1. DESCRIPTION
The Model V-BB (Back to Back) is a Specific Application Attic Sprinkler designed to provide superior fire protection in combustible and non-combustible sloped attic spaces when compared to standard spray attic protection. With specific application criteria for use with Model V-SD (Single Directional) and VK696 Attic Upright Specific Application Sprinklers, Viking attic sprinklers provide an extended coverage spacing alternative to standard spray sprinklers. They make it possible to use a single line of piping at the attic peak, eliminating the need for branch lines and greatly reducing the number of required sprinklers and associated material and installation costs. Model V-BB sprinklers also have lower minimum flow and pressure requirements than competitive products.

Viking Attic Sprinklers can be installed with either steel or CPVC piping (CPVC allowed on wet pipe systems only), and are available in brass or with corrosion-resistant Electroless Nickel PTFE (ENT) coatings where salt water and other corrosive elements are a consideration. They are cULus Listed with specific application guidelines for use as special sprinklers as defined by the National Fire Protection Association (NFPA), and are cULus Listed for extended coverage in combustible and non-combustible construction. The cULus Listing was achieved using full-scale fire tests within wood truss construction.

The Model V-BB Attic Sprinkler provides a reduced response time due to its narrow ridge spacing of 6 ft. (1.8 m) and long throw pattern (up to 30 ft. in each direction measured horizontally), and is offered in three different slope ranges and two different orifice sizes (K=5.6 or 8.0). Listed for specific pitches 4:12<7:12, 7:12<10:12, and 10:12≤12:12; and spans of 60 ft. and 40 ft. The 8.0K can protect up to 80 ft. span when used along with the Model Attic Upright VK696.

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV
Refer to the Approval Chart on page 4.

3. TECHNICAL DATA
Specifications:
- Minimum Operating Pressure: See Design Criteria - UL
- Rated to 175 psi (12 bar) water working pressure
- Factory tested hydrostatically to 500 psi (34.5 bar)
- Thread size: 1/2" (15 mm) or 3/4" (19 mm) NPT
- Nominal K-Factor: 5.6 U.S. (80.6 metric*) or 8.0 (115.2 metric*)

* 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.
- Glass-bulb fluid temperature rated to -65 °F (-55 °C)
- Overall Length: 2-5/8" (67.6 mm)
- Covered by the following US Patent No.: 9,149,818

Material Standards:
- Frame Casting: Brass UNS-C84400 or QM Brass
- Deflector: Brass UNS-C23000
- Bulb: Glass, nominal 3 mm diameter
- Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape
- Screw: Brass UNS-C36000
- Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Ordering Information: (Also refer to the current Viking price list.)
To order the Attic Sprinkler, add 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, ENT = JN
- Temperature Suffix: E = 200 °F (93.3 °C)

V-BB Sprinkler

<table>
<thead>
<tr>
<th>8.0K</th>
<th>5.6K</th>
<th>Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>VK681</td>
<td>VK684</td>
<td>4:12 &lt; 7:12</td>
</tr>
<tr>
<td>VK682</td>
<td>VK685</td>
<td>7:12 &lt; 10:12</td>
</tr>
<tr>
<td>VK683</td>
<td>VK686</td>
<td>10:12 ≤ 12:12</td>
</tr>
</tbody>
</table>

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov
Available Finishes And Temperature Ratings:
Refer to the approval chart on page 4.

Accessories: (Also refer to the “Sprinkler Accessories” section of the Viking website under Technical Data)

Sprinkler Wrench:
Standard Wrench: Part No. 10896W/B

Sprinkler Cabinets:
A. Six-head capacity: Part No. 01724A
B. Twelve-head capacity: Part No. 01725A

4. INSTALLATION
Refer to appropriate NFPA Installation Standards.

5. OPERATION
During a fire condition, 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 deflector, forming a uniform spray pattern to extinguish or control the fire, and protect the piping in the interstitial space.

6. INSPECTIONS, TESTS AND MAINTENANCE
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY
The Model V-BB Specific Application 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>
<thead>
<tr>
<th>Sprinkler Temperature Classification</th>
<th>Sprinkler Nominal Temperature Rating¹</th>
<th>Maximum Ambient Ceiling Temperature²</th>
<th>Bulb Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>200 °F (93.3 °C)</td>
<td>150 °F (65°C)</td>
<td>Green</td>
</tr>
</tbody>
</table>

Sprinkler Finishes: Brass, ENT³

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.
³ cULus Listed as corrosion resistant.
Figure 1: Standard Sprinkler Wrench 10896W/B

Figure 2a: Sprinkler Dimensions - 5.6K

Figure 2b: Sprinkler Dimensions - 8.0K
# APPROVAL CHART 1

Viking V-BB Specific Application Sprinkler
For Combustible and Non-Combustible Sloped Attic Spaces

