

## Model ESFR-22 22.4 K-factor Pendent Rapid Install Sprinkler Early Suppression, Fast Response

### 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.

Scan the QR code or enter the URL in a web browser to access the most up-to-date electronic version of this document. Data rates may apply.



[docs.jci.com/tycofire/TFP327](https://docs.jci.com/tycofire/TFP327)

## General Description

The TYCO Model ESFR-22 22.4 K-Factor Pendent Rapid Install Sprinkler (RIS), herein called the ESFR-22 RIS, is an Early Suppression, Fast Response (ESFR) sprinkler with a pre-installed rubber RIS gasket for quick and easy installation. The ESFR-22 RIS threads into a TYCO RIS welded fitting by hand without the need for tape or sealant. The sprinkler assembly is shown in Figure 1.

The ESFR-22 RIS is a suppression-mode sprinkler that is especially advantageous as a means of eliminating the use of in-rack sprinklers when protecting high-piled storage.

The ESFR-22 RIS sprinkler is primarily used for ceiling-only sprinkler protection of, but not limited to, the following storage applications:

- Most encapsulated or non-encapsulated common materials including cartoned, unexpanded plastics
- Uncartoned (exposed) expanded plastics in accordance with the National Fire Protection Association (NFPA) standard NFPA 13 and FM Global standards
- Some storage arrangements of rubber tires, roll paper, flammable liquids, aerosols, and automotive components

For more specific criteria, see Table B and the applicable design standard.

The ESFR-22 RIS provides the system designer with hydraulic and sprinkler placement options not presently available to the traditional ESFR sprinklers with nominal K-factors of 14.0 and 16.8. In particular, the ESFR-22 RIS is designed to operate at substantially lower-end head pressures, as compared to ESFR sprinklers with nominal K-factors of 14.0 and 16.8. This feature offers flexibility when sizing system piping, as well as possibly reducing or eliminating the need for a system fire pump.

The ESFR-22 RIS can eliminate the use of in-rack sprinklers when protecting high-piled storage of specific materials up to the following heights:

- NFPA: 40 ft (12,2 m) with ceilings up to 45 ft (13,7m)
- FM: 45 ft (13,7 m) with ceilings up to 50 ft (15,2 m)

For more specific criteria, see Table B and the applicable design standard.



### NOTICE

The TYCO Model ESFR-22 Pendent Rapid Install 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 authorities having jurisdiction, such as FM Global. 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.

In all cases, the appropriate NFPA or FM Global installation standard, or other applicable standard, must be referenced to ensure applicability and to obtain complete installation guidelines. The general guidelines in this data sheet are not intended to provide complete installation criteria.

## Sprinkler Identification Number (SIN)

See Table A

| Item                                                                                                                                            | Description                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Sprinkler Identification Number (SIN)                                                                                                           | TY8220                                                    |
| K-factor, gpm/psi <sup>1/2</sup> (Lpm/bar <sup>1/2</sup> )                                                                                      | 22.4 gpm/psi <sup>1/2</sup> (320 Lpm/bar <sup>1/2</sup> ) |
| Temperature Rating °F (°C)                                                                                                                      | 165°F (74°C)<br>212°F (100°C)                             |
| Thread Size                                                                                                                                     | Custom RIS Thread<br>(Not NPT or ISO)                     |
| RIS Welded Fitting<br>Pipe Size Compatibility                                                                                                   | 2 in. (DN50), 2 1/2 (DN65), 3 in. (DN80)                  |
| Sprinkler Orientation                                                                                                                           | Pendent                                                   |
| Maximum Working Pressure, psi (bar)                                                                                                             | 175 psi (12,1 bar)                                        |
| <b>TABLE A</b><br><b>MODEL ESFR-22 EARLY SUPPRESSION FAST RESPONSE</b><br><b>22.4K PENDENT RAPID INSTALL SPRINKLER</b><br><b>TECHNICAL DATA</b> |                                                           |

