



## TECHNICAL DATA

## ATTIC UPRIGHT SPECIFIC APPLICATION SPRINKLER VK697

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](http://www.vikinggroupinc.com).

### 1. DESCRIPTION

The Viking Attic Upright VK697 is a specific application attic sprinkler that provides superior fire protection in combustible and non-combustible sloped attic spaces when used in conjunction with Viking's model V-BB (Back to Back) and V-SD (Single Directional), and V-HIP specific application sprinklers. Installed in the upright position, with the deflector parallel to the roof, the Attic Upright used in combination with the model V-BB increases the allowable span from 60' to 80' (18,3 m to 24,4 m).

Viking Attic Upright sprinklers can be installed with either steel (black or galvanized) or CPVC piping, and allow the use of CPVC to feed the protected space below the attic (CPVC allowed on wet pipe systems only). They are available in brass or with corrosion-resistant Electroless Nickel PTFE (ENT) coatings where salt water and other corrosive elements are a consideration. Viking Attic Upright sprinklers are cULus Listed with specific application guidelines for use as special sprinklers as defined by the National Fire Protection Association (NFPA), and are listed for specific pitch range 4:12 to 12:12.

### 2. LISTINGS AND APPROVALS



**cULus Listed:** Category VNIV  
Refer to the Approval Chart on page 3.

### 3. TECHNICAL DATA

#### Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)  
Rated to 175 psi (12 bar) water working pressure  
Factory tested hydrostatically to 500 psi (34.5 bar)  
Thread size: 1/2" (15 mm) NPT  
Nominal K-Factor: 5.6 U.S. (80 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: 2-1/4" (57 mm)

Covered by the following U.S. Patent No.: 8,083,002 owned by Tyco.

#### Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass  
Deflector: Phosphor Bronze UNS-C51000  
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)

#### Available Finishes And Temperature Ratings:

Refer to Table 1.

#### Accessories: (Also refer to the Viking website.)

#### Sprinkler Wrench:

Standard Wrench: Part No. 21475W/B

#### Sprinkler Cabinets:

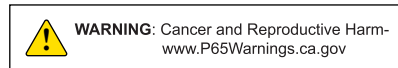
A. Six-head capacity: Part No. 01724A

B. Twelve-head capacity: Part No. 01725A



**VK697 Attic Upright Sprinkler**

SIN	K-factor	Pitch
VK697	5.6 (80.6 metric)	4:12 < 12:12





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**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 Viking Attic Upright 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 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
Intermediate	200 °F (93 °C)	150 °F (65°C)	Green

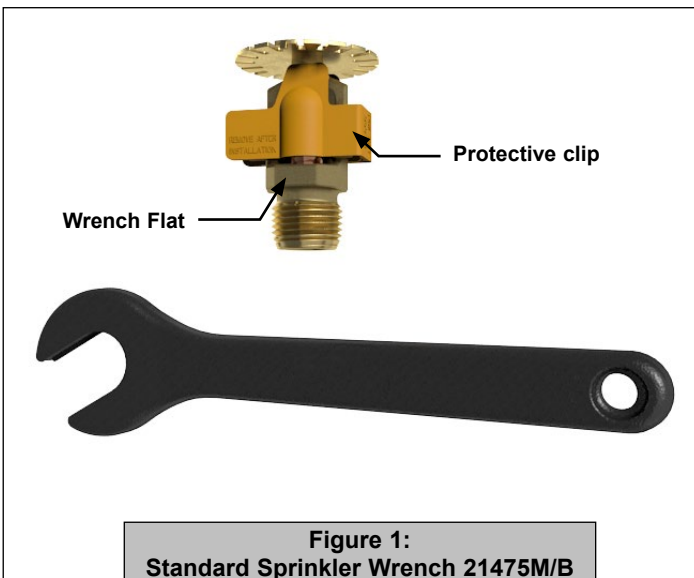
**Sprinkler Finishes:** Brass, ENT<sup>3</sup>

