1. DESCRIPTION
Viking Freedom® Residential Upright Lead Free* Sprinkler VK4670 is a small, thermosensitive, 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 4.9 (70.6 metric†), 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.

* Lead content complies with the definition of ‘Lead Free’ established in the Reduction of Lead in Drinking Water Act (S.3874) endorsed by AWWA’s Water Utility Council, and California Assembly Bill #1953.

2. LISTINGS AND APPROVALS
UL Listed (C-UL-US-EU): Category VKKW
UL Classified to: NSF/ANSI Standard 61, Drinking Water System Components and NSF 372 (MH48034). Refer to the Approval Chart Design Criteria for C-UL-US-EU 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).
Thread size: 1/2” (15 mm) NPT
Nominal K-Factor: 4.9 U.S. (70.6 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: 2-1/4” (58 mm)

Material Standards:
Frame Casting: Brass UNS-C89833
Deflector: Brass UNS-C23000 or Bronze UNS-C22000
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Polytetrafluoroethylene (PTFE) Tape
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
Compression Screw: Brass UNS-C36000

Ordering Information: (Also refer to the current Viking price list.)
Sprinkler: Base Part No. 19442
Order Lead Freed Sprinkler VK4670 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 = F, White Polyester = M-/W, and Black Polyester = M-/B
Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D
For example, sprinkler VK4670 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 19442AB.

Available Finishes And Temperature Ratings:
Refer to Table 1.

Accessories: (Also refer to the Viking website.)
Sprinkler Wrenches:
A. Standard Wrench: Part No. 21475M/B (available since 2017)
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.
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 Freedom® Residential Upright Lead Free Sprinkler VK4670 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. **GUARANTEE**

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

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

<table>
<thead>
<tr>
<th>Sprinkler Temperature Classification</th>
<th>Sprinkler Nominal Temperature Rating(^1)</th>
<th>Maximum Ambient Ceiling Temperature(^2)</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, White Polyester, and Black Polyester

**Footnotes**

\(^1\) The sprinkler temperature rating is stamped on the deflector.

\(^2\) 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

**Viking VK4670, 4.9 K-Factor Residential Upright 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 the most current Edition of NFPA 13, 13R or 13D

<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></td>
<td></td>
<td>Inches</td>
<td>mm</td>
<td>U.S.</td>
<td>metric²</td>
</tr>
<tr>
<td>19442</td>
<td>VK4670</td>
<td>1/2</td>
<td>15</td>
<td>4.9</td>
<td>70.6</td>
</tr>
</tbody>
</table>

#### Max. Coverage Area²

<table>
<thead>
<tr>
<th>Ft.X Ft. (m X m)</th>
<th>Coverage</th>
<th>Ordinary Temp Rating (155 °F/68 °C)</th>
<th>Intermediate Temp Rating (175 °F/79 °C)</th>
<th>Deflector to Ceiling</th>
<th>Installation Type</th>
<th>Listings and Approvals³</th>
<th>Minimum Spacing Ft. (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 X 12 (3.7 X 3.7)</td>
<td>14/14</td>
<td>8.16 (53.0)</td>
<td>14/14</td>
<td>8.16 (53.0)</td>
<td>3 - 5 inches</td>
<td>Upright</td>
<td>See Footnote 7.</td>
</tr>
<tr>
<td>14 X 14 (4.3 X 4.3)</td>
<td>16/16</td>
<td>10.66 (60.6)</td>
<td>16/16</td>
<td>10.66 (60.6)</td>
<td>5 - 10 inches</td>
<td>Upright</td>
<td>See Footnote 6.</td>
</tr>
<tr>
<td>16 X 16 (4.9 X 4.9)</td>
<td>15/15</td>
<td>9.37 (56.8)</td>
<td>15/15</td>
<td>9.37 (56.8)</td>
<td>5 - 10 inches</td>
<td>Upright</td>
<td>See Footnote 7.</td>
</tr>
<tr>
<td>12 X 12 (3.7 X 3.7)</td>
<td>18/18</td>
<td>13.49 (68.1)</td>
<td>18/18</td>
<td>13.49 (68.1)</td>
<td>1 to 3 inches below 14 inch beams</td>
<td>1 to 3 inches below 14 inch beams</td>
<td></td>
</tr>
</tbody>
</table>

#### Footnotes

¹ Part number shown is the base part number. For complete part number, refer to Viking’s current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This chart shows the 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.

