TECHNICAL DATA

SPECIFIC APPLICATION WINDOW SPRINKLERS (K5.6)

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

1. DESCRIPTION

Viking Specific Application window sprinklers are quick response glass bulb, automatic sprinklers. Both Pendent Vertical Sidewall (VSW) and Horizontal Sidewall (HSW) versions are available to meet design needs.
The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive environments and are listed/approved as indicated in the Approval Charts.

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

Evaluation Recognition: ICC-ES Evaluation Report No. ESR-4288

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

3. TECHNICAL DATA

Minimum Operating Pressure: 7 psi (0.5 bar)
Rated to: 175 PSI (12 bar)
Factory tested hydrostatically to 500 psi (34.5 bar).
Thread size: 1/2" NPT (15 mm BSPT)
Nominal K-factor: 5.6 U.S. (80.6 metric*)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)

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

SIN	THREAD	DESCRIPTION
VK960	NPT	Pendent VSW
VK960	BSPT	Pendent VSW
VK962	NPT	HSW
VK962	BSPT	HSW

Material Standards:
Sprinkler Body: Brass CW602N or QM Brass
Deflector: Phosphor Bronze UNS-C51000
Pip Cap Shell - Stainless Steel UNS-S44400
Pip Cap Disc - Stainless Steel UNS-S30100
Belleville Spring - Nickel Alloy
Pip Cap Seal - Polytetrafluoroethylene (PTFE)
Compression Screw: Brass CW612N, CW508L, UNS-C36000 or UNS-C26000
Shipping Cap: Polyethylene
Bulb: Glass, nominal 3 mm diameter

Ordering Information: Refer to Table 1

WARNING: Cancer and Reproductive Harm- www.P65Warnings.ca.gov

ICC-ES Evaluation Report No. ESR-4288
www.icc-es.org

4. INSTALLATION

Refer to appropriate NFPA Installation Standards. Also refer to Figures 3 through 5.

5. OPERATION

During fire conditions, when the temperature around the sprinkler reaches its operating temperature, the heat-sensitive liquid in the glass bulb expands, causing the bulb to shatter, releasing the pip cap 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

Viking automatic window sprinklers are 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.

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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.

SIN	Sprinkler Base Part Number	Style	Size		1: Finishes		2: Temperature Ratings				
			NPT Inch	BSPT mm	Description	Suffix[1]	Sprinkler Temperature Classification	Nominal Rating	Max. Ambient Ceiling Temperature[2]	Bulb Color	Suffix
VK960	23017	Pendent VSW	1/2	--	Brass	A	Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red	B
VK960	23018	Pendent VSW	--	15	Chrome	F	Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green	E
VK962	23019	HSW	1/2	--	White Polyester	M-/W					
VK962	23020	HSW	--	15	Black Polyester	M-/B					
					ENT[3,4]	JN					

Corrosion Resistant Sprinkler Finish: ENT

Example: 23017JNE = VK960, 200 °F (93 °C) Temperature Rated Sprinkler with an ENT[3,4] finish.

Accessories

Sprinkler Wrenches and tools:
Standard Wrench Part Number: 22940MB
Sprinkler Cabinet:
Holds up to 6 sprinklers: Part number 01724A

Footnotes

1. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
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. cULus Listed as corrosion resistant.
4. The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. 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.

Figure 1: Sprinkler Wrench

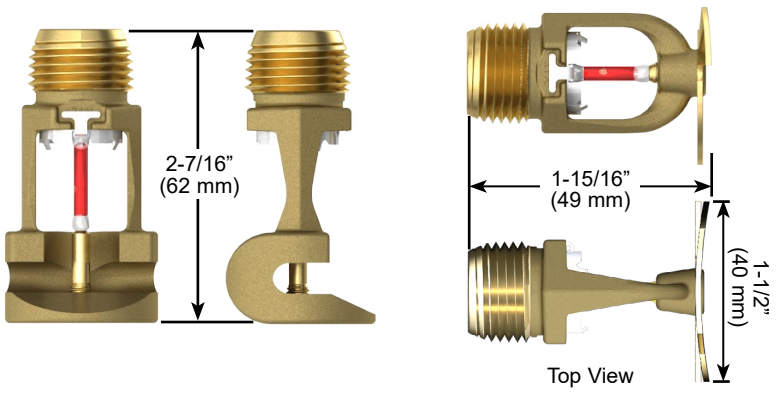

Figure 2: Sprinkler Dimensions (Pendent VSW and HSW)

