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## Model ESFR-22 22.4 K-factor Pendent Sprinklers 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/TFP321](http://docs.jci.com/tycofire/TFP321)

## General Description

The TYCO Model ESFR-22 Pendent Sprinklers are Early Suppression, Fast Response (ESFR) sprinklers with a nominal K-factor of 22.4. The sprinkler assembly is shown in Figure 1. The sprinklers' suppression-mode design is especially advantageous as a means of eliminating the use of in-rack sprinklers when protecting high-piled storage.

The Model ESFR-22 Sprinklers are primarily used for ceiling-only sprin-

kler protection of the following storage applications:

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

**Note:** The sprinklers are not limited to these storage applications.

For more specific criteria, see the Technical Data section, Table A, and the applicable design standard.

The Model ESFR-22 Sprinklers 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 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 installation standard, or other applicable standard, must be referenced to ensure applicability and to obtain complete installation guidelines. The general guidelines in this technical data sheet are not intended to provide complete installation criteria.



## Sprinkler Identification Number

See Table A

## Technical Data

### Approvals

UL and C-UL Listed  
FM Approved  
VdS Approved  
LPCB Certified  
EAC Approved

### Finish

Natural Brass

### Physical Characteristics

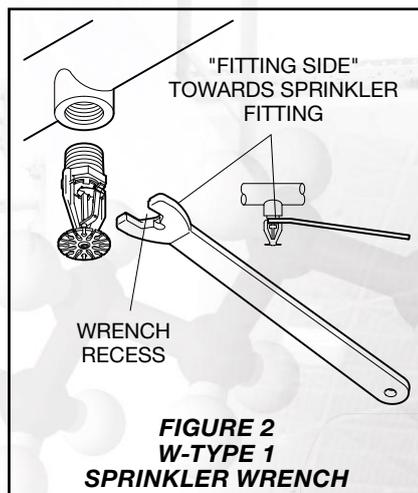
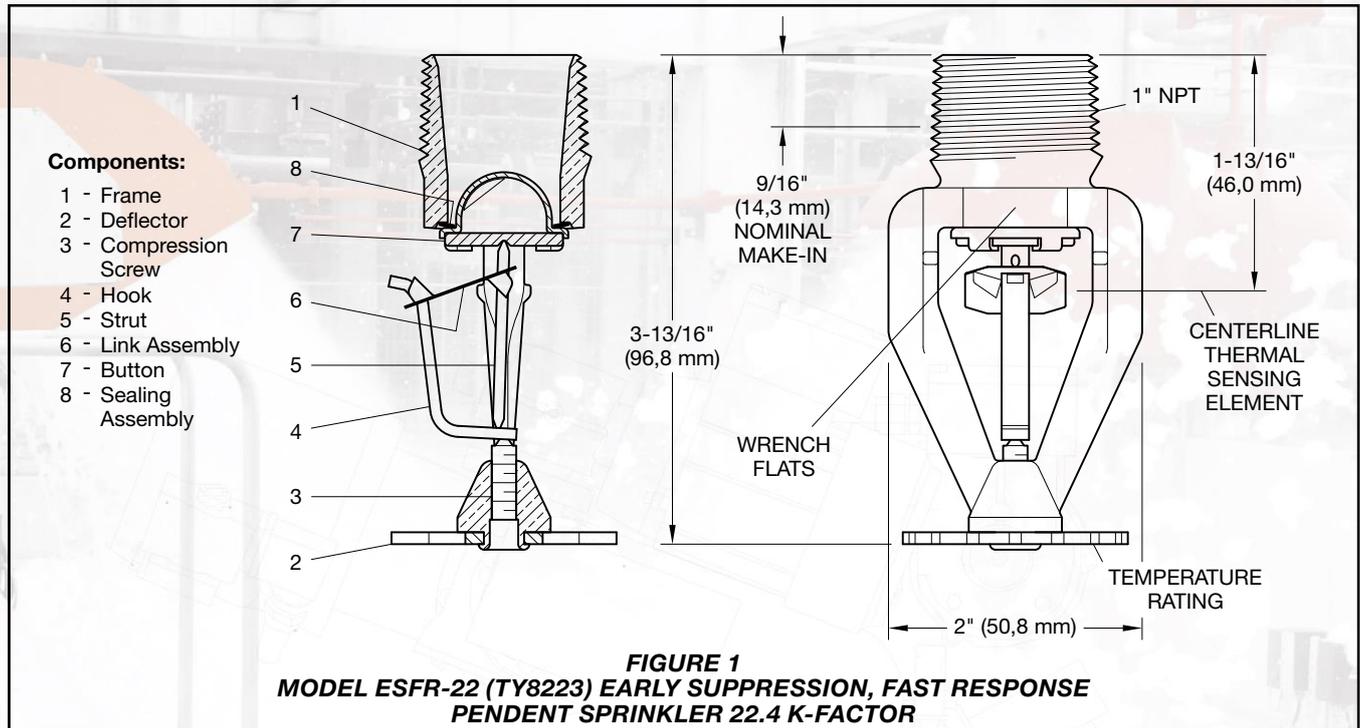
Frame	.....	Brass
Deflector	.....	Bronze
Compression Screw	.....	Stainless Steel
Hook	.....	MONEL
Strut	.....	MONEL
Link Assembly	.....	Solder, Nickel
Button	.....	Copper/Stainless Steel
Sealing Assembly	.....	Beryllium Nickel w/TEFLON

### Additional Technical Data

See Table A

## Operation

The fusible link assembly is comprised of two link halves that are 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.



