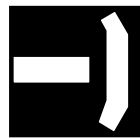
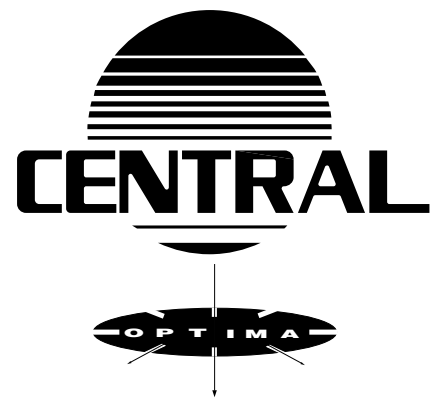


Model WS™ Specific Application Window Sprinklers™

5.6 K-factor - Quick Response

Vertical Sidewall & Horiz. Sidewall Glass Bulb Automatic Sprinkler

Tyco Fire Products --- www.centraisprinkler.com
451 North Cannon Avenue, Lansdale, Pennsylvania 19446 --- USA
Customer Service/Sales: Tel: (215) 362-0700 / Fax: (215) 362-5385
Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500



General Description

The Central Model WS, 5.6 K-factor, Pendent Vertical Sidewall and Horizontal Sidewall, Specific Application Window Sprinklers are quick response glass bulb type spray sprinklers.

These sprinklers are the first sprinklers ever to be specifically Listed to provide protection for heat strengthened or tempered glass windows using closed sprinklers. As part of the testing, the gas flow required to achieve the time/temperature relationship specified in ASTM E119 was established in a test furnace without sprinkler protection. A Window assembly protected with Model WS Specific Application Window Sprinklers was then installed in the test furnace and the same gas flow conditions were maintained for a two hour test period. No cracking or visible damage to the window was permitted during the test period (even when a hose stream was directed at the window).

The success of the Model WS Specific Application Window Sprinkler is based on its specially designed deflector, that ensures that the spray pattern wets the entire surface of the window, and its fast response thermal sensitivity.

Based on this successful testing, the Model WS Specific Application Window Sprinkler can be used as interior protection of windows or glazing in a sprinklered building or non sprinklered building. Also, the Model WS Specific Application Window Sprinkler can be used as an open sprinkler for "Outside Sprinkler Protection against Exposure Fire", using the design requirements of NFPA.

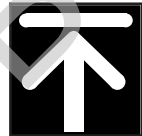
As with any specific application sprinkler, the installation instructions included in this data sheet must be precisely followed. National Evaluation Service Inc. (NES), ICBO Evaluation Service, Inc. (ICBO ES), and Underwriters Laboratories of Canada (ULC) guidelines apply, consult the specific approval report.

Operation: The glass bulb contains a fluid which expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, which then allows the sprinkler to activate & flow water.

WARNING

The Model WS Specific Application Window Sprinklers described herein must be installed & maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.



Technical Data

Sprinkler Identification Number

SIN C3388 - Horizontal Sidewall
SIN C3488 - Pendent Vertical Sidewall

Approvals

UL, C-UL & ULC Listed. NYC Approved.
(The approvals apply only to the service conditions indicated in the Design Criteria Section)

Additional Recognition:

National Evaluation Service (NER 516)
ICBO Evaluation Service (ER 5790)

Pipe Thread Connection

1/2 inch NPT

Discharge Coefficient

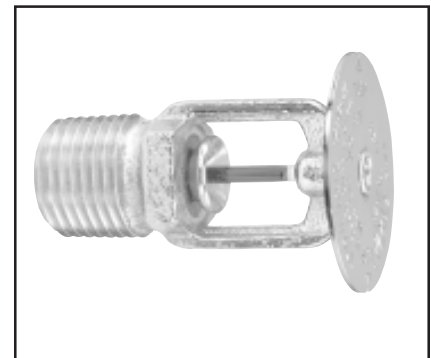
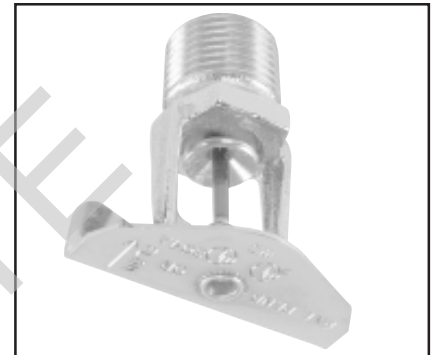
$K = 5.6 \text{ GPM/psi}^{1/2} (80.6 \text{ LPM/bar}^{1/2})$