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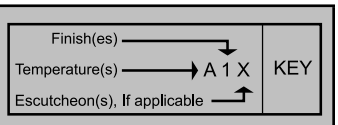
APPROVAL CHART
Viking Specific Application Pendent Vertical Sidewall Window Sprinklers
VK960 K5.6 (80.6 metric)
Maximum 175 PSI (12 Bar) WWP



Sprinkler Base Part Number[1]	Thread Size		Listings and Approvals[2]
	NPT Inch	BSPT mm	cULus and ICC-ES[5]
23017	1/2	--	A1
23018	--	15	A1

Approved Temperature Rating Codes:

A = 155 °F (68 °C) and 200 °F (93 °C)

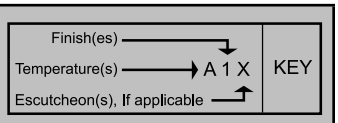
Approved Finish Codes:

1 = Brass, Chrome, White Polyester [3,4], Black Polyester [3,4], and ENT [4]

Footnotes

1 Base Part number is shown. For complete part number, refer to Viking's current price schedule.
2 This table shows the listings and approvals available at the time of publication. Check with the manufacturer for any additional approvals.
3 Other colors are available upon request with the same Listings and Approvals as the standard colors.
4 cULus Listed as corrosion resistant.
5 See ICC-ES Evaluation Report No. ESR-4288 at www.icc-es.org.

APPROVAL CHART
Viking Specific Application Horizontal Sidewall Window Sprinklers
VK962 K5.6 (80.6 metric)
Maximum 175 PSI (12 Bar) WWP



Sprinkler Base Part Number[1]	Thread Size		Listings and Approvals[2]
	NPT Inch	BSPT mm	cULus and ICC-ES[5]
23019	1/2	--	A1
23020	--	15	A1

Approved Temperature Rating Codes:

A = 155 °F (68 °C) and 200 °F (93 °C)

Approved Finish Codes:

1 = Brass, Chrome, White Polyester [3,4], Black Polyester [3,4], and ENT [4]

Footnotes

1 Base Part number is shown. For complete part number, refer to Viking's current price schedule.
2 This table shows the listings and approvals available at the time of publication. Check with the manufacturer for any additional approvals.
3 Other colors are available upon request with the same Listings and Approvals as the standard colors.
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DESIGN CRITERIA - Pendent Vertical Sidewall Window Sprinkler VK960

(Also refer to the Approval Chart.)

cULus Listing Requirements:

Viking Specific Application Pendent Vertical Sidewall Pendent Sprinkler VK960 is cULus Listed as a Specific Application Window Sprinkler for interior use and as an open sprinkler for Outside use; refer to the installation standards such as NFPA 13 for minimum water supply requirements, pressures, and installation guidelines. In addition, the following requirements must be met:

System Types:
- For Interior sprinklers: Wet Systems
- For Outdoor sprinklers: Deluge systems

Areas of Use:
Consult an Authority Having Jurisdiction (AHJ) for local standards, codes, or other requirements. These sprinklers are intended for use in either a sprinklered or unsprinklered building to protect non-operable window areas that are part of a fire separation, only if the following apply:

- Refer to Figure 3A. For interior separations, the sprinklers must be installed on both sides of the window within the fire separation.
- Refer to Figure 3B. For areas where separation from an adjacent space is defined as protecting an adjacent structure from a fire in the building being protected, the sprinklers must be installed on the interior side of the building, OR
- Refer to Figure 3C. For areas where exterior spatial separation is defined as exposure protection, open window sprinklers must be installed on the exterior portion of the building.

Glass Types:
The following specifications must apply in order for the Viking Specific Application Window Sprinkler to be used.

