



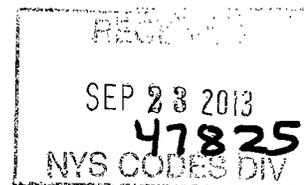
## CITY OF ITHACA

108 East Green Street Ithaca, New York 14850-5690

BUILDING DEPARTMENT

Telephone: 607/274-6508 Fax: 607/274-6521

September 17, 2013



Department of State  
Division of Code Enforcement and Administration  
c/o Chairman George Maney, Capital Region – Syracuse Board of Review  
One commerce Plaza  
99 Washington Avenue  
Albany, New York 12231-0001

Dear Chairman Maney,

I received the decision from the Capital Region – Syracuse Board of Review for Petition No. 2013-0250 regarding Milstein Hall at Cornell University. In the determinations there was particular information required of the City of Ithaca.

Here is the requested information:

Determination #2 that the items identified in the report by Dominic Marinelli of Accessibility Services be corrected. Please note that the report by Dominic Marinelli of Accessibility Services January 6, 2012 was done prior to the Certificate of Occupancy being issued and all corrections identified in the report were made prior to the issuance of the Certificate of Occupancy February 24, 2012. The Certificate of Occupancy was not issued until all the corrections were completed.

Determination #3 required a submission from the City of Ithaca of the ICC Evaluation Services Report for the TYCO WS sprinkler heads used for the windows in the fire separation between Milstein Hall and Sibley Hall. Enclosed please find the ICC Evaluation Services Legacy Report NER-516. Please note that Page 8 of 8 of the TYCO specifications allows blinds, curtains or other window coverings as long as they are not located between the sprinkler head and the protected glazing. This is the situation at the Milstein Hall/Sibley Hall fire separation. The TYCO WS sprinkler heads were installed per the TYCO specifications.

If you have any questions, please contact me.

Sincerely,

Michael Niechwiadowicz  
Acting Building Commissioner  
City of Ithaca Building Division





ICC Evaluation Service, Inc.  
www.icc-es.org

Business/Regional Office • 5320 Workmen Mill Road, Whittier, California 90601 • (562) 699-0543  
Regional Office • 930 Montclair Road, Suite A, Birmingham, Alabama 35213 • (205) 599-9500  
Regional Office • 4051 West Floessmoor Road, Country Club Hills, Illinois 60178 • (708) 799-2305

Legacy report on the 2000 International Building Code®, the 2000 International Residential Code® and the 2002 Accumulative Supplement to the International Codes™, the BOCA® National Building Code/1999, the 1999 Standard Building Code®, the 1997 Uniform Building Code™ and the 1998 International One- and Two-Family Dwelling Code®

DIVISION 13—SPECIAL CONSTRUCTION  
Section 13930—Wet-Pipe Fire Suppression Sprinklers

EVALUATION SUBJECT:

TYCO Fire Products (TFP)/Central Sprinkler Company (Csc) Window Sprinkler™ Model WS™, 1/2-inch Orifice Quick Response Vertical and Horizontal Sidewall Sprinklers SIN TY3388, TY3488, C3388 and C3488

REPORT HOLDER:

TYCO FIRE PRODUCTS RESEARCH AND DEVELOPMENT  
1467 ELMWOOD AVENUE  
CRANSTON, RHODE ISLAND 02910  
www.tycoflow.com

1.0 SUBJECT

Automatic sprinkler system for glazing assemblies located in interior non-load-bearing fire barrier assemblies or exterior walls which are installed to establish a fire-resistance rating.

2.0 PROPERTY FOR WHICH EVALUATION IS SOUGHT

2.1 Alternative materials, design and method of construction and equipment

2.2 Fire-resistance rating

3.0 DESCRIPTION

3.1 General

The Central Window Sprinkler™ Model WS™ sprinklers are designed to wet the entire surface of a glass non-load-bearing walls assembly in order to provide the fire-resistance rating. The sprinklers shall be located on the inside of the glazing assembly located in exterior walls required to be rated for protection and on both sides of an interior non-load-bearing fire barrier assembly. See Conditions Of Use section 7.5 for exterior wall applications.

The sprinklers are used to achieve a 2 hour fire-resistance rating for interior and exterior non-load-bearing walls comprised of 1/2-inch (6.4 mm) thick or greater heat strengthened glass or tempered glass in a noncombustible frame. The fire-resistance rating was tested in accordance with a modified version of ASTM E 119 described in Section 6.1.

3.2 TFP/CSC Model WS™ Sprinkler Head

The TFP/CSC Model WS™ Sprinkler Head is manufactured for two different orientations. The first type, illustrated in Figure 1 is a horizontal sidewall that is designed to face the window assembly horizontally. The second type, illustrated in Figure 2 is a pendent vertical sidewall that is designed to face the window assembly vertically. The Model WS is a quick response sprinkler head that releases once the ambient temperature reaches either 155 or 200° F (68 or 93° C), depending on which rated sprinkler head is installed. The sprinkler heads have an orifice and thread size of 1/2 inch (12.7 mm).

3.3 Glass Fire Barrier Assembly

The glass used within the assembly shall be single or double glazed, nominal 1/2-inch (6.4 mm) thick or greater, heat strengthened glass or tempered glass manufactured in accordance with ASTM C 1048 or Federal Specification DD-G-1403B. The glass component of the wall assembly shall have a maximum height of 13 feet (3965 mm) with an unlimited horizontal span. The glass assembly shall be retained by a noncombustible frame with a standard molded EPDM rubber gasket serving as the seal. Glass panes that are connected by built-joints shall be sealed with a silicone construction sealant between the individual panes or by an aluminum mullion.