**Footnotes**

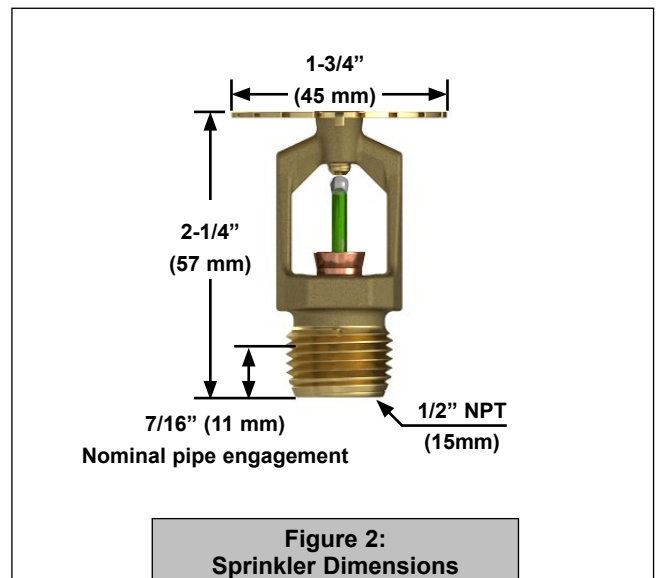
<sup>1</sup> The sprinkler temperature rating is stamped on the deflector.

<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.

<sup>3</sup> cULus Listed as corrosion resistant.



**Figure 1:  
Standard Sprinkler Wrench 21475M/B**



**Figure 2:  
Sprinkler Dimensions**



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### APPROVAL CHART

Attic Upright Specific Application Sprinkler VK697  
 For Combustible and Non-Combustible Sloped Attic Spaces

KEY	
Temperature	↘
Finish	↙
A1X ←	Escutcheon (if applicable)

Part Number <sup>1</sup>	SIN	Maximum Pressure	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals <sup>3</sup>				
			NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	cULus <sup>4</sup>	FM	LPCB	CE	⚙️
21716	VK697	175 psi	1/2"	15 mm	5.6	80	2-1/4	57	A1, A2	--	--	--	--
Approved Temperature Rating A - 200 °F (93.3 °C)							Approved Finish 1 - Brass, 2 - ENT <sup>5</sup>						
<b>Footnotes</b>													
<sup>1</sup> Also refer to Viking's current price 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 table shows the listings and approvals available at the time of printing. Other approvals may be in process. <sup>4</sup> Listed by Underwriters Laboratories Inc. for use in the United States and Canada. <sup>5</sup> cULus Listed as corrosion resistant.													

### DESIGN CRITERIA - UL

(Also refer to Approval Chart 1)  
 Allowable Roof Span, Flow, Pressure and Slope for Specific Application Sprinkler Protecting Attics

Sprinkler Base Part Number	SIN	Thread Size		Nominal K-Factor		Allowable Roof Span <sup>2</sup> Ft. (M)	Minimum Flow		Minimum Pressure		Pitch <sup>1</sup>	Dry Pipe System Maximum Water Delivery Time (in seconds)
		NPT	BSP	U.S.	metric		GPM	LPM	PSI	BAR		
21716	VK697	1/2"	15 mm	5.6	80	10 (3,1) x 12 (3,6)	Minimum 7 psi (0,48 Bar) Minimum 0.10 gpm/ft <sup>2</sup> (4,1 mm/min.) Design Density		4:12 to 12:12		60 seconds (All System Sizes)	
<b>Footnotes</b>												
<sup>1</sup> Pitch and slope indicate the incline of a roof, expressed as a proportion of the vertical rise to the horizontal run. <sup>2</sup> The Attic Upright spacing when measured perpendicular to the slope is maximum 10 ft. (3,1 m) or when measured parallel to the slope is maximum 12 ft. (3,6 m).												
<b>IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form 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.</b>												



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### 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 VK697 Sprinklers

**Design Criteria: Flow and Pressures refer to Design Chart 1.**

**System Type:**

Wet systems and dry systems.

