

## Model TY-FRFS, TY-FS Special, and TY-FS 57, 80, and 115 K-factor Upright and Pendent Flat Spray Sprinklers

### General Description

The Model TY-FRFS, TY-FS Special, and TY-FS, Upright and Pendent, Flat Spray Sprinklers are intended for installation in accordance with CEA 4001 *Sprinkler Systems Planning and Installation* or EN12845 *Automatic Sprinkler Systems – Design, Installation and Maintenance*, as applicable. They produce a flatter spray pattern than standard spray sprinklers, enabling them to be used with lower clearance above the suspended open ceilings and in racks.

As necessary the K80 and K115, Flat Spray Sprinklers may be outfitted with guards, shields, or guards with shields. The guards may be used in areas that make the sprinklers susceptible to mechanical or physical damage, whereas the shields may be used to help prevent the sprinklers from being wetted (cold soldered) from water spray of higher elevation sprinklers. Table A provides a detailed matrix of the allowable combinations.

The Model TY-FRFS with its 3 mm diameter heat sensitive bulb element is rated quick response, the Model TYFS Special with its 4 mm diameter heat-sensitive bulb element is rated special response, and the Model TY-FS with its 5 mm diameter heat sensitive bulb element is rated standard response "A."

#### IMPORTANT

Refer to *Technical Data Sheet TFP2300* for warnings pertaining to regulatory and health information.

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.

CEA 4001 *Sprinkler Systems Planning and Installation* and EN12845 *Automatic Sprinkler Systems – Design, Installation and Maintenance* permits flat spray sprinklers to be used in concealed spaces, suspended open ceilings, and in racks.

#### NOTICE

Model TY-FRFS, TY-FS Special, and TY-FS Sprinklers, as well as guard/shield accessories, described herein must be installed and maintained in compliance with this document, as well as with the applicable standards recognized by the approval agency, 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. Contact the installing contractor or product manufacturer with any questions.

### Sprinkler Identification Numbers (SINs)

#### Model TY-FRFS (3 mm Bulb)

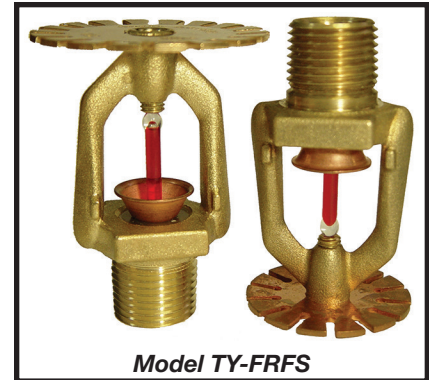
TY1136 – Upright K57  
TY1236 – Pendent K57  
TY3136 – Upright K80  
TY3236 – Pendent K80  
TY4136 – Upright K115  
TY4236 – Pendent K115

#### Model TY-FS Special (4 mm Bulb)

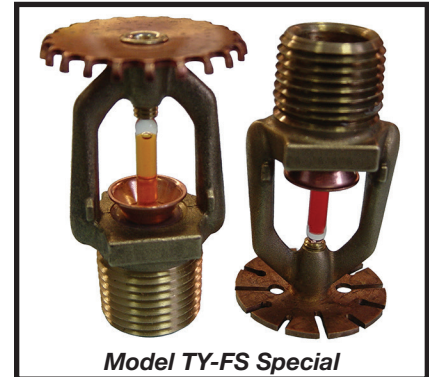
TY1146 – Upright K57  
TY1246 – Pendent K57  
TY3146 – Upright K80  
TY3246 – Pendent K80  
TY4146 – Upright K115  
TY4246 – Pendent K115

#### Model TY-FS (5 mm Bulb)

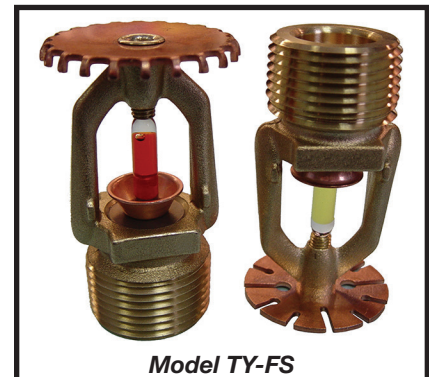
TY1156 – Upright K57  
TY1256 – Pendent K57  
TY3156 – Upright K80  
TY3256 – Pendent K80  
TY4156 – Upright K115  
TY4256 – Pendent K115