4.0 INSTALLATION

4.1 Sprinkler Orientation

When locating the TFP/CSC Model WS horizontal sidewall, the deflector shall be placed within the outside edge of the window frame from 1/2 to 4 inches (12.7 to 102 mm) away from the glass and 2 to 4 inches (51 to 102 mm) down from the top of the noncombustible frame as shown in Figure 1. The TFP/CSC Model WS vertical sidewall shall be located 4 to 12 inches (102 to 305 mm) from the face of the glass and 2 to 4 inches (51 to 102 mm) down from the top of the noncombustible frame as shown in Figure 2. All combustible materials shall be kept 2 inches (51 mm) from the face of the glass. This can be accomplished by a 36-inch (914 mm) pony wall. The use of alternate methods of maintaining clearance to combustibles is outside the scope of this report (See Condition of Use 7.8).

The maximum distance between window sprinklers shall be 6 feet (2440 mm) center to center. The minimum distance shall be 6 feet (1830 mm) unless the sprinklers are separated by a

\*Revised June 1, 2006

ICC Legacy reports are a non-exclusive representation of the facts in any other documents and specifically do not constitute an endorsement of the subject of the report or a recommendation to its use. There is no warranty by ICC Evaluation Service, Inc. expressed or implied as to any findings or other matters in this report, or as to any product covered by the report.



vertical mullion which acts as a baffle between sprinkler heads. The maximum distance maintained between the sprinkler head and the mullion shall be half the distance required between sprinklers.

4.2 Hydraulic Requirements

The code official is to be consulted to determine the hydraulic requirements for each installation.

4.2.1 Interior Protection- Sprinklered Building: Identify which compartmented area has the most hydraulically demanding window sprinklers. Calculate the most demanding 46.5 linear feet of WS window sprinklers. 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 sq. ft. (in accordance with NFPA 13 Light/Ordinary Hazard density curves).

If an area reduction for quick response sprinklers is being 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 WS 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 hydraulically prove the simultaneous operation of the WS window sprinklers and the ceiling sprinklers adjacent to the WS window sprinklers.

4.2.2 Interior Protection - Non-Sprinklered Building: Calculate all the sprinklers on the most demanding side of the glazing assembly within the enclosure.

4.2.3 Exterior Exposure Protection: Calculate all sprinklers controlled by the deluge valve using the design requirements of NFPA.

4.3 Other Documentation

Installation shall comply with this report and a copy of this report shall be available at all times on the job site during installation. Additional details are in the TYCO Fire Products, Technical Data Sheet #TFP620, printed July 2005.

5.0 IDENTIFICATION

All TFP/CSC Window Sprinkler™ Model WS™ sprinklers shall bear a label identifying the manufacturer's name, the product name and the name of the testing agency, UL Testing Laboratories Inc. and this report number NER-516 for field identification.

6.0 EVIDENCE SUBMITTED

6.1 Test report File EX633, Project 94NK27353, August 22, 1995, Underwriters Laboratories Inc., in accordance with ASTM E 119.

As a part of the testing, test furnace calibration tests were conducted to establish a natural gas flow rate curve required to generate a time-temperature relationship as specified in ASTM E 119 with a gypsum wall assembly installed in the location where the window was intended to be installed with no sprinklers discharging water. The fire tests conducted to investigate the ability of the sprinkler to protect the window utilized the same natural gas flow conditions that were established during the calibration test. While the gas flow conditions were the same, operation of the sprinklers onto the window prevented the temperature from reaching the limits of the ASTM E 119 temperature curve within the test chamber.

6.2 Manufacturer's installation literature; TYCO Technical Data Sheet #TFP620, printed 8-03.

6.3 Letter report from Donald J. Boehmer, P.E., December 4, 1995, considering design criteria for the rated assembly.

6.4 UL Directory, Fire Protection Equipment 1998.

6.5 Letter from Underwriters Laboratories Inc., dated July 3, 2002, indicating that it is acceptable to install the specific application window sprinkler, TFP/CSC Model WS (SIN C3388, C3488, TY3388 and TY 3488), with double-glazing.

7.0 CONDITIONS OF USE

The ICC-ES Subcommittee for the National Evaluation Service finds that the TFP/CSC Window Sprinkler™ Model WS™ as described in this report complies with or is a suitable alternative to that specified in the 2000 *International Building Code*®, the 2000 *International Residential Code*®, the 2002 *Accumulative Supplement to the International Codes*™, the BOCA® *National Building Code/1999*, the 1999 *Standard Building Code*®, the 1997 *Uniform Building Code*™ and the 1998 *International One- and Two-Family Dwelling Code*®, subject to the following conditions:

7.1 Products shall be installed in accordance with this report and the manufacturer's installation instructions as specified in this report. The instructions within this report govern if there are any conflicts between the manufacturer's instructions and this report.

7.2 Hydraulic calculations shall show a maximum pressure of 175 psi (1207 kPa) on the vertical sidewall sprinkler heads and horizontal sidewall sprinkler heads separated by a vertical mullion. The hydraulic calculation shall show a maximum pressure of 70 psi (483 kPa) for horizontal sidewall sprinkler heads that are not separated by a vertical mullion which acts as a baffle between sprinkler heads shall be shown.

7.3 The glazing assembly shall not have intermediate horizontal mullions.

7.4 The glazing shall not be used in locations that contain materials that represent explosion or detonation hazards.

7.5 In jurisdictions that have adopted the 2000 *International Building Code*® and the 2002 *Accumulative Supplement to the International Codes*™, BOCA® *National Building Code/1999* and the 1999 *Standard Building Code*®, the TFP/CSC Window Sprinkler™ Model WS™ shall not be used to achieve a fire-resistance rating on glazing assemblies within exterior walls that have a horizontal fire separation distance of less than 5 feet (1525 mm) (the distance from a common property line or assumed property line).

