



## TECHNICAL DATA

### FREEDOM® RESIDENTIAL FLUSH PENDENT SPRINKLER VK476 (K4.9)

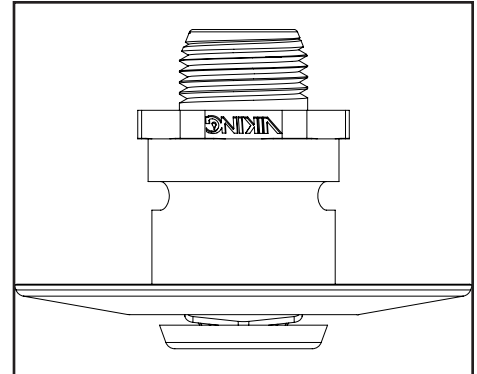
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

#### 1. DESCRIPTION

Viking Freedom® Residential Flush Pendent Sprinkler VK476 is a small high-sensitivity fusible element residential sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The sprinkler orifice design, with a K-Factor of 4.9 (70.6 metric\*), allows the sprinkler's efficient use of available water supplies for the hydraulically designed fire-protection system. The operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

The two-piece design of the sprinkler and ceiling ring allows installation and testing of the sprinkler prior to ceiling installation. The ceiling ring allows for up to 5/8" (16 mm) of vertical adjustment and can be removed and re-installed, allowing access above removable ceiling panels without shutting down the sprinkler system and removing the sprinkler.



#### 2. LISTINGS AND APPROVALS

**cULus Listed:** Category VKKW

Refer to the Approval Chart and Design Criteria on pages 145j-k for cULus Listing requirements that must be followed.

#### 3. TECHNICAL DATA

##### Specifications:

Available since 2009.

Minimum Operating Pressure: Refer to the Approval Chart.

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

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

Nominal K-Factor: 4.9 U.S. (70.6 metric\*)

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

Overall Length: 2-1/8" (54 mm)

##### Material Standards:

Sprinkler Body and Inlet: QM Brass

Deflector Assembly: Copper UNS-C51000 and Brass UNS-C36000

Pin Assembly: Stainless Steel UNS-S30200 and C23000

Seat Assembly: Brass UNS-C31400 or UNS-C31600

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Fusible Element Assembly: Beryllium Nickel and Eutectic Solder

Element Cover: Copper UNS-C11000

Lever Bar Assembly: Copper Alloy UNS-C72500 and Brass UNS-C36000

Lever Arm: Stainless Steel UNS-S31600

Element Assembly: Copper UNS-C11000 and Nickel Alloy

Ceiling Ring: Cold Rolled Steel UNS-G10080

**Ordering Information:** (Also refer to the current Viking price list.)

Viking Freedom® Residential Flush Pendent Sprinkler VK476 and Ceiling Ring:

Part No. 15630MC/- (includes a 165 °F (74 °C) rated sprinkler with a protective plastic cap covering the unit, and a ceiling ring).

Specify finish of the sprinkler and ceiling ring by adding the appropriate suffix for the finish to the base part number:

Finish Suffix: Wood Beam Finish = G, Painted White = W, Painted Black = B

For example, sprinkler VK476 with a Wood Beam Finish = 15630MC/G.

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

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

**Sprinkler Wrench\*\*:** Heavy Duty Wrench Part No. 15209W/R (available since 2009)

\*\*Requires a 1/2" ratchet (not available from Viking).

**Sprinkler Cabinet:** Part No. 01731A, Capacity: five (5) sprinklers (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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**Replacement Ceiling Ring (3" diameter):** Base Part No. 16580M/-

Specify finish of the ceiling ring by adding the appropriate suffix for the finish to the base part number:

Finish Suffix: Wood Beam Finish = G, Painted White = W, Painted Black = B

For example, ceiling ring 16580 with a Wood Beam Finish = 16580M/G.

**4. INSTALLATION**

Refer to appropriate NFPA Installation Standards.

**5. OPERATION**

During fire conditions, when the fusible element reaches its operating temperature, the element cover, fusible element and lever assembly fall away. The deflector is suspended below the ceiling. Water flowing through the sprinkler orifice strikes the deflector, forming a uniform spray pattern over a specific area of coverage determined by the water supply pressure at the sprinkler to extinguish or control the fire.

