

Model ESFR-25 25.2 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/TFP328

General Description

The TYCO Model ESFR-25 25.2 K-Factor Pendent Rapid Install Sprinkler (RIS), herein called the ESFR-25 RIS, is an Early Suppression, Fast Response (ESFR) sprinkler with a pre-installed rubber RIS gasket for quick and easy installation. The ESFR-25 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-25 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-25 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-25 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-25 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-25 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.

The ESFR-25 RIS is listed by Underwriters Laboratories (UL) for specific applications with a maximum storage height of 43 ft (13,1 m) with a maximum ceiling height



of 48 ft (14,6 m) without the requirement for in-rack sprinklers. Refer to the Specific Application Listing (UL) for the design criteria.

NOTICE

The TYCO Model ESFR-25 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 (NFPA), 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) | TY9220 |
| K-factor, gpm/psi ^{1/2} (Lpm/bar ^{1/2}) | 25.2 gpm/psi ^{1/2} (362,9 Lpm/bar ^{1/2}) |
| Temperature Rating °F (°C) | 165°F (74°C) 212°F (100°C) |
| Thread Size | Custom RIS Thread (Not NPT or ISO) |
| RIS Welded Fitting 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) |

TABLE A
MODEL ESFR-25 EARLY SUPPRESSION FAST RESPONSE
25.2K PENDENT RAPID INSTALL SPRINKLER
TECHNICAL DATA

Technical Data

Approvals

UL and cUL Listed
 FM Approved

Note: RIS welded fittings are cUL Listed and FM Approved

Finish

Natural Brass

Physical Characteristics

FrameBrass
 DeflectorBronze
 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.

Specific Application Listing (UL)

The TYCO Model ESFR-25 Pendent Rapid Install Sprinkler is listed by Underwriters Laboratories (UL) for specific applications with a ceiling height greater than 45 ft (13,7 m) up to and including 48 ft (14,6 m), and a storage arrangement up to and including 43 ft (13,1 m). For guidelines for the ESFR-25 RIS Specific Applications Listing (UL) Design Criteria, see Table C.

Design Criteria

The following general guidelines provided for the TYCO Model ESFR-25 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 ft² (9,3 m²)