Temperature Ratings

155°F/68°C & 200°F/93°C

Finishes

Sprinkler: White Polyester, Chrome Plated, or Natural Brass



Specific Application Window Sprinklers

Physical Characteristics

The Model WS Window Sprinklers utilize a dezincification resistant (DZR) bronze frame and a 3 mm bulb. The two-piece button assembly is brass and copper. The sprinkler frame orifice is sealed with a gasketed spring plate (Belleville Seal) consisting of a beryllium nickel disc spring that is sealed on both its inside and outside edges with a Teflon™ gasket. The compression screw is bronze, & the deflector is brass.



Design Criteria

The Model WS Window Sprinklers are listed by UL and C-UL, and NYC Approved (MEA 191-96-E) for use as a "Specific Application Window Sprinkler" and as open sprinklers for "Outside" use. These sprinklers are also recognized by the National Evaluation Service Inc. (NES), ICBO Evaluation Service, Inc. (ICBO ES), and Underwriters Laboratories of Canada (ULC) as providing a two-hour equivalency for a fire separation assembly, when installed in accordance with the NES Report (NER 516), ICBO Evaluation Service Report (ER 5790), and ULC/ORD-C263.1 Appendix A.

Note

NER 516 can be obtained at www.nateval.org. ER 5790 can be obtained at www.icbo.org. ULC/ORD-C263.1 Appendix A can be obtained by contacting Technical Services.

Area of Use: When acceptable to the Authority Having Jurisdiction and unless modified by one of the reports mentioned above, the Model WS Specific Application Window Sprinklers may be used in either a sprinklered or unsprinklered building to protect nonoperable window openings that are part of a fire separation provided:

- a) in an interior fire separation, the window sprinklers are installed on both sides of the window in the fire separation. (Ref. Figure A)
- b) 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 building (Ref. Figure B), or
- c) in jurisdictions where exterior spatial separation is defined as protecting your building from a fire in an adjacent building, open window sprinklers are installed on the exterior side of the building (Ref. Figure C).

System Type:

Interior Protection - Wet Systems.
Outside Exposure Protection - Deluge.

Glass Type: Non Opererable Heat-strengthened, Tempered, or stronger glass window assemblies that are a minimum 1/4" (6 mm) thick.

Type of Window Frame/Mullion: Noncombustible Frame with a standard EPDM rubber gasket seal. Vertical joints of glass panes must be connected by butt-joints sealed with a silicone sealant between the individual panes or by Noncombustible Mullions (Ref. Figure D & E)

Maximum Length of Window Assembly: Unlimited

Maximum Height of Window Assembly:

13' (3,96 m) (Ref. Figure G & H)

Maximum Distance Between Window Sprinklers:

8' (2,44 m) (Ref. Figure D & E)

Minimum Distance Between Window Sprinklers:

6' (1,83 m) (Ref. Figure D & E), unless separated by a baffle or mullion of sufficient depth to act as a baffle. (A mullion will act as a baffle, when in the case of the Pendent Vertical Sidewall, the mullion extends to the back of the sprinkler deflector, and in the case of the Horizontal Sidewall, the mullion extends to the sprinkler wrench flat)

Minimum Distance from Standard Sprinklers:

6' (1,83 m) unless separated by a baffle.

Sprinkler Location:

Mullioned Glazing Assemblies - Locate window sprinklers within each mullioned glazing segment. (Ref. Figure D)

Butt Jointed Glazing Assemblies - Locate window sprinklers on maximum 8' (2,44 m) centers. (Ref. Figure E)

Maximum Distance from Vertical Mullion:

4' (1,22 m). (Ref. Figure D)

Minimum Distance from Vertical Mullion:

4" (101,6 mm). (Ref. Figure D)

Intermediate Horizontal Mullions: Intermediate Horizontal Mullions were not tested with the window sprinkler. Their use is outside the scope of the "Specific Application" Listing for the window sprinklers. (Ref. Figure F)

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" (12,7 mm to 101,6 mm) away from the glass and 2" ±1" (50,8 mm ±25,4 mm) down from the top of exposed glass. (Ref. Figure G)

Pendent Vertical Sidewall - Locate 4" to 12" (101,6 mm to 304,8 mm) from the face of the glass and 3" ±1" (76,2 mm ±25,4 mm) down from the top of exposed glass. (Ref. Figure H)

Minimum Clearance From Face of Glass to Combustible

Materials:

All combustible materials shall be kept 2" (50,8 mm) from the front face of the glass. This can be accomplished by a 36" (914,4 mm) pony wall or any other method acceptable to the Authority Having Jurisdiction.