- Type: Non-operable and/or stronger assemblies
- Treatments: heat-strengthened and tempered
- Glazing: single-glazed/single pane, double-glazed/double pane or insulated.
- Thickness: Minimum 1/4” (6 mm)

Window Frame/Mullion Types:
Non combustible with EPDM rubber gasket; Vertical joints of glass panes must be connected by butt-joints using a silicone sealant between the individual panes or by noncombustible mullions. Refer to Figures 4A and 4B.

Maximum Length of Window: Unlimited

Maximum Height of Window: 13’ (4,0 m) Refer to Figure 5.

Maximum distance between sprinklers: 12’ (3,7 m) Refer to Figures 4A and 4B

Minimum distance between sprinklers: 6’ (1,8 m). Refer to Figures 4A and 4B (unless separated by a mullion meeting depth of a baffle; mullion must extend to the back of the sprinkler deflector.)

Minimum flow per sprinkler: 15 gpm (57 Lpm)

Maximum pressure: 175 PSI (12 bar)

Minimum distance from standard sprinklers: 6’ (1,8 m) unless separated by a baffle

Maximum distance from vertical mullion: 7’ (2,1 m) Refer to figure 4A

Minimum distance from vertical mullions: 4” (100 mm)

Deflector Location:
Sprinkler Deflectors must be located as described below in order to ensure that the entire surface of the glass window is covered. Sprinkler Deflectors are positioned with respect to the window frame, not the ceiling.
- Vertical Sidewall Pendent: Locate 4” to 12” (100 mm to 300 mm) from the face of the glass and 2” to 4” (50 mm to 100 mm) down from the top of exposed glass. Refer to Figure 5A.

Minimum clearance to face of glass to combustible materials: 2” (50 mm)

Escutcheons: Standard surface mount or raised escutcheons may be used.

Minimum flow per sprinkler: 15 gpm (56,8 Lpm)

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DESIGN CRITERIA - Pendent Vertical Sidewall Window Sprinkler VK960

(Also refer to the Approval Chart.)

Continued from previous page.

Interior protection sprinklered building: Identify which compartmented area has the most hydraulically demanding window sprinklers. Calculate up to the most demanding 46.5 linear feet (14.2 linear meters) of window sprinklers on one side of the glazing. The 46.5 linear feet (14,2 linear meters) is based upon 1.2 x the square root of the system area of operation, when the system area of operation is 1500 ft^2 (140 m^2). in accordance with NFPA 13 Light/Ordinary Hazard density curves.

Where the area of Glazing is less than 46.5 linear feet (14.2 linear meters), all window sprinklers on one side shall be calculated. If an area reduction for quick response sprinklers is utilized, the linear length of the calculated window sprinklers may be reduced, but in no case shall be less than 36 linear feet (1.2 x √900).

If a single fire can be expected to operate window sprinklers and sprinklers within the design area of a hydraulically calculated system, the water demand of the window sprinklers shall be added to the water demand of the hydraulic calculations and shall be balanced to the calculated area demand.

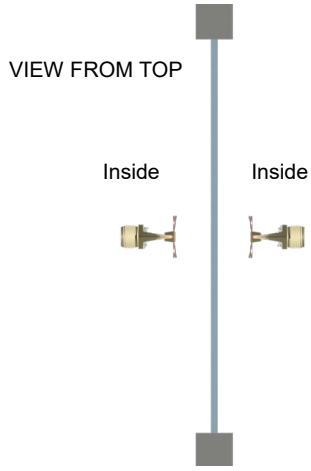
If the window sprinklers are located in an area other than the hydraulic design area, the demand of the window sprinklers is not required to be added to the demand of the remote hydraulic design area. However, it is necessary to prove hydraulically the simultaneous operation of the window sprinklers and the ceiling sprinklers adjacent to the window sprinklers.

Interior protection of non-sprinklered building: Calculate all sprinklers on the most demanding side of the glazing assembly within the enclosure.

Exterior exposure protection: Calculate all sprinklers controlled by the deluge valve using the design requirements of NFPA.