Model TY-FRFS



Model TY-FS Special



Model TY-FS

### 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, allowing the sprinkler to activate and water to flow.

Series	Bulb Size	Orifice	Position	SIN	Approvals	Guard	Shield	Guard/Shield
TY-FRFS	3 mm	K57, 10 mm	Upright	TY1136	LPCB, VdS	N/A	N/A	N/A
TY-FS Special	4 mm			TY1146	VdS	N/A	N/A	N/A
TY-FS	5 mm			TY1156	LPCB, VdS	N/A	N/A	N/A
TY-FRFS	3 mm		Pendent	TY1236	LPCB, VdS	N/A	N/A	N/A
TY-FS Special	4 mm			TY1246	VdS	N/A	N/A	N/A
TY-FS	5 mm			TY1256	LPCB, VdS	N/A	N/A	N/A
TY-FRFS	3 mm	K80, 15 mm	Upright	TY3136	LPCB, VdS	G1	N/A	N/A
TY-FS Special	4 mm			TY3146	VdS	G1	N/A	N/A
TY-FS	5 mm			TY3156	LPCB, VdS	G1	N/A	N/A
TY-FRFS	3 mm		Pendent	TY3236	LPCB, VdS	G1	H1 or H2	G1/H1 or G1/H2
TY-FS Special	4 mm			TY3246	VdS	G1	H1 or H2	G1/H1 or G1/H2
TY-FS	5 mm			TY3256	VdS	G1	H1 or H2	G1/H1 or G1/H2
TY-FRFS	3 mm	K115, 20 mm	Upright	TY4136	LPCB, VdS	G1	N/A	N/A
TY-FS Special	4 mm			TY4146	VdS	G1	N/A	N/A
TY-FS	5 mm			TY4156	VdS	G1	N/A	N/A
TY-FRFS	3 mm		Pendent	TY4236	VdS	G1	H1 or H2	G1/H1 or G1/H2
TY-FS Special	4 mm			TY4246	VdS	G1	H1 or H2	G1/H1 or G1/H2
TY-FS	5 mm			TY4256	VdS	G1	H1 or H2	G1/H1 or G1/H2

**TABLE A**  
**ALLOWABLE COMBINATIONS OF GUARDS, SHIELDS, AND GUARDS WITH SHIELDS**

## Technical Data

### Approvals

VdS Approved for installation per CEA 4001 *Sprinkler Systems Planning and Installation* or EN12845 *Automatic Sprinkler Systems – Design, Installation, and Maintenance*

LPCB Approved  
(See Table A)

The Guards, Shields, and Guards with Shields are VdS Approved with the combinations of product shown in Table A

For details contact:  
Johnson Controls  
Enschede, Netherlands  
Tel. 31-53-428-4444  
Fax 31-53-428-3377

**Maximum Working Pressure**  
12,1 bar

### Discharge Coefficient

K=57 Lpm/bar<sup>1/2</sup>  
K=80 Lpm/bar<sup>1/2</sup>  
K=115 Lpm/bar<sup>1/2</sup>

### Temperature Ratings (°C)

57, 68, 79, 93, and 141

### Finishes

Sprinklers: Natural Brass  
Guards: Red Painted / Zinc Chromate  
Shields: Zinc Chromate