Escutcheon Assemblies:

The window sprinklers can be used with any metallic flush or extended escutcheon, provided the dimensions from the sprinkler deflector to the window frame and glass surface as specified in this data sheet are maintained. These sprinklers are not listed for recessed applications.

Recommended Hydraulic Requirements: The Authority Having Jurisdiction should be consulted to determine the hydraulic requirements for each installation.

Interior Protection Sprinklered Building - Identify which compartmented area has the most hydraulically demanding window sprinklers. Calculate all of the sprinklers within a compartmented area or the number of window sprinklers required to cover a combined linear length of glass equal to 1.2 x the square root of the system area of operation, whichever is greater. For example if the building design area is 1500 ft² then 1.2 x (1500 ft²)^{1/2} = 46.5 linear feet of glass or 1.2 x (139 m²)^{1/2} = 14,2 linear meters of glass. Add the window sprinkler demand to your most demanding hydraulic design area.

Interior Protection Non-Sprinklered - Calculate all the 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: The duration of the water supply must comply with the requirements of NFPA. In the event the window sprinklers are being used to provide the equivalency of a fire rating, the water supply must be capable of supplying water for the required rating period.

Minimum Flow per Sprinkler:

Spacing	Minimum Flow/Pressure
6' to 8' (1,83 m to 2,44 m)	20.0 gpm / 12.7 psi 75,7 Lpm / 0,88 bar
Less than 6' (1,83 m)	15.0 gpm / 7.0 psi 56,8 Lpm / 0,48 bar

Maximum Pressure Per Sprinkler:

Horizontal Sidewall = *70 psi (4,83 bar)

Vertical Sidewall = 175 psi (12,07 bar)

* The 70 psi is only for cold solder purposes. If there is a baffle or mullion of sufficient depth to act as a baffle, separating the sprinklers, the maximum pressure is 175 psi.

Figure 1 - Model WS, Horizontal Sidewall Specific Application Window Sprinkler

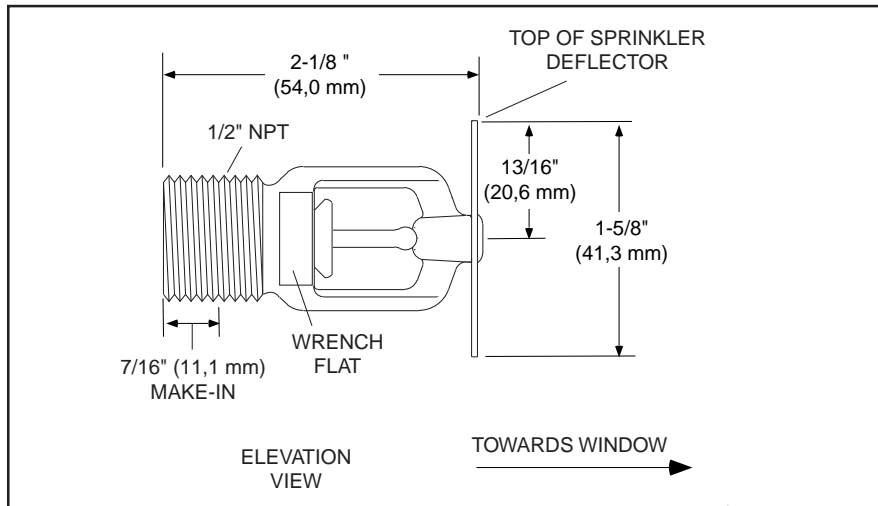


Figure 2 - Model WS, Pendent Vertical Sidewall Specific Application Window Sprinkler

