Model ESFR-25
25.2 K-factor Pendent 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.

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General Description

The TYCO Model ESFR-25 Pendent Sprinklers are Early Suppression, Fast Response (ESFR) sprinklers with a nominal K-factor of 25.2. The sprinkler assembly is shown in 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, see Table B and the applicable design standard.

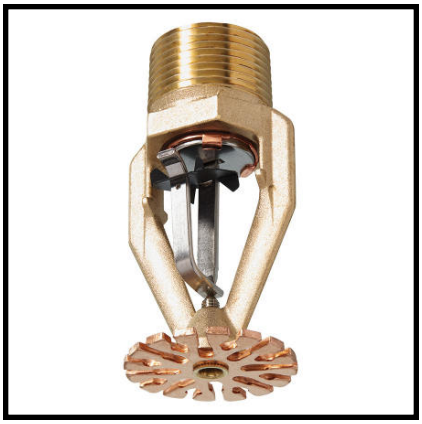
The Model ESFR-25 Pendent Sprinklers provide the system designer with hydraulic and sprinkler placement options not presently available to the traditional ESFR sprinklers having nominal K-factors of 14.0 and 16.8. In particular, the Model ESFR-25 Sprinkler is designed to operate at substantially lower-end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

The Model ESFR-25 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.

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.



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.

Components:

1 - Frame
2 - Deflector
3 - Compression Screw
4 - Hook
5 - Strut
6 - Link Assembly
7 - Button
8 - Sealing Assembly

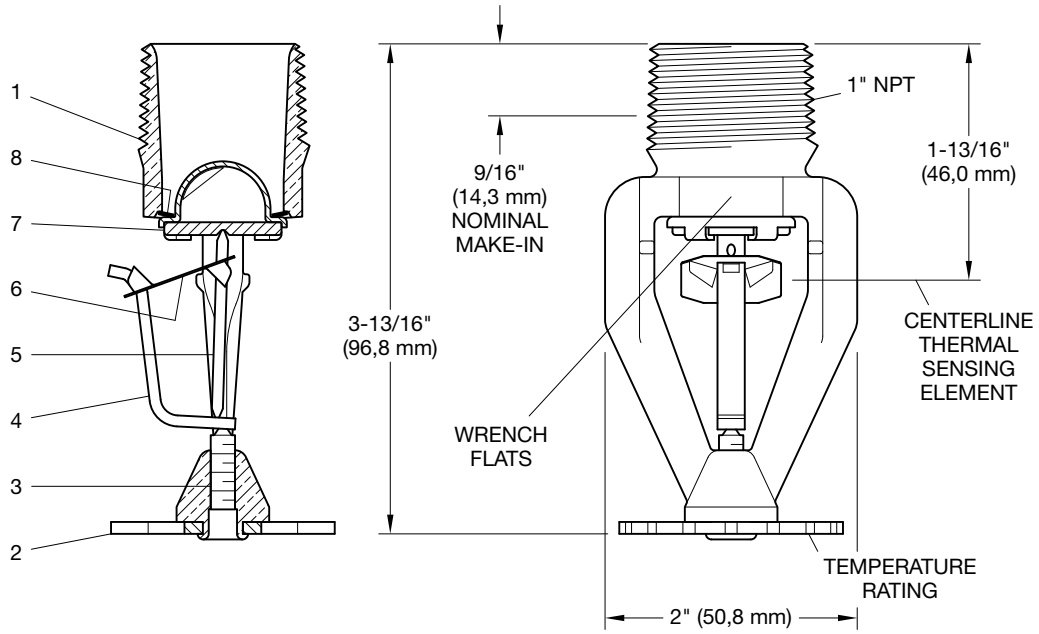


FIGURE 1
MODEL ESFR-25 PENDENT SPRINKLER, 25.2K
EARLY SUPPRESSION, FAST RESPONSE

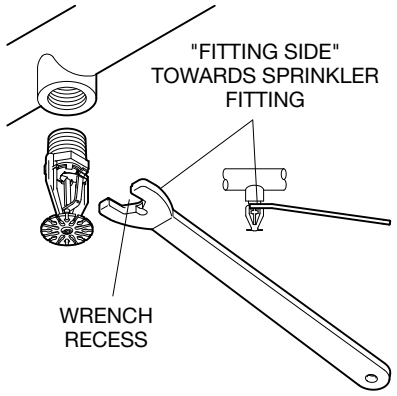


FIGURE 2
W-TYPE 1
SPRINKLER WRENCH

Item	Description
Sprinkler Identification Number (SIN)	TY9226
K-factor, gpm/psi½ (Lpm/bar½)	25.2 gpm/psi½ (362,9 Lpm/bar½)
Temperature Rating ˚F (˚C)	165˚F (74˚C) 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

Sprinkler Identification Number (SIN)

See Table A

Technical Data

Approvals
UL and C-UL Listed
FM Approved
VdS Approved
LPCB Certified (Cert. Nos. 094b and 007l
CE Certified

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.

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.

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 PENDENT SPRINKLER
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW

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)

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)

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).

For guidelines about the TYCO Model ESFR-25 Pendent Sprinkler Specific Applications Listing (UL) Design Criteria, see Table C.

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 ft² (9,3 m²)
Minimum Area of Coverage	64 ft² (5,8 m²)
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 nonexpanded plastic (Refer to NFPA 13)
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	Refer to NFPA 13
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

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.

Installing the Sprinkler

To install the sprinkler, perform the following steps:

Note: *Install the Model ESFR-25 Pendent Sprinkler in the pendent position as shown in 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 sprinkler only by the frame arms.

Step 2. Wrench-tighten the sprinkler using only the W-Type 1 Sprinkler Wrench as shown in Figure 2, and by fully engaging (seating) the wrench on the sprinkler wrench flats as shown in Figure 1.

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 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, 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. For more information, see the Installation section.

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.

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-25 (TY9226), K=25.2, Early Suppression, Fast Response Pendent Sprinkler with 1 in. NPT thread connection, (specify) temperature rating, Natural Brass, P/N (specify):

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

Special Order Sprinkler Assemblies with ISO 7-1 Thread Connection
Specify: Model ESFR-25 (TY9226), K=25.2, Early Suppression, Fast Response Sprinkler with ISO 7-1 thread connection, (specify) temperature rating), Natural Brass, 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

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