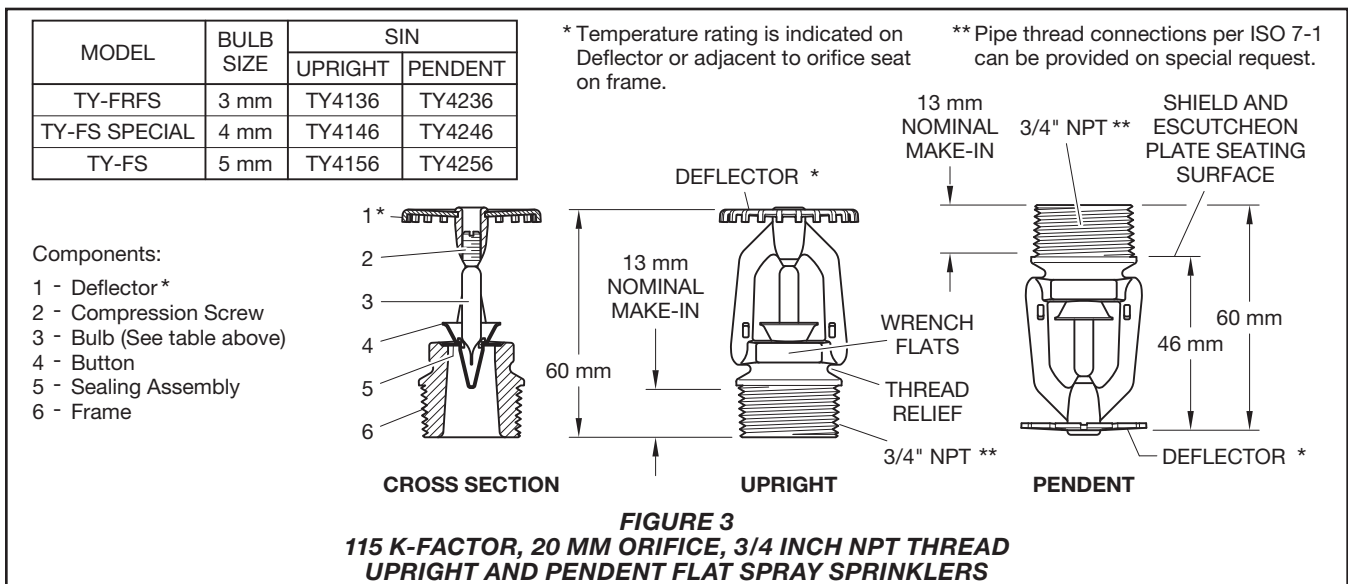
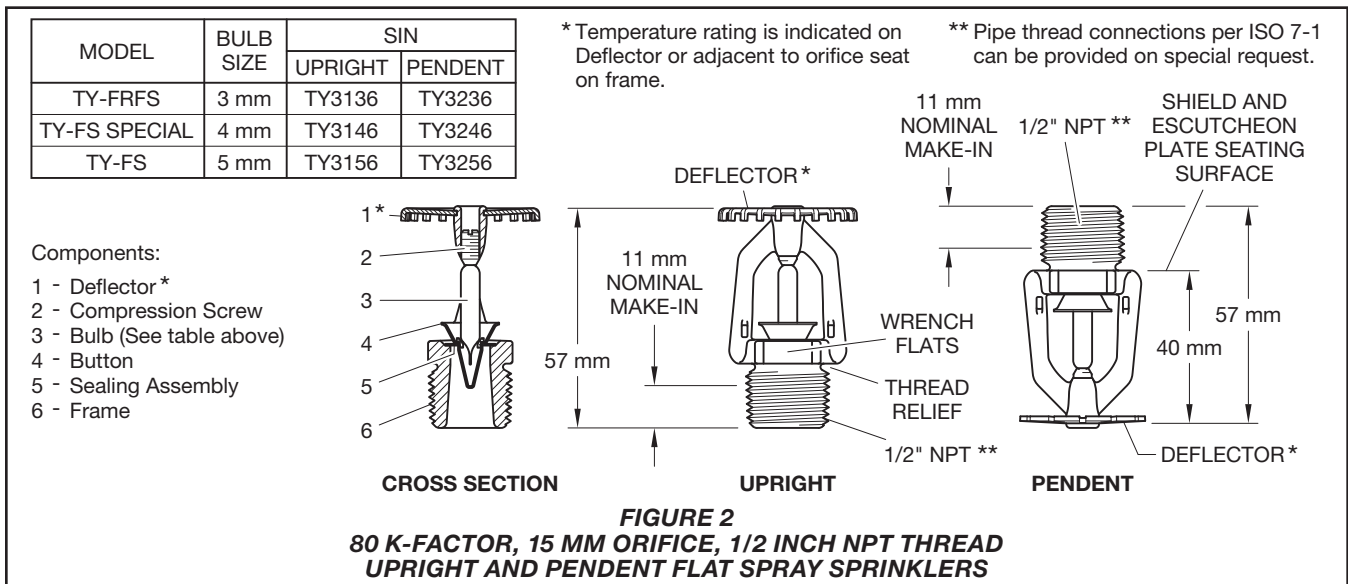
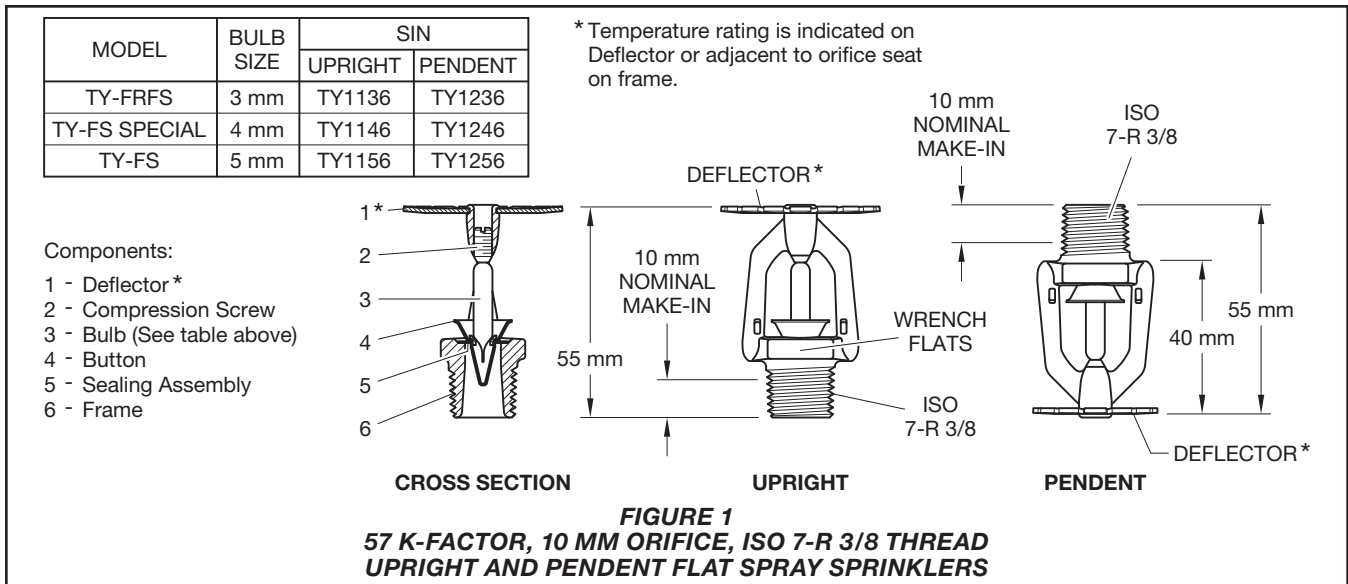
### Physical Characteristics