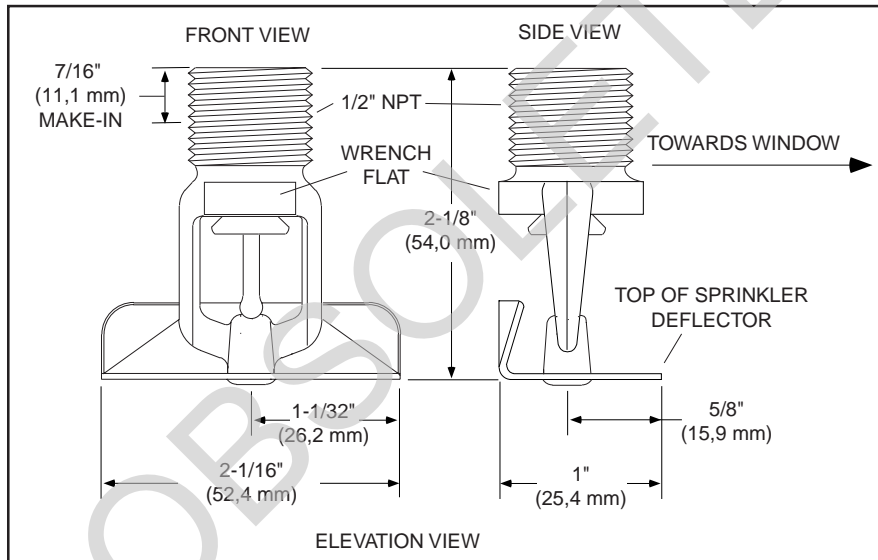
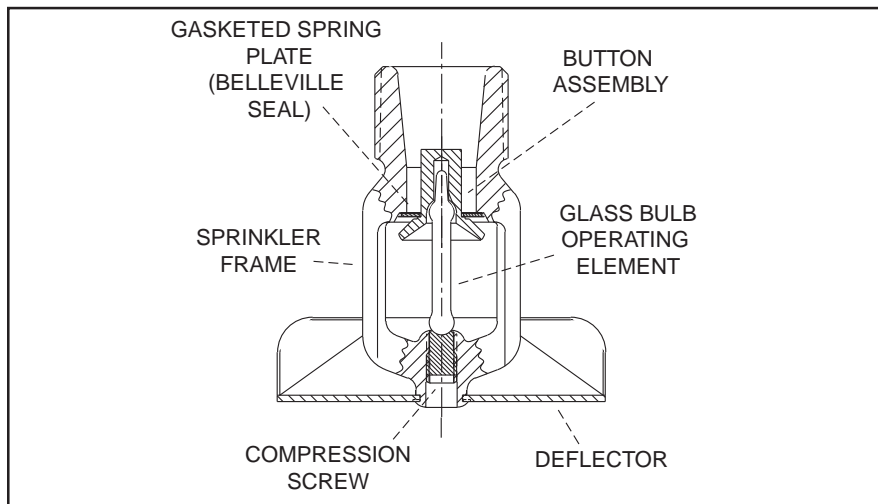


Figure 3 - Cross Section Model WS, Pendent Vertical Sidewall Specific Application Window Sprinkler





Installation

The Model WS Specific Application Window Sprinklers must be installed in accordance with the following instructions.

NOTES

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontal, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch (1,6 mm).

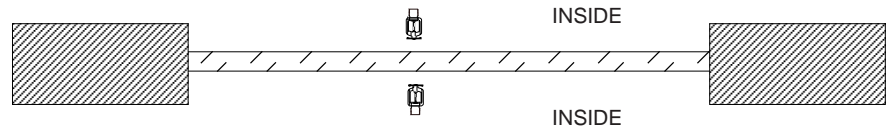
A leak tight 1/2 inch NPT sprinkler joint should be obtained with a torque of 7 to 14 ft.lbs. (9,5 to 14,0 Nm). A maximum of 21 ft.lbs. (28,5 Nm) of torque is to be used to install 1/2 inch NPT sprinklers. Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

Step 1. The pendent vertical sidewall sprinkler must be installed only in the pendent position with the centerline of the sprinkler parallel to the glass surface. The sprinkler must be orientated so that the direction of flow indicated on the sprinkler deflector is facing the window. The horizontal sidewall sprinkler must be installed only in the horizontal position with the centerline of the sprinkler perpendicular to the glass surface. The sprinkler must be orientated so that the word "Top" indicated on the sprinkler deflector is facing the top of window frame.

