



## TECHNICAL DATA

### FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK480

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

Viking Freedom® Residential Concealed Horizontal Sidewall Sprinkler VK480 is a small high-sensitivity solder link and lever residential sprinkler designed for installation on concealed pipe systems, where the appearance of a smooth wall is desired. The sprinkler orifice design, with a K-Factor of 4.0 (57.7 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 special Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive atmospheres and is listed/approved as corrosion resistant as indicated in the Approval Chart.

The sprinkler is hidden from view by a low profile, small diameter cover plate installed flush to the wall. The cover plate is available in several decorative finishes to meet design requirements. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. After the system has been tested and wall finish has been applied, the push-on design of the cover plate assembly allows easy installation of the cover plate with up to 1/4" (6.4 mm) adjustment. Sprinkler VK480 is provided with a pipe guide to properly locate the sprinkler and allow the 1/4" adjustment of the cover plate.



**WARNING:** Cancer and Reproductive Harm-  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## 2. LISTINGS AND APPROVALS



**UL Listed (C-UL-US-EU):** Category VKKW (VK480)



**LPCB Approved: Certificate 096y/01**

Refer to the Approval Chart and Design Criteria for Listing and approval requirements that must be followed.

## 3. TECHNICAL DATA

### Specifications:

Available since 2010.

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: 4.0 U.S. (57.7 metric\*)

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

Available Cover Plate Horizontal Adjustment: 1/4" (6 mm)

Overall Length (Sprinkler Body): 2" (50 mm)

Covered by the following US Patent Numbers: 7,712,218 and 8,960,319

### Material Standards:

Sprinkler Body: QM Brass and Brass UNS-C84400

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

Seat: Brass UNS-C31400

Deflector Ring: Brass UNS-C23000

Deflector Pins: Stainless Steel UNS-S30200

Halo: Brass UNS-C31400 or Phosphor Bronze UNS-C51000

Flow Shaper: Phosphor Bronze UNS-C51000

Lever Bar Ring: Brass UNS-C31400 or Brass UNS-C84400

Compression Screw: 18-8 Stainless Steel

Fusible Link Assembly: Nickel Alloy and Eutectic Solder

Fusible Link Levers: Stainless Steel UNS-S31600

Guide Pin: Stainless Steel UNS-S43000

Shipping Cap: Polyethylene

### Cover Assembly Materials:

Cover Plate Assembly: Copper UNS-C11000 and Brass UNS-C26800

Spring: Beryllium Nickel

Solder: Eutectic

**Ordering Information: Refer to Tables 1 and 2.**



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#### 4. INSTALLATION

Refer to appropriate NFPA or EN 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 fusible element to disengage, releasing the sealing assembly. Water flowing through the sprinkler orifice strikes the flow shaper, 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 Freedom® Residential Concealed Horizontal Sidewall Sprinkler VK480 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: SPRINKLER ORDERING INFORMATION**

Instructions: Using the sprinkler base part number,

(1) add the suffix for the desired Finish

(2) add the suffix for the desired Temperature Rating.

(3) Select a cover plate (See Table 2)

Sprinkler Base Part Number <sup>1</sup>	Size	1: Finishes		2: Temperature Ratings <sup>7</sup>		
	NPT Inch	Description	Suffix	Nominal Rating	Max. Ambient Ceiling Temperature <sup>2</sup>	Suffix
16116	1/2	Brass <sup>8</sup>	A	165 °F (74 °C)	100 °F (38 °C)	C
		ENT <sup>5,6</sup>	JN	205 °F (96 °C)	150 °F (65 °C)	E
		Corrosion Resistant Sprinkler Finish: ENT		Example: 16116JNC = 165 °F (74 °C) Temperature Rated Sprinkler with an ENT finish.		

#### Accessories

##### Sprinkler Wrenches and tools:

- A. Heavy Duty Part Number: 16208W/R<sup>3</sup> (available since 2006)
- B. Head Cabinet Wrench Part Number: 16267<sup>3,4</sup> (available since 2006)
- C. Optional Concealed Cover Plate Installer Tool Part Number: 14412 (available since 2007)
- D. Optional Large Concealed Cover Plate Installer Tool Part No. 14867 (available since 2007)

##### Sprinkler Cabinet:

Holds up to 6 sprinklers: Part number 01731A (available since 1971).