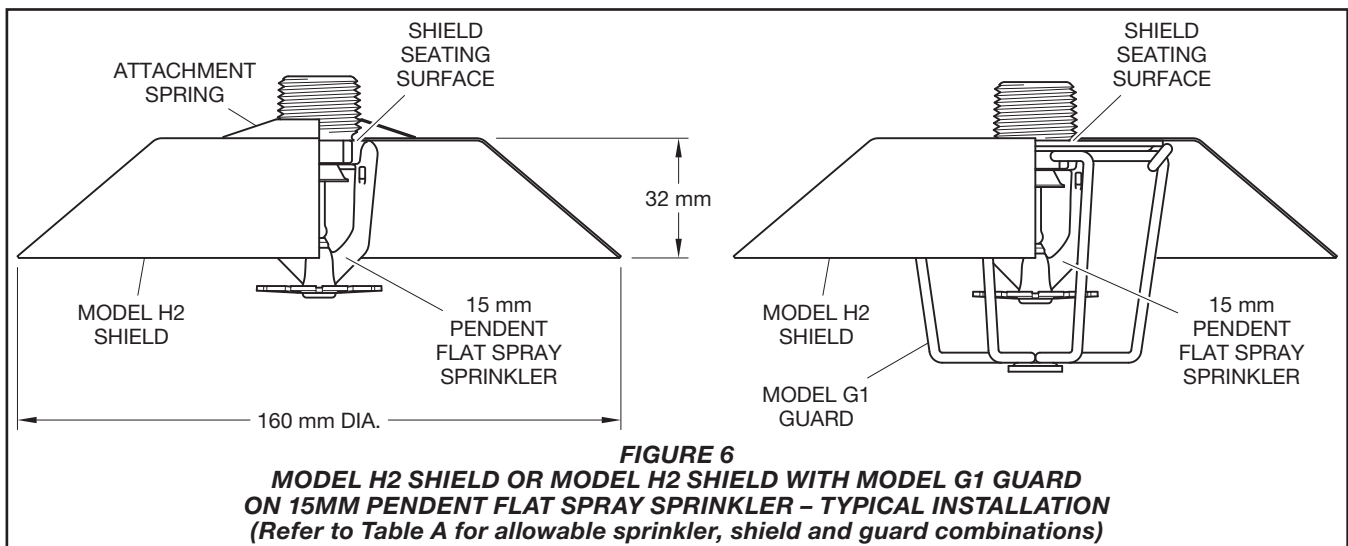
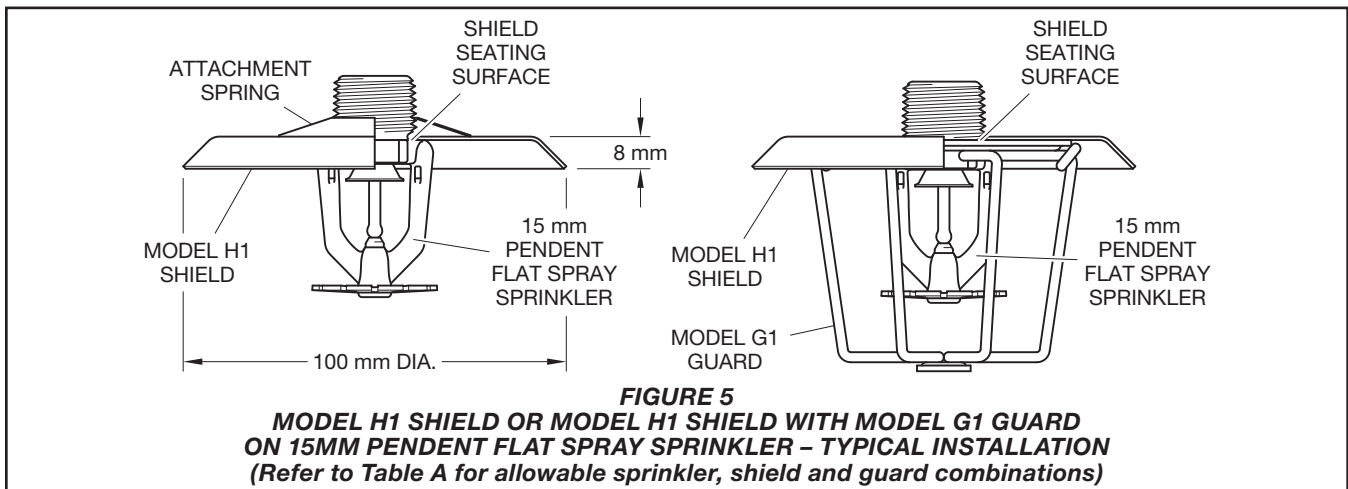
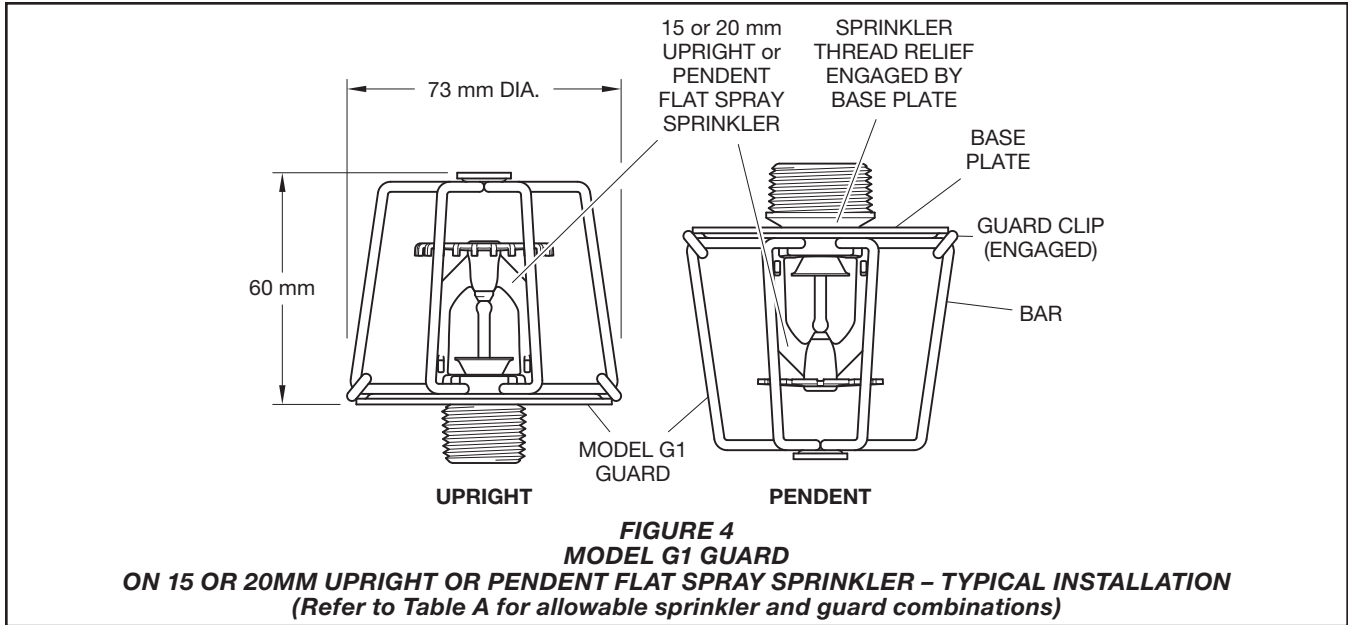
Frame .....Bronze  
Button .....Bronze/Copper  
Sealing Assembly ..Beryllium Nickel w/TEFLON  
Bulb .....Glass  
Compression Screw .....Bronze  
Deflector .....Copper  
Guard .....Welded Carbon Steel  
Shield .....Carbon Steel  
Shield Spring .....Carbon Steel