## Technical Data

### Approvals

UL and cUL Listed  
FM Approved

**Note:** RIS welded fittings are cUL Listed and FM Approved

### Finish

Natural Brass

### Physical Characteristics

Frame .....Brass  
Deflector .....Bronze  
Compression Screw ..... Stainless Steel  
Hook ..... MONEL  
Strut ..... MONEL  
Link Assembly ..... Solder, Nickel  
Button ..... Stainless Steel/Copper  
Sealing Assembly . . Beryllium Nickel w/TEFLON  
RIS Gasket ..... EPDM  
Ejection Spring ..... INCONEL  
Threaded Outlet ..... Steel w/ Zinc Phosphate  
Coating

### Additional Technical Data

See Table A

## Operation

The fusible link assembly is comprised of two link halves joined together by a thin layer of solder. When the rated temperature is reached, the solder melts and the two link halves separate, activating the sprinkler and flowing water.

## Design Criteria

The following general guidelines provided for the TYCO Model ESFR-22 Pendent Rapid Install Sprinkler can be used for a quick reference.

The NFPA and FM Global (FM Approvals) provide installation standards that must be used to properly design an automatic sprinkler system utilizing ESFR sprinklers. The guidelines provided by NFPA and FM Global may differ. Consequently, the appropriate standard must be used for a given installation.

General guidelines are not intended to provide complete installation criteria. In all cases, the appropriate NFPA or FM Global installation standard must be referenced to ensure applicability and to obtain complete installation guidelines. For more information, see Table B.

### Roof Construction

Unobstructed or obstructed construction, such as smooth ceiling, bar joists, beam and girder.

**Note:** In buildings with obstructed construction, where the depths of the solid structural members, as in beams and stem, exceed 12 in. (302 mm), install ESFR Sprinklers in each channel formed by the structural members.

### Ceiling Slope

Maximum 2 in. rise for 12 in. run (16.7%)

### Maximum Coverage Area

100 ft<sup>2</sup> (9,3 m<sup>2</sup>)

**Note:** In some cases, the installation standards permit a greater coverage area.

### Minimum Coverage Area

64 ft<sup>2</sup> (5,8 m<sup>2</sup>) per  
NFPA 13 / FM Global 2-0

### Maximum Spacing

- 12 ft (3,7 m) for building heights up to 30 ft (9,1 m)
- 10 ft (3,1 m) for building heights greater than 30 ft (9,1 m)

**Note:** In some cases, installation standards permit a greater spacing.

### Minimum Spacing

8 ft (2,4 m)

### Minimum Clearance to Commodity

36 in. (914 mm)

### NFPA

#### Deflector-to-Ceiling Distance

6 in. to 18 in. (152 mm to 457 mm)