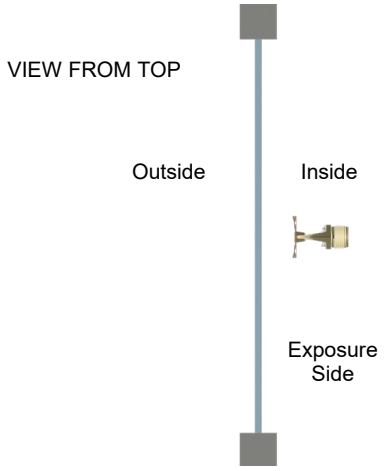
Duration of water supply: Duration of water supply must comply with requirements of NFPA. If window sprinklers are used to provide the equivalency of a fire rating, the water supply must be capable of supplying water for the required rating period.

Figure 3A



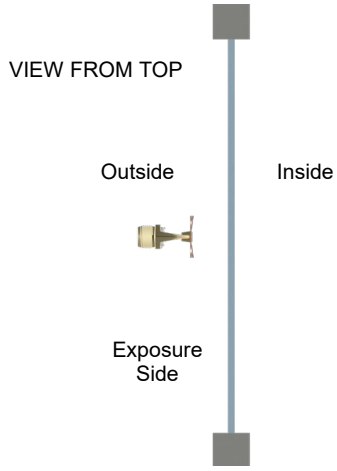
When acceptable to the Authority Having Jurisdiction the window sprinklers may be used in either a sprinklered or unsprinklered building to protect non-operable window openings that are in an interior fire separation, the window sprinklers are installed on both sides of the window in the fire separation.

Figure 3B



When acceptable to the Authority Having Jurisdiction the window sprinklers may be used in either a sprinklered or unsprinklered building to protect non-operable window openings that are part of a fire separation provided in jurisdictions where exterior spatial separation is defined as protecting an adjacent building from a fire in your building, window sprinklers are installed on the interior side of the glass.

Figure 3C



When acceptable to the Authority Having Jurisdiction the window sprinklers may be used in either a sprinklered or unsprinklered building to protect non-operable window openings that are part of a fire separation provided in jurisdictions where exterior spatial separation is defined as protecting your building from a fire in adjacent building, open window sprinklers are installed on the exterior side of the glass.

Figure 3: Typical Non-Operable Windows

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DESIGN CRITERIA - Horizontal Sidewall Window Sprinkler VK962

(Also refer to the Approval Chart.)

cULus Listing Requirements:

Viking Specific Application Horizontal Sidewall Sprinkler VK962 is cULus Listed as a Specific Application Window Sprinkler for interior use and as an open sprinkler for Outside use; refer to the installation standards such as NFPA 13 for minimum water supply requirements, pressures, and installation guidelines. In addition, the following requirements must be met:

System Types:
- For Interior sprinklers: Wet Systems
- For Outdoor sprinklers: Deluge systems

Areas of Use:
Consult an Authority Having Jurisdiction (AHJ) for local standards, codes, or other requirements. These sprinklers are intended for use in either a sprinklered or unsprinklered building to protect non-operable window areas that are part of a fire separation, only if the following apply:

- Refer to Figure 3A. For interior separations, the sprinklers must be installed on both sides of the window within the fire separation.
- Refer to Figure 3B. For areas where separation from an adjacent space is defined as protecting an adjacent structure from a fire in the building being protected, the sprinklers must be installed on the interior side of the building, OR
- Refer to Figure 3C. For areas where exterior spatial separation is defined as exposure protection, open window sprinklers must be installed on the exterior portion of the building.

Glass Types:
The following specifications must apply in order for the Viking Specific Application Window Sprinkler to be used.

- Type: Non-operable and/or stronger assemblies
- Treatments: heat-strengthened and tempered
- Glazing: single-glazed/single pane, double-glazed/double pane or insulated.
- Thickness: Minimum 1/4” (6 mm)

Window Frame/Mullion Types:
Non combustible with EPDM rubber gasket; Vertical joints of glass panes must be connected by butt-joints using a silicone sealant between the individual panes or by noncombustible mullions.