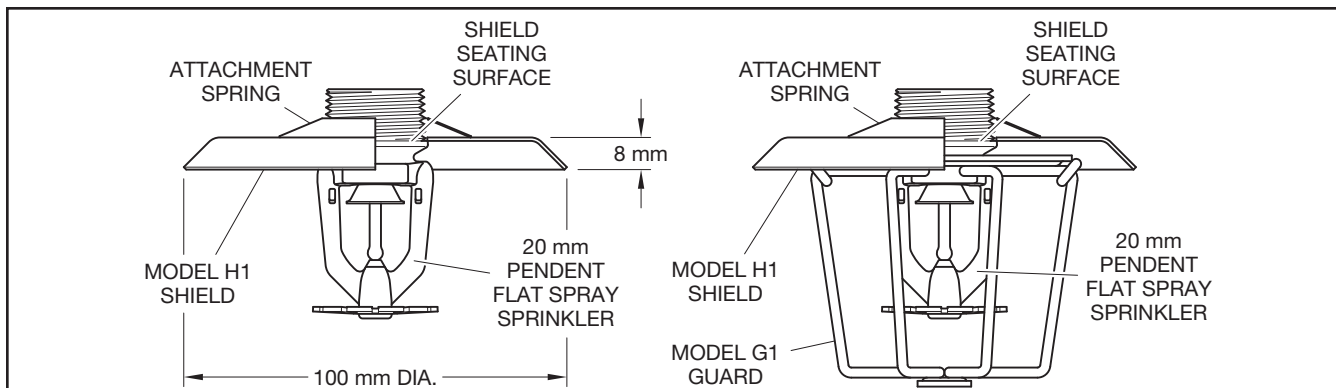
## Design Criteria

The Model TY-FRFS, TY-FS Special, and TY-FS Flat Spray Sprinklers are only intended for installation per CEA 4001 *Sprinkler Systems Planning and Installation* or EN12845 *Automatic Sprinkler Systems – Design, Installation and Maintenance* where flat spray sprinklers are permitted.

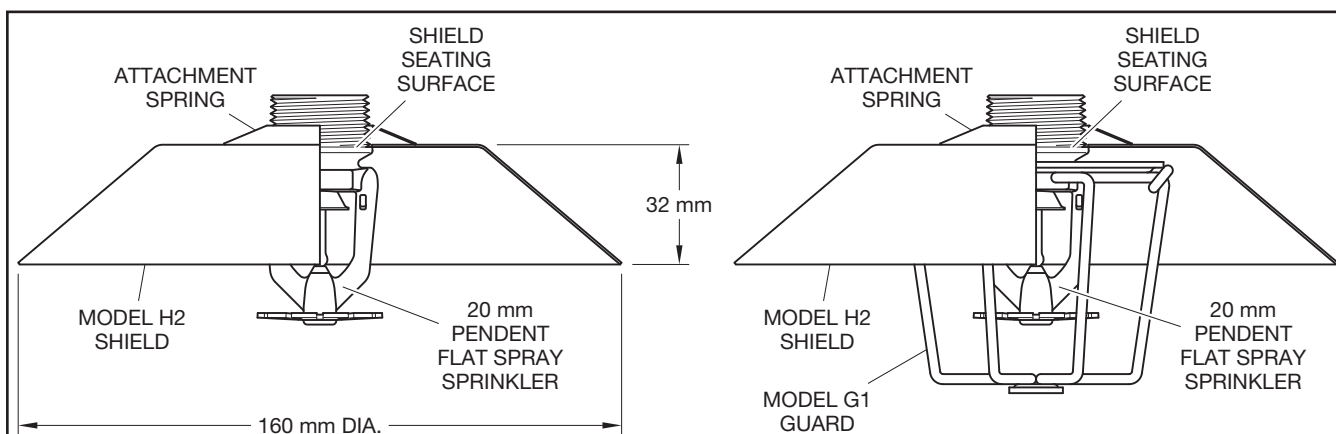
**Note:** In all cases, CEA 4001 *Sprinkler Systems Planning and Installation* or EN12845 *Automatic Sprinkler Systems – Design, Installation and Maintenance* must be referenced and followed to ensure an effective installation. The Flat-Spray Sprinklers have significantly different water distribution characteristics from that of conventional and spray pattern sprinklers that has enabled the Flat-Spray Sprinklers to be used in conformance with CEA 4001 *Sprinkler Systems Planning and Installation* or EN12845 *Automatic Sprinkler Systems – Design, Installation and Maintenance*.







**FIGURE 7**  
**MODEL H1 SHIELD OR MODEL H1 SHIELD WITH MODEL G1 GUARD**  
**ON 20MM PENDENT FLAT SPRAY SPRINKLER – TYPICAL INSTALLATION**  
(Refer to Table A for allowable sprinkler, shield and guard combinations)



**FIGURE 8**  
**MODEL H2 SHIELD OR MODEL H2 SHIELD WITH MODEL G1 GUARD**  
**ON 20MM PENDENT FLAT SPRAY SPRINKLER – TYPICAL INSTALLATION**  
(Refer to Table A for allowable sprinkler, shield and guard combinations)

## Installation

Installation instructions are provided in the following subsections:

- Sprinkler Only Installation
- Sprinkler with Guard Installation
- Sprinkler with Shield Installation
- Sprinklers with Guard and Shield Installation

See the Sprinkler Only Installation subsection for general instructions.

### Sprinkler Only Installation

The Model TY-FRFS, TY-FS Special, and TY-FS Sprinklers must be installed in accordance with this section.

#### General Instructions

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 1,6 mm for 57°C to 2,4 mm for the 141°C temperature ratings.

A leak-tight ISO 7-R 3/8 sprinkler joint should be obtained by applying a minimum-to-maximum torque of 8 to 16 N·m.

A leak tight 1/2 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 9,5 to 19,0 N·m.

A leak tight 3/4 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 13,4 to 26,8 N·m. Higher levels of torque may

distort the sprinkler inlet and cause leakage or impairment of the sprinkler.