#### Footnotes

1. Part number shown is the base part number. For complete part number, refer to the current Viking price list schedule.
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 13 mm (½") ratchet (not available from Viking).
4. Also optional for removal of the protective cap. Ideal for sprinkler cabinets.
5. cULusEU Listed as corrosion resistant.
6. The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. 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. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway. For ENT coated sprinklers, the Belleville spring is exposed.
7. The sprinkler temperature rating is stamped on the deflector.
8. LPCB Listed - Brass Only.



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**TABLE 2: COVER PLATE ORDERING INFORMATION**

Instructions: Using the cover plate base part number,  
 (1) add the suffix for the desired Finish  
 (2) add the suffix for the required Cover Plate Nominal Rating.

Cover Plate Base Part Number <sup>1</sup>	Size Inch (mm)	Style	1: Finishes		2: Temperature Rating Matrix			
			Description	Suffix <sup>4</sup>	Cover Plate Nominal Rating (Required)	Sprinkler Nominal Rating <sup>2</sup>	Sprinkler Max. Ambient Ceiling Temperature <sup>3</sup>	Suffix
16207	3-5/16 (84)	Round	Painted White	M-/W	cULusEU: 135 °F (57 °C) LPCB: 139 °F (59 °C)	155 °F (68 °C)	100 °F (38 °C)	A
						200 °F (93 °C)	150 °F (65 °C)	
					<p><b>Example: 16207MA/W =</b>  <b>135 °F (57 °C) Temperature Rated, 3-5/16" (84 mm) Diameter,</b>  <b>Round Cover Plate with a Painted White finish.</b></p>			

#### Footnotes

- Part number shown is the base part number. For complete part number, refer to the current Viking price list schedule.
- The sprinkler temperature rating is stamped on the deflector.
- 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.
- Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.




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### Approval Chart<sup>1</sup> Viking VK480, 4.0 K-Factor Residential Concealed HSW Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the design criteria on page 4.  
 For Ceiling types refer to the most current Edition of NFPA 13, 13R or 13D.

Sprinkler Base Part Number <sup>2</sup>	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure				
		Inches	mm	U.S.	metric <sup>3</sup>					
16116A	VK480	1/2	15	4.0	57.7	175 psi (12 bar)				
16116JN <sup>10</sup>	VK480	1/2	15	4.0	57.7	175 psi (12 bar)				
Max. Coverage Area <sup>7</sup> Width X Length Ft. X Ft. (m X m)	Max. Spacing Ft. (m)	Ordinary Temp Rating (165 °F/74 °C)		Intermediate Temp Rating (205 °F/96 °C)		Centerline of Sprinkler to Ceiling	Installation Type	Listings and Approvals <sup>4</sup>		Minimum Spacing Ft. (m)
		Flow <sup>7</sup> GPM (L/min)	Pressure <sup>7</sup> PSI (bar)	Flow <sup>7</sup> GPM (L/min)	Pressure <sup>7</sup> PSI (bar)				NYC	
12 X 12 (3.7 X 3.7)	12 (3.7)	11 (41.7)	7.6 (0.52)	13 (49.3)	10.6 (0.73)	4-3/8 to 6-3/8 inches (111 to 162mm)	Concealed with Cover Plate As- sembly	See Footnote 9 and 10	See Footnote 6	8 (2.4)
14 X 14 (4.3 X 4.3)	14 (4.3)	13 (49.3)	10.6 (0.73)	13 (49.3)	10.6 (0.73)					
16 X 16 (4.9 X 4.9)	16 (4.9)	16 (60.6)	16 (1.10)	16 (60.6)	16 (1.10)					
16 X 18 (4.9 X 5.5)	16 (4.9)	17 (64.4)	18.1 (1.25)	18 (68.1)	20.3 (1.40)					
12 X 12 (3.7 X 3.7)	12 (3.7)	12 (45.5)	9 (0.62)	13 (49.3)	10.6 (0.73)	6-3/8 to 12-3/8 inches (162 to 314mm)				
14 X 14 (4.3 X 4.3)	14 (4.3)	14 (53.0)	12.3 (0.84)	14 (53.0)	12.3 (0.84)					
16 X 16 (4.9 X 4.9)	16 (4.9)	16 (60.6)	16 (1.10)	16 (60.6)	16 (1.10)					
16 X 18 (4.9 X 5.5)	16 (4.9)	18 (68.1)	20.3 (1.40)	18 (68.1)	20.3 (1.40)					