Maximum Length of Window: Unlimited

Maximum Height of Window: 13’ (4,0 m) Refer to Figure 5.

Maximum distance between sprinklers: 8’ (2,4 m) Refer to Figures 4A and 4B

Minimum distance between sprinklers: 6’ (1,8 m) Refer to Figures 4A and 4B (unless separated by a mullion meeting depth of a baffle; mullion must extend to the back of the sprinkler deflector.)

Maximum pressure: 175 PSI (12 bar)

Minimum distance from standard sprinklers: 6’ (1,8 m) unless separated by a baffle

Maximum distance from vertical mullion: 5’ (15 m) Refer to Figure 4A

Minimum distance from vertical mullions: 4” (100 mm)

Deflector Location:
Sprinkler Deflectors must be located as described below in order to ensure that the entire surface of the glass window is covered. Sprinkler Deflectors are positioned with respect to the window frame, not the ceiling.
- Horizontal Sidewall: Locate within the outside edge of the window frame from 1/2” to 4” (13 mm to 100 mm) away from the glass and 1” to 3” (25 mm to 75 mm) down from the top of the exposed glass. Refer to Figure 5B.

Minimum clearance to face of glass to combustible materials: 2” (50 mm)

Escutcheons: Standard surface mount or raised escutcheons may be used.

Minimum flow per sprinkler: 20 gpm (75,7 Lpm) for sprinkler spacing of 6’ to 8’ (1,83 m to 2,44 m) or 15 gpm (56,8 Lpm) for sprinkler spacing less than 6’ (1,83 m).

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DESIGN CRITERIA - Horizontal Sidewall Window Sprinkler VK962

(Also refer to the Approval Chart.)

Continued from previous page.

Interior protection sprinklered building: Identify which compartmented area has the most hydraulically demanding window sprinklers. Calculate up to the most demanding 46.5 linear feet (14.2 linear meters) of window sprinklers on one side of the glazing. The 46.5 linear feet (14,2 linear meters) is based upon 1.2 x the square root of the system area of operation, when the system area of operation is 1500 ft^2 (140 m^2). in accordance with NFPA 13 Light/Ordinary Hazard density curves.

Where the area of Glazing is less than 46.5 linear feet (14.2 linear meters), all window sprinklers on one side shall be calculated. If an area reduction for quick response sprinklers is utilized, the linear length of the calculated window sprinklers may be reduced, but in no case shall be less than 36 linear feet (1.2 x $\sqrt{900}$).

If a single fire can be expected to operate window sprinklers and sprinklers within the design area of a hydraulically calculated system, the water demand of the window sprinklers shall be added to the water demand of the hydraulic calculations and shall be balanced to the calculated area demand.

If the window sprinklers are located in an area other than the hydraulic design area, the demand of the window sprinklers is not required to be added to the demand of the remote hydraulic design area. However, it is necessary to prove hydraulically the simultaneous operation of the window sprinklers and the ceiling sprinklers adjacent to the window sprinklers.

Interior protection non-sprinklered building: Calculate all sprinklers on the most demanding side of the glazing assembly within the enclosure.

Exterior exposure protection: Calculate all sprinklers controlled by the deluge valve using the design requirements of NFPA.

Duration of water supply: Duration of water supply must comply with requirements of NFPA. If window sprinklers are used to provide the equivalency of a fire rating, the water supply must be capable of supplying water for the required rating period.

