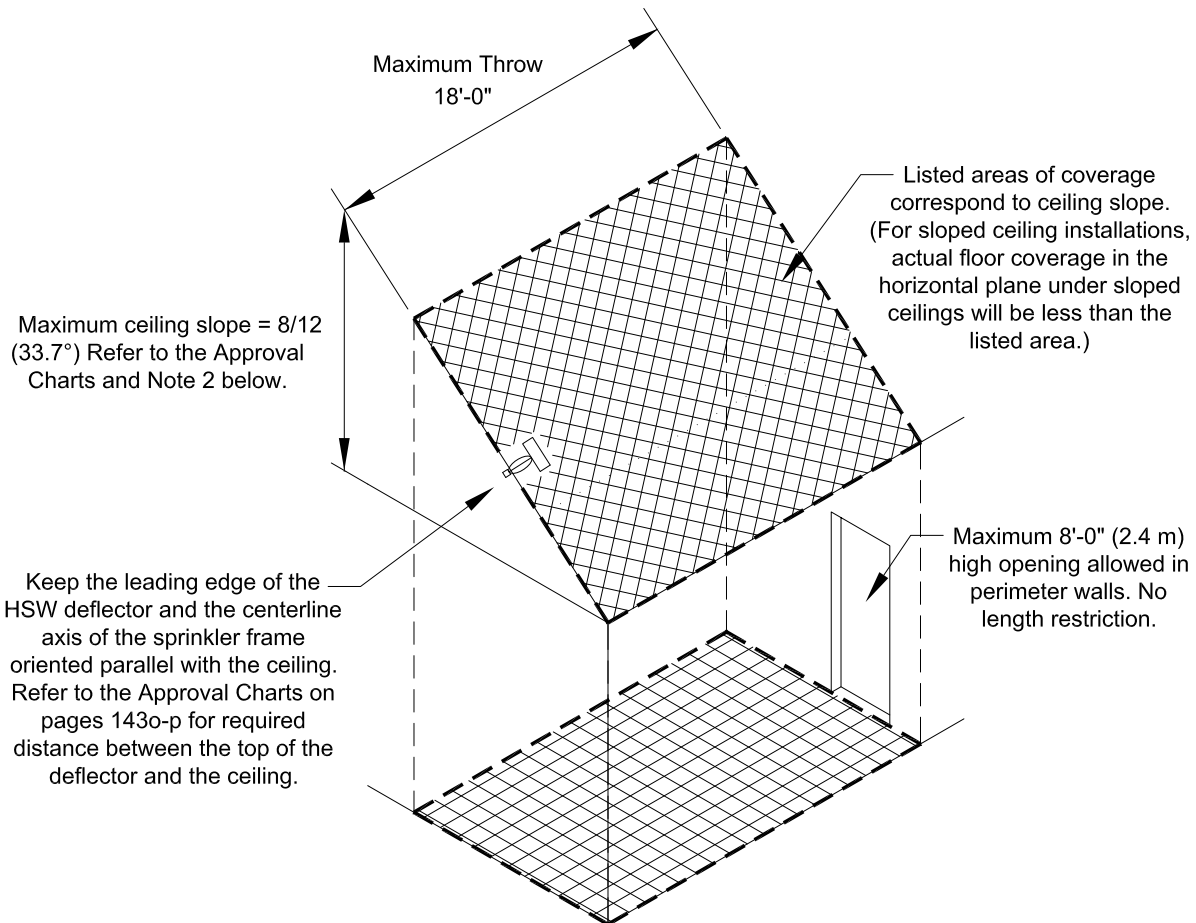


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#### NOTES:

1. A single sprinkler installation has been shown for clarity. Actual installations may require multiple sprinklers.
2. This figure shows an installation of a sprinkler on the side of a sloped ceiling. Installations in this configuration for slopes up to 8/12 (33.7°). (Refer to the Approval Charts on pages 143o-p.)
3. For "cathedral" ceiling applications, install sprinklers in a symmetrical mirror-image of Figure 6.
4. Maximum allowable compartment sizes are as follows (area measured along slope):  
 One Sprinkler: 16' Width x 18' Throw      Two Sprinklers: 32' Width x 18' Throw  
 Three Sprinklers: 48' Width x 18' Throw
5. Sprinklers may be installed in any combination of acceptable installation locations, as long as each sprinkler is located in accordance with its individual listings. **With sprinklers installed at the side** with spray directed across slopes having a pitch between 2/12 and 8/12, and with the deflector 4" to 6" below the ceiling, if there are more than two sprinklers present in a compartment, three sprinklers in the compartment must be included in the hydraulic calculation. Refer to TIA 1028R slope ceiling criteria exceptions.

**Figure 6:**

**Installation Guidelines for sprinklers installed on the side of a sloped ceiling with spray directed across the slope.**