**6. INSPECTIONS, TESTS AND MAINTENANCE**

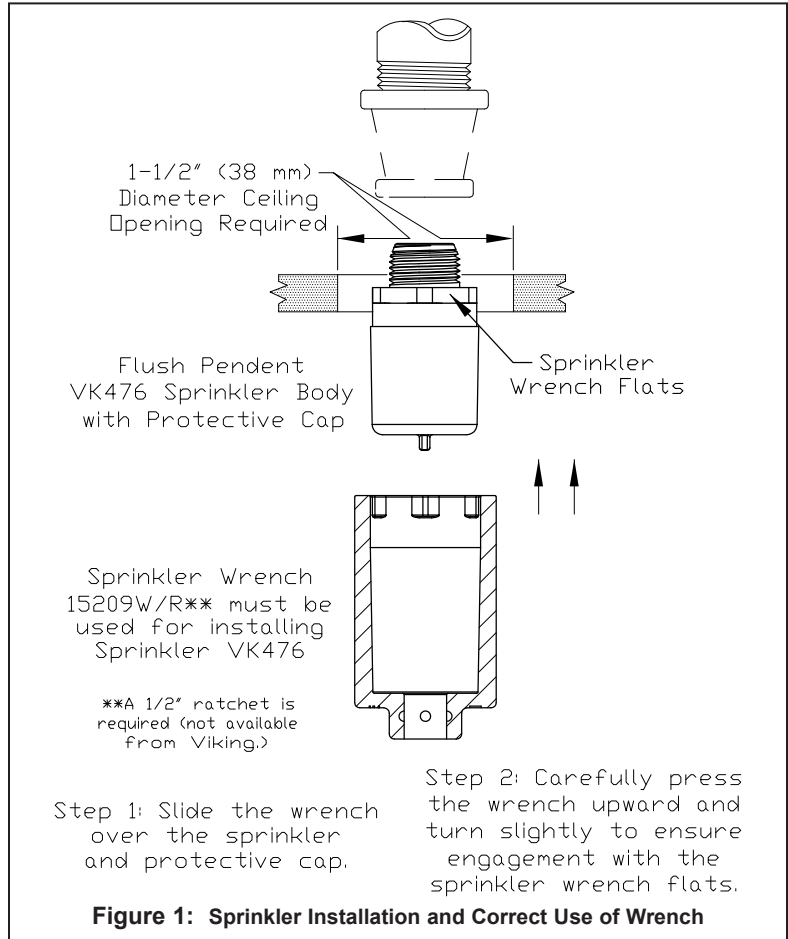
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

**7. AVAILABILITY**

Viking Sprinkler VK476 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>	Ceiling Ring Base Part Number <sup>3</sup>
Ordinary	165 °F (74 °C)	100 °F (38 °C)	16580

**Finishes:** Wood Beam Finish, Painted White, or Painted Black

**Footnotes**

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

<sup>2</sup> 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.

<sup>3</sup> Part number shown is the base part number for replacement ceiling rings. For complete part number, refer to current Viking price list schedule.