#### Footnotes

- <sup>1</sup> For North American Markets only.
- <sup>2</sup> For complete part number, also refer to current Viking price list schedule.
- <sup>3</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>4</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. Refer also to Design Criteria listed below.
- <sup>5</sup> Sprinkler VK480 is Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.
- <sup>6</sup> Meets New York City requirements, effective July 1, 2008.
- <sup>7</sup> For areas of coverage smaller than shown, use the "Flow" and "Pressure" 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 "Flow" and "Pressure" used.
- <sup>8</sup> Other paint colors are available on request with the same listings as the standard finish colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.
- <sup>9</sup> Cover Temperature Rating is UL: 135 °F (57 °C). Cover Part No. 16207<sup>2</sup>.
- <sup>10</sup> Accepted Cover Plate Finishes are: White Polyester<sup>7</sup>.
- <sup>11</sup> cULus Listed as corrosion resistant.

	<h2 style="margin: 0;">TECHNICAL DATA</h2>	<h3 style="margin: 0;">FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK480</h3>
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**DESIGN CRITERIA**  
(Also refer to the Approval Chart on page 3.)

**UL Listing Requirements (C-UL-US-EU):**

When using Viking Residential Concealed Horizontal Sidewall Sprinkler VK480 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 above.

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 above 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.
- **THE TOP OF THE SPRINKLER BODY AND THE TOP OF THE INSTALLATION WRENCH ARE MARKED “TOP”.** Orient the top of the sprinkler element parallel with the ceiling as shown in Figure 3.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

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

**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to Form No. F\_080190 and Form No. F\_080415 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 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**

The internal design of the sprinkler wrench is shaped to fit over the sprinkler and protective cap to ensure that the top of the wrench will be oriented in the same direction as the top of the sprinkler deflector.

Sprinkler wrench
Sprinkler body

Orient the sprinkler and wrench as shown then slide the wrench over the sprinkler body and the protective cap.

**Figure 2: Sprinkler VK480 Installation and Correct Use of Wrench**



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### Approval Chart - LPCB<sup>1</sup>

#### Viking VK480, K58 Residential Concealed HSW Sprinkler

For systems designed according to EN16925 including UK National Annex and BS9251  
 74°C sprinkler with 57°C coverplate<sup>2</sup>

Sprinkler Base Part Number <sup>3</sup>	SIN	Thread	Nominal K-Factor (metric)		Maximum Working Pressure (bar)		Minimum Spacing (m)		
20759	VK480	½" / 15mm	70.6		12.0		2.4		
Max. coverage area <sup>4</sup> W x L (m x m)	Centerline of sprinkler to ceiling (mm)	Minimum design criteria <sup>5</sup>		Nominal <sup>6,7</sup> 2.1mm/min		Nominal <sup>6,7</sup> 2.8mm/min		Nominal <sup>6,7</sup> 4.0mm/min	
		Flow (L/min)	Pressure (bar)	Flow (L/min)	Pressure (bar)	Flow (L/min)	Pressure (bar)	Flow (L/min)	Pressure (bar)
3.7 x 3.7	110 to 162	41.7	0.5	41.7	0.5	41.7	0.5	54.8	0.9
4.3 x 4.3		49.3	0.7	49.3	0.7	51.8	0.8	74.0	1.6
4.9 x 4.9		60.6	1.1	60.6	1.1	67.2	1.3	96.0	2.7
4.9 x 5.5		64.4	1.2	64.4	1.2	67.2	1.3	96.0	2.7
3.7 x 3.7	162 to 314	45.5	0.6	45.5	0.6	45.5	0.6	54.8	0.9
4.3 x 4.3		53	0.8	53.0	0.8	53.0	0.8	74.0	1.6
4.9 x 4.9		60.6	1.1	60.6	1.1	67.2	1.3	96.0	2.7
4.9 x 5.5		68.1	1.4	68.1	1.4	68.1	1.4	96.0	2.7

