1. DESCRIPTION

Viking Freedom® Residential Horizontal Sidewall Sprinkler VK450 is a small, thermo-sensitive, glass-bulb residential sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The orifice design, with a K-Factor of 4.2, allows efficient use of available water supplies for the hydraulically designed fire-protection system. The fast response type glass bulb and special deflector combine speed of operation and area of coverage to meet residential sprinkler standards while being aesthetically pleasing.

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 Chart.
- Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).
- Testing: U.S.A. Patent No. 4,831,870
- Thread size: 1/2” (15 mm) NPT
- Nominal K-Factor: 4.2 U.S. (60.5 metric†)
  †Metric K-factor measurement is shown 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: Brass 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, and White Polyester = M/W
  Temperature Suffix (°F/°C): 155°/68° = B, 175°/79° = 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. 10896WB (available since 2000)
  B. Wrench for recessed sprinklers: Part No. 13655WB†† (available since 2006)
  ††A ½" ratchet is required (not available from Viking).

Sprinkler Cabinets:
- A. Six-head capacity: Part No. 01724A (available since 1971)
4. INSTALLATION
Refer to appropriate NFPA Installation Standards.

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

<table>
<thead>
<tr>
<th>Sprinkler Temperature Classification</th>
<th>Sprinkler Nominal Temperature Rating&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Maximum Ambient Ceiling Temperature&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Bulb Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary</td>
<td>155 °F (68 °C)</td>
<td>100 °F (38 °C)</td>
<td>Red</td>
</tr>
<tr>
<td>Intermediate</td>
<td>175 °F (79 °C)</td>
<td>150 °F (65 °C)</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

Sprinkler Finishes: Brass, Chrome-Enloy<sup>®</sup> (patents pending), and White 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.
### Approval Chart 1
Residential Horizontal Sidewall Sprinkler VK450
For systems designed to NFPA 13D or NFPA 13R.

<table>
<thead>
<tr>
<th>Sprinkler Base Part Number¹</th>
<th>SIN</th>
<th>NPT Thread Size</th>
<th>Nominal K-Factor</th>
<th>Maximum Water Working Pressure</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12357 VK450</td>
<td></td>
<td>1/2</td>
<td>15</td>
<td>4.2</td>
<td>60.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>175 psi (12 bar)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Maximum Areas of Coverage⁴

#### Installed 4” to 6” below smooth, flat, horizontal ceilings, includes ceilings with slopes up to and including 2/12 (9.5°).

<table>
<thead>
<tr>
<th>Coverage Area</th>
<th>Deflector Distance Below the Ceiling</th>
<th>Minimum Water Supply Requirements⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 ft. x 12 ft. (3.7 m x 3.7 m)</td>
<td>4” to 6” (102 mm to 152 mm)</td>
<td>12 gpm @ 8.2 psi (45.4 L/min @ 0.56 bar)</td>
</tr>
<tr>
<td>14 ft. x 14 ft. (4.3 m x 4.3 m)</td>
<td>4” to 6” (102 mm to 152 mm)</td>
<td>14 gpm @ 11.1 psi (53.0 L/min @ 0.76 bar)</td>
</tr>
<tr>
<td>16 ft. x 16 ft. (4.9 m x 4.9 m)</td>
<td>4” to 6” (102 mm to 152 mm)</td>
<td>18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)</td>
</tr>
<tr>
<td>16 ft. x 18 ft. (4.9 m x 5.5 m)</td>
<td>4” to 6” (102 mm to 152 mm)</td>
<td>18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)</td>
</tr>
<tr>
<td>16 ft. x 20 ft. (4.9 m x 6.1 m)</td>
<td>4” to 6” (102 mm to 152 mm)</td>
<td>22 gpm @ 27.4 psi (83.3 L/min @ 1.89 bar)</td>
</tr>
<tr>
<td>16 ft. x 22 ft. (4.9 m x 6.7 m)</td>
<td>4” to 6” (102 mm to 152 mm)</td>
<td>26 gpm @ 38.3 psi (98.4 L/min @ 2.64 bar)</td>
</tr>
</tbody>
</table>

#### Installed 6” to 12” below smooth, flat, horizontal ceilings, includes ceilings with slopes up to and including 2/12 (9.5°).