### FM Global

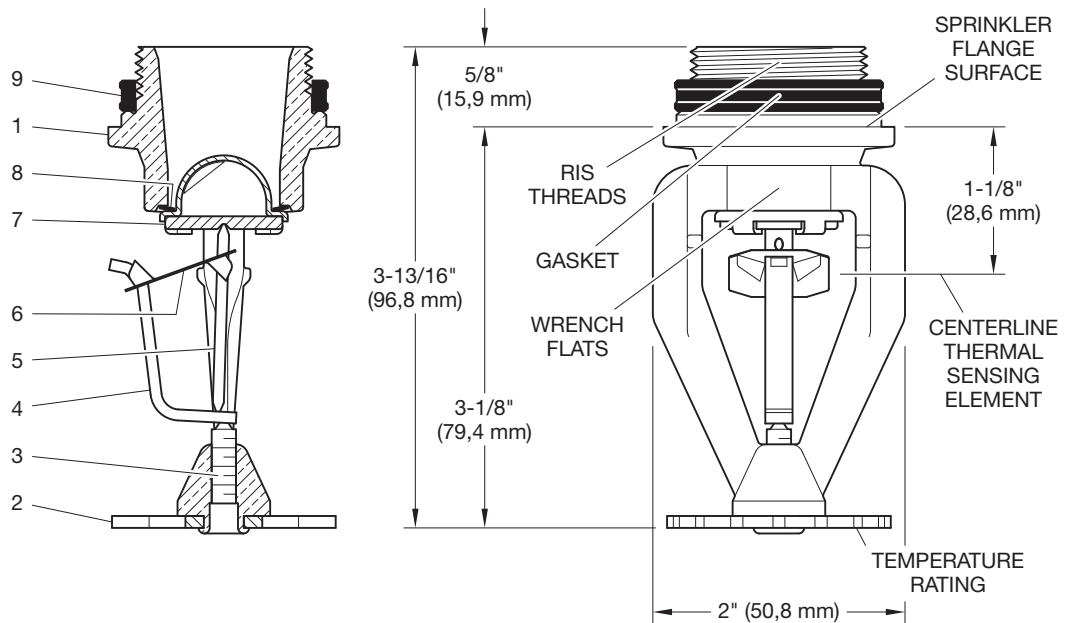
#### Centerline of Thermal Sensing

#### Element-to-Ceiling Distance

Refer to FM Global 2-0 for Storage Sprinklers.

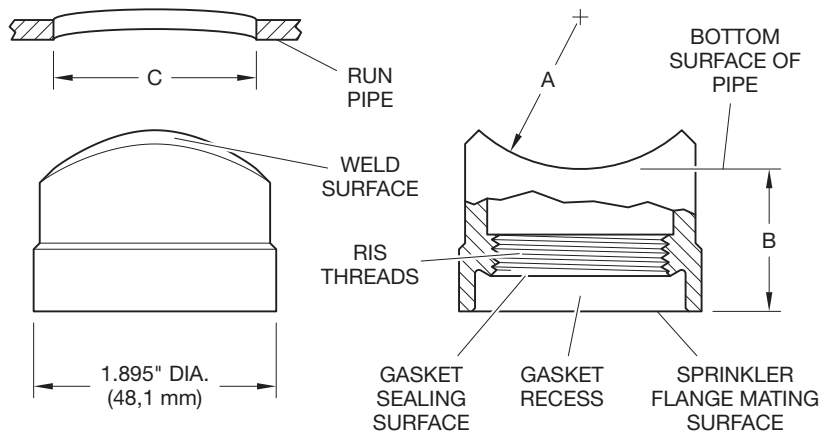
**Components:**

- 1 - Frame
- 2 - Deflector
- 3 - Compression Screw
- 4 - Hook
- 5 - Strut
- 6 - Link Assembly
- 7 - Button
- 8 - Sealing Assembly
- 9 - Gasket



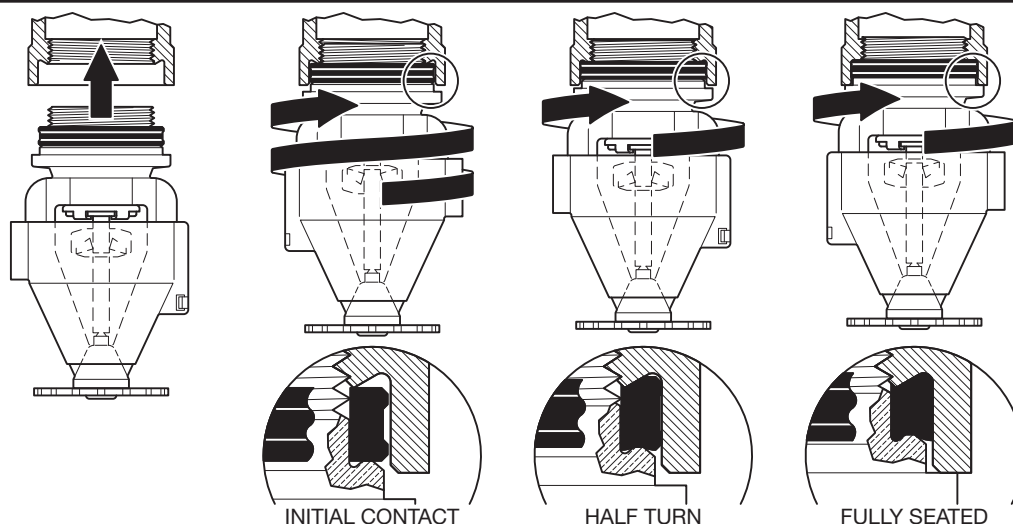
**FIGURE 1**  
**MODEL ESFR-22 EARLY SUPPRESSION FAST RESPONSE**  
**22.4K PENDENT RAPID INSTALL SPRINKLER**  
**ASSEMBLY AND DIMENSIONS**