<table>
<thead>
<tr>
<th>Part Number1</th>
<th>SIN</th>
<th>Maximum Pressure</th>
<th>Thread Size</th>
<th>Nominal K-Factor</th>
<th>Overall Length</th>
<th>Listings and Approvals5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>NPT  BSP</td>
<td>U.S.  metric2</td>
<td>Inches  mm</td>
<td>cULus4  FM  LPCB</td>
</tr>
<tr>
<td>19627</td>
<td>VK684</td>
<td>175 psi</td>
<td>1/2&quot; 15 mm</td>
<td>5.6  80,6</td>
<td>2-5/8 68</td>
<td>A1, A2</td>
</tr>
<tr>
<td>19801</td>
<td>VK685</td>
<td>175 psi</td>
<td>1/2&quot; 15 mm</td>
<td>5.6  80,6</td>
<td>2-5/8 68</td>
<td>A1, A2</td>
</tr>
<tr>
<td>19754</td>
<td>VK686</td>
<td>175 psi</td>
<td>1/2&quot; 15 mm</td>
<td>5.6  80,6</td>
<td>2-5/8 68</td>
<td>A1, A2</td>
</tr>
<tr>
<td>19626</td>
<td>VK681</td>
<td>175 psi</td>
<td>3/4&quot; 20 mm</td>
<td>8.0  115,2</td>
<td>2-5/8 68</td>
<td>A1, A2</td>
</tr>
<tr>
<td>19798</td>
<td>VK682</td>
<td>175 psi</td>
<td>3/4&quot; 20 mm</td>
<td>8.0  115,2</td>
<td>2-5/8 68</td>
<td>A1, A2</td>
</tr>
<tr>
<td>19751</td>
<td>VK683</td>
<td>175 psi</td>
<td>3/4&quot; 20 mm</td>
<td>8.0  115,2</td>
<td>2-5/8 68</td>
<td>A1, A2</td>
</tr>
</tbody>
</table>

**Approved Temperature Rating**
A - 200 °F (93.3 °C)

**Approved Finishes**
1 - Brass, 2 - ENT5

---

**DESIGN CRITERIA - UL Chart 1**

(Also refer to Approval Chart 1)

Allowable flow, pressure and slope for attic protection using Viking V-BB Sprinklers

<table>
<thead>
<tr>
<th>Sprinkler Base Part Number</th>
<th>SIN</th>
<th>Type</th>
<th>Thread Size</th>
<th>Nominal K-Factor</th>
<th>Allowable Roof Span1 ft. (m)</th>
<th>Minimum Flow GPM LPM PSI BAR</th>
<th>Minimum Pressure</th>
<th>Pitch1</th>
<th>Dry Pipe System Maximum Water Delivery Time2 (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19627</td>
<td>VK684</td>
<td>V-BB</td>
<td>1/2&quot; 15 mm</td>
<td>5.6  80,6</td>
<td>≤40 (12,2)</td>
<td>24 91</td>
<td>18.4 1,3</td>
<td>4:12 &lt; 7:12</td>
<td>See footnote 3</td>
</tr>
<tr>
<td>19801</td>
<td>VK685</td>
<td>V-BB</td>
<td>1/2&quot; 15 mm</td>
<td>5.6  80,6</td>
<td>≤40 (12,2)</td>
<td>24 91</td>
<td>18.4 1,3</td>
<td>7:12 &lt; 10:12</td>
<td>See footnote 3</td>
</tr>
<tr>
<td>19754</td>
<td>VK686</td>
<td>V-BB</td>
<td>1/2&quot; 15 mm</td>
<td>5.6  80,6</td>
<td>≤40 (12,2)</td>
<td>24 91</td>
<td>18.4 1,3</td>
<td>10:12 ≤ 12:12</td>
<td>See footnote 3</td>
</tr>
<tr>
<td>19626</td>
<td>VK681</td>
<td>V-BB</td>
<td>3/4&quot; 20 mm</td>
<td>8.0  115,2</td>
<td>≤60 (18,3)</td>
<td>38 144</td>
<td>22.6 1,5</td>
<td>4:12 &lt; 7:12</td>
<td>See footnote 3</td>
</tr>
<tr>
<td>19798</td>
<td>VK682</td>
<td>V-BB</td>
<td>3/4&quot; 20 mm</td>
<td>8.0  115,2</td>
<td>≤60 (18,3)</td>
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</tr>
<tr>
<td>19751</td>
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<td>V-BB</td>
<td>3/4&quot; 20 mm</td>
<td>8.0  115,2</td>
<td>≤60 (18,3)</td>
<td>38 144</td>
<td>22.6 1,5</td>
<td>10:12 ≤ 12:12</td>
<td>See footnote 3</td>
</tr>
</tbody>
</table>