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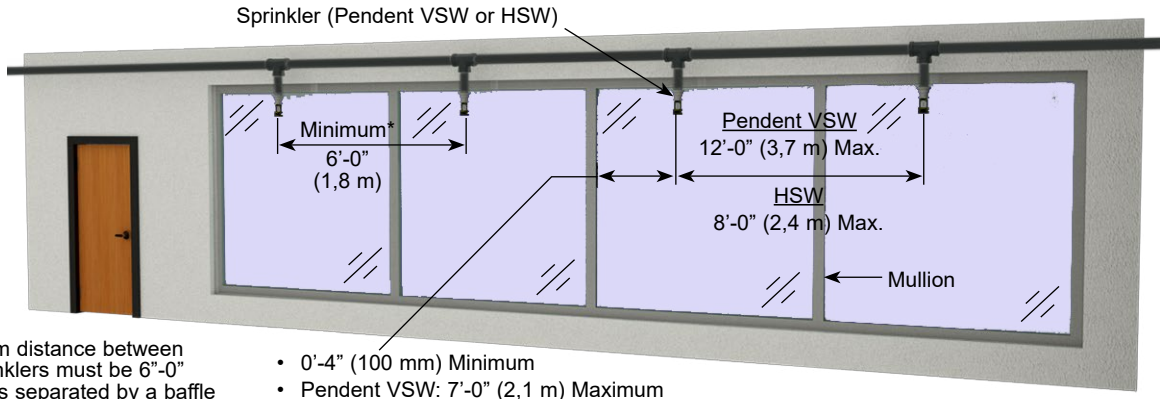
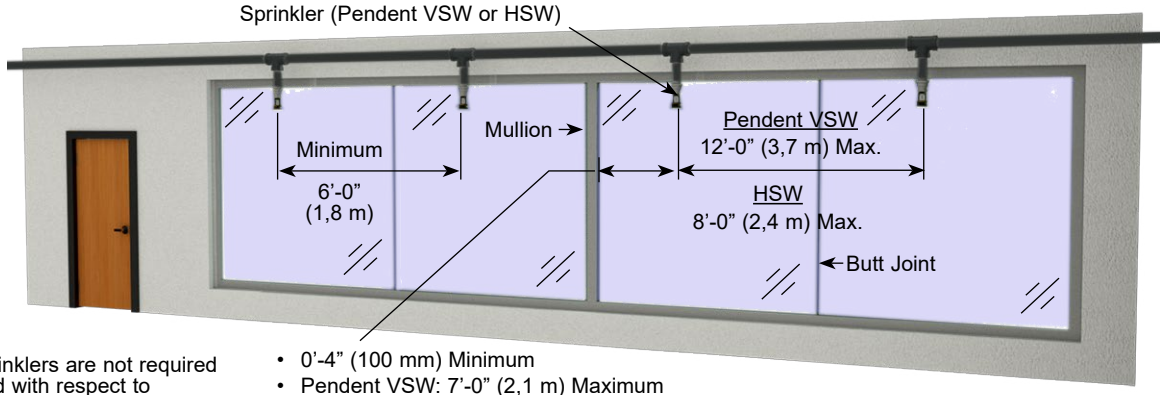


*The minimum distance between Window Sprinklers must be 6"-0" (1,8 m) unless separated by a baffle or mullion of adequate depth to act as a baffle.

- 0'-4" (100 mm) Minimum
- Pendent VSW: 7'-0" (2,1 m) Maximum
- HSW: 5'-0" (1,5 m) Maximum

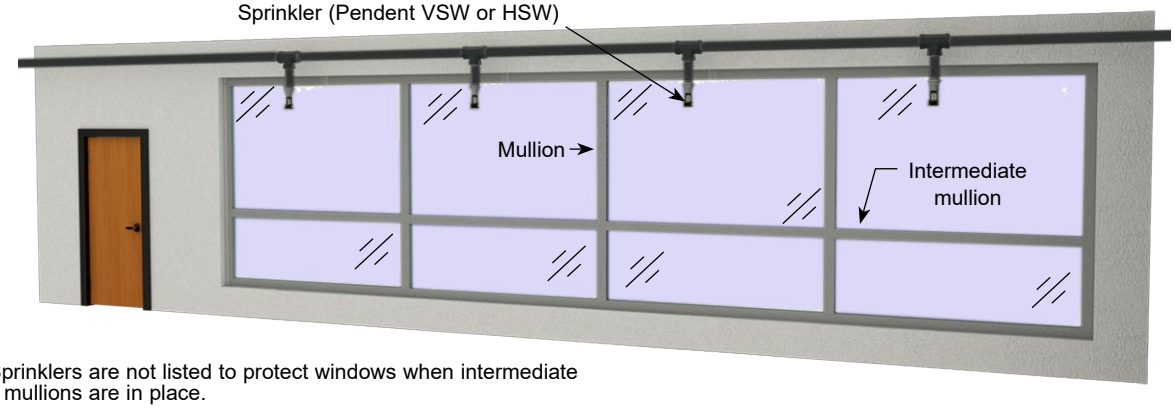
Figure 4A: Multiple Windows Separated by Mullions



Window Sprinklers are not required to be located with respect to horizontal or vertical butt joints.