| Nominal<br>Pipe Size<br>ANSI Inches<br>DN | Nominal Dimensions<br>Inches<br>(mm) |                  |                 |                            | Part<br>Number |
|-------------------------------------------|--------------------------------------|------------------|-----------------|----------------------------|----------------|
|                                           | Pipe<br>O.D.                         | A<br>Pipe Radius | B               | C<br>Pipe Hole<br>Cut Size |                |
| 2<br>DN50                                 | 2.375<br>(60,3)                      | 1.188<br>(30,2)  | 1.109<br>(28,2) | 1.375<br>(35)              | 568880200      |
| 2-1/2<br>DN65                             | 2.875 - 3.000<br>(73,0 - 76,1)       | 1.438<br>(36,5)  | 1.208<br>(30,7) |                            | 568880250      |
| 3<br>DN80                                 | 3.500<br>(88,9)                      | 1.750<br>(44,5)  | 1.274<br>(32,4) |                            | 568880300      |



**FIGURE 2**  
**MODEL ESFR-22 EARLY SUPPRESSION FAST RESPONSE**  
**22.4K PENDENT RAPID INSTALL SPRINKLER**  
**RIS WELDED FITTING FEATURES AND SPECIFICATIONS**

| Storage Type                                                                                                                                                                                                                                           | NFPA                          | FM Global                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------|
| Sprinkler Type                                                                                                                                                                                                                                         | ESFR                          | Storage                               |
| Response Type                                                                                                                                                                                                                                          | FR                            | QR                                    |
| System Type                                                                                                                                                                                                                                            | Wet                           | Wet                                   |
| Temperature Rating °F (°C)                                                                                                                                                                                                                             | 165°F (74°C)<br>212°F (100°C) | 165°F (74°C)<br>212°F (100°C)         |
| Open Frame (i.e., no solid shelves), Single, Double, Multiple-Row, or Portable Rack Storage of Class I-IV and Group A or B Plastics                                                                                                                    | Refer to NFPA 13              | Refer to FM Global 2-0 and 8-9        |
| Solid Pile or Palletized Storage of Class I-IV and Group A or B Plastics                                                                                                                                                                               | Refer to NFPA 13              | Refer to FM Global 2-0 and 8-9        |
| Idle Pallet Storage                                                                                                                                                                                                                                    | Refer to NFPA 13              | Refer to FM Global 2-0, 8-9, and 8-24 |
| Rubber Tire Storage                                                                                                                                                                                                                                    | Refer to NFPA 13              | Refer to FM Global 2-0 and 8-3        |
| Roll Paper Storage<br>(Refer to the Standard)                                                                                                                                                                                                          | Refer to NFPA 13              | Refer to FM Global 8-21               |
| Flammable/Ignitable Liquid Storage<br>(Refer to the Standard)                                                                                                                                                                                          | Refer to NFPA 30              | Refer to FM Global 7-29               |
| Aerosol Storage<br>(Refer to the Standard)                                                                                                                                                                                                             | Refer to NFPA 30B             | Refer to FM Global 7-31               |
| Automotive Components in Portable Racks<br>(Control mode only; refer to the Standard)                                                                                                                                                                  | N/A                           | N/A                                   |
| <p>N/A – Not Applicable</p> <p style="text-align: center;"><b>TABLE B</b><br/> <b>MODEL ESFR-22 EARLY SUPPRESSION FAST RESPONSE</b><br/> <b>22.4K PENDENT RAPID INSTALL SPRINKLER</b><br/> <b>COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW</b></p> |                               |                                       |