---

1. Pitch and slope indicate the incline of a roof, expressed as a proportion of the vertical rise to the horizontal run.
2. Refer to the Viking Attic Upright VK696 data sheet for roof spans over 60 ft (18.29 m) up to 80 ft (24.38 m) wide.
3. Refer to NFPA 13, 2013, Section 7.2.3.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page SR1-3 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, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.
**ADDITIONAL DESIGN CRITERIA - UL Chart 2**
(Also refer to DESIGN CRITERIA Chart 1)
Allowable roof span, flow, pressure and slope for attic protection using Viking V-BB Sprinklers

<table>
<thead>
<tr>
<th>Design Criteria: Flow and Pressures refer to Design Chart 1.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Type:</strong> Wet systems and dry systems.</td>
</tr>
<tr>
<td><strong>Antifreeze Systems:</strong> Use only listed antifreeze in accordance with the applicable NFPA standard as follows:</td>
</tr>
<tr>
<td><strong>Option 1:</strong> Use any listed antifreeze in accordance with the manufacturer’s installation instructions.</td>
</tr>
<tr>
<td><strong>Option 2:</strong> For a Light Hazard Unoccupied attic</td>
</tr>
<tr>
<td>1. Use freeze master™ antifreeze (refer to Manufacturer’s documentation)</td>
</tr>
<tr>
<td>2. Viking Attic Sprinklers (V-BB, V-HIP, V-SD, VK696, VK697)</td>
</tr>
<tr>
<td><strong>Piping Types:</strong> Steel (wet and dry) CPVC (wet systems only).</td>
</tr>
<tr>
<td><strong>Occupancy Classification:</strong> Light hazard only.</td>
</tr>
<tr>
<td><strong>NOTE:</strong> The Model V-BB Specific Application Attic sprinklers have not been evaluated for use with sprayed on foam insulation.</td>
</tr>
</tbody>
</table>

**Viking V-BB Sprinkler Spacing**

<table>
<thead>
<tr>
<th><strong>Maximum Coverage Area:</strong> 400 ft² (37.16 m²) as measured along the slope.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage area is determined by the twice the maximum distance thrown measured along the slope, multiplied by the distance along the branch line.</td>
</tr>
<tr>
<td><strong>Example:</strong> 60' (18.3 m) span with a 10:12 slope, when measured along the slope provides a distance of approximately 39’-1&quot; (11.9 m). This number must be multiplied by 2 to equal the overall span, which would be approximately 78’-2&quot; (23.8 m). 400 ft² divided by 78’-2&quot; (23.8 m) allows a maximum spacing along the branchline of 5’-1&quot; (15.5 m).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Along the Branch Line:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Spacing: 4’-0” (1.2 m) between V-BB’s and from V-SD’s. 7’-0” (2.1 m) from Viking Attic Uprights. 6’-0” (1.8 m) from Standard Spray Sprinklers</td>
</tr>
<tr>
<td>Maximum Spacing: 6’-0” (1.8 m) between V-BB’s and from V-SD’s.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Measured Down the Slope:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Spacing: 26’-0” (7.9 m) from Viking Attic Uprights and Standard Spray Sprinklers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Deflector Position below Peak, Ridge, or Deck:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>For all roof pitches as per the listing from 4:12 – 12:12 the maximum deflector distance down is 22” (560 mm), and the minimum deflector distance down is 16” (405 mm).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Deflector Position above Scissor Truss:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>For all roof pitches as per the listing from 4:12 – 12:12 the minimum distance above a scissor truss is 18” (458 mm).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Maximum distance from center line of the ridge:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>6” (152 mm) on either side of the center line.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Minimum distance from Truss:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>6” (152 mm) from nearest edge of the truss.</td>
</tr>
</tbody>
</table>
Draft Curtains:
Where used to allow Attic Upright Sprinkler installation shall be constructed to contain heat, may be constructed of minimum ½” (13 mm) plywood or equivalent.

Use of UL Listed CPVC Blazemaster Piping (Wet Systems Only):
Can be used to supply the sprinklers protecting the floor below the combustible concealed space when covered with 6” (152 mm) of non-combustible insulation over the horizontal or vertical piping, and extending 12” (304 mm) on both sides of the center line of the piping. If the piping is located in the joist, the width of the joist channel must be entirely covered to 6” (152 mm) above the top of the piping. The area above the piping must be protected with the Model V-BB’s, V-SD’s, or the Attic Upright Sprinklers.

