



## TECHNICAL DATA

## FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK466 (K5.2)

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

### 1. DESCRIPTION

Viking Freedom® Residential Pendent Sprinkler VK466 is a thermosensitive, glass-bulb residential sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The orifice design, with a K-Factor of 5.2 (74.9 metric\*), allows efficient use of available water supplies for the hydraulically designed fire-protection system. The fast response type glass bulb and special deflector combine speed of operation and area of coverage to meet residential sprinkler standards while being aesthetically pleasing.

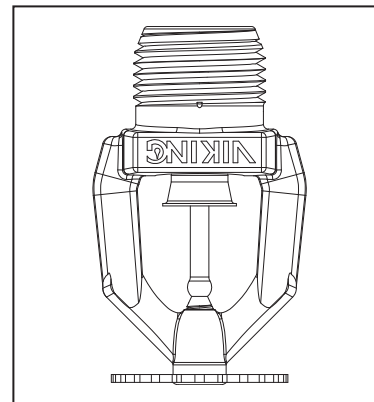
### 2. LISTINGS AND APPROVALS



**cULus Listed:** Category VKKW

**NSF Certified:** NSF/ANSI Standard 61, Drinking Water System Components

Refer to the Approval Chart on page 141i and Design Criteria on page 141n for cULus Listing requirements that must be followed.



### 3. TECHNICAL DATA

#### Specifications:

Available since 2006.

Minimum Operating Pressure: Refer to the Approval Chart.

Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 5.2 U.S. (74.9 metric\*)

\* Metric K-factor measurement shown is for 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: 2-1/4" (58 mm)

#### Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass

Deflector: Brass UNS-C23000 or Phosphor Bronze UNS-C51000

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Polytetrafluoroethylene (PTFE) Tape

Compression 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.)

**Sprinkler:** Base Part No. 13781

Order Sprinkler VK466 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome-Enloy® = F, White Polyester = M-W and Black Polyester M-B

Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D

For example, sprinkler VK466 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 13781AB.

#### Available Finishes And Temperature Ratings:

Refer to Table 1.

**Accessories:** (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

#### Sprinkler Wrenches:

A. Standard Wrench: Part No. 10896W/B (available since 2000)

B. Wrench for Recessed Pendent Sprinklers: Part No. 16036W/B\*\* (available since 2011)

\*\*A 1/2" ratchet is required (not available from Viking).

#### Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

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.

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**4. INSTALLATION**

Refer to appropriate NFPA Installation Standards. For NFPA 13D horizontal ceiling criteria and slopes, refer to TIA 1028R for slope ceiling criteria exceptions.

**5. OPERATION**

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

**6. INSPECTIONS, TESTS AND MAINTENANCE**

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

**7. AVAILABILITY**

The Viking Model VK466 Sprinkler is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

**8. GUARANTEE**

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

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

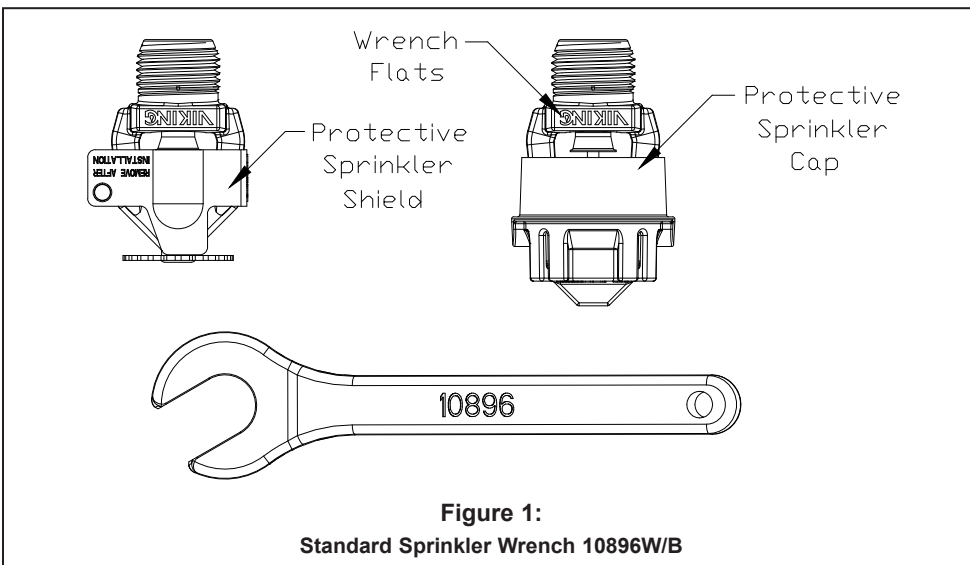
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating <sup>1</sup>	Maximum Ambient Ceiling Temperature <sup>2</sup>	Bulb Color
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow


**Sprinkler Finishes:** Brass, Chrome-Enloy® (patents pending), White Polyester, and Black Polyester

**Footnotes**

<sup>1</sup> The sprinkler temperature rating is stamped on the deflector.

<sup>2</sup> Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



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<p><b>Approval Chart</b>                  Residential Pendent Sprinkler VK466                  For systems designed to NFPA 13D<sup>9</sup> or NFPA 13R.                  For systems designed to NFPA 13, refer to the design criteria on page 140y.</p>	<table border="1" style="border-collapse: collapse;"> <tr> <td style="font-size: small;">Temperature</td> <td rowspan="3" style="text-align: center; vertical-align: middle;"><b>KEY</b></td> </tr> <tr> <td style="font-size: small;">Finish</td> </tr> <tr> <td style="font-size: small;">A1X ← Escutcheon (if applicable)</td> </tr> </table>	Temperature	<b>KEY</b>	Finish	A1X ← Escutcheon (if applicable)
Temperature	<b>KEY</b>				
Finish					
A1X ← Escutcheon (if applicable)					

Sprinkler Base Part Number <sup>1</sup>	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Overall Length	
		Inches	mm	U.S.	metric <sup>2</sup>		Inches	mm
13781	VK466	1/2	15	5.2	74.9	175 psi (12 bar)	2-1/4	58

Maximum Areas of Coverage <sup>6</sup>	Minimum Water Supply Requirements <sup>6</sup>	Listings and Approvals <sup>3</sup> (Refer also to Design Criteria on page 141n.)		
		cULus <sup>4</sup>	NYC	NSF <sup>7</sup>

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

12 ft. x 12 ft. (3.7 m x 3.7 m)	14 gpm @ 7.2 psi (53 L/min @ 0.50 bar)	A1X	See Footnote 5.	A1X
14 ft. x 14 ft. (4.3 m x 4.3 m)	14 gpm @ 7.2 psi (53 L/min @ 0.50 bar)	A1X	See Footnote 5.	A1X
16 ft. x 16 ft. (4.9 m x 4.9 m)	14 gpm @ 7.2 psi (53 L/min @ 0.50 bar)	A1X	See Footnote 5.	A1X
18 ft. x 18 ft. (5.5 m x 5.5 m)	17 gpm @ 10.7 psi (64.4 L/min @ 0.74 bar)	A1X	See Footnote 5.	A1X
20 ft. x 20 ft. (6.1 m x 6.1 m)	20 gpm @ 14.8 psi (75.7 L/min @ 1.02 bar)	A1X	See Footnote 5.	A1X

**Installed below horizontal ceilings with beams<sup>8</sup>.**

12 ft. x 12 ft. (3.7 m x 3.7 m)	14 gpm @ 7.2 psi (53 L/min @ 0.50 bar)	B1X	See Footnote 5.	B1X
14 ft. x 14 ft. (4.3 m x 4.3 m)	14 gpm @ 7.2 psi (53 L/min @ 0.50 bar)	B1X	See Footnote 5.	B1X
16 ft. x 16 ft. (4.9 m x 4.9 m)	14 gpm @ 7.2 psi (53 L/min @ 0.50 bar)	B1X	See Footnote 5.	B1X
18 ft. x 18 ft. (5.5 m x 5.5 m)	17 gpm @ 10.7 psi (64.4 L/min @ 0.74 bar)	B1X	See Footnote 5.	B1X
20 ft. x 20 ft. (6.1 m x 6.1 m)	21 gpm @ 16.3 psi (79.5 L/min @ 1.12 bar)	B1X	See Footnote 5.	B1X

**Installed below ceilings with slopes<sup>10</sup> up to and including a 8/12 (33.7°) pitch. Refer to Figure 7 on page 141p.**