- 0'-4" (100 mm) Minimum
- Pendent VSW: 7'-0" (2,1 m) Maximum
- HSW: 5'-0" (1,5 m) Maximum

Figure 4B: Multiple Windows Separated by Butt Joints



Window Sprinklers are not listed to protect windows when intermediate horizontal mullions are in place.

Figure 4C: Windows with Horizontal Mullions

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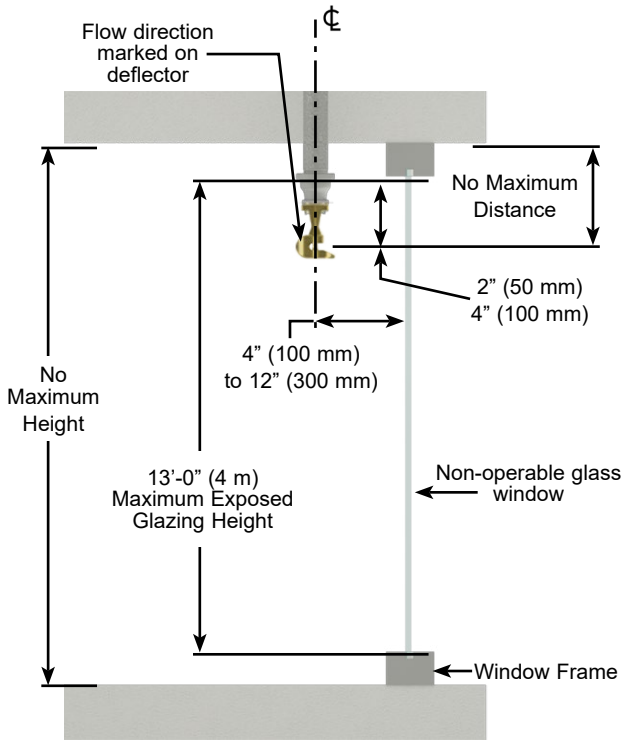
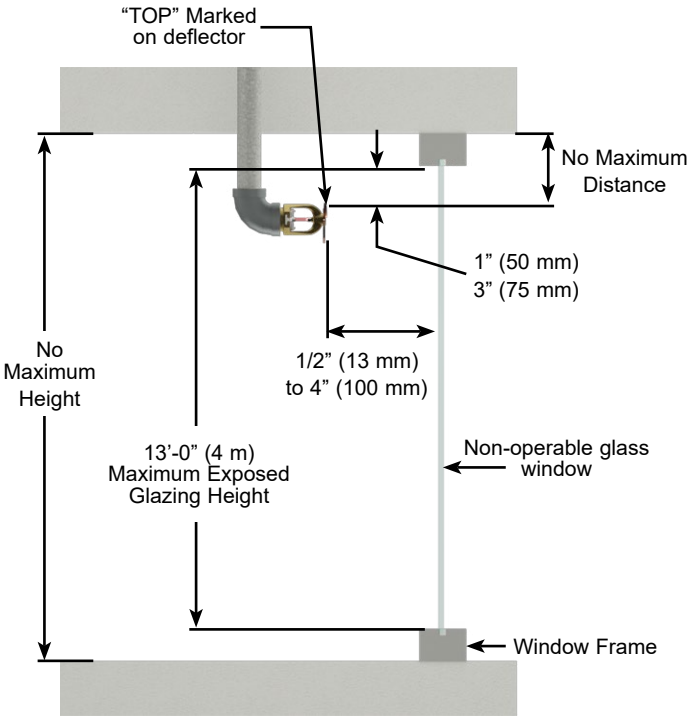
Figure 5A: Vertical Sidewall Pendent



NOTE: Position the sprinkler with the frame arms aligned parallel to glazing and deflector flow indicator pointed towards glazing.

