1. DESCRIPTION
Viking EC/QREC Ordinary Hazard ELO Fusible Element Sprinkler VK535 is a thermosensitive spray sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The extra-large orifice produces the flows required to meet Ordinary Hazard density requirements at lower pressures than standard orifice or large orifice sprinklers. Upright Sprinkler VK535 is UL Listed as standard response and FM Approved as quick response. The special Polyester, PTFE, and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, the ENT coating has been investigated for installation in corrosive environments and is Listed/Approved as indicated in the Approval Chart(s).

2. LISTINGS AND APPROVALS
- **cULus Listed:** Category VNIV
- **FM Approved:** Class 2022

Refer to the Approval Chart(s) and Design Criterion for listing and approval requirements that must be followed.

cULus Listing requires the spacing between upright VK535 sprinklers to be a minimum of 13 ft. (4 m) to prevent cold soldering.

3. TECHNICAL DATA
   - **Specifications:**
     - Minimum Operating Pressure: Refer to the Approval Charts.
     - Factory tested hydrostatically to 500 psi (34.5 bar).
     - Thread size: 3/4" (20 mm) NPT
     - Nominal K-factor: 11.2 U.S. (161.3 metric†)

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

   - **Overall Length:** 2-5/16 (59 mm)

   - **Material Standards:**
     - Sprinkler Frame: Brass UNS-C84400
     - Deflector: Copper UNS-C19500 for Sprinkler
     - Fusible Element Assembly: Nickel Alloy
     - Trigger and Support: Stainless Steel UNS-S31600
     - Seat and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
     - Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
     - Screw: Brass UNS-C36000
     - For PTFE Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-PTFE Coated
     - For Polyester Coated Sprinklers: Belleville Spring-Exposed
     - For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pip Cap-ENT Coated

   - **Ordering Information:** (Also refer to the current Viking price list.)
     - Order EC/QREC Ordinary Hazard ELO Fusible Element Sprinklers 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, Black Polyester = M-B, Black PTFE = N, and ENT = JN
     - Temperature Suffix (°F/°C): 165/74 = C and 205/96 = E
     - For example, sprinkler VK535 with a Brass finish and a 165 °F/74 °C temperature rating = Part No. 14139AC

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

   - **Accessories:** (Also refer to the Viking website.)
     - **Sprinkler Wrenches:** Standard Wrench: Part No. 05118CW/B (available since 1981)
     - **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 fusible element assembly disengages, releasing the seat and spring assemblies to open the waterway. 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 Sprinkler VK535 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.

Figure 1:
Standard Sprinkler Wrench 05118CW/B

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>Frame Paint Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary</td>
<td>165 °F (74 °C)</td>
<td>100 °F (38 °C)</td>
<td>None</td>
</tr>
<tr>
<td>Intermediate</td>
<td>205 °F (96 °C)</td>
<td>150 °F (65 °C)</td>
<td>White</td>
</tr>
<tr>
<td>High</td>
<td>280 °F (138 °C)</td>
<td>225 °F (107 °C)</td>
<td>Blue</td>
</tr>
</tbody>
</table>

Sprinkler Finishes: Brass, Chrome, White Polyester\(^\text{a}\), Black Polyester\(^\text{a}\), Black PTFE\(^\text{a}\), and ENT\(^3,4\)

Corrosion Resistant Sprinkler Coatings: ENT\(^3,4\)

Footnotes

\(^1\) Decorative sprinklers may not be color coded. The 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.

\(^3\) The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart(s). These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. Note that the spring is exposed on sprinklers with ENT coatings. For ENT coated automatic sprinklers, the waterway is coated.

\(^4\) cULus Listed as corrosion resistant.