#### Footnotes

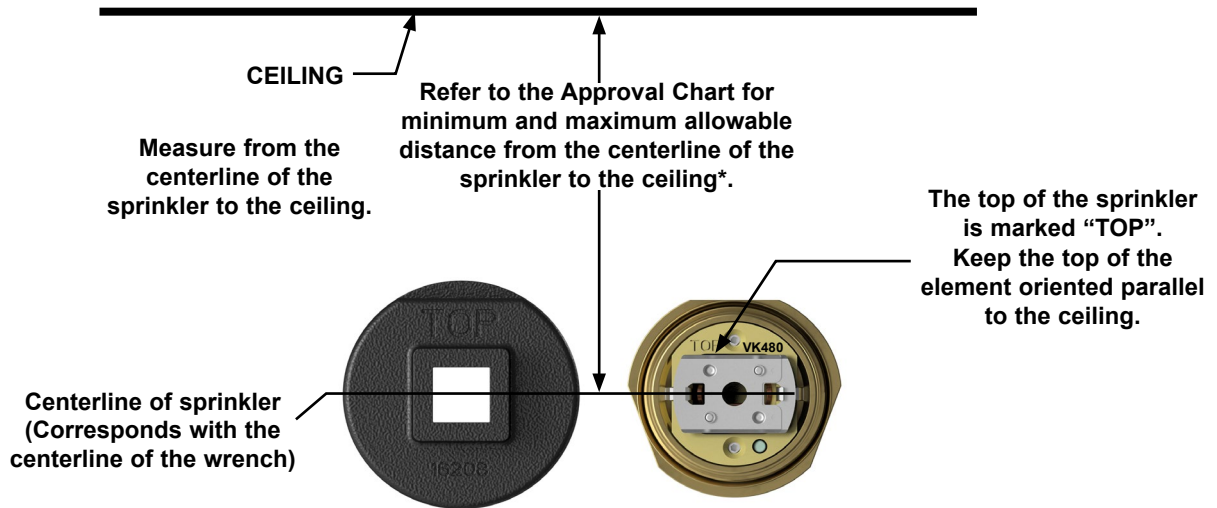
- Not for North American markets. The VK480 is a vented style concealed sprinkler. Do not install embedded in concrete ceilings.
- Accepted Cover Plate Finishes are: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black. Other paint colours are available on request with the same listings as the standard finish colours. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colours are indicated on a label inside the cover assembly. Refer to Figure 1.
- Part number shown is the base part number. For complete part number, contact Viking.
- For areas of coverage smaller than shown, use the "Flow" and "Pressure" 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 "Flow" and "Pressure" used. For detailed guidance on obstructions please refer to the relevant EN16925, NFPA13, 13R or 13D design and installation standards. The minimum flow for each sprinkler shall be selected such that both the actual width and length dimensions are equal to or less than those given in the table above.
- Minimum LPCB approved flow and pressure for each room size.
- Flow and pressure required to achieve nominal density, or minimum approved flow and pressure if higher.
- The nominal density is that used for design purposes and required by the installation standard. As a proportion of the flow is required to wet the walls the actual density on the floor will be lower than nominal. Product testing and approvals are carried out at the minimum values given above and so design should be based on the values given above and does not need to be adjusted to take account of wall-wetting.