**Antifreeze Systems:**

Use only listed antifreeze in accordance with the applicable NFPA standard as follows:

**Option 1:** Use any listed antifreeze in accordance with the manufacturer's installation instructions.

**Option 2:** For a Light Hazard Unoccupied attic

1. System Volume  $\leq 200$  gal (764 L)
2. Use freezemaster™ antifreeze (refer to Manufacturer's documentation)
3. Viking Attic Sprinklers (V-BB, V-HIP, V-SD, VK696, VK697)
4. Calculate the number of sprinklers in the hydraulically remote area in accordance with wet system criteria.\*

\* **NOTE:** For systems greater than 40 Gal (151 L), pipe sizing shall be determined using both the Darcy-Weisbach and Hazen-Williams approved hydraulic calculations. Because of the density of freezemaster™ antifreeze, the K-factor must be adjusted, and the friction loss must be considered in the system design.

**Piping Types:**

Steel (wet and dry) CPVC (wet systems only).

**Occupancy Classification:** Light hazard only.

**Viking Attic Upright Sprinkler Spacing**

**Maximum Coverage Area:**

120 ft<sup>2</sup> (11,2 m<sup>2</sup>)

**Minimum Spacing:**

7'-0" (2,1 m) from Attic Upright Sprinklers, V-BB Sprinklers, V-SD Sprinklers, V-HIP, and Standard Spray Sprinklers, when measured along the peak/ridge direction.

26'-0" (7,9 m) from Viking V-BB, V-SD and V-HIP Sprinklers when measured down the slope.

**Maximum Spacing:**

10'-0" (3,1 m) when measured perpendicular to the slope.

12'-0" (3,7 m) when measured parallel to the slope.

**Additional Spacing Considerations:**

If there is more than one row of Attic Upright Sprinklers, they must be staggered as shown in Figure 4.

Attic Upright Sprinklers can provide up to 10'-0" (3,1 m) coverage at the eave(s) beyond the maximum allowable roof spans for the V-BB, V-SD and V-HIP Sprinklers by installing a row of Attic Uprights. Refer to Figure 4 and 7 for installation criteria in these situations.

**Deflector Position:**

Deflector located 1"– 3" (26 - 77 mm) below the bottom of the top chord or bottom of solid wood rafter for all roof pitches as per the listing from 4:12 – 12:12, with a maximum top chord or solid wood rafter depth of 12" (305 mm).

**Use of UL Listed BlazeMaster® CPVC Piping (Wet Systems Only):**

Can be used to supply the sprinklers protecting the floor below the combustible concealed space when covered with 6" (153 mm) of non-combustible insulation over the horizontal or vertical piping, and extending 12" (305 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" above the top of the piping. The area above the piping must be protected with the Viking Model V-BB's, V-SD's, V-HIP's or the Attic Upright Sprinklers.

Listed BlazeMaster® CPVC piping may also be used exposed to provide wet system, vertical or angled, sprigs to Attic Upright Sprinklers where:

- The exposed portion of an angled sprig is a maximum length of 3'-0" (0,9 m), with the sprig being supported adjacent to the Attic Upright Sprinkler, and vertical restraint is provided on the horizontal pipe runs with CPVC hangers.

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*Continued from previous page.*

- Maximum exposed length on a sprig of 10'-0" (3,1 m), with a maximum lateral distance for the Attic Upright Sprinkler of 12" (305 mm) off of the centerline of the sprig. Sprig must also be supported at the swing joint to the Attic Upright Sprinkler.
- Minimum 6" (153 mm) deep of non-combustible insulation extending 12" (305 mm) on each side of the pipe centerline for the CPVC branchline feeding the Attic Upright Sprinklers.
- If the CPVC branchline is installed inside the ceiling joist, the joist channel must be covered or filled with a minimum of 6" (153 mm) deep non-combustible insulation on top of the branchline feeding the Attic Upright Sprinkler sprigs.
- Additional non-combustible insulation can be added to reduce the exposed length of the sprigs being used with the Attic Upright Sprinklers.
- Installed with a minimum lateral distance of 18" (458 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 BlazeMaster® CPVC piping at [www.lubrizol.com](http://www.lubrizol.com)

**Obstruction criteria:**

Refer to Figures 8 and 9.

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" diameter piping.

**Hydraulic Requirements:**

**Minimum design pressure:**

7 psi

**Minimum design density:**

0.10 gpm/sq. ft.