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

Minimum Coverage Area

64 ft² (5,8 m²) 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

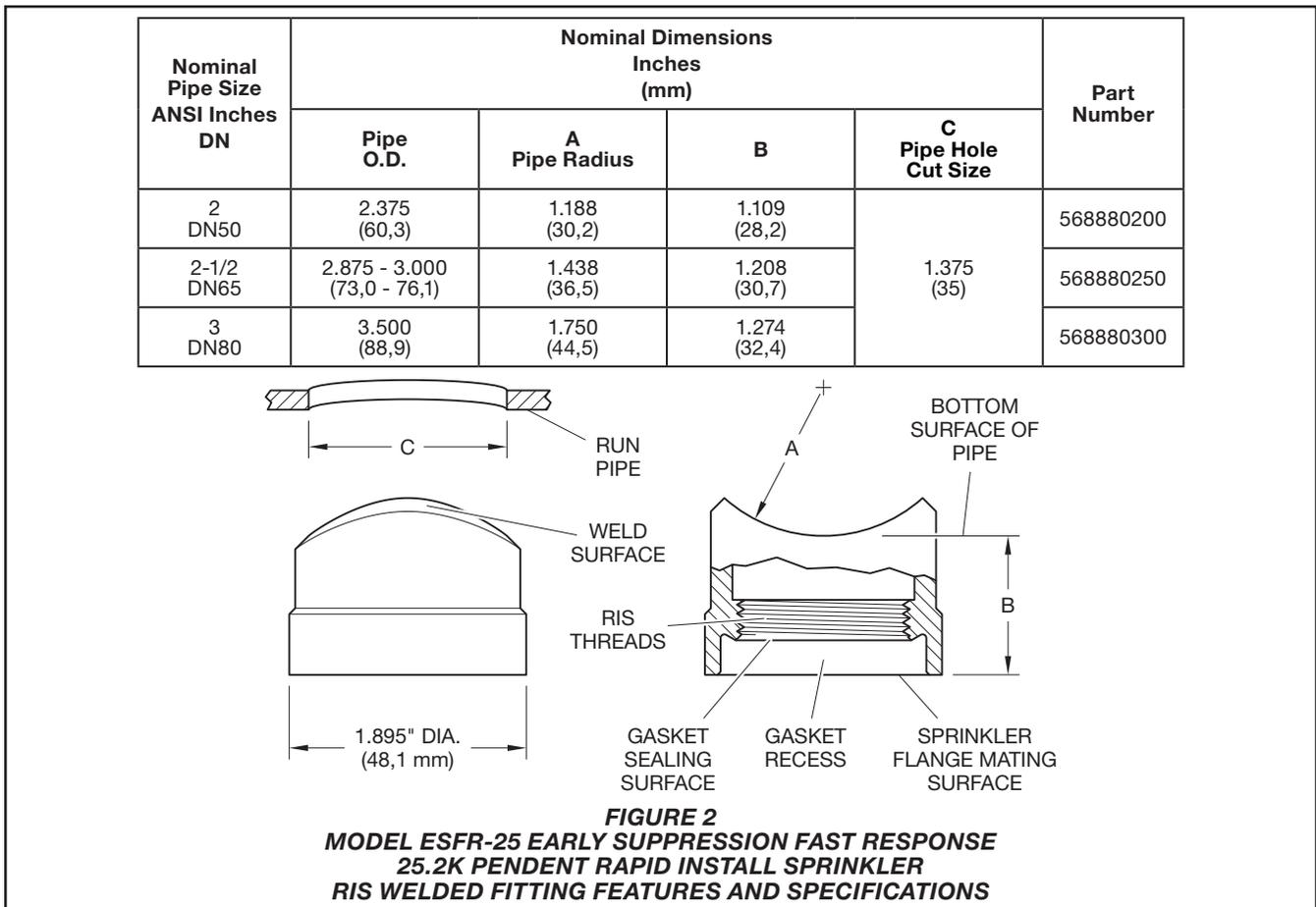
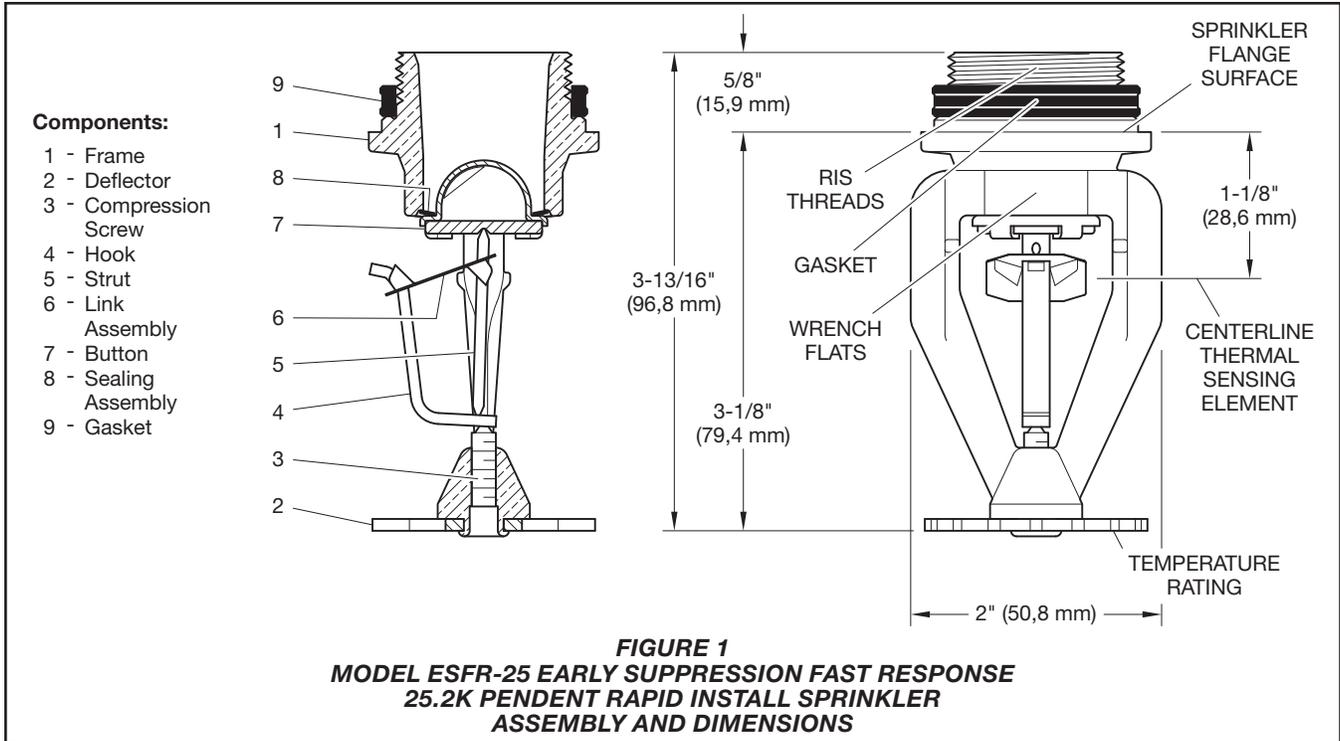
6 in. to 18 in. (152 mm to 457 mm)