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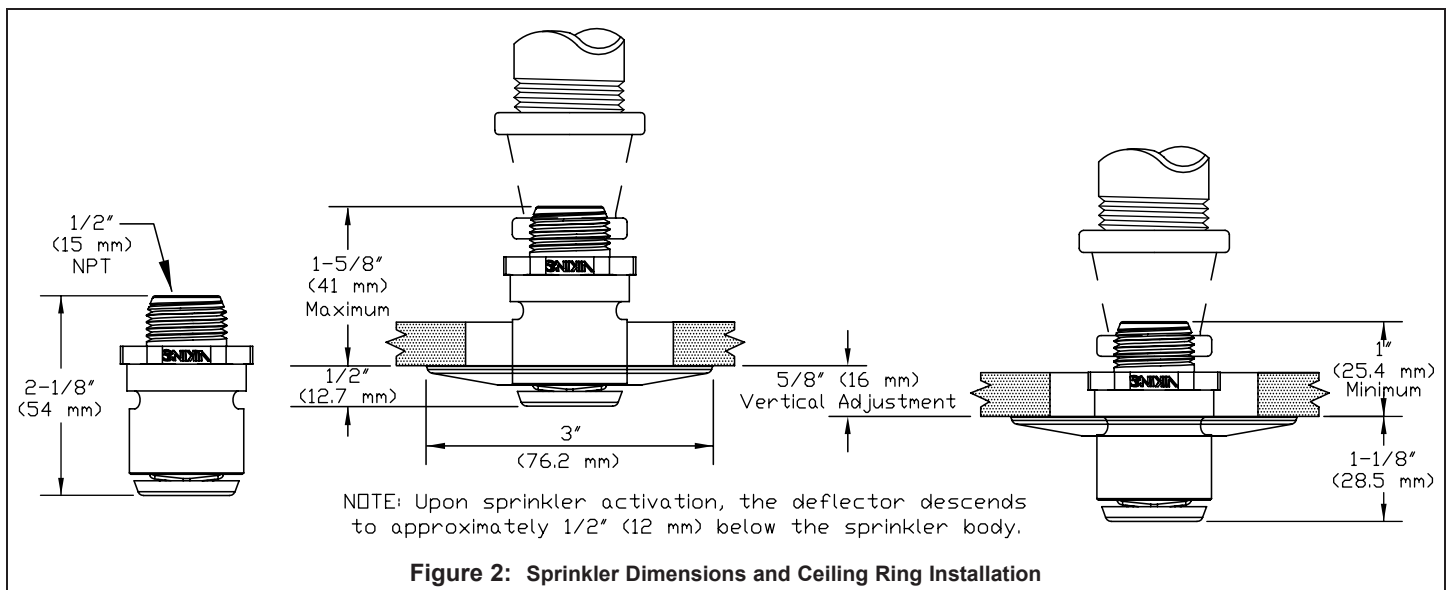
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<h3 style="margin: 0;">Approval Chart</h3> <p style="margin: 0;">Residential Flush Pendent Sprinkler VK476                  For systems designed to NFPA 13D or NFPA 13R.                  For systems designed to NFPA 13, refer to the design criteria on page 145k.</p>	<table style="font-size: 8px; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">—</td> <td style="border: 1px solid black; padding: 2px;">Sprinkler Temperature Rating</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">—</td> <td style="border: 1px solid black; padding: 2px;">Cover Plate Temperature Rating</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">AW1</td> <td style="border: 1px solid black; padding: 2px;">Cover Plate Finish KEY</td> </tr> </table>	—	Sprinkler Temperature Rating	—	Cover Plate Temperature Rating	AW1	Cover Plate Finish KEY
—	Sprinkler Temperature Rating						
—	Cover Plate Temperature Rating						
AW1	Cover Plate Finish KEY						

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
15630	VK476	1/2	15	4.9	70.6	175 psi (12 bar)	2-1/8"	54
<b>Maximum Areas of Coverage<sup>7</sup></b>		<b>Minimum Water Supply Requirements<sup>7</sup></b>				<b>Listings and Approvals<sup>3</sup></b> (Refer also to Design Criteria on page 145k.)		
						cULus <sup>4</sup>	NYC	NSF
<b>Installed below smooth, flat, horizontal ceilings and horizontal ceilings with beams<sup>5</sup>. Includes ceilings with slopes up to and including 2/12 (9.5°).</b>								
16 ft. x 16 ft. (4.9 m x 4.9 m)		13 gpm @ 7.0 psi (49.2 L/min @ 0.48 bar)				A1	See Footnote 5.	--
18 ft. x 18 ft. (5.5 m x 5.5 m)		17 gpm @ 12 psi (64.4 L/min @ 0.83 bar)				A1	See Footnote 5.	--
20 ft. x 20 ft. (6.1 m x 6.1 m)		21 gpm @ 18.4 psi (79.5 L/min @ 1.27 bar)				A1	See Footnote 5.	--
<b>Installed below ceilings with slopes<sup>8</sup> up to and including a 4/12 (18.4°) pitch. Refer to Figure 5 on page 145m.</b>								
						UL	NYC	NSF
16 ft. x 16 ft. (4.9 m x 4.9 m)		18 gpm @ 13.5 psi (68.1 L/min @ 0.93 bar)				A1	See Footnote 5.	--
18 ft. x 18 ft. (5.5 m x 5.5 m)		20 gpm @ 16.7 psi (75.7 L/min @ 1.15 bar)				A1	See Footnote 5.	--
20 ft. x 20 ft. (6.1 m x 6.1 m)		24 gpm @ 24 psi (90.8 L/min @ 1.65 bar)				A1	See Footnote 5.	--
<b>Sprinkler Temperature Rating</b> A - 165 °F (74 °C)					<b>Finishes</b> 1 - Wood Beam Finish, Painted White, and Painted Black <sup>9</sup>			