1007  
 30' to  
 2100' min  
 103 min  
 5-0/10'

In jurisdictions that have adopted the 2000 *International Residential Code*® with the 2002 *Accumulative Supplement to the International Codes*™ and the 1998 *International One- and Two-Family Dwelling Code*®, the TFP/CSC Window Sprinkler™ Model WS™ shall not be used to achieve a fire-resistance rating on glazing assemblies within exterior walls that have a horizontal fire separation distance of less than 3 feet (915 mm) (the distance from a common property line or assumed property line).

In jurisdictions that have adopted the 1997 *Uniform Building Code*™, the TFP/CSC Window Sprinkler™ Model WS™ shall not be used to achieve a fire-resistive rating in exterior walls.

7.6 System piping shall be designed, sized and installed in accordance with NFPA 13.

7.7 Glazing Assemblies that incorporate other than wet-type sprinkler systems or load-bearing assemblies are outside the scope of this report.

7.8 All combustible materials shall be kept 2 inches (51 mm) from the face of the glass. This can be accomplished by a 36-inch (914 mm) pony wall.

The evaluation of the use of alternative methods to the pony wall described in this report to maintain a minimum 2-inch (51 mm) clearance of combustibles from the face of the assembly is outside the scope of this evaluation. The use of an alternative method shall be subjected to specific approval by the authority having jurisdiction and evidence supporting the alternative construction shall be submitted to the code official with the application for permit.

7.9 The automatic water supply shall have the capability to supply water to the assembly for a time not less than the rating of the assembly. The maximum fire-resistance rating shall not exceed 2 hours.

7.10 This report is subject to periodic re-examination. For information on the current status of this report contact the ICC-ES.

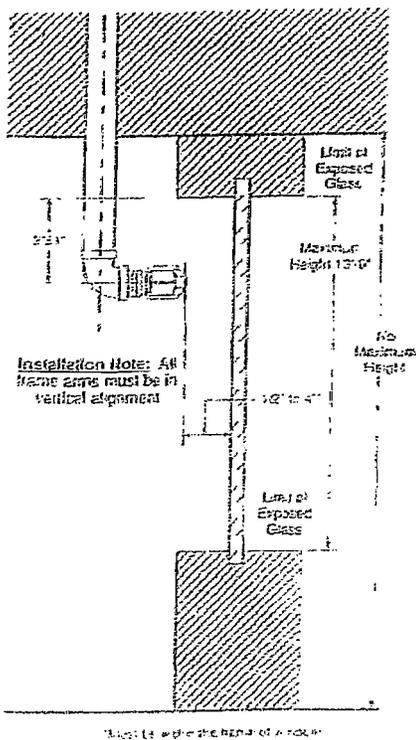


FIGURE 1  
WS™ HORIZONTAL SIDEWALL  
SPRINKLER INSTALLATION

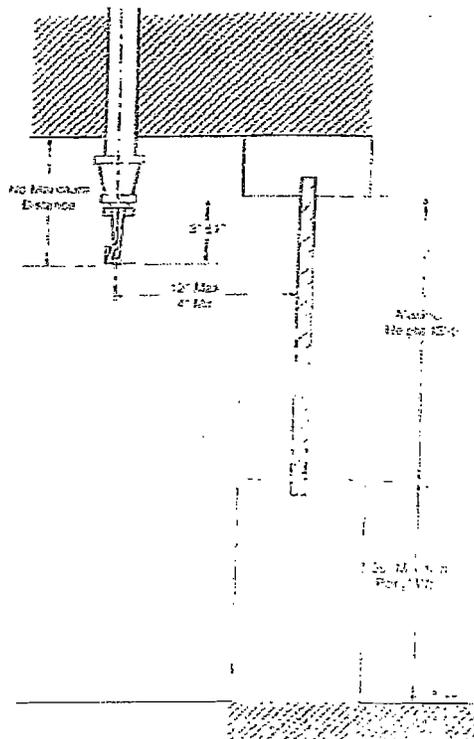


FIGURE 2  
WS™ PENDENT VERTICAL SIDEWALL  
SPRINKLER INSTALLATION

THESE DRAWINGS ARE FOR ILLUSTRATION PURPOSES ONLY. THEY ARE NOT INTENDED FOR USE AS CONSTRUCTION DOCUMENTS FOR THE PURPOSE OF DESIGN, FABRICATION OR ERECTION.

# tyco / Fire & Building Products

Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500

## Model WS™ — 5.6 K-factor Specific Application Window Sprinklers, Horizontal and Pendent Vertical Sidewall

### General Description

The Model WS, 5.6 K-factor, Horizontal Sidewall and Pendent Vertical Sidewall, Specific Application Window Sprinklers are fast 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 Win-

dow 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. ICC Evaluation Service, Underwriters Laboratories of Canada (ULC), or Building Materials Evaluation Commission (BMEC) guidelines apply. consult the specific approval report.

#### WARNING

*The Model WS Specific Application Window Sprinklers described herein must be installed and 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 performance of these devices.*

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

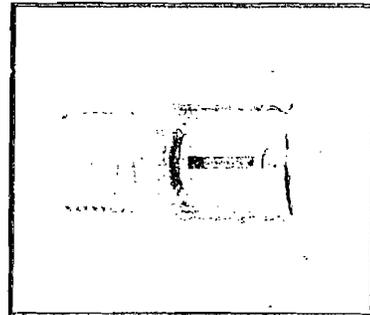
### Sprinkler Identification Number

TY3388 - Horizontal Sidewall  
TY3488 - Pendent Vertical Sidewall

TY3388 is a redesignation for C3388.  
TY3488 is a redesignation for C3488.