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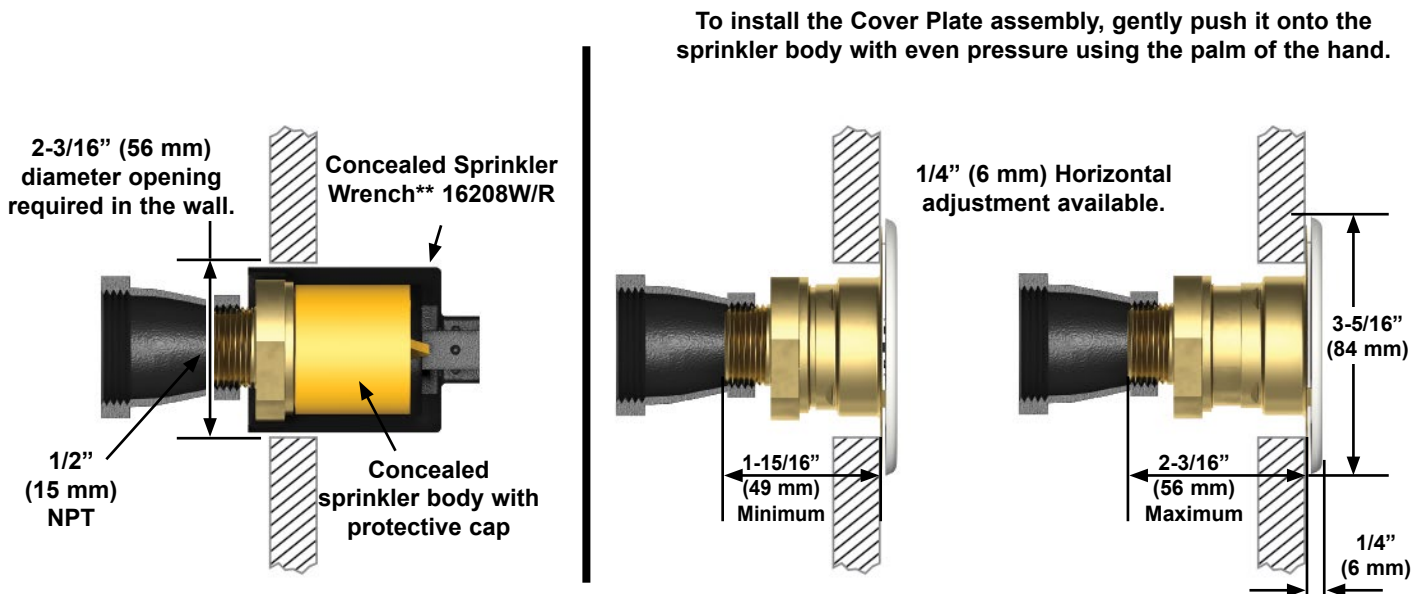
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**Figure 3: Sprinkler VK480 Correct Deflector Orientation**

\*Distance from the ceiling affects water supply requirements. Refer to the Approval Chart.



**Figure 4: Sprinkler VK480 Dimensions and Cover Installation**

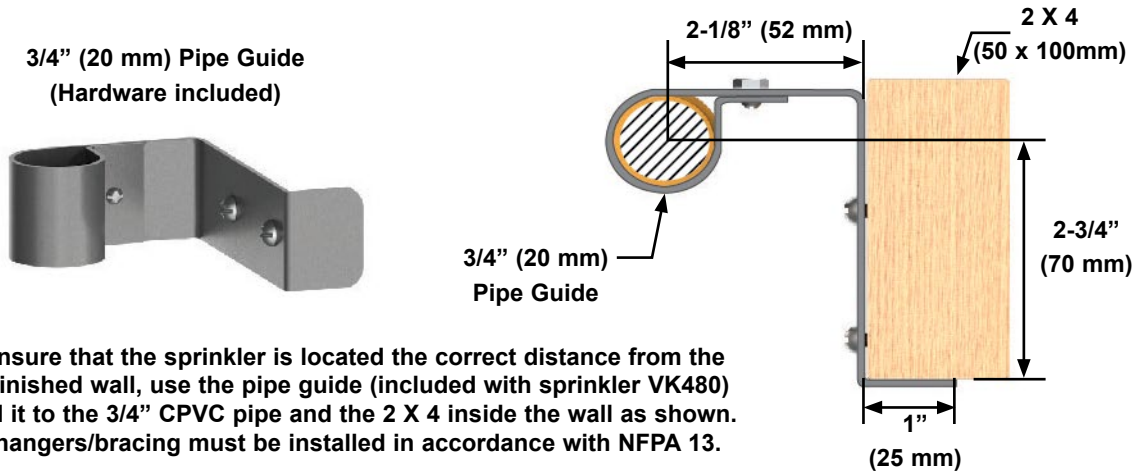
\*\* A 1/2" ratchet is required (not available from Viking).