Listed CPVC Blazemaster piping may also be used exposed to feed wet systems using Viking V-BB sprinklers in accordance with the following requirements, and in accordance with Figure 15:

- Risers are vertical and protected by V-BB or V-SD sprinklers located a maximum of 12” (304 mm) away from the riser centerline.
- Model V-BB or V-SD sprinklers are mounted directly to the branchline.
- Model V-BB or V-SD sprinklers are installed on arm-overs a maximum of 6” (152 mm) laterally from the center line of the branch line.
- Model V-BB or V-SD sprinklers are installed on Vertical Sprigs attached to the branchline.
- Model V-BB or V-SD sprinklers are installed on angled sprigs a maximum of 6” (152 mm) laterally from the centerline of the branchline.
- Installed with a minimum lateral distance of 18” (456 mm) from any device that produces and releases heat, i.e. attic furnace, kitchen or bathroom exhaust fan, flue vents, heat lamps, and other such devices.

NOTICE
Insulation requirements are provided solely for Fire Protection purposes and not for freeze protection.

NOTICE
Non-combustible insulation being used needs to be verified for chemical compatibility with the CPVC piping at www.lubrizol.com

Obstruction Criteria:
Refer to Figures 4—14
Refer to Sections 8.8.5.2.1.3 and 8.8.5.2.1.7 of NFPA 13, 2013 for requirements if installed on greater than 2-1/2” (64 mm) diameter piping.

Hydraulic Requirements:
Viking V-BB Sprinklers must be calculated in accordance with the following figures and guidelines.
The design area shall include the most hydraulically demanding sprinklers, and in certain cases may require more than one set of calculations to verify the system’s design.
The following figures cover Hydraulic Requirements for Viking V-BB Sprinklers only, and when installed with Attic Upright or Standard Spray Sprinklers.
For areas using Viking V-SD Sprinklers refer to the applicable data sheets.

Refer to Figures-unless otherwise noted, all Figures portray a 60’ (18,3 m) roof span:
Figure 16 – V-BB Sprinklers
Figure 17 – V-BB Sprinklers & Attic Upright or Standard Spray Sprinklers Beyond an Obstruction
Figure 18 – V-BB Sprinklers & Attic Upright or Standard Spray Sprinklers at the Hip
Figure 19 – V-BB Sprinklers & Attic Upright or Standard Spray Sprinklers in a Dormer, at a Hip, or at an Ell.
Figure 20 – V-BB Sprinklers & Attic Upright or Standard Spray Sprinklers separated by compartmentalization.

<table>
<thead>
<tr>
<th>V-BB (Back to Back)</th>
<th>V-SD (Single Directional)</th>
<th>Attic Upright</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>Side</td>
<td>Top</td>
</tr>
</tbody>
</table>

Figure 3: Sprinkler Type Legend
Refer to figures 4 and 5 below—unless otherwise noted, all Figures portray a 60’ (18.3 m) roof span. Maximum 6” (152 mm) obstruction allowed provided it sits at least 36” (914 mm) vertically below the Viking V-BB Sprinkler. Larger or closer obstructions require an additional sprinkler on the opposite side of the obstruction. This criteria only limits the obstructions that run across the trusses or rafters, not the top chord of the trusses or the depth of the rafter.

Refer to Figures 6 and 7 below where the maximum spacing for Attic Upright Sprinklers is 12 ft. (3.7 m) and standard spray sprinklers is 15 ft (4.6 m). Any horizontal obstruction that is 4 ft. (1.2 m) or less in width requires minimum 6” (152 mm) clearance over the top to allow for sufficient water flow over and under. The clearance must be measured perpendicular to and from the bottom of the rafter. If the clearance is less than 6” (152 mm), an additional sprinkler is required on the opposite side of the obstruction. If the obstruction is more than 4 ft. (1.2 m) wide, an additional sprinkler is required underneath.
Refer to Figure 8 below. For vertical obstructions, the maximum dimension of the obstruction is the width and the horizontal distance is measured horizontally.

