1. DESCRIPTION
Viking Mirage® Standard and Quick Response Concealed Pendent Sprinkler VK461 is a thermosensitive glass-bulb spray sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile cover assembly that provides up to ½" (13 mm) of vertical adjustment. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on" and "thread-on" designs of the concealed cover plate assemblies allow easy installation of the cover plate after the system has been tested and the ceiling finish has been applied. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler.

2. LISTINGS AND APPROVALS

- **cULus Listed:** Category VNIV
- **FM Approved:** Class 2015
- **NYC Approved:** MEA 89-92-E, Volume 38

Refer to the Approval Charts and Design Criteria for listing and approval requirements that must be followed.

3. TECHNICAL DATA

**Specifications:**
- Available since 2006.
- Minimum Operating Pressure: 7 psi (0.5 bar).
- 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: 2.8 U.S. (40.3 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)
- Patents Pending

**Material Standards:**
- Sprinkler Body: Brass UNS-C84400
- Deflector: Copper UNS-C19500
- Deflector Pins: Stainless Steel UNS-S30300
- Bushing: Brass UNS-C36000
- Bulb: Glass, nominal 3 mm diameter
- Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
- Button: Brass UNS-C36000
- Screws: 18-8 Stainless Steel
- Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
- Yoke: Phosphor Bronze UNS-C51000
- Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating

**Cover Assembly Materials:**
- Cover: Copper UNS-C11000
- Base: Brass UNS-C26000 or UNS-C26800
- Springs: Nickel Alloy
- Solder: Eutectic

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

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.
5. OPERATION
During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand and the bulb to shatter, releasing the yoke, pipe-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
Viking Mirage® Concealed Pendent Sprinkler VK461 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: ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Sprinkler Base Part No.</th>
<th>Size</th>
<th>1: Finishes</th>
<th>2: Temperature Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprinkler Temperature Classification</td>
<td>Nominal Rating</td>
<td>Bulb Color</td>
<td>Max. Ambient Ceiling Temperature</td>
</tr>
<tr>
<td>13831</td>
<td>1/2</td>
<td>Brass A</td>
<td>Ordinary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Intermediate</td>
</tr>
</tbody>
</table>

**Accessories**

Sprinkler Wrenches³ and Tools:
A. Heavy duty wrench - part number: 14047WB
B. Cabinet wrench - part number 14031
C. Cover plate installation tool (small) - part number: 14412
D. Cover plate installation tool (large) - part number: 14867

Sprinkler Cabinet:
Part number 01731A.

**Footnotes**

1. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
2. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. Requires a 1/2” ratchet which is not available from us.
4. The installer tool is for push-on style cover plates only.
TABLE 2: COVER PLATE ORDERING INFORMATION

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

Example:
23190MC/W = 165 °F (74 °C) Temperature Rated, 2-3/4" (70 mm) diameter, Thread-On style Round Cover Plate with a Painted White finish.

<table>
<thead>
<tr>
<th>1: Select a Cover Plate Base Part Number</th>
<th>2: Select a Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thread-On Style</strong></td>
<td><strong>Push-On Style</strong></td>
</tr>
<tr>
<td>Base Part Number</td>
<td>Size Inch (mm)</td>
</tr>
<tr>
<td>23174</td>
<td>3-5/16 (84)</td>
</tr>
<tr>
<td>23179</td>
<td>3-5/16 (84)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3: Temperature Rating Matrix

<table>
<thead>
<tr>
<th>Cover Plate Nominal Rating (Required)</th>
<th>Temperature Classification</th>
<th>Sprinkler Nominal Rating</th>
<th>Sprinkler Maximum Ambient Ceiling Temperature</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL: 135 °F (57 °C)</td>
<td>Ordinary</td>
<td>155 °F (68 °C)</td>
<td>100 °F (38 °C)</td>
<td>A</td>
</tr>
<tr>
<td>FM: 139° F (59 °C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>165 °F (74 °C)</td>
<td>Intermediate</td>
<td>175 °F (79 °C)</td>
<td>150 °F (65 °C)</td>
<td>C</td>
</tr>
<tr>
<td>165 °F (74 °C)</td>
<td>Intermediate</td>
<td>200 °F (93 °C)</td>
<td>150 °F (65 °C)</td>
<td>C</td>
</tr>
</tbody>
</table>

Footnotes
1. Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
2. Square cover plate cULus Listing is for the 135°F (57°C) temperature rated cover plate only. Refer to the Approval Charts.
3. The sprinkler temperature rating is stamped on the deflector.
4. 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.
5. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
Approval Chart 1 (UL)
Mirage® Quick Response Concealed Pendent Sprinkler VK461
For Light Hazard Occupancies Only
Maximum 175 PSI (12 bar) WWP