		UL	NYC	NSF <sup>7</sup>
20 ft. x 20 ft. (6.1 m x 6.1 m)	20 gpm @ 14.8 psi (75.7 L/min @ 1.02 bar)	B1X	See Footnote 5.	B1X
20 ft. x 20 ft. (6.1 m x 6.1 m)	23 gpm @ 19.6 psi (87.1 L/min @ 1.35 bar)	C1X	See Footnote 5.	C1X

Approved Temperature Ratings	Approved Finishes	Approved Escutcheons
A - 155 °F (68 °C) and 175 °F (79 °C) B - 155 °F (68 °C) C - 175 °F (79 °C)	1 - Brass, Chrome-Enloy®, White Polyester, and Black Polyester <sup>11</sup>	X - Standard surface-mounted escutcheons or the Micro-fast® Model F-1 Adjustable Escutcheon, or recessed with the Micromatic® Model E-1 or E-2 Recessed Escutcheon

**Footnotes**

- <sup>1</sup> Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
- <sup>2</sup> 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.
- <sup>3</sup> 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.
- <sup>4</sup> Listed by Underwriter's Laboratories for use in the U.S. and Canada.
- <sup>5</sup> Meets New York City requirements, effective July 1, 2008.
- <sup>6</sup> For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum Water Supply Requirement" used.
- <sup>7</sup> Tested and Certified by NSF (National Sanitation Foundation) to NSF/ANSI Standard 61, Drinking Water System Components.
- <sup>8</sup> Listings are for residential occupancies with smooth, flat, horizontal ceilings or horizontal ceilings with beams. Includes ceilings with slopes up to and including a 2/12 (9.5°) pitch. (For beam ceiling design criteria, refer to Beam Ceiling Guidelines and Figures 5 and 6A through 6D on pages 141o-p).
- <sup>9</sup> Refer to TIA 1028R slope ceiling criteria exceptions.
- <sup>10</sup> Areas under sloped ceilings must be measured along the ceiling slope. Actual floor coverage in the horizontal plane under sloped ceilings will be less than the listed area of coverage.
- <sup>11</sup> Other paint colors are available on request with the same cULus Listings as the standard finish colors.