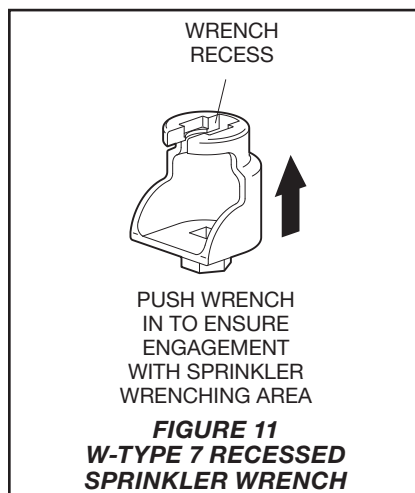
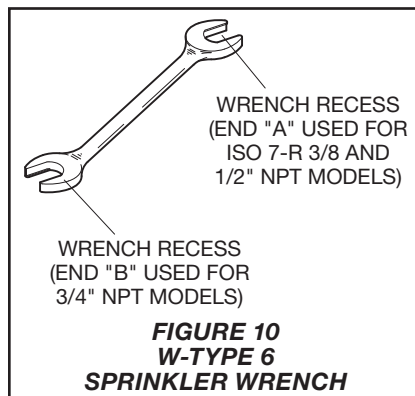
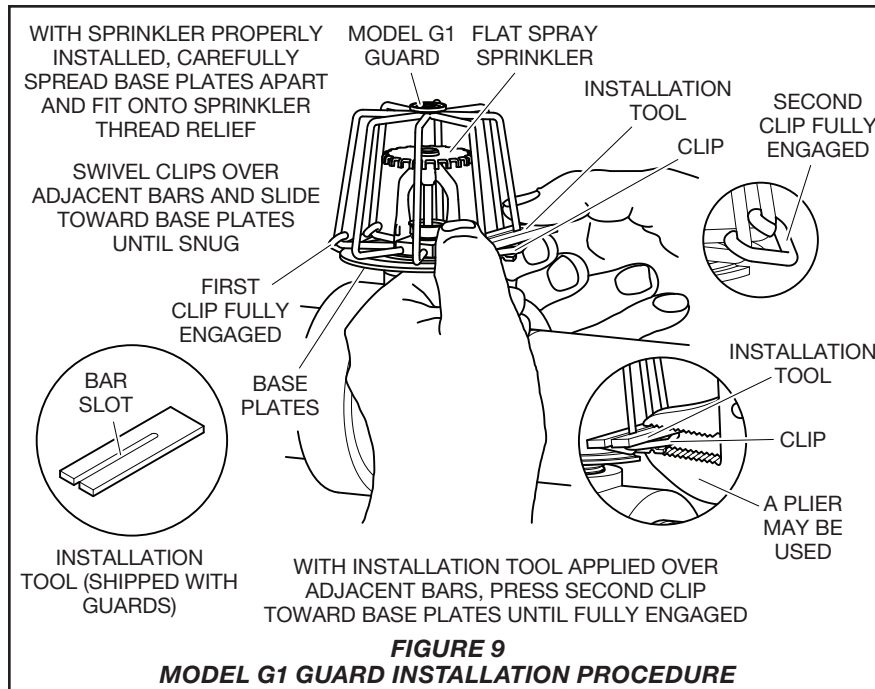
Do not attempt to make-up for insufficient adjustment in the escutcheon plate by under- or over-tightening the sprinkler. Readjust the position of the sprinkler fitting to suit.

**Note:** Pendent sprinklers are to be installed in the pendent position; upright sprinklers are to be installed in the upright position.

**Step 1.** With pipe thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

**Step 2.** Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (See Figure 10). With reference to Figures 1, 2, and 3 the W-Type 6 Sprinkler Wrench is to be applied to the wrench flats.





**Sprinkler with Guard Installation**

With reference to Figures 4 and 9, 15 mm or 20 mm Upright or Pendent Sprinklers with Model G1 Guard must be installed in accordance with this section:

**Step 1.** The G1 Guard is to be mounted on the sprinkler after the sprinkler has been installed in accordance with the Sprinklers Only Installation subsection.

**Step 2.** With the Clips loose, first spread the two halves of the Sprinkler Guard just enough to pass by the sprinkler deflector from the side. Then, once again spread the two halves of the Sprinkler Guard just enough to pass over the Thread Relief portion of the sprinkler. (See Figures 2 and 3)

**Step 3.** With the Sprinkler Guard positioned on the Thread Relief portion of the sprinkler, as applicable, engage the Clips and then slide the Clips until they seat against the Base Plate to complete the installation as shown in Figure 4.

To help assist with the sliding of the Clips, the Guard Installation Tool maybe used as shown in Figure 9. In addition, pliers can be used to facilitate the final seating of the Clips.

**Note:** The Clips must seat against the Base Plate in order to be considered fully seated and in order to complete the installation.