### TABLE 2: OBSTRUCTION CRITERIA

<table>
<thead>
<tr>
<th>Dimension X</th>
<th>Distance Y</th>
<th>Additional Sprinklers Required Beyond Obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Horizontal Dimension of Obstruction</td>
<td>Minimum Horizontal Distance to Obstruction</td>
<td></td>
</tr>
<tr>
<td>All vertical obstructions</td>
<td>&lt; 6&quot; (152 mm)</td>
<td>YES</td>
</tr>
<tr>
<td>1/2&quot; - 1&quot; (13 mm - 25 mm)</td>
<td>6&quot; (152 mm)</td>
<td>NO</td>
</tr>
<tr>
<td>1&quot; - 4&quot; (25 mm - 102 mm)</td>
<td>12&quot; (305 mm)</td>
<td>NO</td>
</tr>
<tr>
<td>4&quot; - 8&quot; (101 mm - 203 mm)</td>
<td>24&quot; (610 mm)</td>
<td>NO</td>
</tr>
<tr>
<td>8&quot; - 10 &quot; (203,mm - 254 mm)</td>
<td>5'-0&quot; (1,5 m)</td>
<td>NO</td>
</tr>
<tr>
<td>10&quot; - 20&quot; (254 mm - 508 mm)</td>
<td>10'-0&quot; (3,0 m)</td>
<td>NO</td>
</tr>
<tr>
<td>20&quot; - 30&quot; (508 mm - 762mm)</td>
<td>15'-0&quot; (4,6 m)</td>
<td>NO</td>
</tr>
<tr>
<td>30&quot; - 40 &quot; (762 mm - 1016 mm)</td>
<td>20'-0&quot; (6,1 m)</td>
<td>NO</td>
</tr>
<tr>
<td>40&quot; - 48&quot; (1016 mm - 1219 mm)</td>
<td>25'-0&quot; (7,6 m)</td>
<td>NO</td>
</tr>
<tr>
<td>&gt; 48&quot; (1219 mm)</td>
<td>Any distance</td>
<td>YES</td>
</tr>
</tbody>
</table>
If a V-BB Sprinkler is 36" (914 mm) or greater above the space, and 36" (914 mm) or greater clearance above the space is present, additional sprinklers are not needed.

If a V-BB sprinkler is 36" (914 mm) or greater above the space, and a 12" - 36" (304 - 914 mm) clearance above the space is present, intermediate level standard sprinklers are required.

 Otherwise, the area outside the mechanical space is to be protected as shown using standard spray sprinklers as necessary or by building a shear wall and installing V-SD Sprinklers.
If a V-BB Sprinkler can be installed below or between stiffeners and 16 to 22” (404 to 559 mm) distance to peak can be maintained, as well as A and B clearances to the stiffeners, no additional sprinklers are required.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>VK681</td>
<td>VK682</td>
</tr>
<tr>
<td>0°</td>
<td>0°</td>
</tr>
<tr>
<td>0°</td>
<td>0°</td>
</tr>
<tr>
<td>A &gt;0°</td>
<td>A +15°</td>
</tr>
<tr>
<td>A +10°</td>
<td>A +8°</td>
</tr>
</tbody>
</table>

![Figure 12: Obstruction Criteria 9](image1)

When the stiffeners are located a minimum of 12” (305 mm) below the V-BB Sprinkler, the stiffeners are 7-12” (190 mm) maximum wide, the openings are 12” (305 mm) minimum, and there is 70% minimum open area, no additional sprinklers are required.

![Figure 13: Obstruction Criteria 10](image2)

Otherwise, additional sprinklers are required as shown.

![Figure 14: Obstruction Criteria 11](image3)
Vertical riser

Vertical sprig

Armover sprig

Branchline

Armover

Figure 15: Exposed CPVC with V-BB Sprinklers

Wet Systems: Calculate the most demanding 5 sprinklers.

Dry Systems: Calculate the most demanding 7 sprinklers.

NOTE: Wet system shown.

Figure 16: V-BB Sprinklers
**Wet Systems:** Calculate the most demanding 5 V-BB sprinklers and add up to 2 of the most demanding Attic Upright or Standard Spray Sprinklers.

**Dry Systems:** Calculate the most demanding 7 V-BB sprinklers and add up to 2 of the most demanding Attic Upright or Standard Spray Sprinklers.

**Figure 17:**
V-BB and Attic Upright or Standard Spray Sprinklers Beyond an Obstruction
**Wet Systems:** Calculate the most demanding 5 V-BB sprinklers plus the 2 most demanding Attic Upright Sprinklers, and then calculate the most demanding area up to 1500 ft² (137 m²) having Attic Upright sprinklers. Use the most demanding calculation.

**Dry Systems:** Calculate the most demanding 7 V-BB sprinklers plus the 2 most demanding Attic Upright sprinklers, and then calculate the most demanding area up to 1950 ft² (181 m²) having Attic Upright sprinklers. Use the most demanding calculation.

Figure 18:
V-BB and Attic Upright or Standard Spray Sprinklers at the Hip
Where the quantity of Attic Upright or Standard Spray sprinklers in each dormer, cross, or ell is 4 or less and all of the dormers, crosses and ells meet the maximum 4 standard sprinkler criteria, calculate the V-BB demand as shown in Figures 16 and 17, and add up to 2 of the most demanding Attic Upright or Standard Spray sprinklers in the dormer, cross, or ell that is adjacent to the Attic Upright Sprinklers that are being included in the demand calculation.

Where the quantity of Attic Upright or Standard Spray sprinklers in any dormer, cross, or ell is greater than four, refer to Figure 18.
Calculate the V-BB demand as described in Figures 16 and 17, then calculate the Attic Upright or Standard Spray Sprinklers per NFPA 13. Use the most demanding calculation.