<table>
<thead>
<tr>
<th>Coverage Area</th>
<th>Deflector Distance Below the Ceiling</th>
<th>Minimum Water Supply Requirements⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 ft. x 16 ft. (4.9 m x 4.9 m)</td>
<td>6” to 12” (152 mm to 305 mm)</td>
<td>20 gpm @ 22.7 psi (75.7 L/min @ 1.56 bar)</td>
</tr>
<tr>
<td>16 ft. x 18 ft. (4.9 m x 5.5 m)</td>
<td>6” to 12” (152 mm to 305 mm)</td>
<td>20 gpm @ 22.7 psi (75.7 L/min @ 1.56 bar)</td>
</tr>
<tr>
<td>16 ft. x 20 ft. (4.9 m x 6.1 m)</td>
<td>6” to 12” (152 mm to 305 mm)</td>
<td>25 gpm @ 35.4 psi (94.6 L/min @ 2.44 bar)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Coverage Area</th>
<th>Deflector Distance Below the Ceiling</th>
<th>Minimum Water Supply Requirements⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 ft. x 18 ft. (4.9 m x 5.5 m)</td>
<td>4” to 6” (102 mm to 152 mm)</td>
<td>18 gpm @ 18.4 psi (68.1 L/min @ 1.26 bar)</td>
</tr>
</tbody>
</table>

### Approved Temperature Ratings
A - 155 °F (68 °C) and 175 °F (79 °C)
B - 155 °F (68 °C)

### Approved Escutcheons
X - Standard surface-mounted escutcheons or the Microfast® Model F-1 Adjustable Escutcheon⁹, or recessed with the Micromatic® Model E-1 or E-2 Recessed Escutcheon, or G-1 Recessed Escutcheon
Y - Standard surface-mounted escutcheons or the Microfast® Model F-1 Adjustable Escutcheon⁹

### Approved Finishes
1 - Brass, Chrome-Enloy®, White, and Black

### Footnotes
1. Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
2. 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.
3. 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.
4. 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.
5. Listed by Underwriter’s Laboratories for use in the U.S. and Canada.
6. 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.
7. Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 30.
8. Tested and Certified by NSF (National Sanitation Foundation) to NSF/ANSI Standard 61, Drinking Water System Components.
9. The Microfast® Model F-1 Adjustable Escutcheon is considered a surface-mounted escutcheon because it does not allow the fusible element of the sprinkler to be recessed behind the face of the wall or ceiling.
# Technical Data

**FREEDOM® Residential Horizontal Sidewall Sprinkler VK450 (K4.2)**

Sprinkler 143p

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### Approval Chart 2

<table>
<thead>
<tr>
<th>Sprinkler Base Part Number</th>
<th>SIN</th>
<th>NPT Thread Size</th>
<th>Nominal K-Factor</th>
<th>Maximum Water Working Pressure</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Inches</td>
<td>mm U.S.</td>
<td>metric</td>
<td>Inches mm</td>
</tr>
<tr>
<td>12357</td>
<td>VK450</td>
<td>1/2</td>
<td>15</td>
<td>4.2</td>
<td>60.5</td>
</tr>
</tbody>
</table>

**Maximum Areas of Coverage**

- **Deflector Distance Below the Ceiling**
- **Minimum Water Supply Requirements**

**Listings**

- UL
- NYC
- NSF

**Approved Temperature Ratings**

- A - 155 °F (68 °C) and 175 °F (79 °C)

**Approved Finishes**

- 1 - Brass, Chrome-Enloy®, White, and Black

**Approved Escutcheons**

- X - Standard surface-mounted escutcheons or the Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Micromatic® Model E-1, E-2, or G-1 Recessed Escutcheon

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**Footnotes**

1. Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
2. Metric K-factor shown is for use when pressure is measured in kPa, divide the metric K-factor shown by 10.0.
3. 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.
4. 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.
5. 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.
6. 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.
7. Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 30.
8. Tested and Certified by NSF (National Sanitation Foundation) to NSF/ANSI Standard 61, Drinking Water System Components.
9. The Microfast® Model F-1 Adjustable Escutcheon is considered a surface-mounted escutcheon because it does not allow the fusible element of the sprinkler to be recessed behind the face of the wall or ceiling.
10. 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.
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
- A minimum discharge of 0.1 gpm/sq. ft. over the “design area” consisting of the four contiguous most hydraulically demanding sprinklers for the coverage areas being protected by the four sprinklers. NOTE: The \( A_s = S \times L \) method must be used to determine the sprinkler protection area of coverage per 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.
Sprinkler VK450 Dimensions with Model E-1, E-2, and G-1 Recessed Escutcheons

Figure 3:
Sprinkler VK450 Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon

Figure 4:
Sprinkler VK450 Dimensions with Model E-1, E-2, and G-1 Recessed Escutcheons
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 at the peak of a sloped ceiling, with slopes up to and including an 8/12 (33.7°) pitch.
3. Refer to the Approval Chart on page 143p for the required deflector distance below the ceiling.
4. Listed areas of coverage are measured along the ceiling (for sloped ceiling installations, actual floor coverage in the horizontal plane under sloped ceilings will be less than the listed area).

Figure 5:
Installation Guidelines for sprinklers installed at the peak of a sloped ceiling with spray directed down the slope.
**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 for required distance between the top of the deflector and the ceiling.
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.

**Figure 6:**
Installation Guidelines for sprinklers installed on the side of a sloped ceiling with spray directed across the slope.