\(^5\) For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and PTFE coatings.
# Approval Chart 1 (UL)

## Technical Data

**ECOH ELO FUSIBLE ELEMENT UPRIGHT SPRINKLER VK535 (K11.2)**

<table>
<thead>
<tr>
<th>Sprinkler Base Part Number</th>
<th>SIN</th>
<th>NPT Thread Size</th>
<th>Nominal K-factor</th>
<th>Maximum Water Working Pressure</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>14139</td>
<td>VK535</td>
<td>3/4</td>
<td>20</td>
<td>11.2</td>
<td>161.3</td>
</tr>
</tbody>
</table>

### Maximum Sprinkler Spacing (L x W)

<table>
<thead>
<tr>
<th>Maximum Area per Sprinkler</th>
<th>Minimum Water Supply Requirements</th>
<th>Listings and Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ordinary Hazard Group I</td>
<td>Ordinary Hazard Group II</td>
</tr>
<tr>
<td></td>
<td>Flow / Pressure</td>
<td>Flow / Pressure</td>
</tr>
</tbody>
</table>

#### Standard Response

| 16 ft. x 16 ft. (4.9 m x 4.9 m) | 256 ft² (23.8 m²) | 38 gpm @ 11.5 psi (143.9 L/min @ .79 Bar) | 51 gpm @ 20.7 psi (193.1 L/min @ 1.43 Bar) | A1 | See Footnote 6. |
| 18 ft. x 18 ft. (5.5 m x 5.5 m) | 324 ft² (30.1 m²) | 49 gpm @ 19.1 psi (185.5 L/min @ 1.32 Bar) | 65 gpm @ 33.7 psi (246.1 L/min @ 2.32 Bar) | A1 | See Footnote 6. |
| 20 ft. x 20 ft. (6.1 m x 6.1 m) | 400 ft² (37.2 m²) | 60 gpm @ 28.7 psi (227.1 L/min @ 1.98 Bar) | 80 gpm @ 51.0 psi (302.8 L/min @ 3.52 Bar) | A1 | See Footnote 6. |

#### Quick Response (cULus only)

| 14 ft. x 14 ft. (4.3 m x 4.3 m) | 196 ft² (18.2 m²) | 30 gpm @ 7.2 psi (113.6 L/min @ .50 Bar) | 39 gpm @ 12.1 psi (147.7 L/min @ .84 Bar) | A1 | See Footnote 6. |

### Approved Temperature Ratings

A - 165 °F (74 °C) and 205 °F (96 °C)

### Approved Finishes

1 - Brass, Chrome, White Polyester, Black Polyester, Black PTFE and ENT

#### 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 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 listings and approvals available at time of printing. Check with the manufacturer for any additional approvals.
4. cULus Listed for use in the U.S. and Canada.
5. To determine “Minimum Water Supply Requirement” for areas of coverage where length and width of actual sprinkler spacing are not equal, select the “Maximum Sprinkler Spacing” from the chart that is equal to or greater than the larger of the actual spacing (length or width) dimensions used. For areas of coverage smaller than shown, use the “Minimum Water Supply Requirement” in the appropriate hazard group for the next larger area listed. The distance from sprinklers to walls shall not exceed one-half the “Maximum Sprinkler Spacing” listed for the “Minimum Water Supply Requirement” used.
7. cULus Listed as corrosion resistant.
### DESIGN CRITERIA - UL
(Also refer to Approval Chart 1.)

**cULus Listing Requirements:**
ECOH-ELO Fusible Element Upright Sprinkler VK535 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for extended coverage upright sprinklers as indicated below:

- The minimum water supplies and maximum areas of coverage shown in the Approval Chart are designed to provide the following design densities:
  - 0.15 gpm/ft² (6.1 mm/min) for Ordinary-Hazard Group I densities;
  - 0.2 gpm/ft² (8.1 mm/min) for Ordinary-Hazard Group II densities.
- The sprinkler installation rules contained in NFPA 13 for extended coverage upright and pendent spray sprinklers must be followed with the exception that cULus Listing requires the spacing between upright VK535 sprinklers to be a minimum of 13 ft (4 m) to prevent cold soldering.
- Viking ECOH-ELO Fusible Element Upright Sprinklers are cULus Listed for use in unobstructed construction, and noncombustible obstructed construction consisting of solid steel and/or concrete beams as defined in the latest edition of NFPA 13.
- Ceiling slope not to exceed 2/12 (9.5°).