FM Global

Centerline of Thermal Sensing

Element-to-Ceiling Distance

Refer to FM Global 2-0 for Storage Sprinklers.



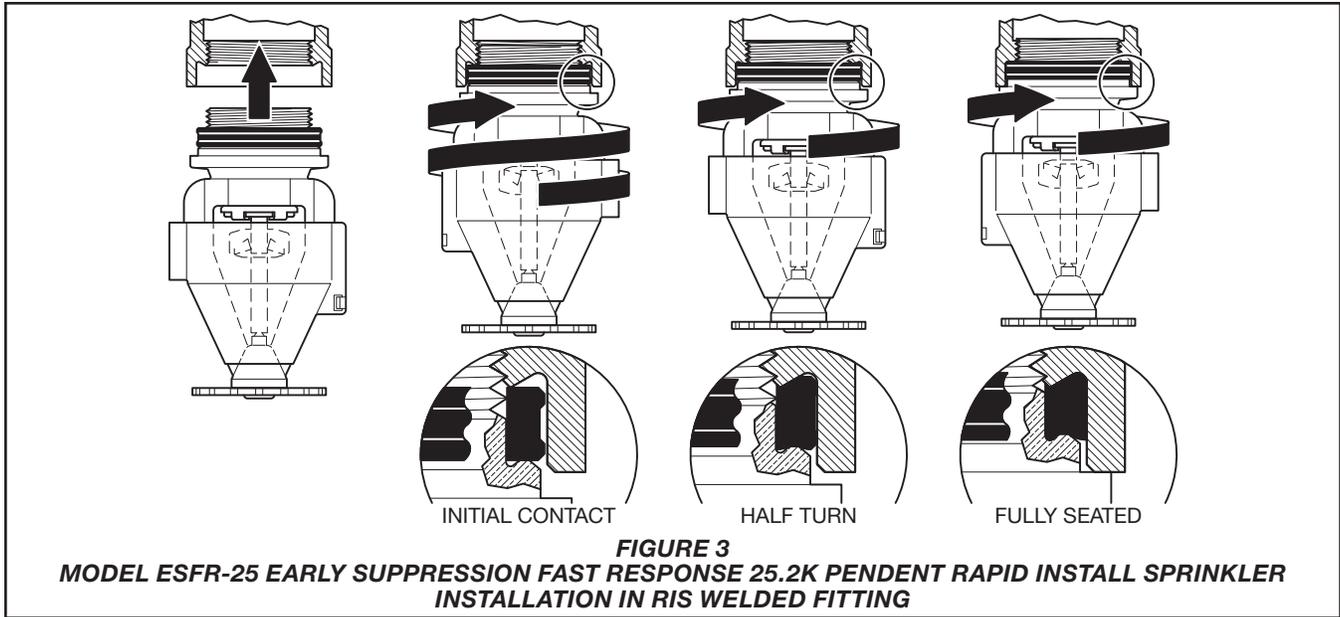
| Storage Type | NFPA | FM Global |
|---|-------------------------------|---------------------------------------|
| Sprinkler Type | ESFR | Storage |
| Response Type | FR | QR |
| System Type | Wet | Wet |
| Temperature Rating °F (°C) | 165°F (74°C) 212°F (100°C) | 165°F (74°C) 212°F (100°C) |
| Open 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 (Refer to the Standard) | Refer to NFPA 13 | Refer to FM Global 8-21 |
| Flammable/Ignitable Liquid Storage (Refer to the Standard) | Refer to NFPA 30 | Refer to FM Global 7-29 |
| Aerosol Storage (Refer to the Standard) | Refer to NFPA 30B | Refer to FM Global 7-31 |
| Automotive Components in Portable Racks (Control mode only; refer to the Standard) | Refer to NFPA 13 | N/A |