**FIGURE 3**  
**MODEL ESFR-22 EARLY SUPPRESSION FAST RESPONSE 22.4K PENDENT RAPID INSTALL SPRINKLER**  
**INSTALLATION IN RIS WELDED FITTING**

## Installation

The TYCO Model ESFR-22 Pendent Rapid Install Sprinkler must be installed in accordance with this section. Read the General Instructions section before proceeding to the relevant installation instructions.

**Note:** Model ESFR-22 RIS assemblies and RIS plugs, see Figures 1 and 6, include a factory-assembled RIS gasket.

## General Instructions

Observe the following guidelines while installing the sprinkler.

### NOTICE

Ensure the sprinkler threads are clean and do not apply sealant such as tape or paste. Threads with debris or sealant could cause damage or impairment.

Do not apply pressure to the fusible link assembly. Failure to avoid this can lead to an unstable link assembly and premature activation of the sprinkler. Damaged sprinklers must be replaced.

- To avoid damaging the fusible link assembly during installation, ensure the factory-assembled link protector remains attached to the sprinkler, and handle the sprinkler by the frame arms only as shown in Figure 4. Use only the appropriate sprinkler alignment tool as shown in Figure 5.
- To achieve a sound weld between the pipe and RIS welded fitting, ensure the surfaces of the pipe and RIS welded fitting near the joint area are free from porosity and indentations. Remove all surface contam-

inants such as oil, grease, loose paint, and dirt particles from the joint area before welding.

- Align the RIS fitting and pipe during automatic welding practices with a RIS fitting welding alignment cone as shown in Figure 9.
- Ensure the RIS gasket is present on the ESFR-22 RIS and positioned at the base of the threads near the flange as shown in Figure 1.
- Temporarily plug an open RIS welded fitting with a RIS welded fitting plug assembly, as shown in Figure 6.

**Note:** When painting or powder coating, do not use the RIS welded fitting plug assembly.

- Do not remove the black protective coating inside the RIS welded fitting surface.
- Before painting or powder coating, mask the RIS welded fitting lip and internal features as shown in Figure 7. For example, use a 1-7/8 in. (4,76 mm) high temperature polyester masking disc or a high temperature 2 in. (5,08 mm) ceramic magnet as masking materials.
- As finishing processes can vary, when planning painting or powder coating pipe with RIS welded fittings installed, it is recommended that operators use their own established best methods to protect critical fitting areas such as the mating surface and interior features. One option is to use the separately ordered powder coating plug, see Figure 8. The plug is made from silicone rubber formulated for a maximum temperature

exposure of 446°F (230°C). It may not be completely effective for all finishing operations based on specific equipment and processes employed.

## Installing the Sprinkler

**Note:** The ESFR-22 RIS sprinkler is designed to be installed directly in RIS welded fittings and cannot be installed directly in standard fittings featuring NPT or ISO tapered threads.

Rapid Install Sprinkler Adapters are available for transitioning Tyco sprinklers featuring RIS connection technology to conventional tapered threads. Refer to TFP741, TFP742 or TFP743 for more information.

**Step 1.** Thread the ESFR-22 RIS by hand into the RIS welded fitting until the RIS gasket makes initial contact as shown in Figure 3.