The G1 Guard may be located in any position relative to the sprinkler frame arms.

**Sprinkler with Shield Installation**

With reference to Figures 5, 6, 7, or 8, 15 mm or 20 mm Pendent Sprinklers with Model H1 or Model H2 Shield must be installed in accordance with this section:

**Note:** Pendent sprinklers are to be installed in the pendent position.

**Step 1.** With pipe thread sealant applied to the pipe threads, install the Shield over the sprinkler threads.

**Step 2.** Place the Attachment Spring over the sprinkler threads, seating it against the Shield.

**Step 3.** Hand-tighten the sprinkler into the sprinkler fitting.

**Step 4.** Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (See Figure 11). The wrench is to be applied to the sprinkler wrenching area shown in Figures 2 or 3, as applicable.

**Note:** When installed correctly, the Attachment Spring will be slightly compressed and the Shield will be held firmly in place.

**Sprinkler with Guard and Shield Installation**

With reference to Figures 5, 6, 7, or 8, 15 or 20 mm Pendent Sprinklers with Model H1 or Model H2 Shield and Model G1 Guard must be installed in accordance with this section:

**Note:** Pendent sprinklers are to be installed in the pendent position.

**Step 1.** With pipe thread sealant applied to the pipe threads, install the Shield over the sprinkler threads.

**Step 2.** When installing K115 Sprinklers, place the Attachment Spring over the sprinkler threads, seating it against the Shield.

**Note:** An Attachment Spring is not utilized for K80 Sprinklers with Guard and Shield.

**Step 3.** Hand tighten the sprinkler into the sprinkler fitting.

**Step 4.** Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Sprinkler Wrench (See Figure 11). The wrench is to be applied to the sprinkler wrenching area shown in Figures 2 or 3, as applicable.

**Step 5.** After the sprinkler with shield is installed into the sprinkler pipe fitting, install the guard as described in the Sprinkler with Guard Installation subsection.

P/N 51 - XXX - 1 - XXX			<table border="1"> <tr> <th colspan="2">SPRINKLER FINISH</th> </tr> <tr> <td>1</td> <td>NATURAL BRASS</td> </tr> </table>		SPRINKLER FINISH		1	NATURAL BRASS	<table border="1"> <tr> <th colspan="2">TEMPERATURE RATING</th> </tr> <tr> <td>135</td> <td>135°F (57°C)</td> </tr> <tr> <td>155</td> <td>155°F (68°C)</td> </tr> <tr> <td>175</td> <td>175°F (79°C)</td> </tr> <tr> <td>200</td> <td>200°F (93°C)</td> </tr> <tr> <td>286</td> <td>286°F (141°C)</td> </tr> </table>		TEMPERATURE RATING		135	135°F (57°C)	155	155°F (68°C)	175	175°F (79°C)	200	200°F (93°C)	286	286°F (141°C)																																																							
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**TABLE B  
FLAT SPRAY SPRINKLERS  
PART NUMBER SELECTION**

## Care and Maintenance

The Model TY-FRFS, TY-FS Special, and TY-FS Sprinklers must be maintained and serviced in accordance with this section:

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 system 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. Refer to the Installation section for additional information.

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 authorities having jurisdiction. Contact the installing contractor or product manufacturer with 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

For warranty terms and conditions, visit [www.tyco-fire.com](http://www.tyco-fire.com).

## Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and part number (P/N).

**Note:** Sprinklers, wrenches, guards, shields, attachment springs, and additional clip installation tool are all sold separately.

### Sprinkler Assemblies

Specify: Model (TY-FRFS, TY-FS Special, or TY-FS), (specify SIN), (specify Standard, Special, or Quick Response), (specify 57, 80, or 115) K-factor, (specify temperature rating), (specify Pendent or Upright) Sprinklers, P/N (specify from Table B)

### Sprinkler Wrenches

Specify: W-Type (specify) Sprinkler Wrench, P/N (specify):

W-6 . . . . . 56-000-6-387  
W-7 . . . . . 56-850-4-001

### Guards

Specify: Model G1 Guard with (specify) finish, P/N (specify):

Red Painted . . . . . 56-000-6-387  
Zinc Chromate . . . . . 56-850-4-001

### Shields

Specify: Model (specify), (specify NPT size) Shield, P/N (specify):

H1, 1/2 in. NPT . . . . . 22521  
H1, 3/4 in. NPT . . . . . 22522  
H2, 1/2 in. NPT . . . . . 22529  
H2, 3/4 in. NPT . . . . . 22524

### Attachment Springs

Specify: (specify NPT size) Shield Spring, P/N (specify):

1/2 in. NPT . . . . . 22526  
3/4 in. NPT . . . . . 22527

### Additional\* Clip Installation Tool

Specify: Clip Installation Tool for G1 Guard, P/N 56-000-8-597

\* The Clip Installation Tool is included with guard orders in original cartons.