For individual areas requiring more than four Attic Upright Sprinklers, the maximum area of the attic protected by Attic Upright Sprinklers is 3,000 ft (279 m<sup>2</sup>) in any single area. In order to be considered a single area, the areas protected by the Attic Upright Sprinklers must be separated by a minimum of 15'-0" (4,6 m), having that separation being protected by V-BB, V-SD or V-HIP sprinklers.

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 systems design.

**Refer to the Technical Data Sheets for the Model V-BB (Form No. F\_042915), V-SD (Form No. F\_043015), and V-HIP (Form No. F\_092116) Specific Application Attic Sprinklers for more information regarding hydraulic requirements of Attic Upright Sprinklers.**

V-BB (Back to Back)	V-SD (Single Directional)	Attic Upright	V-HIP
<p>Top Side</p>	<p>Top Side</p>	<p>Top Side</p>	<p>Top Side</p>

**Figure 3: Sprinkler Type Legend**



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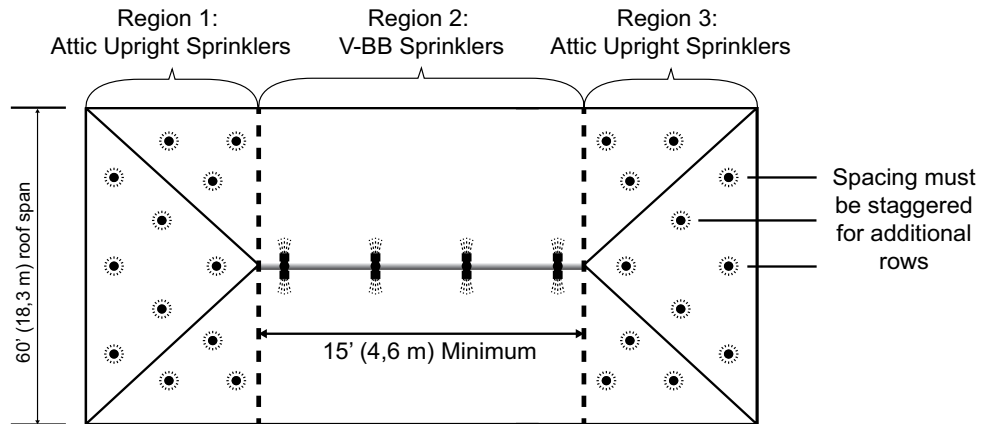
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**When the total number of Attic Upright Sprinklers at the hip is greater than 4:**

**Wet Systems:** Calculate the most demanding 5 model V-BB Sprinklers, add the most demanding 2 Attic Upright Sprinklers, then calculate the most demanding region up to 1500 ft<sup>2</sup> (137 m<sup>2</sup>) that uses Attic Upright Sprinklers (example: Region 1 at right). Use the most demanding calculation.

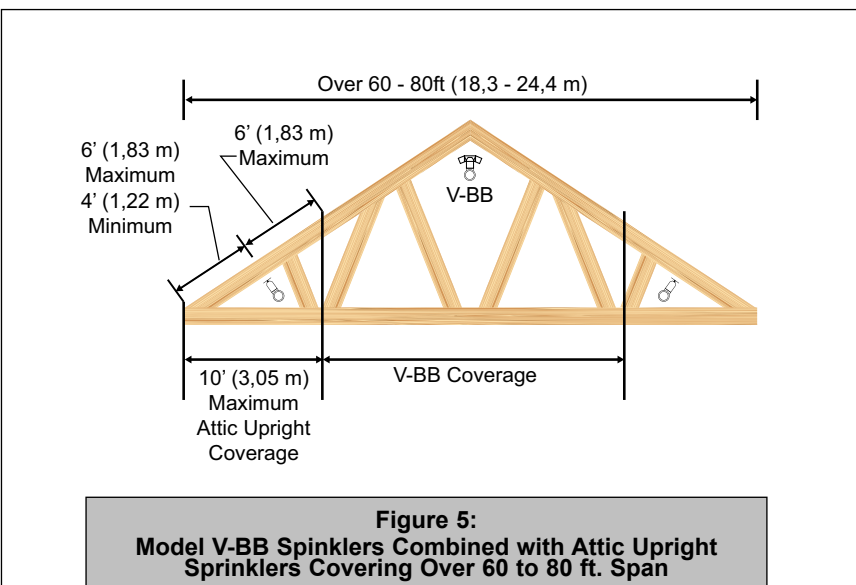
**Dry Systems:** Calculate the most demanding 7 model V-BB sprinklers, add the most demanding 2 Attic Upright Sprinklers, then calculate the most demanding region up to 1950 ft<sup>2</sup>, (181 m<sup>2</sup>) that uses Attic Upright Sprinklers (example: Region 1 at right). Use the most demanding calculation.