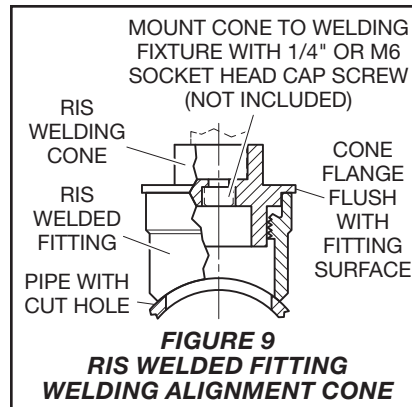
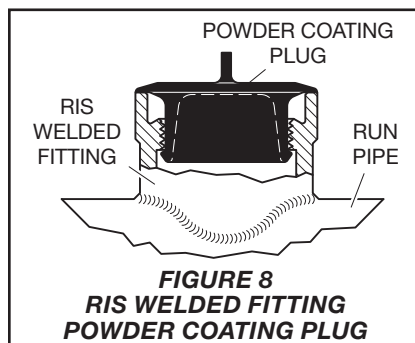
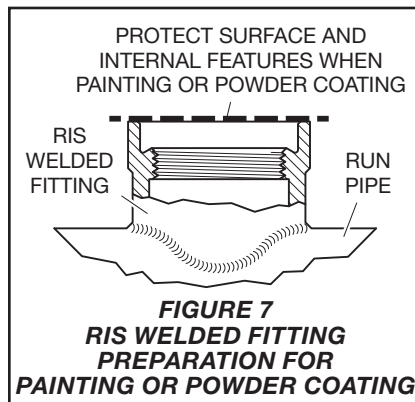
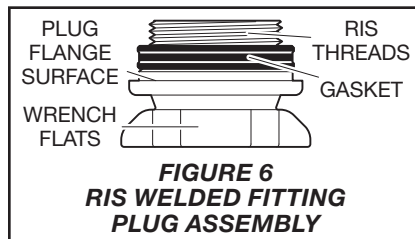
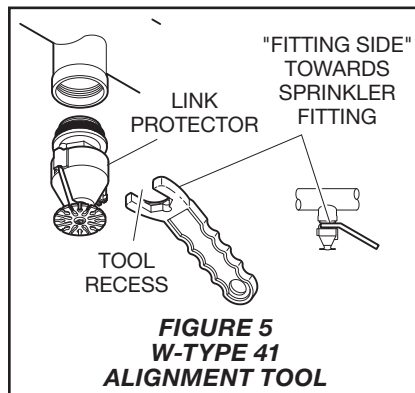
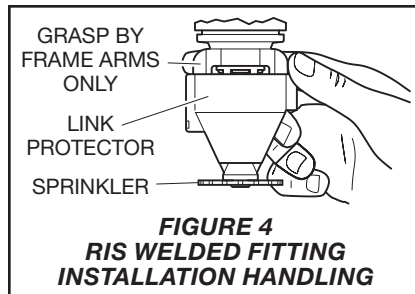
**Step 2.** Continue to rotate the ESFR-22 RIS by hand a minimum of a 1/2 turn, through fully seating the sprinkler to produce a water-tight seal as shown in Figure 3. Adjust the sprinkler within this range to align the frame arms to the branch line if deemed necessary.

(Optional) Use the alignment tool as shown in Figure 5 for more leverage.

Scan the QR code to access demonstration video.

**Note:** Data rates may apply.





## Care and Maintenance

The TYCO Model ESFR-22 22.4 K-Factor Pendent Rapid Install 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, obtain permission to shut down the affected fire protection system from the proper authorities and notify all personnel who may be affected by this action.

Sprinklers which 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 similar mishandling, must be replaced. In the event that an RIS gasket is damaged, or the sprinkler needs to be reinstalled, the RIS gasket must be replaced.

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 such as NFPA 25, in addition to the standards of any authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to 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).