Figure 20:
V-BB Sprinklers and Attic Upright or Standard Spray Sprinklers Separated by Compartmentalization
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 overtighten 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)

**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.
**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!**

**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.

**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.
CARE AND HANDLING OF SPRINKLERS

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.
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.

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.

<table>
<thead>
<tr>
<th>Sprinkler Temperature Rating (Fusing Point)</th>
<th>Wax Part Number</th>
<th>Wax Melting Point</th>
<th>Maximum Ambient Ceiling Temperature</th>
<th>Wax Color</th>
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<td>148 °F (64 °C)</td>
<td>100 °F (38 °C)</td>
<td>Light Brown</td>
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<td>175 °F (79 °C)</td>
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<td>161 °F (71 °C)</td>
<td>150 °F (65 °C)</td>
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<td>200 °F (93 °C)</td>
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</tbody>
</table>

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.
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.

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.
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 pendant 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 pendant 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-acting 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 pendant 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 pendant sprinkler with an integral upright or pendant 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.
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. Viking 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.
1. DESCRIPTION - STANDARD RESPONSE, QUICK RESPONSE, EXTENDED COVERAGE, AND DRY SPRINKLERS

Viking thermosensitive spray sprinklers consist of a small frame and either a glass bulb or a fusible operating element. Available styles include pendent, flush pendent, concealed pendent, upright, horizontal sidewall, vertical sidewall, or conventional, depending on the particular sprinkler model selected.

Viking sprinklers are available with various finishes, temperature ratings, responses, and K-Factors to meet design requirements†. Used in conjunction with one of the corrosion-resistant coatings (for frame style sprinklers), the units provide protection against many corrosive environments. In addition, the special Polyester or Teflon® coatings can be used in decorative applications where colors are desired.

† Refer to the sprinkler technical data page for available styles, finishes, temperature ratings, responses, and nominal K-Factors for specific sprinkler models.

2. LISTINGS AND APPROVALS

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

3. TECHNICAL DATA

Specifications:
Refer to the appropriate sprinkler technical data sheet.

Material Standards:
Refer to the appropriate sprinkler technical data sheet.

4. INSTALLATION

NOTE: 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)

A. Care and Handling (also refer to Bulletin - Care and Handling of Sprinklers, Form No. F_091699.)

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, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed (refer to the temperature chart on the sprinkler technical data page). Never install any glass-bulb sprinkler if the bulb is cracked or if there is a loss of liquid from the bulb. A small air bubble should be present in the glass bulb. Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed immediately. (Note: Installing glass bulb sprinklers in direct sunlight (ultraviolet light) may affect the color of the dye used to color code the bulb. This color change does not affect the integrity of the bulb.)

Sprinklers must be protected from mechanical damage during storage, transport, handling, and after installation. Sprinklers subject to mechanical damage must be protected with an approved sprinkler guard.

Use only sprinklers listed as corrosion resistant when subject to corrosive environments. When installing corrosion-resistant sprinklers, take care not to damage the corrosion-resistant coating. Use only the special wrench designed for installing coated or recessed Viking sprinklers (any other wrench may damage the unit).

Concealed sprinklers must be installed in neutral or negative pressure plenums only!

Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they could be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.

Use wet pipe systems must be provided with adequate heat. Sprinklers supplied from dry systems in areas subject to freezing must be listed dry sprinklers, upright, or horizontal sidewall sprinklers installed so that water is not trapped. For dry systems, pendant sprinklers and sidewall sprinklers installed on return bends are permitted, where the sprinklers, return bend, and branch line piping are in an area maintained at or above 40 °F (4 °C).

B. Installation Instructions - Standard Spray Sprinklers

Viking sprinklers are manufactured and tested to meet the rigid requirements of approving agencies. They are designed to be installed in accordance with recognized installation standards. Deviation from the standards or any alteration to sprinklers or cover plate assemblies after they leave the factory including, but not limited to: painting, plating, coating, or modification, may render them inoperative and will automatically nullify the approvals and any guarantee made by The Viking Corporation.
Before installation, be sure to have the appropriate sprinkler model and style, with the correct K-Factor, temperature rating, and response characteristics. Sprinklers must be installed after the piping is in place to prevent mechanical damage. Keep sprinklers with protective caps or bulb shields contained within the caps or shields during installation and testing, and any time the sprinkler is shipped or handled.

1a. For frame-style sprinklers, install escutcheon (if used), which is designed to thread onto the external threads of the sprinkler. Refer to the appropriate sprinkler data page to determine approved escutcheons for use with specific sprinkler models.