Also, Viking ECOH-ELO Upright Sprinkler VK535 is specifically cULus Listed for:

- For non-combustible obstructed construction within trusses or bar joists having non-combustible web members greater than 1" (25.4 mm) when applying the 4 times obstruction criteria rule as defined in NFPA 13 under “Obstructions to Sprinkler Discharge Pattern Development”.
- For installation under concrete tees when installed as follows:
  1. The stems of the concrete tee construction must be spaced between 3 ft (0.9 m) and 7 ft-6 in (2.3 m) on center. The depth of the concrete tees must not exceed 30 in (762 mm). The maximum permitted concrete tee length is 32 ft (9.8 m). However, where the concrete tee length exceeds 32 ft (9.8 m), non-combustible baffles, equal in height to the depth of the tees, can be installed so that the space between the tees does not exceed 32 ft (9.8 m).
  2. The sprinkler deflector is to be located in a horizontal plane at or above 1" (25.4 mm) below the bottom of the concrete tee stems.
  3. When the sprinkler deflector is located higher than a horizontal plane 1" (25.4 mm) beneath the bottom of the concrete tee stems, the obstruction to sprinkler discharge criteria requirements of NFPA 13 for extended coverage upright sprinklers applies.

**IMPORTANT:** Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. 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, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.
## Approval Chart 2 (FM)
Quick Response Extended Coverage ELO Upright Sprinkler VK535
For HC-1, HC-2, and HC-3 Occupancies
Maximum 175 PSI (12 Bar) WWP

<table>
<thead>
<tr>
<th>Maximum Sprinkler Spacing (L x W)</th>
<th>Maximum Area per Sprinkler</th>
<th>Refer to Design Criteria below.</th>
<th>FM Approval¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 ft. x 12 ft. (3.7 m x 3.7 m)</td>
<td>144 ft² (13.4 m²)</td>
<td>NOTE: FM installation guidelines may differ from cULus and/or NFPA criteria. Refer to the latest applicable FM Loss Prevention Data Sheets (including 2-0 and 3-26).</td>
<td>A1</td>
</tr>
<tr>
<td>14 ft. x 14 ft. (4.3 m x 4.3 m)</td>
<td>196 ft² (18.2 m²)</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>16 ft. x 16 ft. (4.9 m x 4.9 m)</td>
<td>256 ft² (23.8 m²)</td>
<td></td>
<td>A1</td>
</tr>
</tbody>
</table>

### Approved Temperature Ratings
A - 165 °F (74 °C), 205 °F (96 °C), and 280 °F (138 °C)

### Approved Finishes
1 - Brass, Chrome, White Polyester, Black Polyester, and ENT

### Footnotes
1. This chart shows the FM Approvals available at time of printing. Check with the manufacturer for any additional approvals.
2. To determine “Minimum Water Supply Requirement” for areas of coverage where length and width of actual sprinkler spacing are not equal, select the “Maximum Sprinkler Spacing” from the chart that is equal to or greater than the larger of the actual spacing (length or width) dimensions used. Example: When using 10'-6" x 13'-0" sprinkler spacing, provide the “Minimum Water Supply Requirement” listed in the chart for 14'-0" x 14'-0" spacing. For areas of coverage smaller than shown, use the “Minimum Water Supply Requirement” in the appropriate hazard group for the next larger area listed. The distance from sprinklers to walls shall not exceed one-half the “Maximum Sprinkler Spacing” listed for the “Minimum Water Supply Requirement” used.

## DESIGN CRITERIA - FM
(Also refer to Approval Chart 2 above.)

### FM Approval Requirements:
Sprinkler VK535 is FM Approved as a quick response Non-Storage extended coverage upright sprinkler as indicated in the FM Approval Guide for use in occupancy hazard classifications HC-1, HC-2, and HC-3. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheets 2-0 and 3-26). 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_091699 - Care and Handling of Sprinklers. 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, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.