#### IMPORTANT

*Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.*



# Technical Data

## Approvals

UL, C-UL, and ULC Listed.  
 NYC under MEA 289-04-E.  
 (The approvals only apply to the service conditions indicated in the Design Criteria section.)

## Additional Recognition

- ICC Evaluation Service (ICC-ES Legacy Report NER-516)
- Building Materials Evaluation Commission (BMEC 01-11-263)

## Pipe Thread Connection

1/2 inch NPT

## Discharge Coefficient

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

## Temperature Rating

155°F/68°C & 200°F/93°C

## Finish

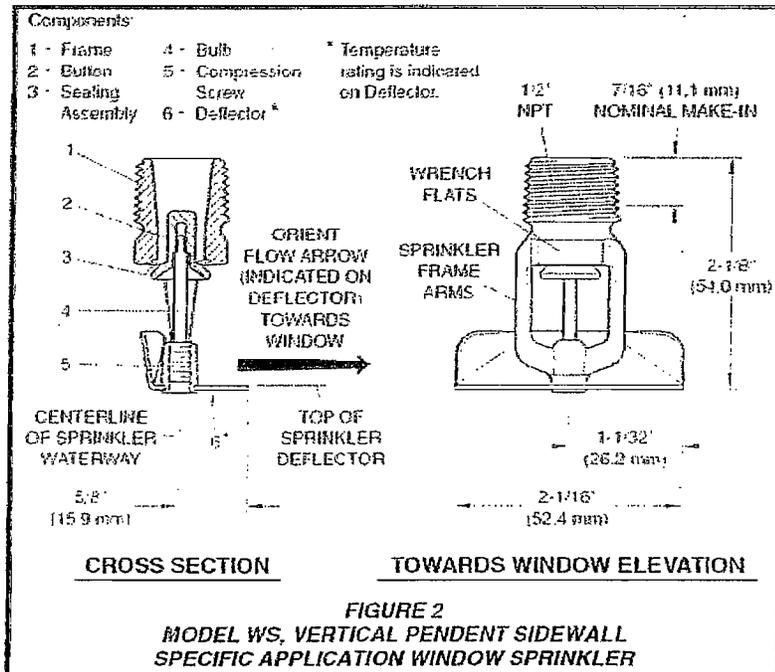
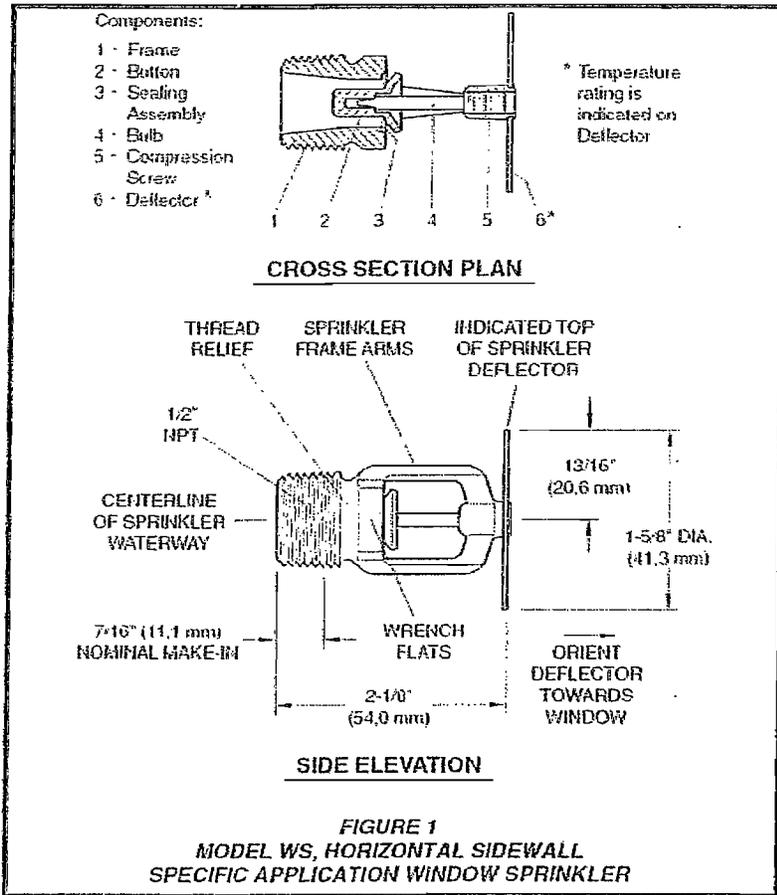
Polyster Coated, Chrome Plated, or Natural Brass

## Physical Characteristics

|                   |                            |
|-------------------|----------------------------|
| Frame             | Brass                      |
| Button            | Bronze/Copper              |
| Sealing Assembly  | Beryllium Nickel w/Teflon† |
| Bulb              | Glass (3 mm dia.)          |
| Compression Screw | Brass                      |
| Deflector         | Brass/Bronze               |

† DuPont Registered Trademark

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, allowing the sprinkler to activate and water to flow.



## Design Criteria

The Model WS Window Sprinklers are listed by UL and C-UL, and NYC Approved (MEA 335-01-E) for use as a "Specific Application Window Sprinkler" and as open sprinklers for "Outside" use. These sprinklers are also recognized by the International Code Council Evaluation Service, Underwriters Laboratories of Canada (ULC), and the Building Materials Evaluation Commission (BMEC) for use in the Province of Ontario, Canada as providing a two-hour equivalency for a fire separation assembly, when installed in accordance with the NES Report (NER 516), ULC/ORD-C263.1 Appendix A, and BMEC Report (01-11-263).