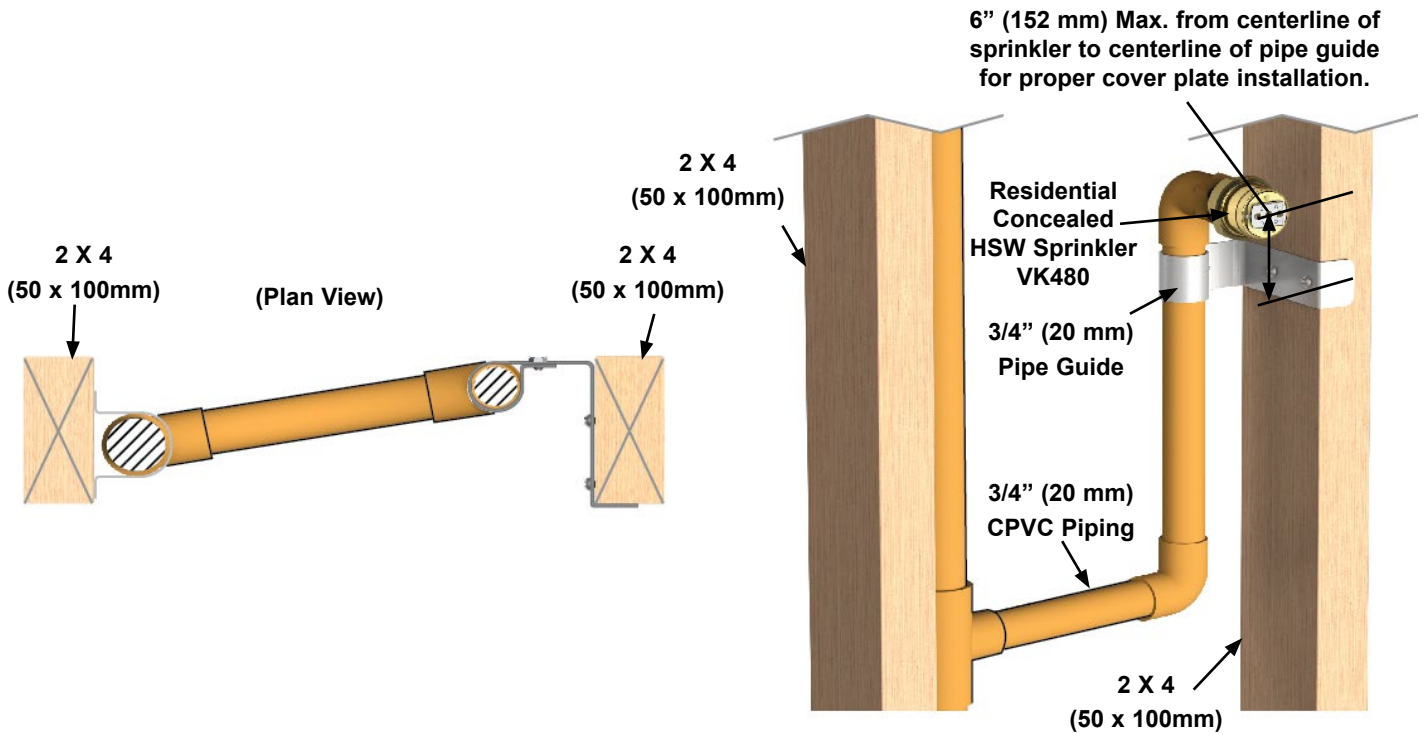
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**Figure 5: Sprinkler VK480 Pipe Guide**



**Figure 6: Sprinkler VK480 Pipe Guide Installation Instructions**





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