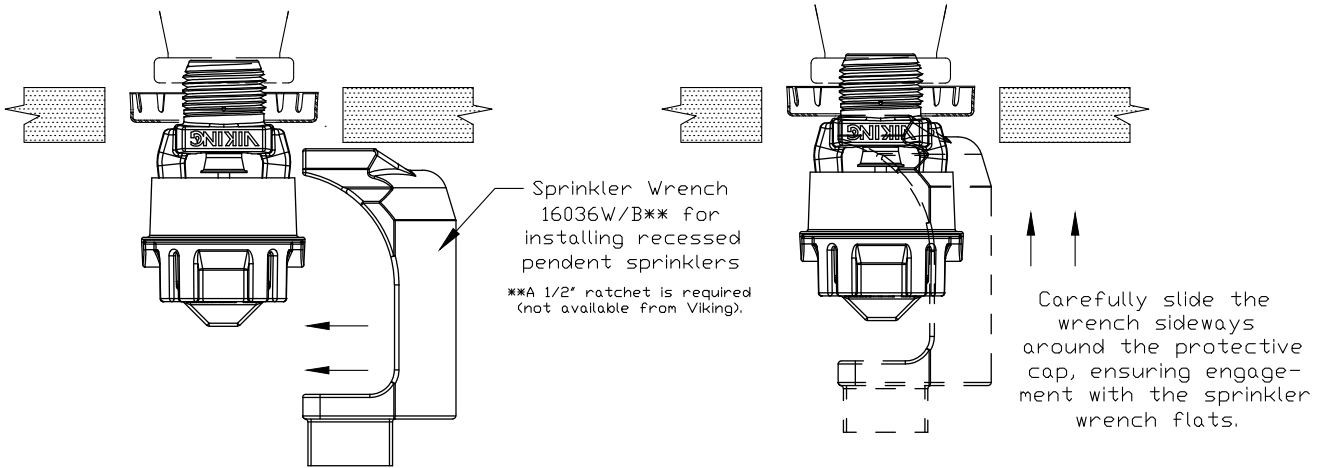


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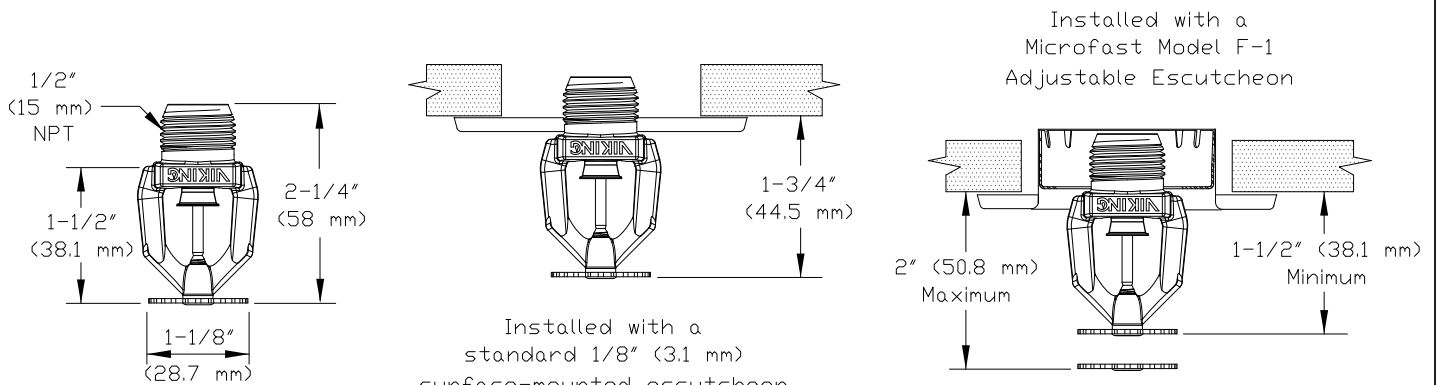
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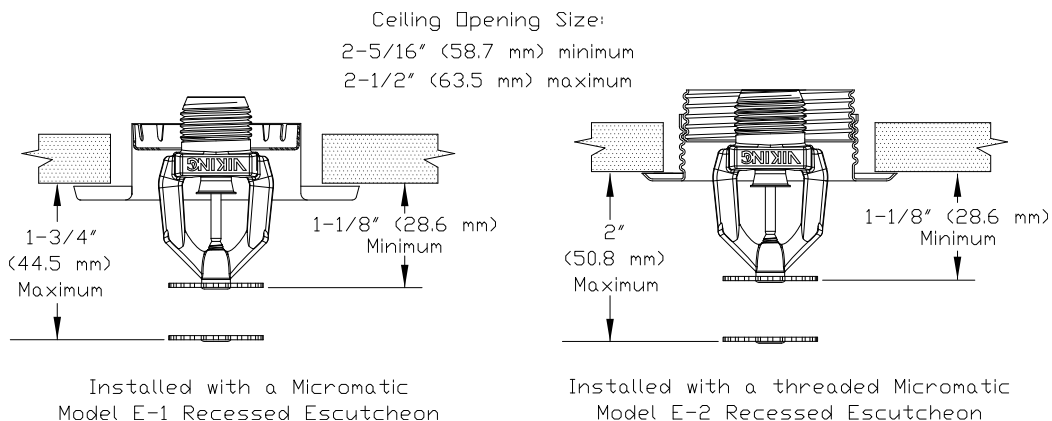
**Figure 2:**

**Wrench 16036W/B for Recessed Sprinkler VK466**



**Figure 3:**

**Sprinkler VK466 Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon**



**Figure 4:**

**Sprinkler VK466 Dimensions with the Model E-1 and E-2 Recessed Escutcheons**



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### DESIGN CRITERIA

(Also refer to the Approval Chart on page 1411.)

#### **cULus Listing Requirements:**

When using Viking Residential Sprinkler VK466 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart on page 1411.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the Approval Chart on data page 1411 for NFPA 13D and NFPA13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

### BEAM CEILING GUIDELINES

cULus Listed for installation in residential occupancies with beam ceilings (with horizontal ceilings only).  
Refer to the Approval Chart for sprinkler areas of coverage and hydraulic design.

**Sprinkler Location:** Locate sprinklers on the underside of the beams (not in the bays or pockets formed by the beams). Refer to Figure 5. The vertical distance from the sprinkler deflector to the bottom of the primary beam must be between 1-1/8 and 1-3/4" (29 to 45 mm). The horizontal distance from the centerline of the sprinkler to the primary beam cannot be more than 2" (51 mm) (Figure 5).

**NOTE:** Consult with a structural engineer before drilling beams to allow the installation of sprinkler drops. Where drilling is not permitted, sprinkler position requirements allow for the sprinkler drop to be placed adjacent to the primary beam.