### NOTE

NER 516 can be obtained at [www.icc-es.org](http://www.icc-es.org). ULC/ORD-C263.1 Appendix A and BMEC 01-11-263 may 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 3A-1).

b) in jurisdictions where exterior spatial separation (i.e., separation from adjacent space) 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 3A-2), or

c) in jurisdictions where exterior spatial separation is defined as protecting your building from a fire in an adjacent building (i.e., exposure protection), open window sprinklers are installed on the exterior side of the building (Ref. Figure 3A-3).

### System Type:

Interior Protection - Wet Systems.

Outside Exposure Protection - Deluge.

### Glass Type:

Non-operable, heat-strengthened, tempered, single-glazed (single pane); non-operable heat-strengthened, tempered, double-glazed (double pane or insulated); or, non-operable, stronger glass window assemblies. In all three cases, each individual pane of the window assembly is to be minimum .6 mm (.024") 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 3B-1 & 3B-2).

### Maximum Length Of Window Assembly:

Unlimited.

### Maximum Height Of Window Assembly:

13' (3.96 m) (Ref. Figure 3C & 3D).

### Maximum Distance Between Window Sprinklers:

8' (2.44 m) (Ref. Figure 3B-1 & 3B-2).

### Minimum Distance Between Window Sprinklers:

6" (1.53 m) (Ref. Figure 3B-1 & 3B-2), 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 Pendant Vertical Sidelwall, the mullion extends to the back of the sprinkler deflector, and in the case of the Horizontal Sidelwall, the mullion extends to the sprinkler wrench flat.)

### Minimum Distance From Standard Sprinklers:

6" (1.53 m) unless separated by a baffle.

### Sprinkler Location:

Mullioned Glazing Assemblies - Locate window sprinklers within each mullioned glazing segment (Ref. Figure 3B-1).

Butt Jointed Glazing Assemblies - Locate window sprinklers on maximum 8' (2.44 m) centers (Ref. Figure 3B-2).

### Maximum Distance From Vertical Mullion:

4' (1.22 m) (Ref. Figure 3B-1).

### Minimum Distance From Vertical Mullions:

4" (101.6 mm) (Ref. Figure 3B-1).

### 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 3B-3).

### 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 Sidelwall - 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 3C).

Pendant Vertical Sidelwall - 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 3D).

### 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 minimum 36" (914.4 mm) pony wall or 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 ft<sup>2</sup> then  $1.2 \times (1500 \text{ ft}^2)^{1/2} = 46.5$  linear feet of glass or  $1.2 \times (139 \text{ m}^2)^{1/2} = 14.2$  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:

20 GPM (75.7 LPM) for sprinkler spacing of 6 to 8 ft (1.83 to 2.44 m) or 15 GPM (56.8 mLPM) for sprinkler spacing less than 6 ft (1.83 m).

### Maximum Pressure Per Sprinkler:

Horizontal Sidelwall = 70" psi (4.83 bar)

Vertical Sidelwall = 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.

# 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 horizontally, 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 19.0 Nm). A maximum of 20 ft.lbs. (28.5 Nm) of torque is to be used to install 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 W-Type 20 (End A) Sprinkler Wrench (Ref. Figure 4). The W-Type 20 (End A) Sprinkler Wrench is to be applied to the Sprinkler Wrench flats only.

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 in an interior fire separation, the window sprinklers are installed on both sides of the window in the fire separation

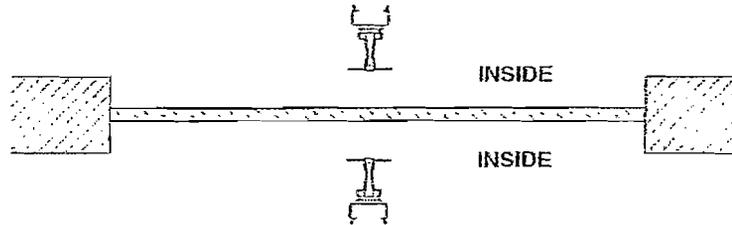


FIGURE 3A-1 — INTERIOR FIRE SEPARATION

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 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.

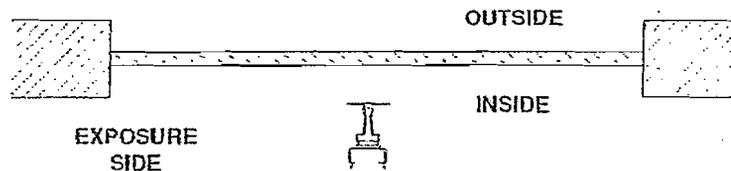


FIGURE 3A-2 — EXTERIOR FIRE SEPARATION — SPRINKLERS INSIDE

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 glass.

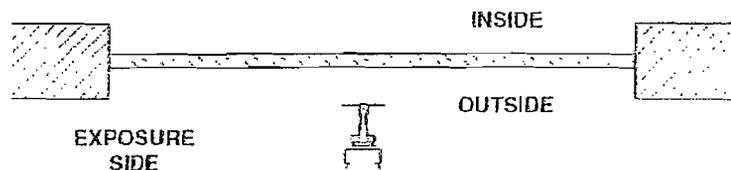
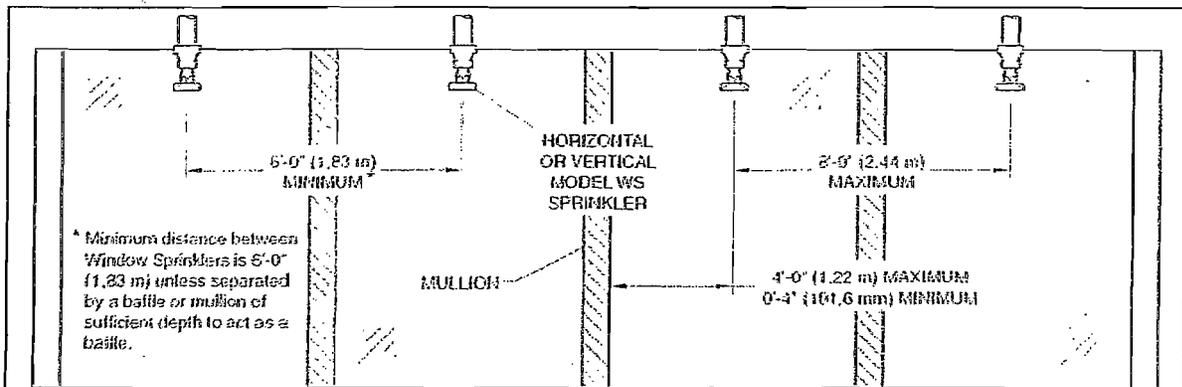