Step 2. With pipe thread sealant applied to the pipe threads, hand tighten the sprinkler into the sprinkler fitting.

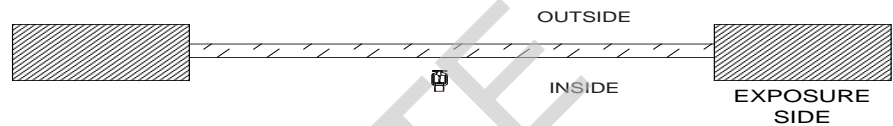
Step 3. Wrench tighten the Sprinkler using only the Combination Sprinkler Wrench (Ref. Figure 4). The Combination Sprinkler Wrench is to be applied to the Sprinkler Wrench flats only.

Figure A - Interior Fire Separation



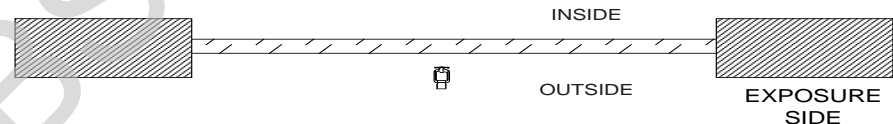
When acceptable to the Authority Having Jurisdiction the Model WS Specific Application Window Sprinklers may be used in either a sprinklered or unsprinklered building to protect nonoperable window openings that are part of a fire separation provided in an interior fire separation, the window sprinklers are installed on both sides of the window in the fire separation.

Figure B - Exterior Separation



When acceptable to the Authority Having Jurisdiction the Model WS Specific Application Window Sprinklers may be used in either a sprinklered or unsprinklered building to protect nonoperable 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 building

Figure C - Exterior Separation

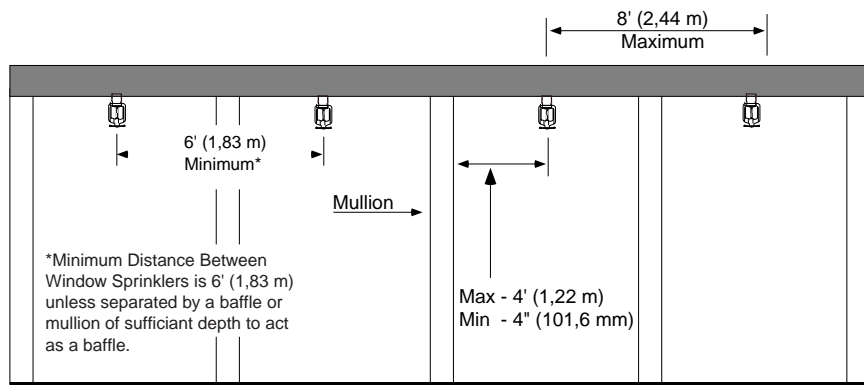


When acceptable to the Authority Having Jurisdiction the Model WS Specific Application Window Sprinklers may be used in either a sprinklered or unsprinklered building to protect nonoperable window openings that are part of a fire separation provided in jurisdictions where exterior spatial separation is defined as protecting your building from a fire in an adjacent building, open window sprinklers are installed on the exterior side of the building

Figure 4 - Combination Sprinkler Wrench (Part #1106)