1b. For flush and concealed style sprinklers: Cut the sprinkler nipple so that the ½” or 3/4” (15 mm or 20 mm) NPT outlet of the reducing coupling is at the desired location, and centered in the opening* in the ceiling or wall.

*Size depends on the sprinkler model used. Refer to the sprinkler technical data page.

2. Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler only, taking care not to allow a build-up of compound in the sprinkler inlet. NOTE: Sprinklers with protective caps or bulb shields must have the caps or shields kept on them when applying pipe-joint compound or tape. *Exception: For domed concealed sprinklers, remove the protective cap for installation, and then place it back on the sprinkler temporarily.

3. Refer to the appropriate sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used. DO NOT use the deflector or fusible element to start or thread the sprinkler into a fitting.

a. Install the sprinkler onto the piping using the special sprinkler wrench only, taking care not to over-tighten or damage the sprinkler.

b. For flush and concealed style sprinklers: the internal diameter of the special sprinkler installation wrench is designed for use with the sprinkler contained in the protective cap. *Exception: For domed concealed sprinklers, remove the protective cap for installation, and then place it back on the sprinkler temporarily. Thread the flush or concealed sprinkler into the ½” or 3/4” (15 mm or 20 mm) NPT outlet of the coupling by turning it clockwise with the special sprinkler wrench. *Thread size depends on the particular sprinkler model used. Refer to the sprinkler technical data page.

C. Installation Instructions - Dry Sprinklers

**WARNING:** Viking dry sprinklers are to be installed in the 1” outlet (for dry and preaction systems), or run of malleable, ductile iron, or Nibco CPVC threaded tee fittings (for wet systems) that meet the dimensional requirements of ANSI B16.3 (Class 150), or cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125), even at branch line ends. The threaded end of the dry sprinkler is designed to allow the seal to penetrate and extend into the fitting to a predetermined depth. This prevents condensation from accumulating and freezing over the sprinkler seal. **NOTE:** When using CPVC fittings with Viking dry sprinklers, use only new Nibco Model 5012-S-B1. When selecting other CPVC fittings, contact Viking Technical Services.

1. **DO NOT** install the dry sprinkler into a threaded elbow, coupling, or any other fitting that could interfere with thread penetration. Such installation would damage the brass seal.

2. **DO NOT** install dry sprinklers into couplings or fittings that would allow condensation to accumulate above the seal when the sprinkler is located in an area subject to freezing.

3. **NEVER** try to modify dry sprinklers. They are manufactured for specific “A” or “B” dimensions and cannot be modified.

The dry sprinkler must be installed after the piping is in place to prevent mechanical damage. Before installation, be sure to have the correct sprinkler model and style, with the appropriate “A” or “B” dimension(s), temperature rating, orifice size, and response characteristics. Keep sprinklers with protective caps or bulb shields contained within the caps or shields during installation and testing, and any time the sprinkler is shipped or handled. *Exception: For concealed and adjustable recessed dry sprinklers, the protective caps and shields are removed for installation.

To install the dry sprinkler, refer to the instructions below and the appropriate sprinkler technical data page for illustrated instructions.

**Dry upright sprinklers must be installed above the piping, in the upright position only.** When installing dry upright or plain barrel style vertical sidewall sprinklers on piping located close to the ceiling, it may be necessary to lower the sprinkler into the fitting from above the ceiling. When installing dry upright or plain barrel vertical sidewall sprinklers from below the ceiling, verify that the opening in the ceiling is a minimum 1-1/2” (38.1 mm) in diameter.

For dry upright or plain barrel vertical sidewall sprinklers in the upright position: First, install the escutcheon (if used) over the threaded end of the sprinkler barrel. Slide the escutcheon past the external threads. **NOTE:** When installing the dry upright or plain barrel vertical sidewall sprinkler from above the ceiling, it will be necessary to install the escutcheon after lowering the threaded end of the sprinkler through the ceiling penetration.

A. **For all dry sprinklers:** Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler barrel only, taking care not to allow a build-up of compound or tape over the brass inlet and seal. **NOTE:** Sprinklers with protective caps or bulb shields must be contained within the caps or shields before applying pipe-joint compound or tape.
B. Refer to the appropriate sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.
C. Install the dry sprinkler on the piping using the special dry sprinkler wrench only, while taking care not to damage the sprinkler.  
   **NOTE:** Thread the sprinkler into the fitting hand tight, plus 1/2 turn with the dry sprinkler wrench.
D. For adjustable standard and adjustable recessed dry pendent and sidewall sprinklers: Escutcheons can be installed after the sprinklers have been installed onto the piping. Refer to the appropriate sprinkler technical data page for escutcheon installation instructions and illustrations.