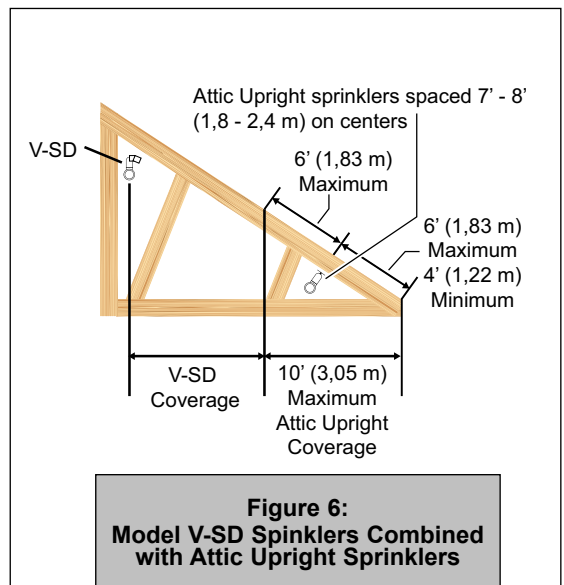
**Figure 4:  
Attic Upright Sprinklers Combined with V-BB Sprinklers**

Refer to Figures 5 and 6 below. For attics having a span of 60 - 80 ft. (18,3 - 24,4 m), only the 8.0K model V-BB sprinklers combined with Attic Upright Sprinklers can be used. For attics with a span of over 80' (24,4 m), Standard Spray Spinklers must be used throughout the attic.

In an attic using single ridge construction, 8.0K model V-BB sprinklers must be used to protect the center portion. Attic Upright sprinklers should be used to cover up to 10 feet (3,1 m) at the eaves beyond the maximum 60 ft. (18,3) span covered by the model V-BB Sprinklers. Refer to the Technical Data Sheets for the model V-BB and V-SD sprinklers for more information.



**Figure 5:  
Model V-BB Spinklers Combined with Attic Upright Sprinklers Covering Over 60 to 80 ft. Span**



**Figure 6:  
Model V-SD Spinklers Combined with Attic Upright Sprinklers**



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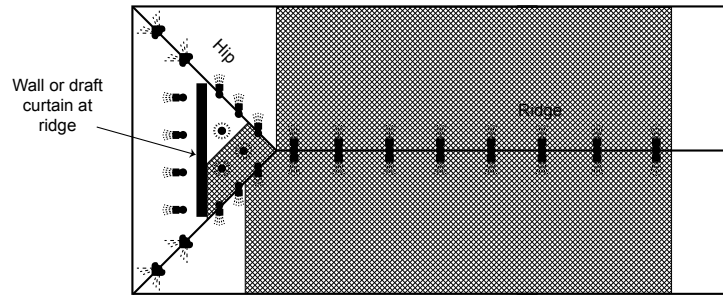
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**Where the total number of Attic Upright Sprinklers at the hip is 4 or less:**

**Wet Systems** - Calculate the most demanding 5 V-BB, V-SD, or V-Hip Sprinklers plus up to 2 most demanding Attic Upright Sprinklers

