



# Model ESFR-22 22.4 K-factor Pendent Sprinklers Early Suppression, Fast Response

## General Description

TYCO Model ESFR-22 Pendent Sprinklers are Early Suppression, Fast Response Sprinklers having a nominal K-factor of 22.4 (Ref. to Figure 1). They are suppression-mode sprinklers that are 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 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 NFPA 13 and FM Global standards
- some storage arrangements of rubber tires, roll paper, flammable liquids, and aerosols

For more specific criteria, refer to Table A as well as the applicable design standard.

The Model ESFR-22 can protect a storage arrangement of 40 ft (12,2 m) with a ceiling height of 45 ft (13,7 m) without requiring in-rack sprinklers. In addition, it can be installed with a maximum deflector-to-ceiling distance of 18 in. (460 mm).

### 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.

Applications for TYCO ESFR Sprinklers are expanding beyond currently recognized installation standards. For information on research fire tests (for example, with flammable liquids and aerosols) that may be acceptable to an authority having jurisdiction, contact Johnson Controls Technical Services.

### NOTICE

The 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 (for example, 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

Refer to Table A for sprinkler identification number.



## Technical Data

### Approvals

UL and C-UL Listed  
FM Approved

### Finish

Natural Brass

### Physical Characteristics

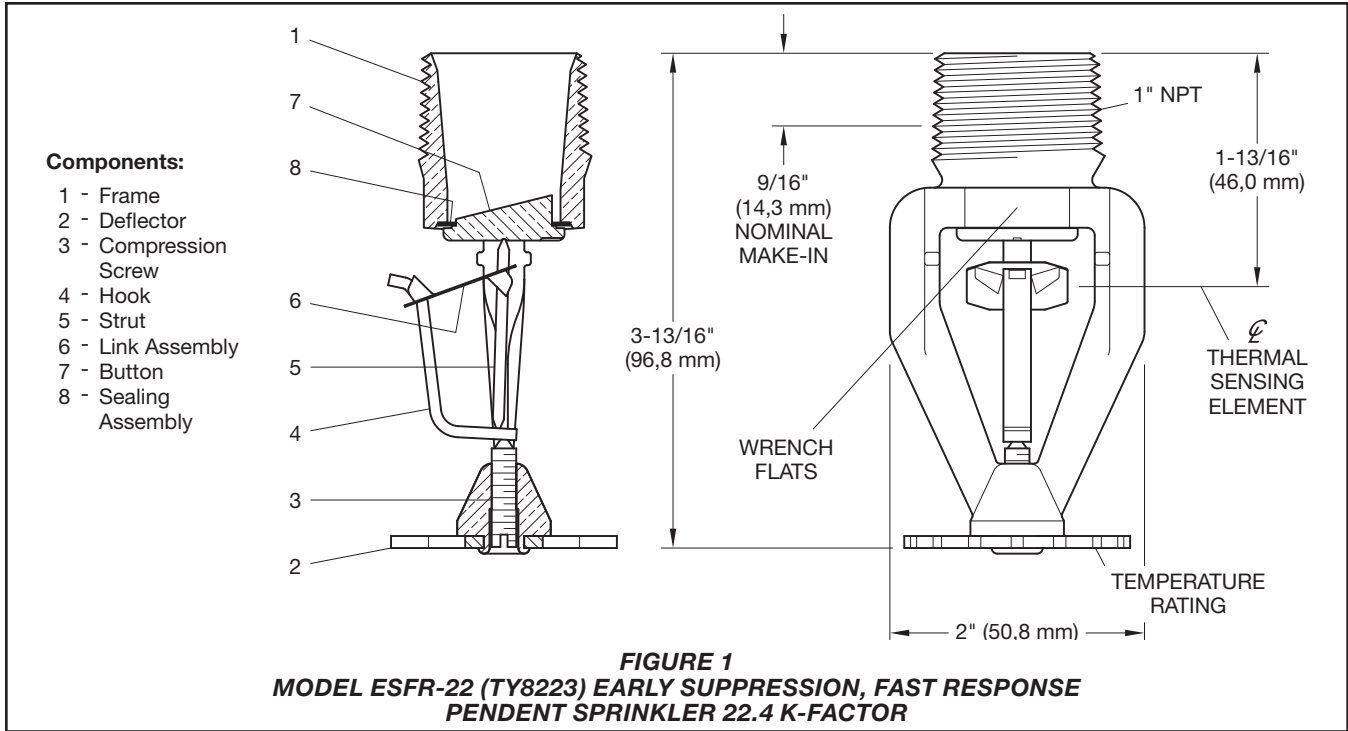
Frame	Brass
Deflector	Bronze
Compression Screw	Stainless Steel
Hook	MONEL
Strut	MONEL
Link Assembly	Solder, Nickel
Button	Brass
Sealing Assembly	Beryllium Nickel w/TEFLON

### Additional Technical Data

Refer to Table A for additional technical data.