**Beam Position:** Directly attached to the underside of a combustible or non-combustible smooth ceiling of any height.

#### **Beam Size and Shape (Cross section):**

- Depth: Maximum 14" (356 mm) for primary beams. Secondary beam depth cannot be greater than the primary beam.
- Width: Unlimited.
- Beam Shape: Rectangular to circular.

**Beam Types:** Combustible or non-combustible, solid surface, solid or hollow core.

#### **Beam Spacing:**

- A. For primary beams, the distance from the wall to the center of the nearest primary beam must be at least 3'-4" (1.0 m), and not more than one-half the listed sprinkler spacing. Note: Sprinklers may not be required to be located in the first beam nearest the wall. Center-to-center distance between primary beams is to be a maximum of 20 ft (6.1 m). Refer to Figure 6A.
- B. When beam pockets created by the primary beams exceed 20 ft (6.1 m) in length, secondary beams are required as follows (also refer to Figure 6B):
  1. Secondary beam depth must be equal to primary beam depth.
  2. Secondary beams must be placed so that the bays formed by the primary beams do not exceed 20 ft (6.1 m) in length.
- C. When primary beam spans do not exceed 20 ft (6.1 m), secondary beams (not required) may have any distance from wall to nearest secondary beam and any distance center to center between secondary beams. Refer to Figure 6C.

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

**Beam and Soffit Arrangements:** If a soffit is installed, beams may be arranged within the soffit. The cross section of the soffit may be any size, provided it does not create an obstruction to water distribution per the obstruction rules of NFPA 13 for residential sprinklers. Where there is a soffit, beam spacing from the wall is to be measured from the face of the soffit rather than the wall. Refer to Figure 6D. **NOTE:** The sprinkler area of coverage is to be measured from the wall.