Figure 5B: Horizontal Sidewall



NOTE: Position the sprinkler with the frame arms aligned vertically and marked side of the deflector facing parallel to glazing.

All combustible materials must be kept a minimum of 2” (50 mm) from the sprinklered face of the glazing. A minimum 3’-0” (900 mm) pony wall may be used or other method acceptable to the Authority Having Jurisdiction

Do not use any type of window coverings between the sprinkler and the glazing.

Figure 5: Installation Dimensions

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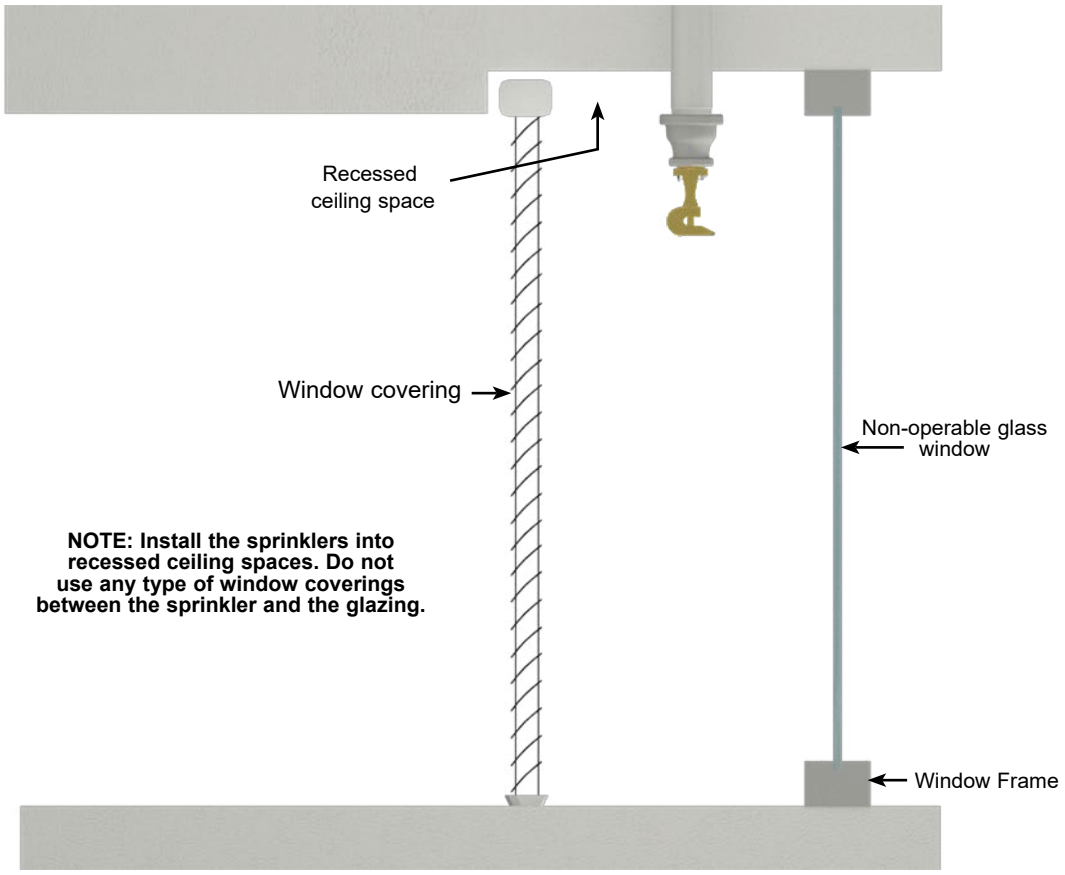

NOTE: Install the sprinklers into recessed ceiling spaces. Do not use any type of window coverings between the sprinkler and the glazing.

All combustible materials must be kept a minimum of 2” (50 mm) from the sprinklered face of the glazing. A minimum 3’-0” (900 mm) pony wall may be used or other method acceptable to the Authority Having Jurisdiction.

Figure 6: Recessed Ceiling Space Installation

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