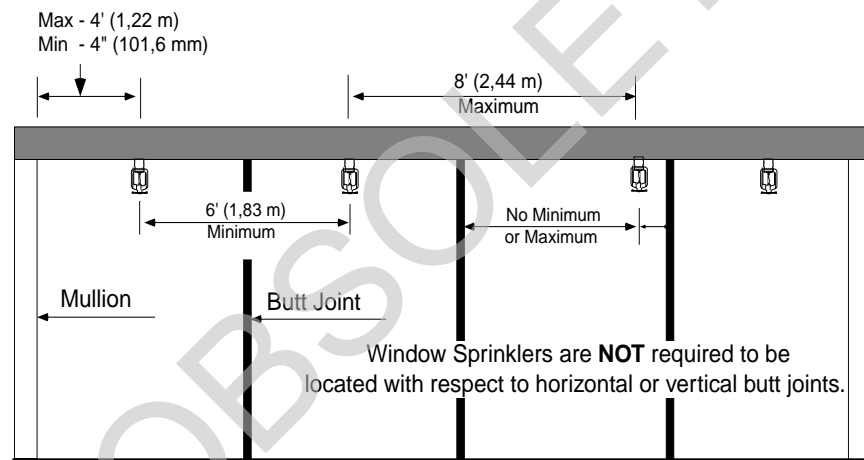


Figure D - Multiple Windows Separated by Mullions



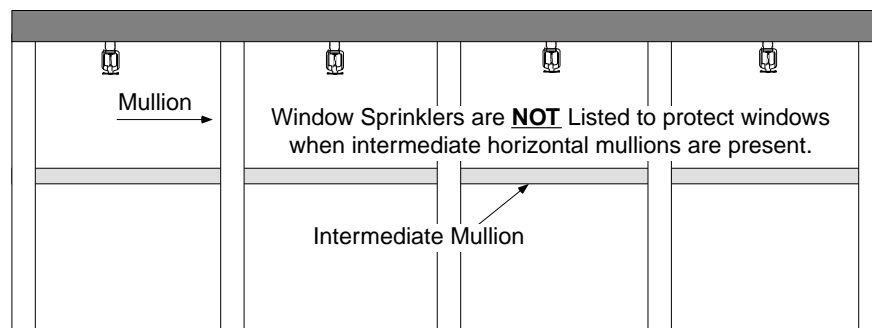
(Pendent Vertical Sidewall Sprinklers show for clarity)

Figure E - Multiple Windows Separated by Butt Joints



(Pendent Vertical Sidewall Sprinklers show for clarity)

Figure F - Windows with Horizontal Mullions



(Pendent Vertical Sidewall Sprinklers show for clarity)



Care & Maintenance

The Model WS Specific Application Window Sprinklers must be maintained and serviced in accordance with the following instructions.

NOTES

Before closing a fire protection system main control valve for maintenance work on the fire protection system it controls, permission to shut down the affected fire protection systems must be obtained from the proper authorities. All personnel who may be affected by this action must be notified.

Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be shipped or stored where their temperatures will exceed 100°F/38°C and they must never be painted, plated, coated or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage - before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb (ref. Installation Section).

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any other authorities having jurisdiction. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service.