<table>
<thead>
<tr>
<th>Sprinkler Base Part Number</th>
<th>SIN</th>
<th>NPT Thread Size</th>
<th>Nominal K-Factor</th>
<th>Overall Length (Sprinkler Body)</th>
<th>Listings and Approvals³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inch</td>
<td>mm</td>
<td>U.S.</td>
<td>metric²</td>
<td>Inches</td>
</tr>
<tr>
<td>13831A VK461</td>
<td>1/2&quot;</td>
<td>15</td>
<td>2.8</td>
<td>40.3</td>
<td>2-3/16&quot;</td>
</tr>
</tbody>
</table>

Sprinkler Temperature Ratings
A - 155°F (68°C)
B - 175°F (79°C) and 200°F (93°C)

Cover Plate Assembly Temperature Ratings⁶
W - 135°F (57°C) cULus Listed cover 23190 or 23447, 23174, 23463 (large diameter), or 23179 or 23482 (square cover plate) FM Approved as 139°F (59°C)
X - 165°F (74°C) cover 23190, 23447 or 23174, 23463 (large diameter)

Finishes of the Cover Plate Assembly⁷
1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted 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 measurement is shown 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 Listed by Underwriter’s Laboratories for use in the U.S. and Canada.
5 Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 38.
6 The 135/139°F cover has an orange label. The 165°F cover has a white label.
7 Standard painted finishes consist of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

DESIGN CRITERIA - UL
(Also refer to Approval Chart 1 above.)
cULus Listing Requirements: Mirage® Concealed Pendent Sprinkler VK461 is cULus Listed as a quick response sprinkler for installation in accordance with the latest edition of NFPA 13 for standard coverage pendent spray sprinklers as indicated below:
• Limited to Light Hazard Occupancies where allowed by the installation standards being applied, with hydraulically calculated wet systems only.
• Maximum spacing allowed is 15 ft. (4.6 m).
• Minimum spacing allowed is 6 ft. (1.8 m) unless baffles are installed in accordance with NFPA 13.
• Minimum distance from walls is 4 in. (102 mm).
• Maximum distance from walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
• The sprinkler obstruction rules contained in NFPA 13 for standard coverage pendent spray sprinklers must be followed.

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

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

MIRAGE® STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK461 (K2.8)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

**Approval Chart 2 (FM)**

<table>
<thead>
<tr>
<th>Sprinkler Base Part Number¹</th>
<th>SIN</th>
<th>NPT Thread Size</th>
<th>Nominal K-Factor</th>
<th>Overall Length (Sprinkler Body)</th>
<th>FM Approvals³,⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Inch</td>
<td>mm</td>
<td>Inches</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>U.S.</td>
<td>metric¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13831A</td>
<td>VK461</td>
<td>1/2”</td>
<td>15</td>
<td>2.8</td>
<td>40.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-3/16”</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

**Sprinkler Temperature Ratings**

A - 155°F (68°C)  
B - 175°F (79°C) and 200°F (93°C)

**Cover Plate Assembly Temperature Ratings⁵**

- **W** - 135°F (57°C) cULus Listed cover 23190, 23447 or 23174, 23463 (large diameter), or 23179, 23482 (square cover plate) FM Approved as 139°F (59°C)
- **X** - 165°F (74°C) cover 23190, 23447, Or 23174, 23463 (large diameter), or 23179, 23482 (square cover plate)

**Finishes of the Cover Plate Assembly⁶**

1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted 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 measurement is shown in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

3 This chart shows the FM Approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

4 FM Approved as a standard response Non-Storage concealed pendent sprinkler. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0).

5 The 135/139°F cover has an orange label. The 165°F cover has a white label.

6 Standard painted finishes consist of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

**DESIGN CRITERIA - FM**

(Also refer to Approval Chart 2 above.)

**FM Approval Requirements:**

Viking Concealed Pendent Sprinkler VK461 is FM Approved as a standard response Non-Storage concealed pendent sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

**IMPORTANT:** Always refer to Bulletin Form No. F_080415 - Best Practices for Residential Sprinkler Handling and Installation. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.
All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 1: Identification of Custom Paint for Concealed Covers

Figure 2: Square Cover Assembly
Sprinkler and Adapter Assembly
- Protective cap removed
- Use wrench 14047W/B**

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

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

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

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

NOTE: Upon sprinkler activation, the deflector descends to approximately 13/16” (21 mm) below the sprinkler body.

Figure 2: Sprinkler Dimensions and Cover Installation

2-1/4” (57 mm) diameter opening required in the ceiling.

Sprinkler frame arms