



# Model ESFR-25 25.2 K-factor Pendent Sprinkler Early Suppression, Fast Response

## General Description

TYCO Model ESFR-25 Pendent Sprinklers are Early Suppression, Fast Response (ESFR) sprinklers having a nominal K-factor of 25.2 (Ref. 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-25 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, aerosols, and automotive components

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

The Model ESFR-25 Pendent Sprinklers provide the system designer with hydraulic and sprinkler placement options not presently available to the traditional ESFR sprinklers having nominal K-factors of 14.0 and 16.8. In particular, the Model ESFR-25 Sprinkler has been designed to operate at

substantially lower-end head pressures, as compared to ESFR Sprinklers having 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.

Also, Model ESFR-25 Sprinklers permit use of a maximum deflector-to-ceiling distance of 18 in. (460 mm) versus 14 in. (356 mm). Additionally, a storage arrangement of 40 ft (12,2 m) with a ceiling height of 45 ft (13,7 m) does not require in-rack sprinklers as do other ESFR Sprinklers having nominal K-factors of 14.0 and 16.8.

The Model ESFR-25 Sprinklers are 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.

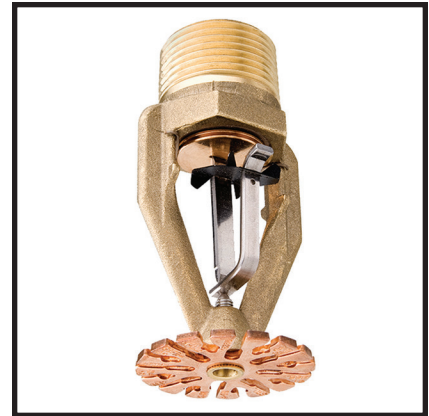
Applications for the TYCO ESFR Sprinklers are expanding beyond currently recognized installation standards. For information on research fire tests, such as with flammable liquids and aerosols, that may be acceptable to an authority having jurisdiction, contact Technical Services.

### NOTICE

*The Model ESFR-25 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)

Refer to Table A for sprinkler identification number.

## Technical Data

### Approvals

- UL and C-UL Listed
- FM Approved
- VdS Approved
- NYC Approved under MEA 356-01-E
- LPCB Certified (Cert. Nos. 094b and 0071)
- CE Certified (Certificate of Conformity 1725-CPR-F0010)

### Finish

Natural Brass

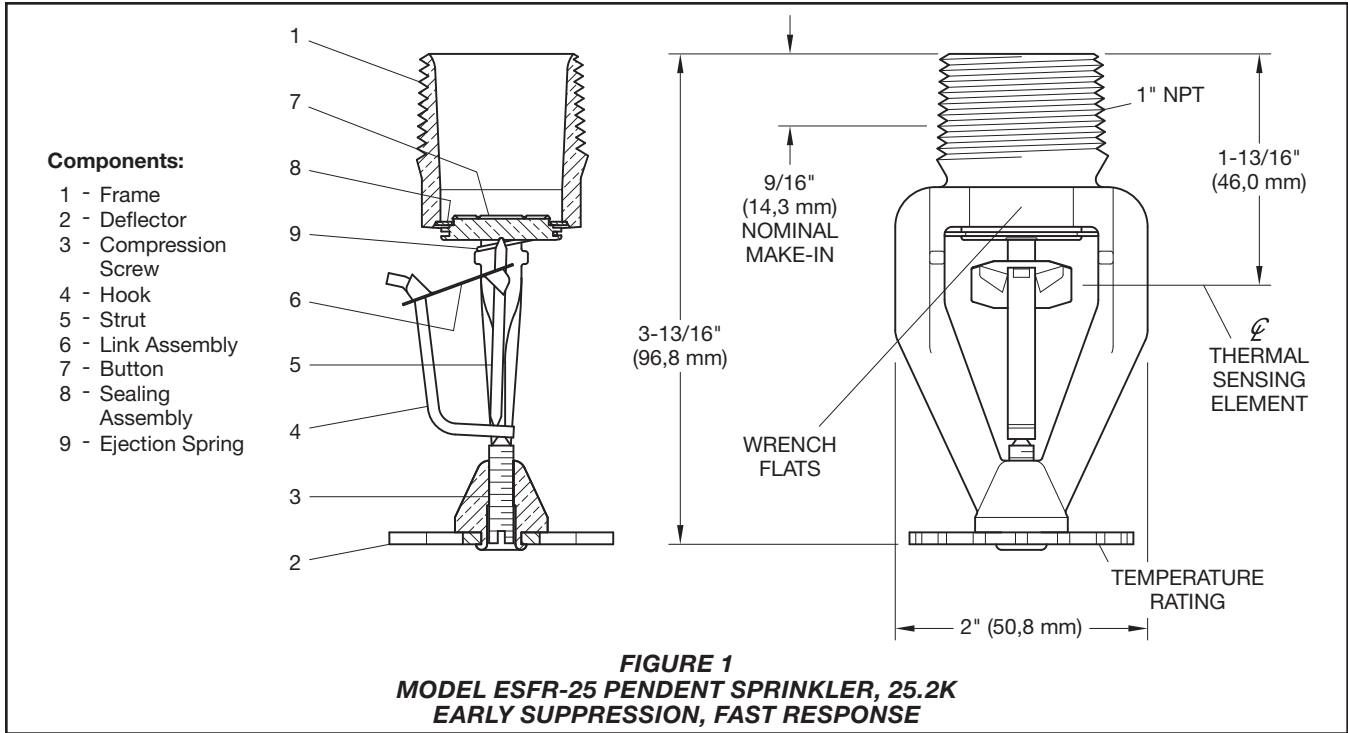
### Physical Characteristics

|                   |       |                           |
|-------------------|-------|---------------------------|
| Frame             | ..... | Brass                     |
| Deflector         | ..... | Bronze                    |
| Compression Screw | ..... | Stainless Steel           |
| Hook              | ..... | MONEL                     |
| Strut             | ..... | MONEL                     |
| Link Assembly     | ..... | Solder, Nickel            |
| Button            | ..... | Brass                     |
| Sealing Assembly  | ..... | Beryllium Nickel w/TEFLON |
| Ejection Spring   | ..... | INCONEL                   |

### Additional Technical Data

Refer to Table A for additional technical data.

**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.



## 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-25 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 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. Refer to Table B for additional information.

| Item   | Description   |
|--|---|
| Sprinkler Identification Number (SIN)                      | TY9226  |
| K-factor, gpm/psi <sup>1/2</sup> (lpm/bar <sup>1/2</sup> ) | 25.2 gpm/psi <sup>1/2</sup> (362,9 lpm/bar <sup>1/2</sup> ) |
| Temperature Rating °F (°C)                                 | 165°F (74°C)<br>212°F (100°C)                               |
| 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-25 PENDENT SPRINKLER**  
**TECHNICAL DATA**

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

- **TFP313**  
Model ESFR-22 (TY8226)  
K=22.4 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. 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>)

| <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)  | 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)   | Refer to NFPA 13              | N/A                                   |

N/A – Not Applicable

**TABLE B**  
**MODEL ESFR-25 PENDENT SPRINKLER**  
**COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW**

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)

**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**

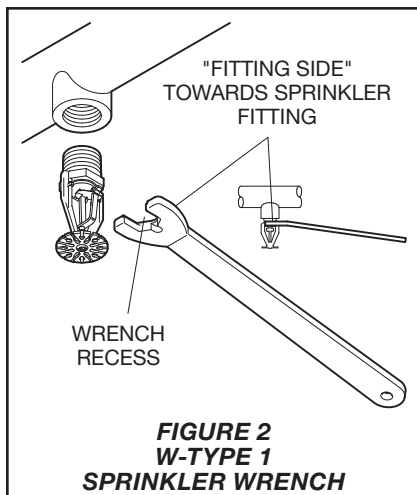
Refer to FM Global 2-0 for Storage  
Sprinklers.

## **Specific Application Listing (UL)**

TYCO Model ESFR-25 Pendent Sprinklers are 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). Refer to Table C for guidelines for the TYCO Model ESFR-25 Pendent Sprinkler Specific Applications Listing (UL) Design Criteria. Refer to Table C for additional information.

| Description                                     | Specification, UL   |
|---|---|
| Sprinkler Type                                  | ESFR  |
| Temperature Rating °F (°C)                      | 165°F (74°C)<br>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 <sup>2</sup> (9,3 m <sup>2</sup> )   |
| Minimum Area of Coverage                        | 64 ft <sup>2</sup> (5,8 m <sup>2</sup> )  |
| 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 PENDENT SPRINKLER**  
**SPECIFIC APPLICATION LISTING (UL)**  
**COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW**



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

## Installation

TYCO Model ESFR-25 Early Suppression, Fast Response 25.2K 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 and by using the appropriate sprinkler wrench. Do not apply pressure to the fusible Link Assembly. 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-25 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-25 Pendent Sprinkler only by the Frame arms.

**Step 2.** Wrench-tighten the Model ESFR-25 Pendent Sprinkler using only the W-Type 1 Sprinkler Wrench (Ref. Figure 2) and by fully engaging (seating) the wrench on the sprinkler wrench flats (Ref. Figure 1).

**Step 3.** After installation, inspect the Link Assembly of each Model ESFR-25 Pendent Sprinkler for damage. In particular, verify that the Link Assembly and Hook are positioned as illustrated in Figure 1, 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-25 Early Suppression, Fast Response 25.2K 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, permission to shut down the affected fire protection system must be obtained 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. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. Refer to 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 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.

## 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 Sprinklers (TY9226), (specify temperature rating), with Natural Brass finish, P/N (specify):

|                         |              |
|-------------------------|--------------|
| 165°F (74°C) . . . . .  | 58-441-1-165 |
| 212°F (100°C) . . . . . | 58-441-1-214 |

### Special Order

#### Sprinkler Assemblies with ISO 7-1 Thread Connection

Specify: Model ESFR-25, Early Suppression, Fast Response 25.2K Pendent Sprinklers (TY9226) with ISO 7-1 thread connection, (specify temperature rating), with Natural Brass finish, P/N (specify):

|                         |              |
|-------------------------|--------------|
| 165°F (74°C) . . . . .  | 58-442-1-165 |
| 212°F (100°C) . . . . . | 58-442-1-214 |

### Sprinkler Wrench

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