#### **Definitions:**

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



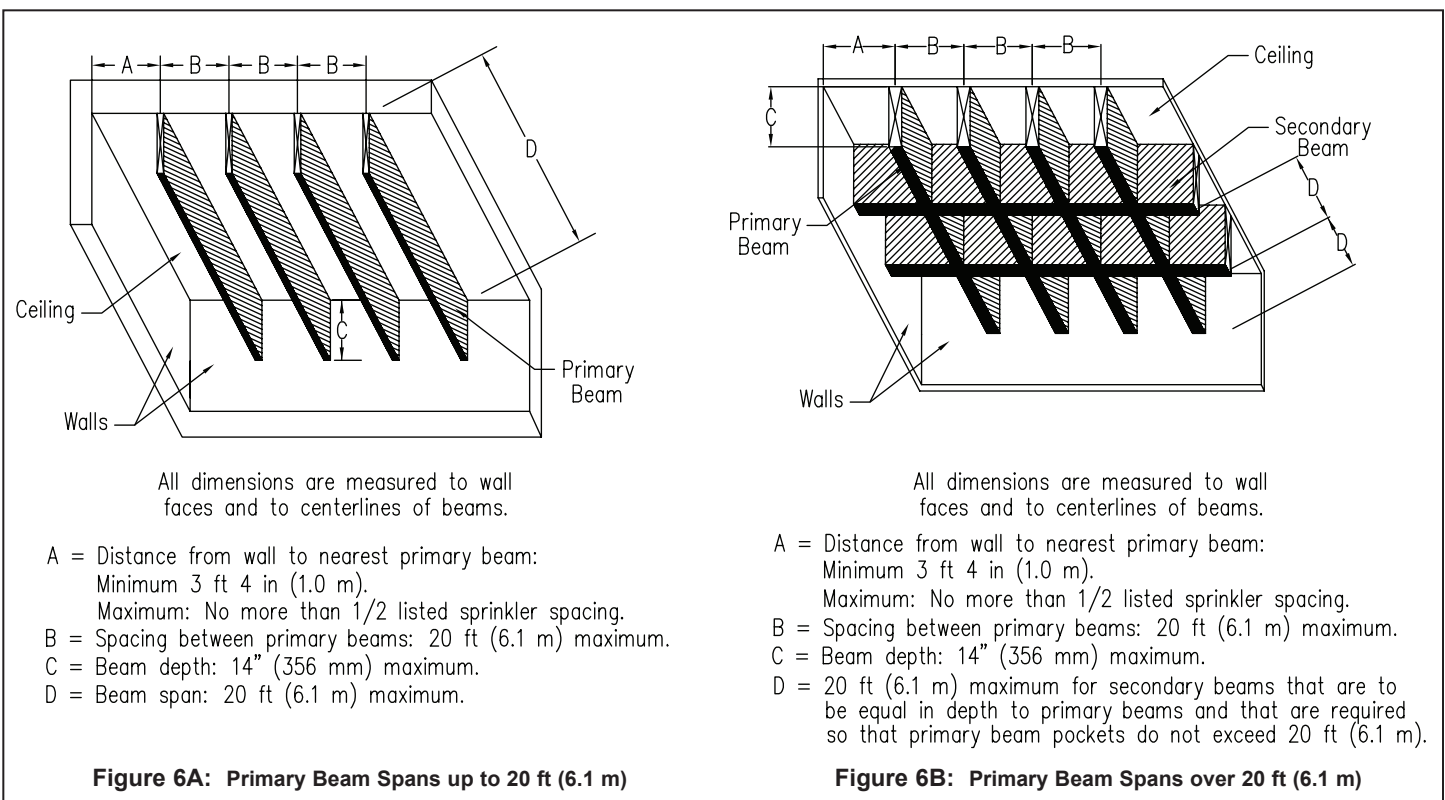
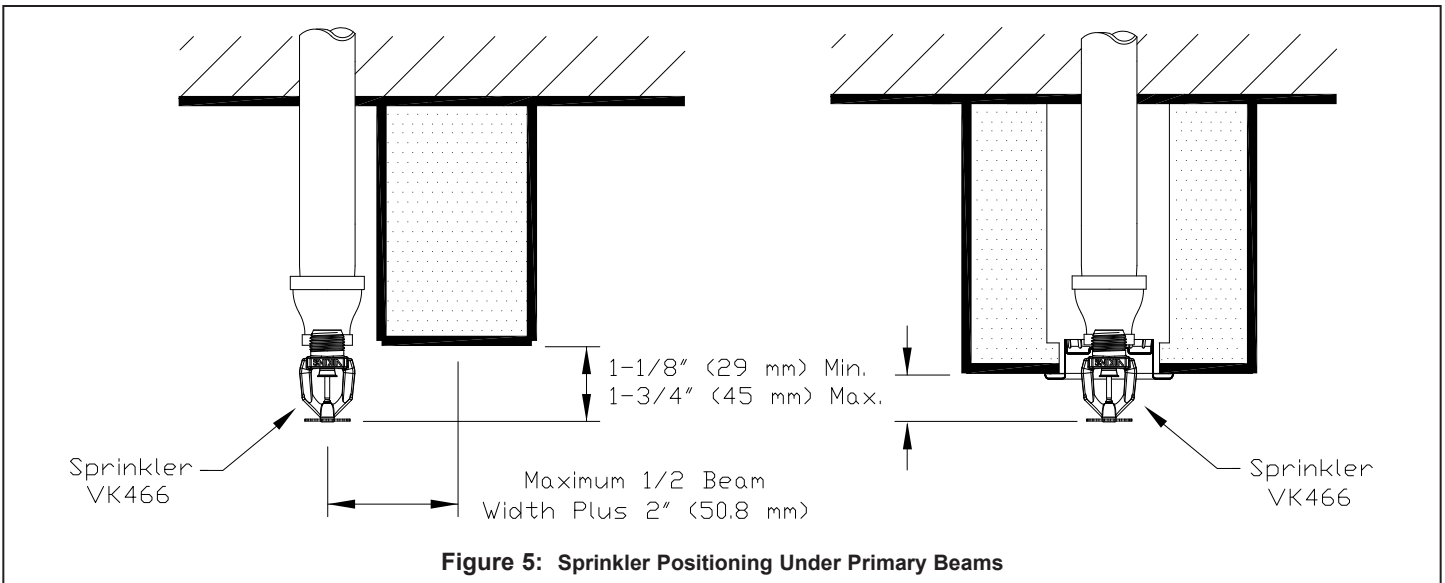
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**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to pages RES1-17 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.**