Figure F
WS™ Horizontal Sidewall

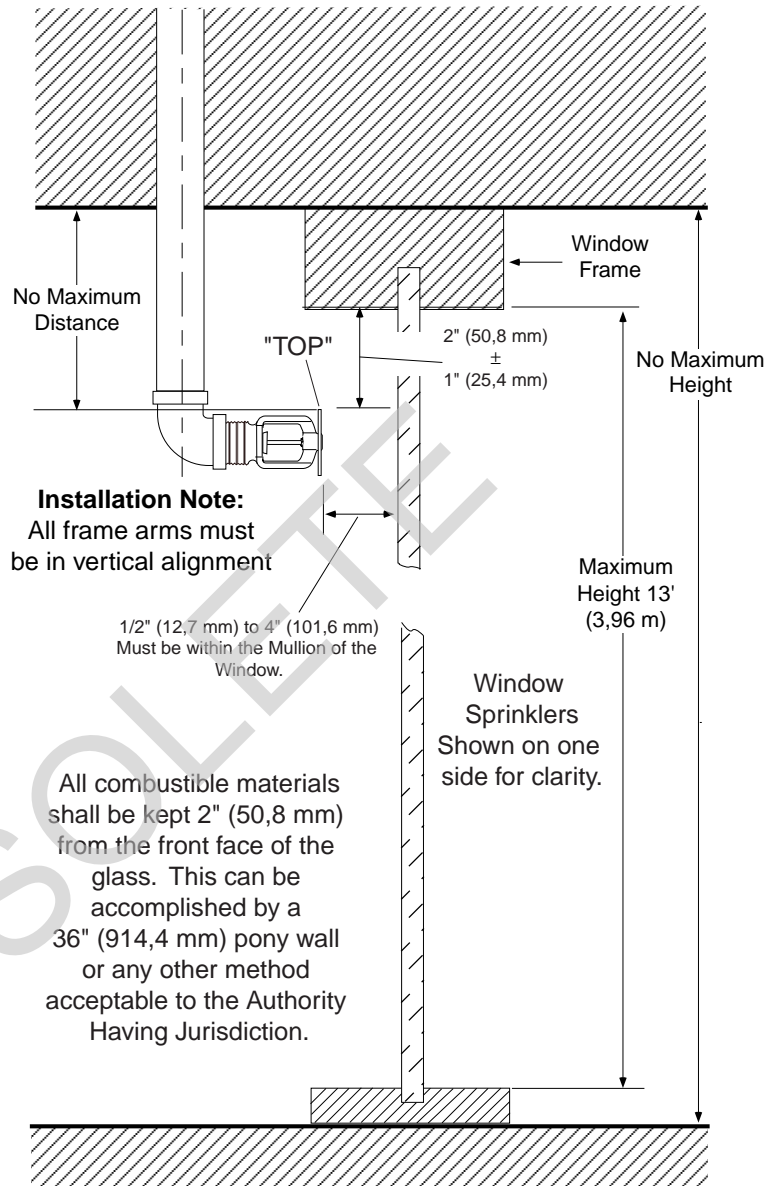
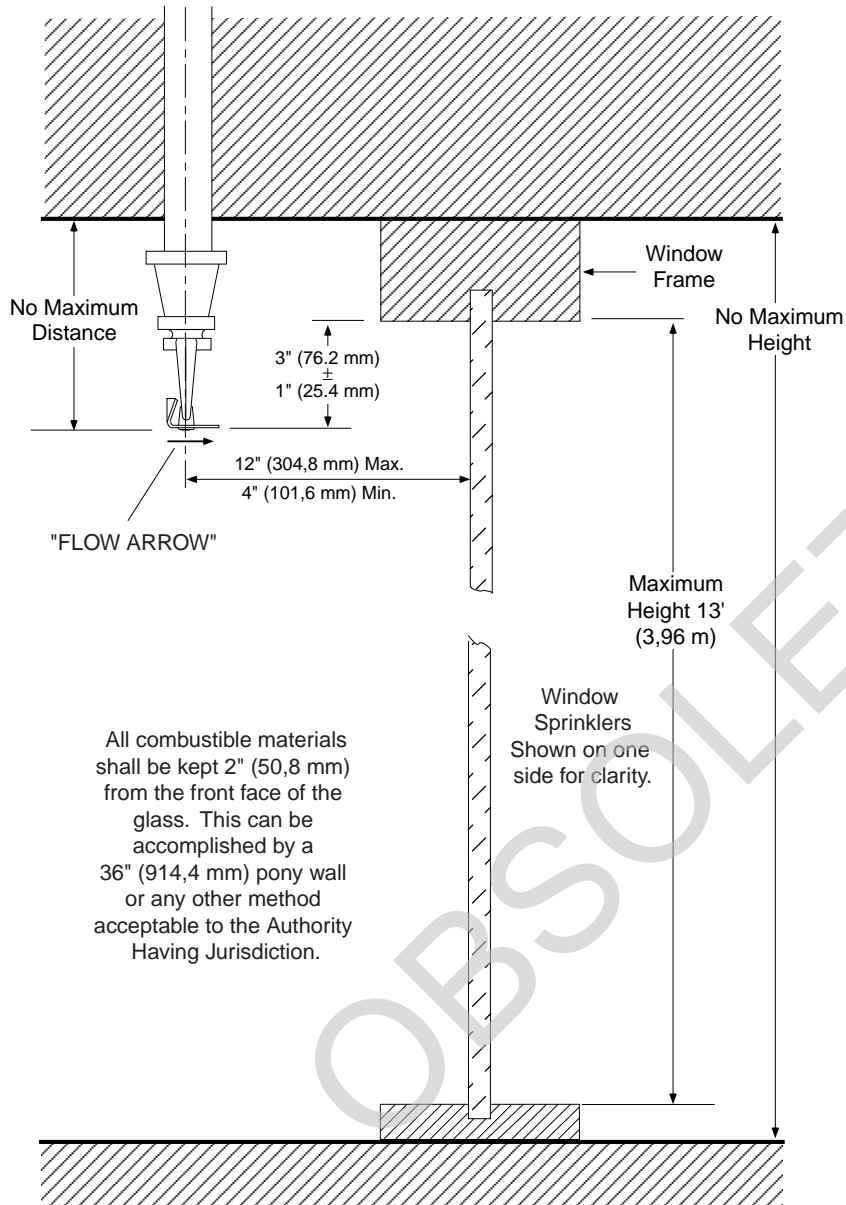