FIGURE 3A-3 — EXTERIOR FIRE SEPARATION — SPRINKLERS OUTSIDE

FIGURE 3A  
TYPICAL NONOPERABLE WINDOW OPENINGS



A Window Sprinkler must be provided at each window glazing segment, regardless of width of segment. If segment is less than 6'-0" a baffle or mullion to act as a baffle must be provided

FIGURE 3B-1 — MULTIPLE WINDOWS SEPARATED BY MULLIONS

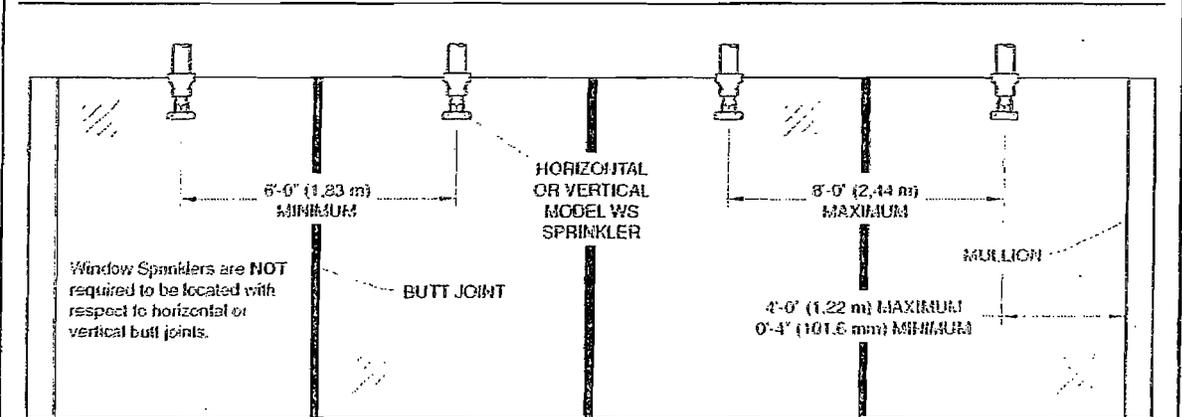


FIGURE 3B-2 — MULTIPLE WINDOWS SEPARATED BY BUTT JOINTS

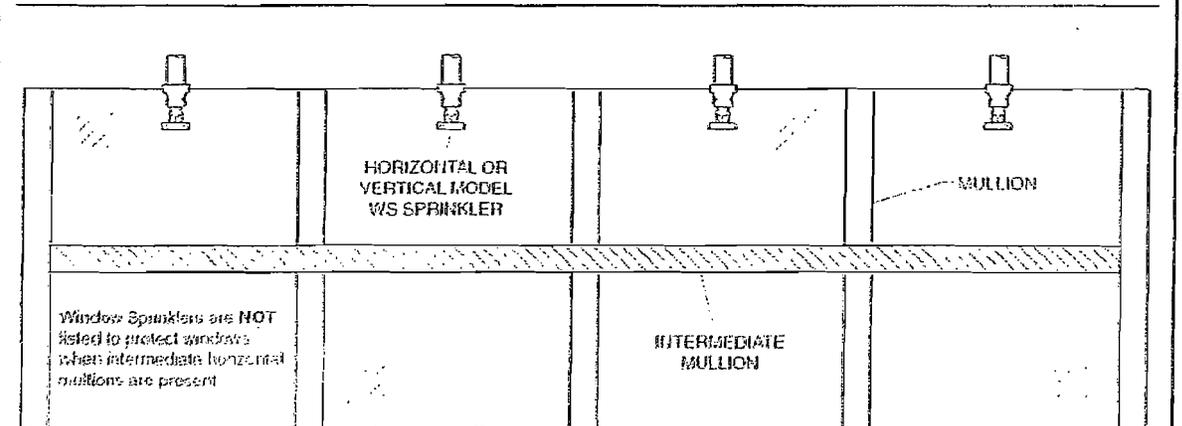
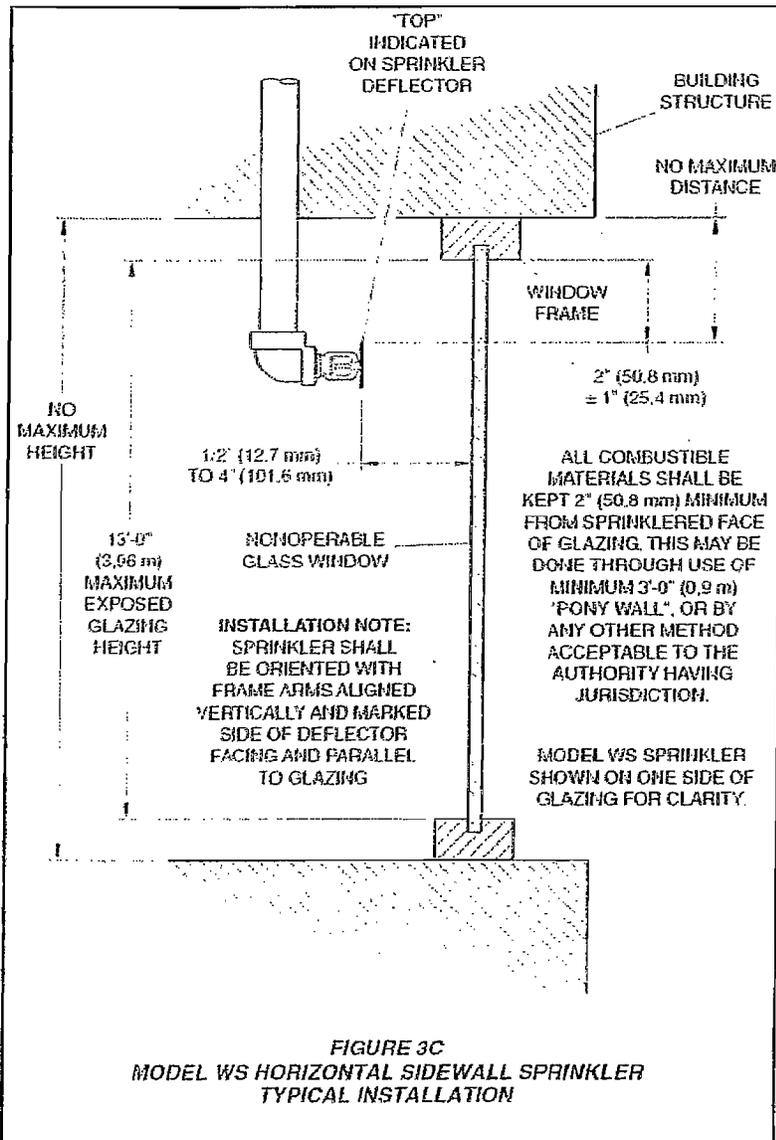