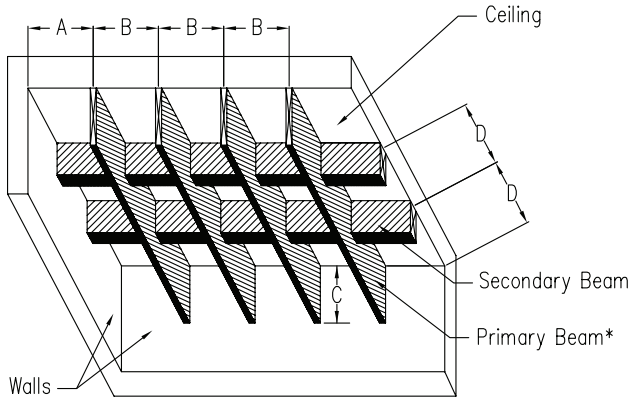


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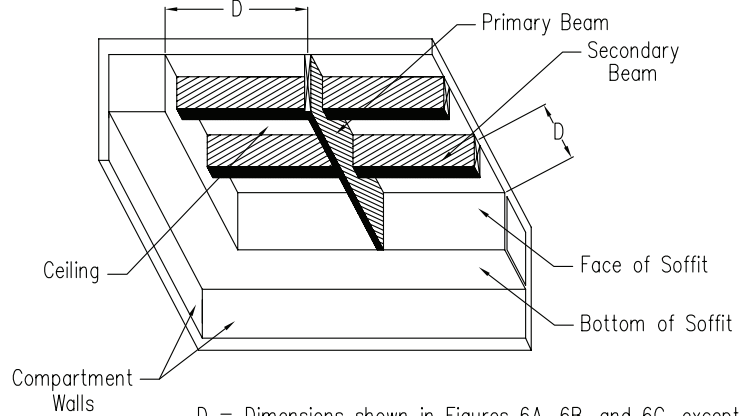
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All dimensions are measured to wall faces and to centerlines of beams.

- A = Distance from wall to nearest primary beam:  
Minimum 3 ft 4 in (1.0 m).  
Maximum: No more than 1/2 listed sprinkler spacing.
  - B = Spacing between primary beams: 20 ft (6.1 m) maximum.
  - C = Beam depth: 14" (356 mm) maximum. Note: Secondary beam depth cannot be greater than the primary beam.
  - D = Any distance for secondary beams, unless primary beam spans exceed 20 ft (6.1 m).
- \* Refer to Figure 6B for primary beam spans exceeding 20 ft (6.1 m).

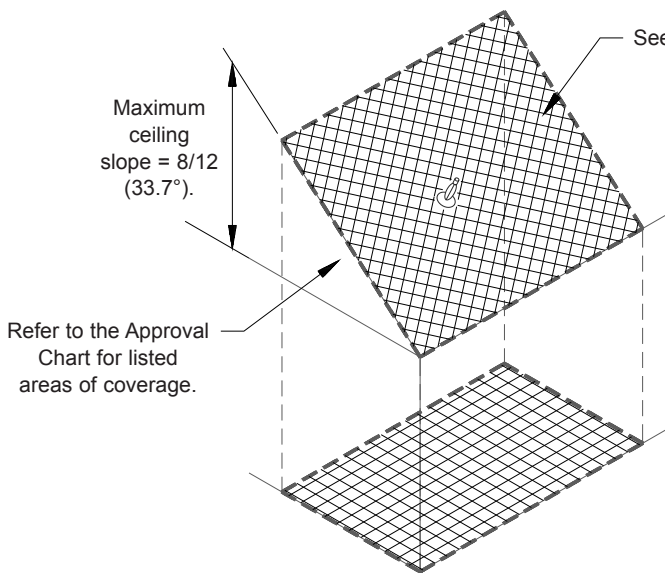
Figure 6C: Combination of Primary and Secondary Beams



D = Dimensions shown in Figures 6A, 6B, and 6C, except measurements are taken from the face of the soffit instead of from the wall surface.

NOTE: The sprinkler area of coverage is to be measured from the wall.

Figure 6D: Beam and Soffit Arrangements



Notes:

1. Listed areas of coverage correspond to areas measured along ceiling slope. (For sloped ceiling installations, actual floor coverage in the horizontal plane under sloped ceilings will be less than the listed area.)
2. Actual installations may require multiple sprinklers. A single sprinkler installation has been shown for clarity.
3. For "cathedral" ceiling applications, install sprinklers in a symmetrical mirror-image of Figure 7.

Figure 7:  
Installation Instructions - Sloped Ceilings

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