## 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.



## Design Criteria

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

The National Fire Protection Association (NFPA) and FM Global (FM Approvals) provide installation standards that must be used to properly design an automatic sprinkler system utilizing Early Suppression, Fast Response (ESFR) Sprinklers. The guidelines provided by NFPA and FM Approvals may differ. Consequently, the appropriate standard must be used for a given installation.

In all cases, the appropriate NFPA or FM Approvals installation standard must be referenced to ensure applicability and to obtain complete installation guidelines. The following general guidelines are not intended to provide complete installation criteria. Refer to Table B for additional information.

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**

In addition to this technical data sheet, the following Technical Data Sheets describe other TYCO ESFR Sprinklers:

- **TFP312**  
Model ESFR-25 (TY9226)  
K=25.2 Pendent Sprinkler
- **TFP315**  
Model ESFR-17 (TY7226)  
K=16.8 Pendent Sprinkler
- **TFP316**  
Model ESFR-17 (TY7126)  
K=16.8 Upright Sprinkler
- **TFP317**  
Model ESFR-17 (TY7223)  
K=16.8 Pendent Sprinkler

- **TFP318**  
Model ESFR-1 (TY6226)  
K=14.0 Pendent Sprinkler
- **TFP319**  
Model ESFR-14 (TY6236)  
K=14.0 Pendent Sprinkler
- **TFP320**  
Model ESFR-17 (TY7229)  
K=16.8 Pendent Sprinkler

### Roof Construction

Unobstructed or obstructed construction, such as smooth ceiling, bar joists, beam and girder, etc. Where the depths of the solid structural members, (for example, beams and stem) exceed 12 in. (302 mm), install ESFR Sprinklers in each channel formed by the structural members.

<b>Storage Type</b>	<b>NFPA</b>	<b>FM Global</b>
Sprinkler Type	ESFR	Storage
Response Type	QR	QR
System Type	Wet	Wet
Temperature Rating °F (°C) <sup>1</sup>	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 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**

**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>)

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); in some cases, installation standards permit a greater spacing

**Minimum Spacing**

8 ft (2,4 m)

**Minimum Clearance to Commodity**

36 in. (914 mm)

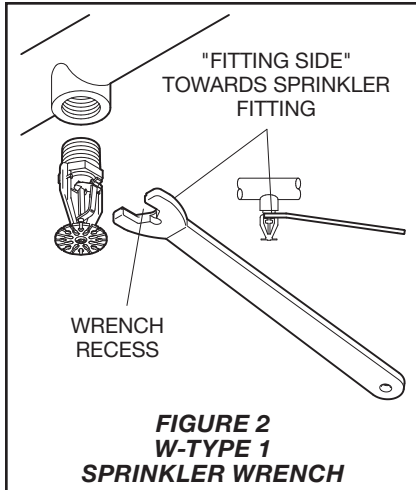
**Deflector-to-Ceiling Distance**

NFPA – 6 to 18 in. (152 to 457 mm)

**Centerline of Thermal Sensing**

**Element-to-Ceiling Distance**

FM Global – See FM Global 2-0 for Storage Sprinklers



**FIGURE 2**  
**W-TYPE 1**  
**SPRINKLER WRENCH**

## Installation

TYCO Model ESFR-22 Pendent Sprinklers must be installed in accordance with this section.

### 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 20 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.

**Note:** Install the Model ESFR-22 Pendent Sprinkler in the pendent position (Ref. Figure 2).

**Step 1.** With pipe-thread sealant applied, hand-tighten the sprinkler into the sprinkler fitting. Do not apply pressure to the Link Assembly, and handle the Model ESFR-22 Pendent Sprinkler only by the Frame arms.

**Step 2.** Use only the W-Type 1 Sprinkler Wrench (Ref. Figure 2) to install the Model ESFR-22 Pendent Sprinkler. Fully engage (seat) the wrench recess on the sprinkler wrench flats (Ref. Figure 1) and wrench-tighten.

**Step 3.** After installation, inspect the Link Assembly of each Model ESFR-22 Pendent Sprinkler for damage. In particular, verify that the Link Assembly and Hook are positioned as illustrated 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

TYCO Model ESFR-22 Pendent 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 the like, 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 (for example, 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.

## 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 Inch 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