Figure 3B-3 — WINDOWS WITH HORIZONTAL MULLIONS

FIGURE 3B  
WINDOW MULLIONS AND BUTT JOINTS



## Care and Maintenance

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

### NOTE

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

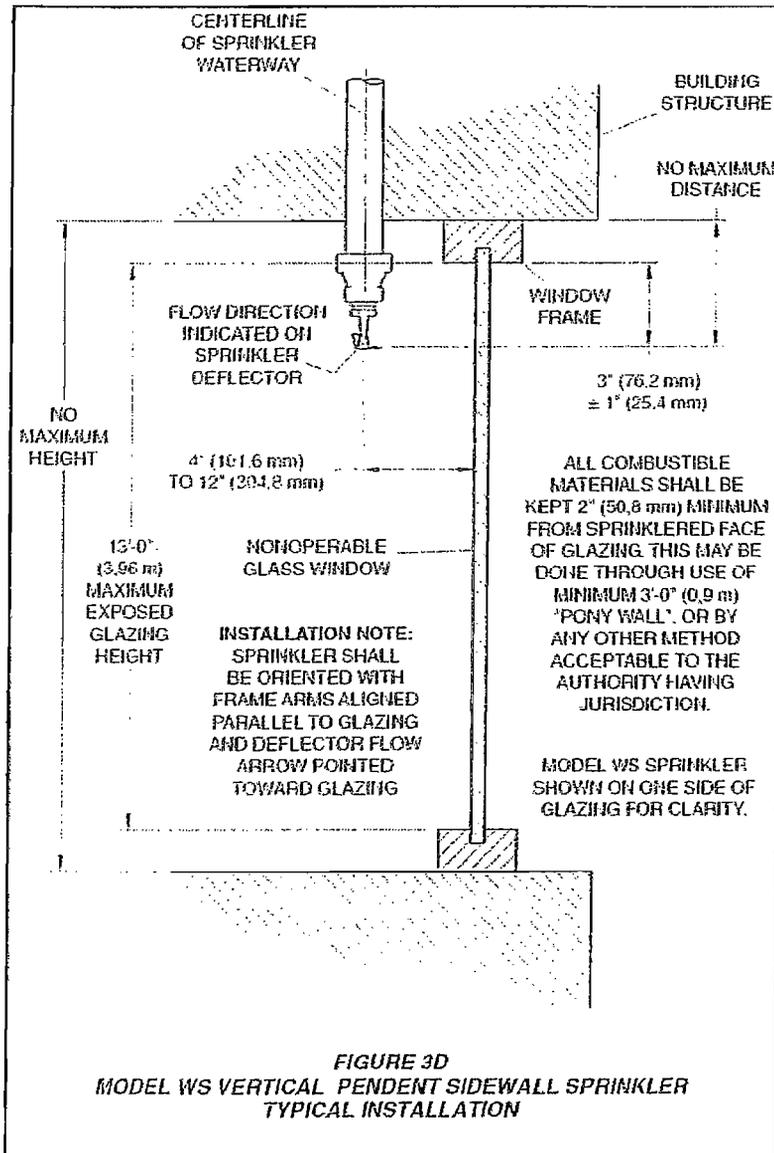
Sprinklers that are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers 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 to the sprinklers - 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 in accordance with local requirements and/or national codes.