D. Installation Instructions - Testing
4. After installation, the entire sprinkler system must be tested. The test must be conducted to comply with the installation standards. Viking high pressure sprinklers may be hydrostatically tested at a maximum of 300 psi (20.7 bar) for limited periods of time (two hours), for the purpose of acceptance by the Authority Having Jurisdiction.
   a. Make sure the sprinkler is properly tightened. If a thread leak occurs, normally the sprinkler 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. Air testing [do not exceed 40 psi (2.76 bar)] the sprinkler piping prior to testing with water may be considered in areas where leakage during testing must be prevented. Refer to the Installation Standards and the Authority Having Jurisdiction.
   b. Remove plastic protective sprinkler caps or bulb shields AFTER 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. To remove the bulb shields, simply pull the ends of the shields apart where they are snapped together. To remove caps from frame style sprinklers, turn the caps slightly and pull them off the sprinklers. **SPRINKLER CAPS OR BULB SHIELDS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!** Retain a protective cap or shield in the spare sprinkler cabinet.
5. For flush style sprinklers: the ceiling ring can now be installed onto the sprinkler body. Align the ceiling ring with the sprinkler body and thread or push it on (depends on sprinkler model) until the outer flange touches the surface of the ceiling. Note the maximum adjustment is 1/4" (6.35 mm). DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler drop nipple as required.
6. For concealed sprinklers: the cover assembly can now be attached.
   a. Remove the cover from the protective box, taking care not to damage the cover plate assembly.
   b. Gently place the base of the cover plate assembly over the sprinkler protruding through the opening in the ceiling.
   c. Push the cover plate assembly onto the sprinkler until the unfinished brass flange of the cover plate base (or the cover adapter, if used) touches the surface of the ceiling.
   d. Refer to the applicable technical data sheet to determine the maximum adjustment available for concealed sprinklers. DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler drop nipple.
   **NOTE:** If it is necessary to remove the entire sprinkler unit, the system must be taken out of service. See section 6. INSPECTIONS, TESTS AND MAINTENANCE and follow all warnings and instructions.

5. OPERATION
Refer to the appropriate sprinkler technical data page(s). During fire conditions, the operating element fuses or shatters (depending on the type of sprinkler), releasing the pip cap and sealing assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

**IMPORTANT:** Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Viking 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.
6. INSPECTIONS, TESTS AND MAINTENANCE

NOTICE: Refer to NFPA 25 for Inspection, Testing and Maintenance requirements. NOTICE: The owner is responsible for having the fire-protection system and devices inspected, tested, and maintained in proper operating condition in accordance with this guide, and applicable NFPA standards. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

A. Sprinklers must be inspected on a regular basis for corrosion, mechanical damage, obstructions, paint, etc. Frequency of inspections may vary due to corrosive atmospheres, water supplies, and activity around the sprinkler unit.

B. Sprinklers or cover plate assemblies that have been field painted, caulked, 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. Refer to NFPA 25 and the Authority Having Jurisdiction for the specified period of time after which testing and/or replacement is required. Never attempt to repair or reassemble a sprinkler. Sprinklers and cover assemblies that have operated cannot be reassembled or re-used, but must be replaced. When replacement is necessary, use only new sprinklers and cover assemblies with identical performance characteristics.

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.

1. Remove the system from service, drain all water, and relieve all pressure on the piping.

2a. For frame-style sprinklers, use the special sprinkler wrench to remove the old sprinkler by turning it counterclockwise to unthread it from the piping.

2b. For flush and concealed style sprinklers: Remove the ceiling ring or cover plate assembly before unthreading the sprinkler body from the piping. Ceiling rings and cover plates can be removed either by gently unthreading them or pulling them off the sprinkler body (depends on the sprinkler model used). After the ceiling ring or cover plate assembly has been removed from the sprinkler body, place the plastic protective cap (from the spare sprinkler cabinet) over the sprinkler to be removed and then fit the sprinkler wrench over the cap. Then use the wrench to unthread the sprinkler from the piping. Exception: Domed concealed sprinklers are removed without the plastic cap.

3. Install the new sprinkler unit by following the instructions in section 4. INSTALLATION. Care must be taken to ensure that the replacement sprinkler is the proper model and style, with the correct K-Factor, temperature rating, and response characteristics. A fully stocked spare sprinkler cabinet should be provided for this purpose. For flush or concealed sprinklers: stock of spare ceiling rings or cover plates should also be available in the spare sprinkler cabinet.

E. Place the system back in service and secure all valves. Check for and repair all leaks. Sprinkler systems that have been subjected 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 or high ambient temperatures, but have not operated, should be replaced. Refer to the Authority Having Jurisdiction for minimum replacement 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.
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.

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<td><strong>STATE OF CALIFORNIA, USA</strong></td>
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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](http://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](http://www.vikinggroupinc.com) or contact Viking directly.