**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> 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 3 through 4D on pages 145l-m).
  - <sup>7</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>8</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>9</sup> Painted finish consists 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 on the sprinkler body.





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### DESIGN CRITERIA

(Also refer to the Approval Chart on page 145j.)

#### cULus Listing Requirements:

When using Viking Residential Flush Pendent Sprinkler VK476 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 145j.

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 145j for NFPA 13D and NFPA 13R 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 3. The vertical distance from the sprinkler deflector to the bottom of the primary beam must be between 1/2 and 1-1/8" (12.7 to 28.5 mm). The horizontal distance from the centerline of the sprinkler to the primary beam cannot be more than 2" (51 mm) (Figure 3).

**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" (355 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'-0" (6.1 m). Refer to Figure 4A.
- B. When beam pockets created by the primary beams exceed 20'-0" (6.1 m) in length, secondary beams are required as follows (also refer to Figure 4B):
  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'-0" (6.1 m) in length.
- C. When primary beam spans do not exceed 20'-0" (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 4C.

**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 4D. **NOTE:** The sprinkler area of coverage is to be measured from the wall.

#### Definitions:

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

**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to 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.**

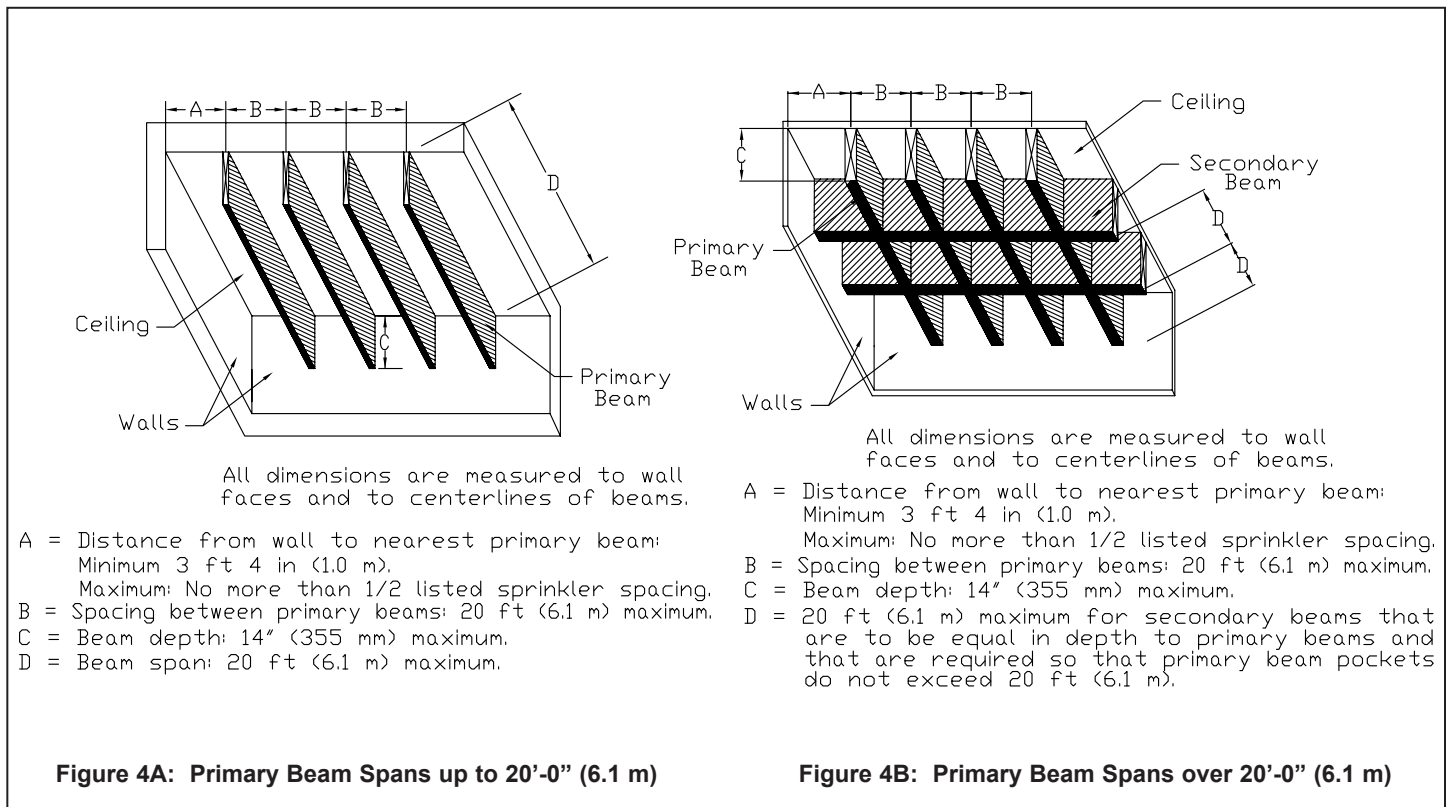
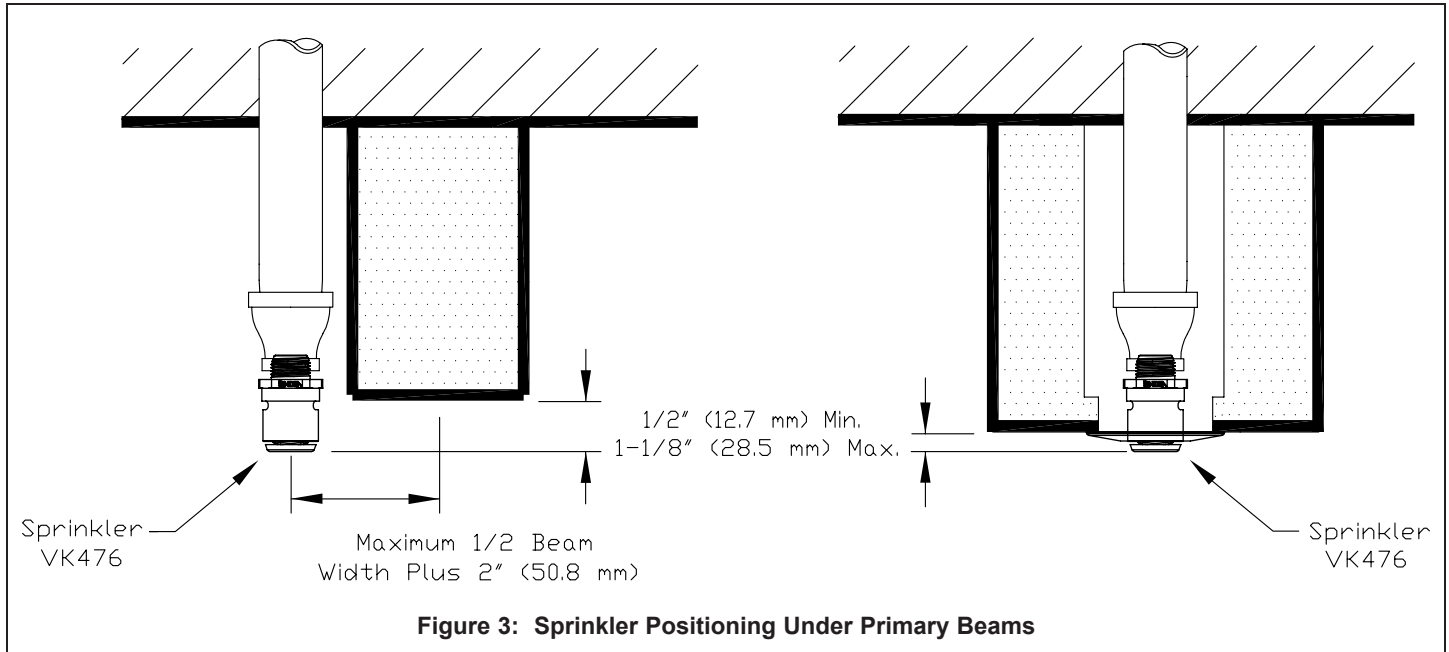