Figure G
WS™ Pendent Vertical Sidewall Sprinkler



Limited Warranty

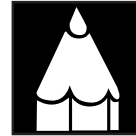
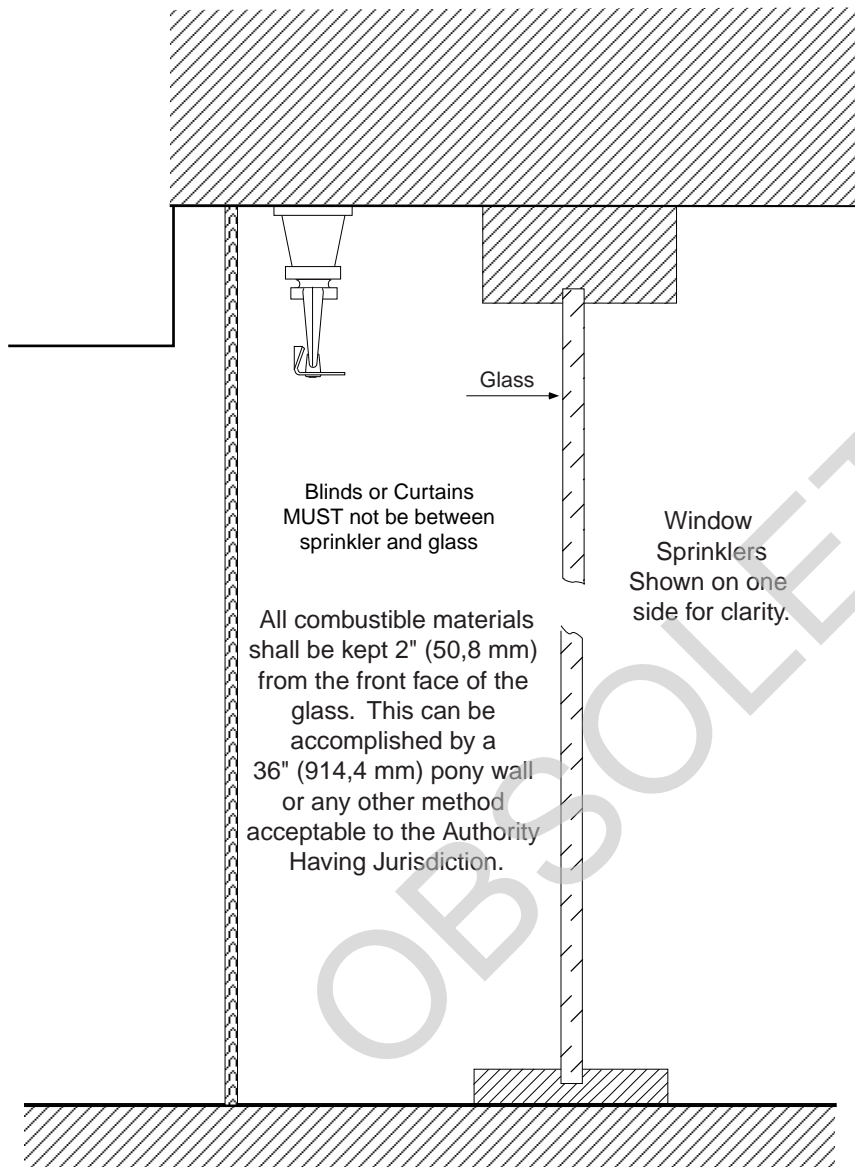
Products manufactured by Tyco Fire Products are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by Tyco Fire Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire Products or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by Tyco Fire Products to be defective shall be either repaired or replaced, at Tyco Fire Products' sole option. Tyco Fire Products neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. Tyco Fire Products shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

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THE FOREGOING WARRANTY IS MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Figure H Recessed Ceiling Condition

Pendent Vertical and Horizontal Sidewall Window Sprinklers can be installed into recessed ceiling spaces. Curtains, blinds or other window coverings are **NOT** to be located between the sprinkler and the window.



Ordering Information

Ordering Information: When placing an order, indicate the full product name. Please specify the quantity, model, style, orifice size, temperature rating, type of finish or coating, and sprinkler wrench. Refer to price list for complete listing of Part Numbers.

Patents: Patents are pending.

Teflon is a trademark of the DuPont Corp.