N/A – Not Applicable

TABLE B
MODEL ESFR-25 EARLY SUPPRESSION FAST RESPONSE
25.2K PENDENT RAPID INSTALL SPRINKLER
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW

| Description | Specification, UL |
|---|---|
| Sprinkler Type | ESFR |
| Temperature Rating °F (°C) | 165°F (74°C) 212°F (100°C) |
| Response Type | QR |
| Sprinkler Position | Pendent, frame arms aligned with pipe, deflectors parallel with ceiling or roof |
| System Type | Wet |
| Maximum Area of Coverage | 100 ft ² (9,3 m ²) |
| Minimum Area of Coverage | 64 ft ² (5,8 m ²) |
| Maximum Slope Ceiling | 2 in. rise for 12 in. run (16.7%) |
| Maximum Spacing | 10 ft (3,1 m) |
| Minimum Spacing | 8 ft (2,4 m) |
| Deflector Distance from Walls | Minimum of 4 in. (100 mm) from walls but no more than 1/2 the allowable distance permitted between sprinklers |
| Deflector to Top of Storage | Minimum of 36 in. (914 mm) |
| Deflector to Ceiling Distance | 6 in. to 14 in. (152 mm to 356 mm) |
| Maximum Ceiling Height | 48 ft (14,6 m) |
| Maximum Storage Height | 43 ft (13,1 m) |
| Storage Arrangement | Palletized, solid piled, open frame; single row or double row |
| Commodity | Class I - IV, Cartoned unexpanded plastic |
| Sprinkler System Design | NFPA 13 for ESFR Sprinklers based upon 45 psi (3,1 bar) design pressure 169 gpm (640 Lpm) with 12 sprinkler remote area |
| Obstruction Criteria | Reference NFPA 13, Chapter 8 |
| Minimum Aisle Width | 5 ft (1,5 m) |
| Hose Stream allowance and Water Supply Duration | 250 gpm for 60 minutes (950 Lpm for 60 minutes) |

TABLE C
MODEL ESFR-25 EARLY SUPPRESSION FAST RESPONSE
25.2K PENDENT RAPID INSTALL SPRINKLER
SPECIFIC APPLICATION LISTING (UL)
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW



Installation

The TYCO Model ESFR-25 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-25 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-25 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-25 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-25 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-25 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.