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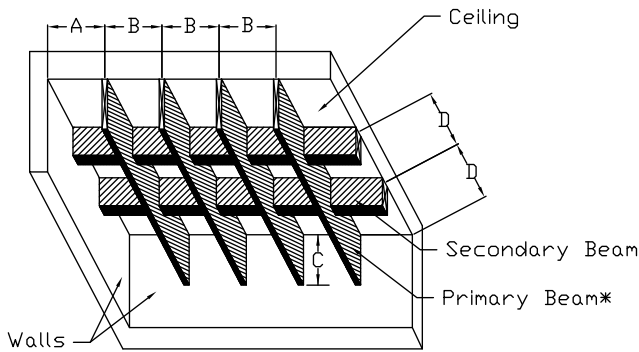


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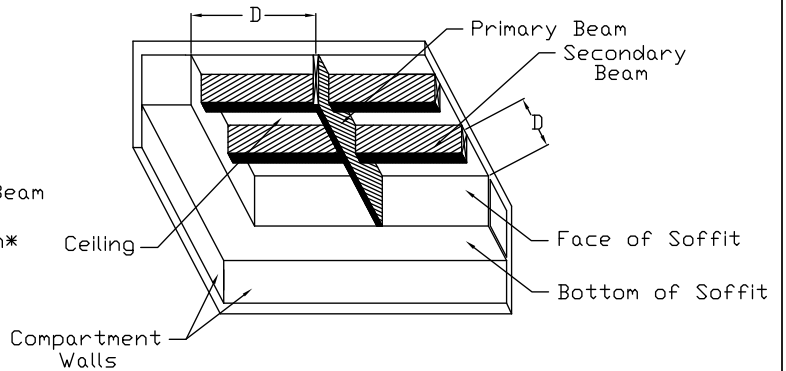
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All dimensions are measured to wall faces and to centerlines of beams.

- 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" (355 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 4B for primary beam spans exceeding 20 ft (6.1 m).

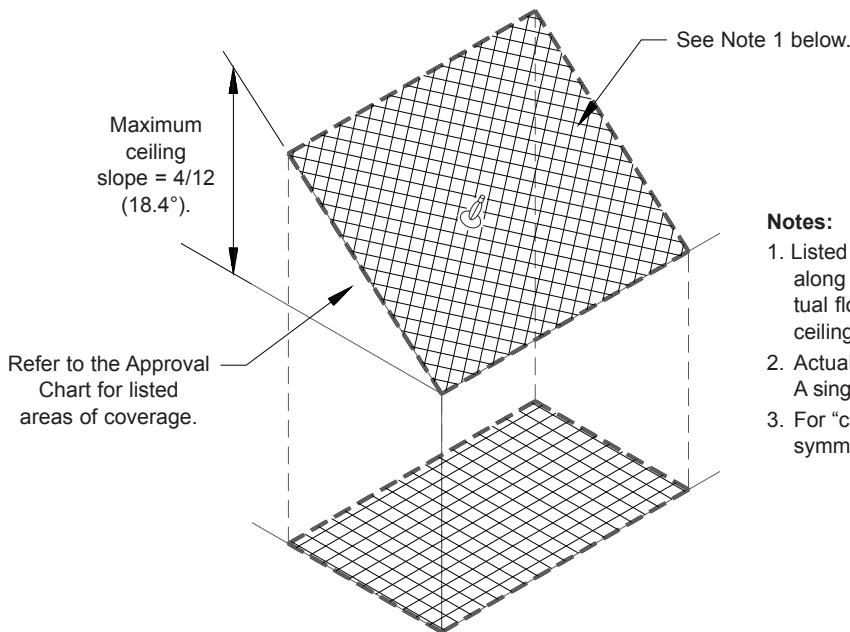


D = Dimensions shown in Figures 4A, 4B, and 4C, except measurements are taken from the face of the soffit instead of from the wall surface.

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

Figure 4C: Combination of Primary and Secondary Beams

Figure 4D: 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 5.

Figure 5: Installation Instructions - Sloped Ceilings