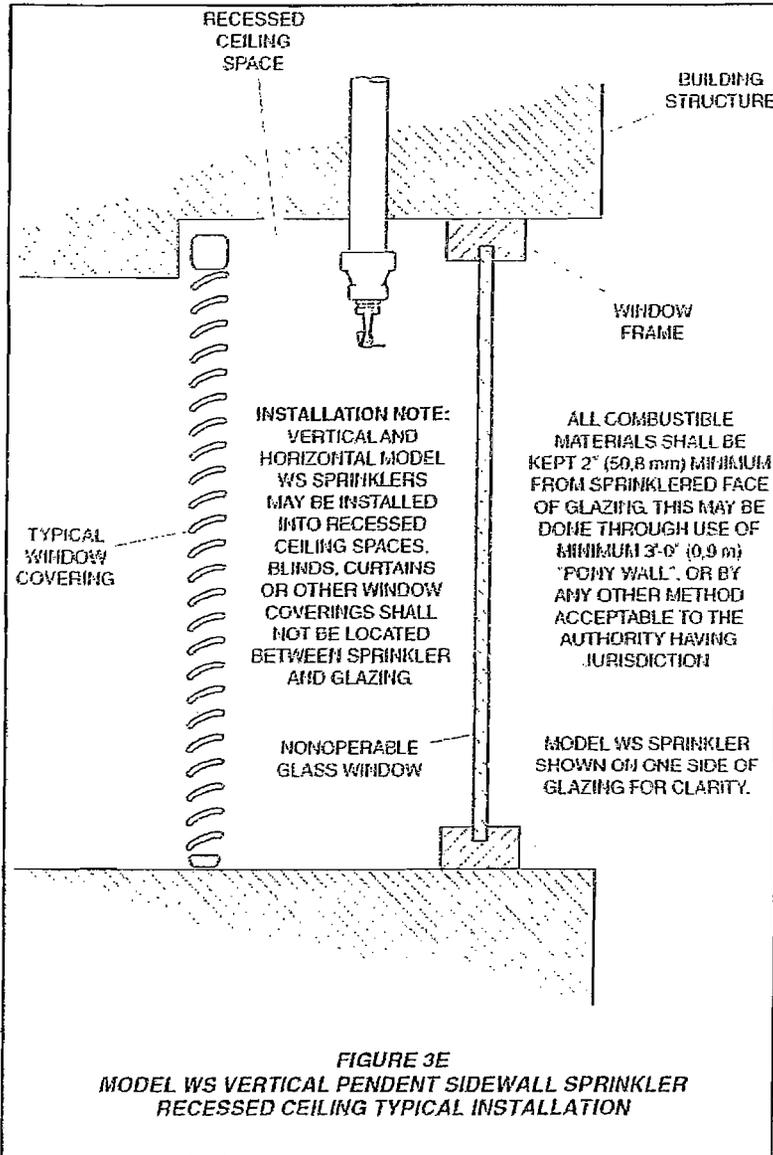


## Limited Warranty

Products manufactured by Tyco Fire & Building 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 & Building Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire & Building 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 & Building Products to be defective shall be either repaired or replaced, at Tyco Fire & Building Products' sole option. Tyco Fire & Building 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 & Building Products shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

IN NO EVENT SHALL TYCO FIRE & BUILDING PRODUCTS BE LIABLE, IN CONTRACT, TORT, STRICT LIABILITY OR UNDER ANY OTHER LEGAL THEORY, FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LABOR CHARGES, REGARDLESS OF WHETHER TYCO FIRE & BUILDING PRODUCTS WAS INFORMED ABOUT THE POSSIBILITY OF SUCH DAMAGES, AND IN NO EVENT SHALL TYCO FIRE & BUILDING PRODUCTS' LIABILITY EXCEED AN AMOUNT EQUAL TO THE SALES PRICE.

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.



## Ordering Procedure

Contact your local distributor for availability.

### Sprinkler Assemblies with NPT Thread Connections:

Specify: Model WS. (Specify SIM), (specify Horizontal or Vertical Pendent) Specific Application Window Sprinkler, with (specify temperature rating), (specify finish), P/N (specify).

#### WS (TY3388) Horizontal Sidewall Window Sprinkler

|   |                  |
|---|------------------|
| 155 F/68 C,<br>Natural Brass . . . . .  | P/N 50-305-1-155 |
| 155 F/68 C,<br>Chrome Plated . . . . .  | P/N 50-305-9-155 |
| 155 F/68 C,<br>White Coated . . . . .   | P/N 50-305-4-155 |
| 155 F/68 C,<br>White RAL9010* . . . . . | P/N 50-305-3-155 |
| 200 F/93 C,<br>Natural Brass . . . . .  | P/N 50-305-1-200 |
| 200 F/93 C,<br>Chrome Plated . . . . .  | P/N 50-305-9-200 |
| 200 F/93 C,<br>White Coated . . . . .   | P/N 50-305-4-200 |
| 200 F/93 C,<br>White RAL9010* . . . . . | P/N 50-305-3-200 |

#### WS (TY3486) Vertical Pendent Sidewall Window Sprinkler

|   |                  |
|---|------------------|
| 155 F/68 C,<br>Natural Brass . . . . .  | P/N 50-304-1-155 |
| 155 F/68 C,<br>Chrome Plated . . . . .  | P/N 50-304-9-155 |
| 155 F/68 C,<br>White Coated . . . . .   | P/N 50-304-4-155 |
| 155 F/68 C,<br>White RAL9010* . . . . . | P/N 50-304-3-155 |
| 200 F/93 C,<br>Natural Brass . . . . .  | P/N 50-304-1-200 |
| 200 F/93 C,<br>Chrome Plated . . . . .  | P/N 50-304-9-200 |
| 200 F/93 C,<br>White Coated . . . . .   | P/N 50-304-4-200 |
| 200 F/93 C,<br>White RAL9010* . . . . . | P/N 50-304-3-200 |

\* Eastern Hemisphere sales only

### Sprinkler Wrench:

Specify: W-Type 20 Sprinkler Wrench.  
P/N 56-000-1-106.