Item	Description
Sprinkler Identification Number (SIN)	TY8223
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> )
Thread Size	1 in. NPT or ISO 7-R 1
Sprinkler Orientation	Pendent
Maximum Working Pressure, psi (bar)	175 psi (12,1 bar)

**TABLE A**  
**MODEL ESFR-22 PENDENT SPRINKLER**  
**TECHNICAL DATA**

## Design Criteria

Use the following guidelines about the TYCO Model ESFR-22 Sprinklers for quick reference.

The National Fire Protection Association (NFPA) and FM Global 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.

In all cases, the appropriate NFPA or FM Global installation standard must be

referenced to ensure applicability and to obtain complete installation guidelines. The guidelines are not intended to provide complete installation criteria. For more information, see Table B.

### Design Guidelines

#### Roof Construction

Applications include unobstructed or obstructed constructions, such as smooth ceilings, bar joists, beam and girder, or similar constructions.

**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>)

#### 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)

#### Deflector-to-Ceiling Distance

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

#### Centerline of Thermal Sensing Element-to-Ceiling Distance

FM Global: 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	165°F (74°C) 212°F (100°C)	165°F (74°C) 212°F (100°C)
Open Frame (for example, 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 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 2-0 and 8-9
Idle Pallet Storage	Refer to NFPA 13	Refer to FM 2-0, 8-9, and 8-24
Rubber Tire Storage	Refer to NFPA 13	Refer to FM 2-0 and 8-3
Roll Paper Storage (Refer to the Standard)	Refer to NFPA 13	Refer to FM 8-21
Flammable/Ignitable Liquid Storage (Refer to the Standard)	Refer to NFPA 30	Refer to FM 7-29
Aerosol Storage (Refer to the Standard)	Refer to NFPA 30B	Refer to FM 7-31
Automotive Components in Portable Racks (Control mode only; refer to the Standard)	N/A	N/A

N/A – Not Applicable

**TABLE B**  
**MODEL ESFR-22 PENDENT SPRINKLERS**  
**COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW**

## Installation

The TYCO Model ESFR-22 Sprinklers must be installed in accordance with the following instructions.

### General Instructions

Damage to the fusible link assembly during installation can be avoided by handling the sprinkler by the frame arms only (that is, do not apply pressure to the fusible link assembly), and by using the appropriate sprinkler wrench. Failure to do so can lead to an unstable link assembly and premature activation of the sprinkler. Damaged sprinklers must be replaced.

A leak-tight 1 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 0 to 30 lb-ft (26,8 to 40,2 N·m). Higher levels of torque can distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

### Installing the Sprinkler

To install the sprinkler, perform the following steps:

**Note:** *Install the Model ESFR-22 Pendent Sprinkler in the pendent position as shown in Figure 2.*

**Step 1.** Handle the Model ESFR-22 Sprinkler only by the frame arms. Apply pipe-thread sealant to the sprinkler. Hand-tighten the sprinkler into the sprinkler fitting, and do not apply pressure to the link assembly.

**Step 2.** Use only the W-Type 1 Sprinkler Wrench as shown in Figure 2 to install the sprinkler. Fully engage or seat the wrench recess on the sprinkler wrench flats as shown in Figure 1 and wrench-tighten.

**Step 3.** After installation, inspect the link assembly of each sprinkler for damage. In particular, verify that the link assembly and hook are positioned as shown in Figures 1 and 2, and that the link assembly is not bent, creased, or forced out of normal position in any way. Replace damaged sprinklers.

## Care and Maintenance

The TYCO Model ESFR-22 Pendent Sprinklers must be maintained and serviced in accordance with the following information.

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 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 any other action, must be replaced.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with the following documents and standards:

- This technical data sheet
- Applicable standards of the National Fire Protection Association such as NFPA 25
- 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 with 1 in. NPT Thread Connection**  
Specify: Model ESFR-22 (TY8223), K=22.4, Early Suppression, Fast Response Pendent Sprinkler with 1 in. NPT thread connection, (specify) temperature rating, Natural Brass, P/N (specify):

165°F (74°C) .....	58-464-1-165
212°F (100°C) .....	58-464-1-212

**Special Order Sprinkler Assemblies with ISO 7-1 Thread Connections**  
Specify: Model ESFR-22 (TY8223), K=22.4, Early Suppression, Fast Response Pendent Sprinkler with ISO 7-1 thread connection, (specify) temperature rating, Natural Brass, P/N (specify):

165°F (74°C) .....	58-465-1-165
212°F (100°C) .....	58-465-1-212

**Sprinkler Wrench**  
Specify: W-Type 1 Sprinkler Wrench, P/N 56-872-1-025

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## TFP321 Change History Appendix

ISSUE DATE	NOTES
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.
04-22	Page 1, added QR code and URL to allow convenient access to electronic version from printed document; Page 1, Approvals sub-section, added EAC Approved.
03-21	Removed statement from General Description section indicating applications expanding beyond recognized installation standards and advising customers to contact Technical Services for fire test information potentially acceptable to authority having jurisdiction; Clarified storage and ceiling heights allowable per NFPA and FM in high-piled storage applications.
12-20	Added LPCB and VdS Approved; Changed Button to two-piece design, formerly single-piece; Removed greater coverage area statements from Maximum Coverage Area and Maximum Spacing sections in Design Criteria; Removed references to other Tyco ESFR technical data sheets.
03-20	Table B Commodity Selection and Design Criteria, changed NFPA Response Type to Fast Response (FR), formerly Quick Response (QR).
08-18	Updated Tyco® branding and document format; Added Johnson Controls copyright; Added disclaimer stating specifications and information subject to change without notice; Added reference to Regulatory and Health Warning Technical Data Sheet TFP2300.
05-18	Organized technical information into tables as required by UL.
01-18	New Technical Data Sheet TFP321 describes Model ESFR-22 22.4 K-factor Early Suppression Fast Response Pendent Sprinkler.

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