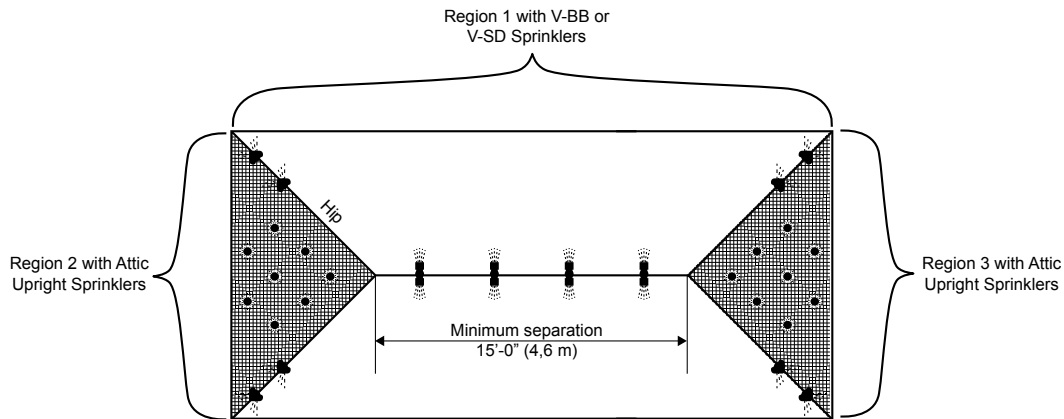
**Dry Systems** - Calculate the most demanding 9 V-BB, V-SD, or V-Hip Sprinklers plus up to 2 most demanding Attic Upright Sprinklers (Out of the 9, calculate a maximum of 7 V-BB sprinklers).



**Where the total number of Attic Upright Sprinklers at the hip is greater than 4:**

**Wet Systems** - Calculate up to the most demanding 5 V-BB, V-SD, or V-Hip Sprinklers plus up to 2 most demanding Attic Upright Sprinklers, then calculate the most demanding region up to 1500 ft<sup>2</sup> (137 m<sup>2</sup>) containing Attic Upright Sprinklers (Region 2 below). Use the most demanding calculation.

**Dry Systems** - Calculate up to the most demanding 9 V-B, V-SD, or V-Hip Sprinklers then add the 2 most demanding Attic Upright Sprinklers, then calculate the most demanding region up to 1950 ft<sup>2</sup> (181 m<sup>2</sup>) containing Attic Upright Sprinklers. Use the most demanding calculation.



**Figure 7:  
V-BB, V-SD, V-Hip, and Attic Upright Sprinklers at the Hip**

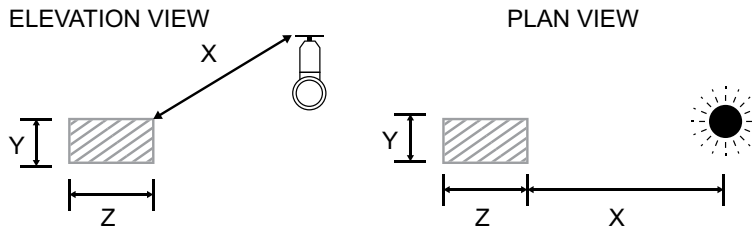


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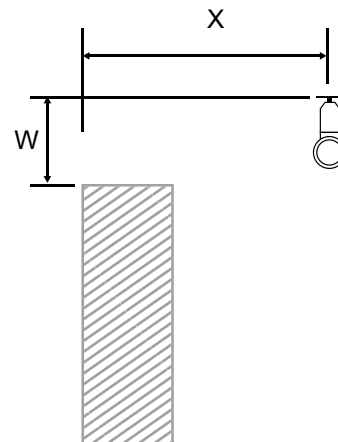
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Refer to Figure 7 below. Requirements:  $X \geq 3Y$  or  $3Z$ ,  $X \leq 24"$  (610 mm); Use the larger dimension Y or Z.



**Figure 8:  
Attic Upright Obstruction Criteria 1**

<b>Table 2: Attic Upright Obstruction Criteria</b>	
Horizontal Distance (X)	Minimum Vertical Distance Below Deflector (W)
≤6" (≤152 mm)	3" (77 mm)
>6" - 9" (>152 - 229 mm)	4" (102 mm)
>9" - 12" (>229 - 305 mm)	6" (152 mm)
>12" - 15" (>305 - 381 mm)	8" (204 mm)
>15" - 18" (>381 - 458 mm)	9-1/2" (242 mm)
>18" - 24" (>458 - 610 mm)	12-1/2" (318 mm)
>24" - 30" (>610 - 762 mm)	15-1/2" (394 mm)
>30" (762 mm)	18" (458 mm)



**Figure 9:  
Attic Upright Obstruction Criteria 2**