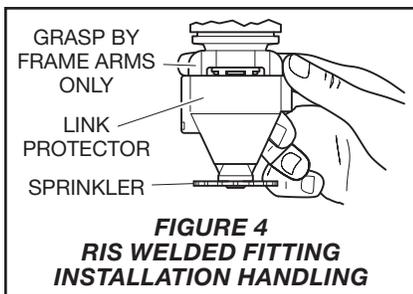


FIGURE 4
RIS WELDED FITTING
INSTALLATION HANDLING

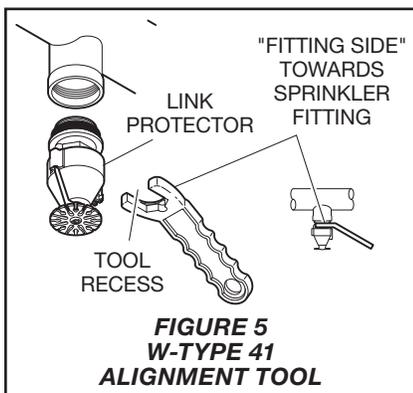


FIGURE 5
W-TYPE 41
ALIGNMENT TOOL

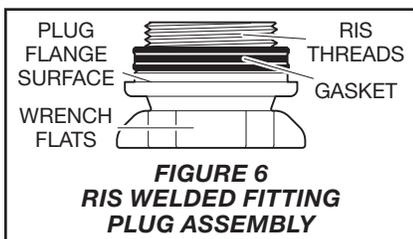


FIGURE 6
RIS WELDED FITTING
PLUG ASSEMBLY

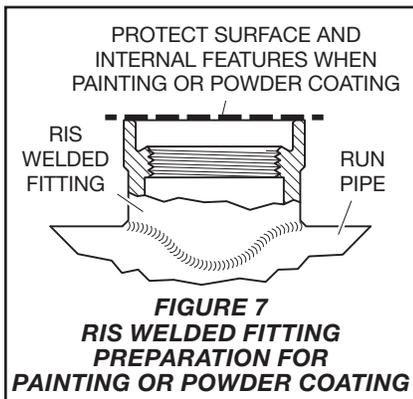


FIGURE 7
RIS WELDED FITTING
PREPARATION FOR
PAINTING OR POWDER COATING

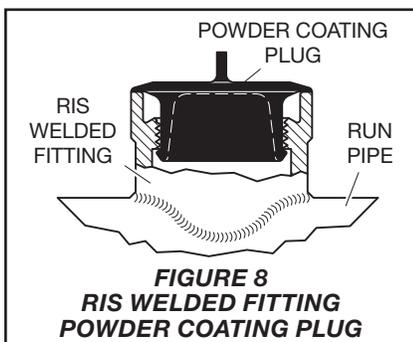


FIGURE 8
RIS WELDED FITTING
POWDER COATING PLUG

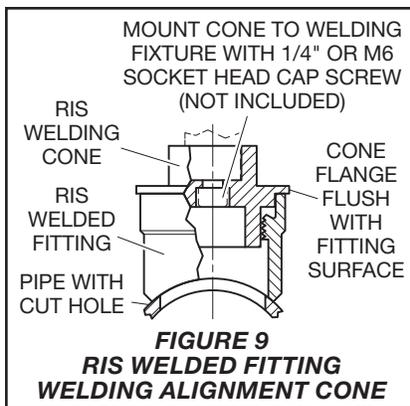


FIGURE 9
RIS WELDED FITTING
WELDING ALIGNMENT CONE

Care and Maintenance

The TYCO Model ESFR-25 25.2 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.

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-25 Early Suppression, Fast Response 25.2K Pendent Rapid Install Sprinkler (TY9220), (specify temperature rating), P/N (specify):

165°F (74°C) 58-488-1-165
212°F (100°C) 58-488-1-212

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.



TFP328 Change History Appendix

| ISSUE DATE | NOTES |
|------------|---|
| 03-23 | Page 6, 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 7 as Figure 4; Page 7, 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 6, 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 6, 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 7, 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. |
| 12-20 | New Technical Data Sheet TFP328 describes Model ESFR-25 Pendent RIS Rapid Install Sprinkler. |