⁴ 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.

⁵ Listed by Underwriter’s Laboratories, Inc. for use in the U.S., Canada, and European Union.

⁶ Meets New York City requirements, effective July 1, 2008.

⁷ Approved Finishes are: Brass, Chrome, White Polyester, and Black Polyester.

⁸ UL Classified to: NSF/ANSI Standard 61, Drinking Water System Components and NSF 372 (MH48034).

⁹ Other paint colors are available on request with the same C-UL-US-EU listings as the standard finish colors.
UL Listing Requirements (C-UL-US-EU):
When using Viking Freedom® Residential Upright Lead Free Sprinkler VK4670 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 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 of NFPA 13.
- Minimum distance between residential sprinklers: 9 ft. (2.74 m).

Beam Spacing:
A. For primary beams, the distance from the wall to the center of the nearest primary beam must be at least 3'-4" (1.0 m), and not more than one-half the listed sprinkler spacing. Note: Sprinklers may not be required to be located in the first beam nearest the wall. Center-to-center distance between primary beams is to be a maximum of 16 ft (4.9 m). Refer to Figure 3A.
B. When beam pockets created by the primary beams exceed 20 ft (6.1 m) in length, secondary beams are required as follows (also refer to Figure 3B):
   1. Secondary beam depth must be equal to primary beam depth.
   2. Secondary beams must be placed so that the bays formed by the primary beams do not exceed 20 ft (6.1 m) in length.
C. When primary beam spans do not exceed 20 ft (6.1 m), secondary beams (not required) may have any distance from wall to nearest secondary beam and any distance center to center between secondary beams. Refer to Figure 3C.

Also:
When primary beam spans exceed 20ft (6.1m) an alternate protection scheme for the compartment would be to calculate all the sprinklers in the compartment. Refer to Figure 5.
- More stringent design requirement.
- Secondary beams or baffles would not be required for a compartment space design.
- The minimum required discharge from each sprinkler would utilize flow rates given in the Approval Chart for NFPA 13D and NFPA13R applications.

Lintels:
Must be present over doorways exiting the compartment. Lintel height must be at least 8" (203 mm), or at least the depth of the primary beams, whichever is greater.

Beam and Soffit Arrangements:
If a soffit is installed, beams may be arranged within the soffit. The cross section of the soffit may be any size, provided it does not create an obstruction to water distribution per the obstruction rules of NFPA 13 for residential sprinklers. Where there is a soffit, beam spacing from the wall is to be measured from the face of the soffit rather than the wall. Refer to Figure 3D. NOTE: The sprinkler area of coverage is to be measured from the wall.

Definitions:
- Primary beams: The main beams that run primarily in one direction.
- Secondary beams: The beams that run perpendicular to the main beams.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No.s F_080190, F_080814, and F_080415 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: Sprinkler Positioning Under Primary Beams

Figure 3: Sprinkler Positioning Under Primary Beams
**Figure 4A:** Primary Beam Spans up to 20 ft (6.1 m)  
A = Distance from wall to nearest primary beam:  
Minimum: 3 ft 4 in (1.0 m).  
Maximum: No more than 1/2 listed sprinkler spacing.  
B = Spacing between primary beams: 16 ft (4.9 m) maximum  
C = Beam depth: 14" (356 mm) maximum  
D = Beam span: 20 ft (6.1 m) maximum

**Figure 4B:** Primary Beam Spans over 20 ft (6.1 m)  
A = Distance from wall to nearest primary beam:  
Minimum: 3 ft 4 in (1.0 m).  
Maximum: No more than 1/2 listed sprinkler spacing.  
B = Spacing between primary beams: 16 ft (4.9 m) maximum  
C = Beam depth: 14" (356 mm) maximum  
D = 20 ft (6.1 m) maximum for secondary beams that are to be  
equal in depth for primary beams and that are required so that  
primary beam pockets do not exceed 20 ft (6.1 m).

**EXAMPLE**

**Figure 5:** Alternate Entire Compartment Protection Scheme Example  
All dimensions are measured to wall faces and to centerlines of beams.  
- Primary beam spans exceeding 20 ft (6.1 m)  
- Secondary beams or baffles not required  
- Calculate all sprinklers in compartment  
  (Above example 6 sprinklers)