### Sprinkler Assemblies

Specify: Model ESFR-22 Early Suppression, Fast Response 22.4K Pendent Rapid Install Sprinkler (TY8220), (specify temperature rating), P/N (specify):

165°F (74°C) . . . . . 58-468-1-165  
212°F (100°C) . . . . . 58-468-1-212

### RIS Welded Fitting

Specify: RIS Welded Fitting, Pipe Size (specify), P/N (specify from Figure 2)

### RIS Welded Fitting Plug Assembly

Specify: RIS Welded Fitting Plug Assembly, P/N 56-888-0-102

### RIS Welded Fitting Powder Coating Plug

Specify: RIS Welded Fitting Powder Coating Plug, P/N 56-888-0-106

### RIS Welding Alignment Cone

Specify: RIS Welding Alignment Cone, P/N 56-888-0-002

### RIS Gasket

Specify: ESFR RIS Gasket, 1 in., P/N 91-448-1-001

**Note:** See the Care and Maintenance section for replacement requirements.

### Alignment Tool

Specify: W-Type 41 Alignment Tool, P/N 56-888-0-001

### RIS Adapters

Rapid Install Sprinkler Adapters are available for installing Tyco sprinklers featuring RIS connection technology in conventional NPT or ISO tapered thread fittings. Refer to TFP741, TFP742 or TFP743 for more information.



Worldwide  
Contacts

www.tyco-fire.com

## TFP327 Change History Appendix

| ISSUE DATE | NOTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 03-23      | Page 5, Installation section, end of General Instructions sub-section, added finishing process bullet point recommending use of separately ordered powder coating plug; Installation section, Installing the Sprinkler sub-section, relocated demonstration video QR code to end of procedure, formerly on page 6 as Figure 4; Page 6, updated Figure numbers; Added Figure 8, RIS welded fitting powder coating plug application; Added Figure 9, RIS welded fitting welding alignment cone application; Ordering Procedure, added RIS Welded Fitting Powder Coating Plug sub-section.                           |
| 01-23      | Page 5, Installation section, General Instructions sub-section, alignment cone bullet point, removed instruction to fabricate welding alignment cone in accordance with specification found on Tyco website, specification no longer provided online; Page 5, Installation section, Installing the Sprinkler sub-section, expanded note limiting installation in RIS welded fittings, advising Rapid Install Sprinkler Adapters are available for transitioning from pipe fittings with conventional tapered threads; Page 6, Ordering Procedure, added RIS Welding Alignment Cone and RIS Adapters sub-sections. |
| 12-22      | Page 1, updated QR code and URL; Page 2, Design Criteria Roof Construction sub-section, added note requiring sprinkler installed in each channel formed by structural members in areas of buildings with obstructed construction consisting of solid structural members exceeding 12 in. (302 mm) deep; Page 4, changed corporate address and telephone number to 1467 Elmwood Avenue, Cranston, RI 02910   Telephone +1-401-781-8220, formerly 1400 Pennbrook Parkway, Lansdale, PA 19446   Telephone +1-215-362-0700.                                                                                           |
| 01-22      | Added QR code and URL to allow convenient access to electronic version from printed document; Clarified RIS Welded Fittings are cUL Listed and FM Approved.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 08-21      | Expanded pipe compatibility of 2 1/2 in. (DN65) RIS Fitting to include 2.875 in. to 3.000 in. (73,0 mm to 76,1 mm) O.D. range in Figure 2, formerly shown as 2.875 in. (73,0 mm).                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 05-21      | Clarified storage and ceiling heights allowable per NFPA and FM in high-piled storage applications; Changed depiction of RIS welded fitting to reflect redesign with thickened material around outlet port.                                                                                                                                                                                                                                                                                                                                                                                                       |
| 03-21      | Added guidance on weld fitting painting practices; Added QR code for access to installation demonstration video.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 01-21      | Removed all content relating to UL Specific Application.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 12-20      | New Technical Data Sheet TFP327 describes Model ESFR-22 Pendent RIS Rapid Install Sprinkler.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |