

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 A 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 inches (460 mm) versus 14 inches (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.

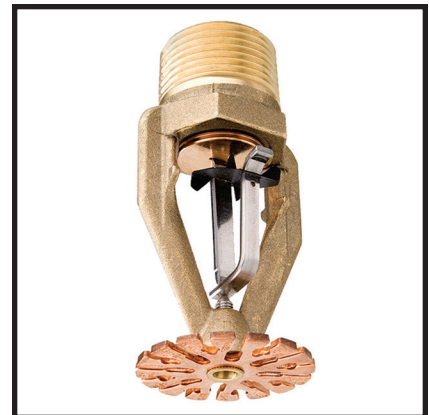
Applications for the TYCO ESFR Sprinklers are expanding beyond currently recognized installation standards. For information on research fire tests (e.g., with flammable liquids and aerosols) that may be acceptable to an authority having jurisdiction, contact Tyco Fire Protection Products (TFPP) Technical 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 (e.g., 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 guide-



lines. The general guidelines in this data sheet are not intended to provide complete installation criteria.

Sprinkler Identification Number (SIN)

TY9226

TY9226 is a re-designation for Central SIN 9226, Gem SIN G8441, and Star SIN S8010.

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-CPD-H0010)

Maximum Working Pressure

175 psi (12,1 bar)

Pipe Thread Connections

1 Inch NPT or ISO 7-R 1

Discharge Coefficient

K=25.2 gpm/psi^{1/2} (362,9 lpm/bar^{1/2})

Temperature Ratings

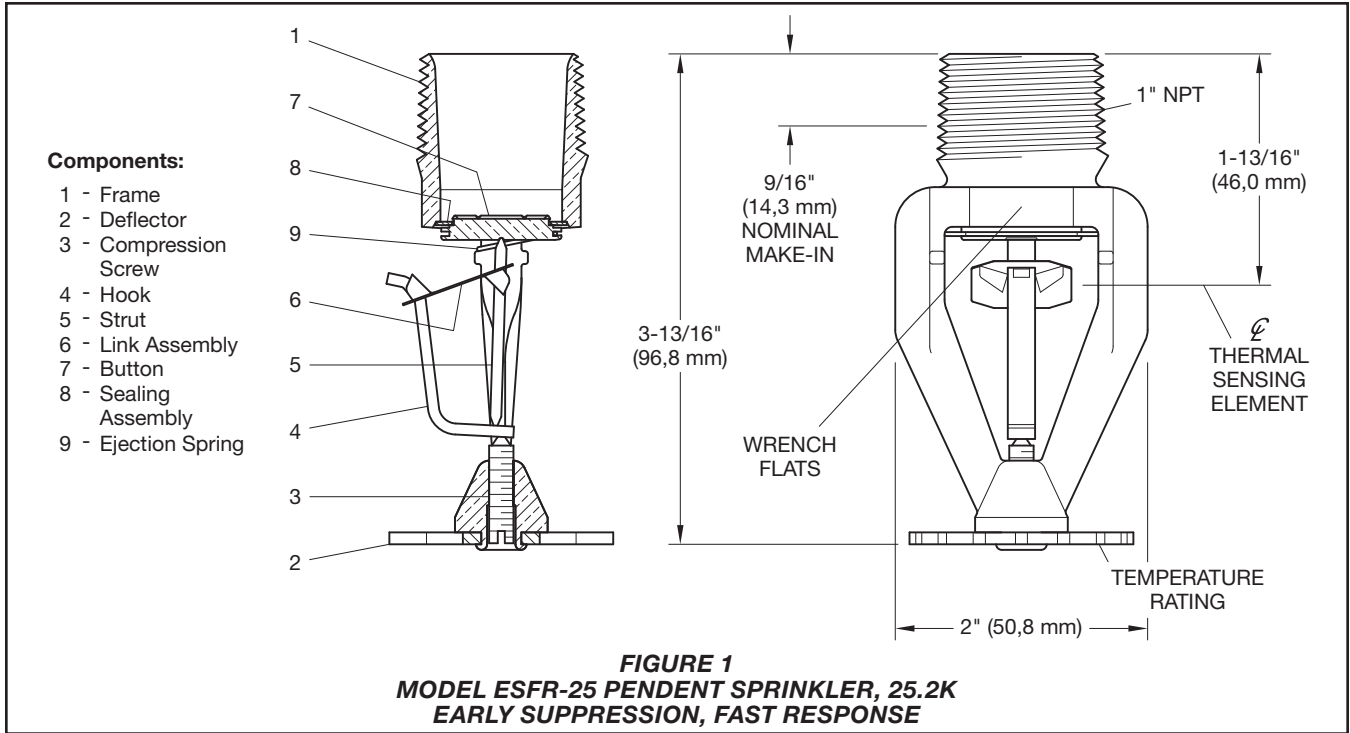
165°F (74°C) and 212°F (100°C)

Finish

Natural Brass

IMPORTANT

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.



Storage Type	NFPA	FM Global
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 Chapters 16 and 17	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 Chapters 14 and 15	Refer to FM Global 2-0 and 8-9
Idle Pallet Storage	Refer to NFPA 13 Chapter 12	Refer to FM Global 2-0, 8-9, and 8-24
Rubber Tire Storage	Refer to NFPA 13 Chapter 18	Refer to FM Global 2-0 and 8-3
Roll Paper Storage (Refer to the Standard)	Refer to NFPA 13 Chapter 19	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 Chapter 20	N/A

N/A – Not Applicable

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

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

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.

In all cases, the appropriate NFPA or FM Global 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.

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

- **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

System Type
Wet Pipe

Roof Construction

Unobstructed or obstructed construction (e.g., smooth ceiling, bar joists, beam and girder, and so forth). Where the depths of the solid structural members (e.g., beams and stem) exceed 12 inches (302 mm), install ESFR Sprinklers in each channel formed by the structural members.

Ceiling Slope

Maximum 2 inch rise for 12 inch run (16.7%)

Maximum Coverage Area

100 ft² (9,3 m²)

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 feet (3,7 m) for building heights up to 30 feet (9,1 m)

10 feet (3,1 m) for building heights greater than 30 feet (9,1 m).

In some cases, installation standards permit a greater spacing.

Minimum Spacing

8 feet (2,4 m)

Minimum Clearance to Commodity

36 inches (914 mm)

NFPA

Deflector-to-Ceiling Distance

6 to 18 inches (152 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), the following guideline are provided for the TYCO Model ESFR-25 Pendent Sprinklers:

Sprinkler Position

Pendent:

Frame arms aligned with pipe
Deflectors parallel with ceiling or roof

System Type

Wet Pipe only

Maximum Area of Coverage

100 ft² (9,3 m²)

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

Minimum Area of Coverage

64 ft² (5,8 m²) according to NFPA 13

Maximum Slope Ceiling

2 inch rise for 12 inch run (16.7%)

Maximum Spacing

10 feet (3,1 m)

In some cases, the installation standards permit a greater spacing.

Minimum Spacing

8 feet (2,4 m)

Temperature Rating

165°F (74°C) and 212°F (100°C)

Deflector Distance from Walls

Minimum of 4 inches (102 mm) from walls but no more than 1/2 the allowable distance permitted between sprinklers

Deflector to Top of Storage

Minimum of 36 inches (914 mm)

Deflector-to-Ceiling Distance

6 to 14 inches (152 to 356 mm)

Maximum Ceiling Height

48 feet (14,6 m)

Maximum Storage Height

43 feet (13,1 m)

Storage Arrangement

Palletized, solid piled, open frame, single row, or double row

Commodity

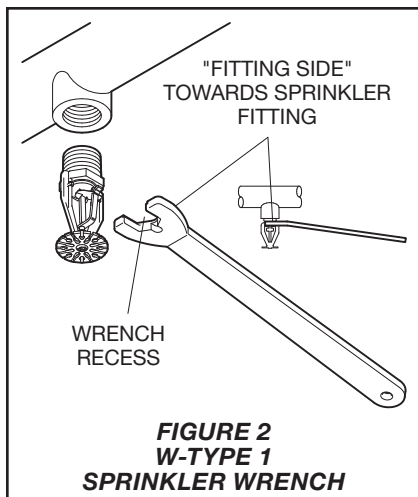
Class I-IV; Cartoned, unexpanded plastic

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

Minimum Aisle Width

5 feet (1,5 m)



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 (i.e., 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 inch NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 20 to 30 lbs.-ft. (26,8 to 40,2 Nm). 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 4. 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 (Ref. Installation section).

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 (e.g., 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 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