

tyco Fire Suppression & Building Products

Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500
Email: techserv@tycofp.com

Model ESFR-25 Early Suppression, Fast Response Pendent Sprinklers 25.2 K-Factor

General Description

The TYCO Model ESFR-25 Pendent Sprinklers are “Early Suppression, Fast Response Sprinklers” having a nominal K-Factor of 25.2. (Refer 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-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 1 in this data sheet as well as the applicable design standard.

The Model ESFR-25 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

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.

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 (360 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.

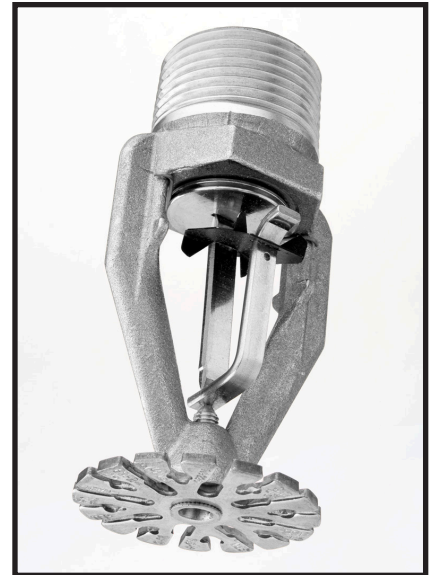
Applications for the TYCO ESFR Sprinklers are expanding beyond currently recognized installation standards. For information on research fire tests (with flammable liquids and aerosols, for example) that may be acceptable to an Authority Having Jurisdiction, contact the Technical Services department.

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, 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.

Owners are responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted 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 data sheet are not intended to provide complete installation criteria.



Model/Sprinkler Identification Number (SIN)

TY9226 - Pendent K=25.2

TY9226 is a re-designation for C9226, G8441, and S8010.

Technical Data

Approvals

UL and C-UL Listed
FM and VdS Approved
LPCB Approved (094b/01 and 071/01)
NYC under MEA 356-01-E

Maximum Working Pressure
175 psi (12,1 bar)

Pipe Thread Connections
1 inch NPT
ISO 7-R1

Discharge Coefficient
K = 25.2 GPM/psi^{1/2}
(362,9 LPM/bar^{1/2})

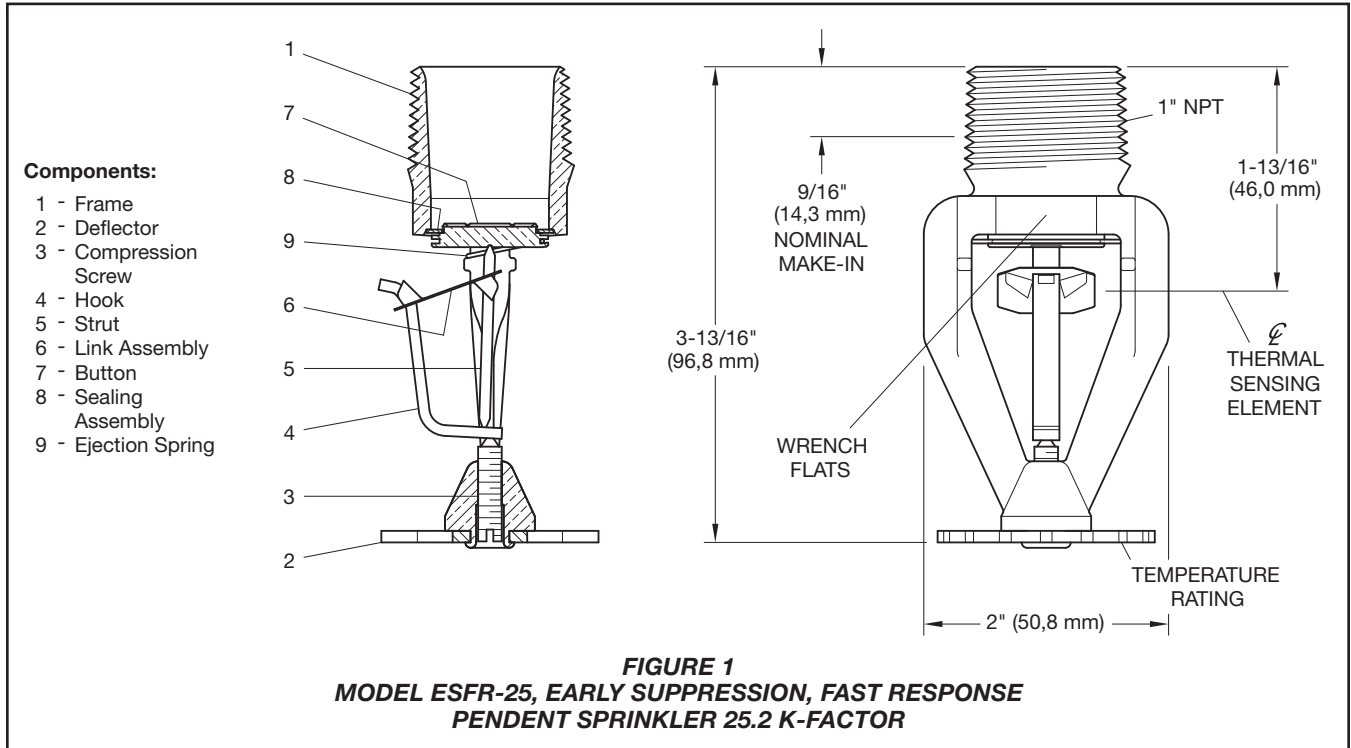


FIGURE 1
MODEL ESFR-25, EARLY SUPPRESSION, FAST RESPONSE
PENDENT SPRINKLER 25.2 K-FACTOR

- Components:**
- 1 - Frame
 - 2 - Deflector
 - 3 - Compression Screw
 - 4 - Hook
 - 5 - Strut
 - 6 - Link Assembly
 - 7 - Button
 - 8 - Sealing Assembly
 - 9 - Ejection Spring

Temperature Ratings

165°F (74°C)
 214°F (101°C)

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 with Teflon*
Ejection Spring.....	Inconel

Patents

U.S.A. Patent Numbers:

- 5,829,532
- 6,059,044
- 6,336,509
- 6,502,643
- 6,868,917
- 7,165,624

Additional Patents pending

Design Criteria

The following general guidelines provided for the TYCO Model ESFR-25 Sprinklers can be used for a quick reference.

NOTICE

The National Fire Protection Association (NFPA) and FM Global (FM) 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 may differ. Consequently, the appropriate standard must be used for a given installation.

In all cases, the appropriate NFPA or FM 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 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
- **TFP318** — Model ESFR-1 (TY6226), K=14.0 Pendent Sprinkler

System Type

Wet pipe system

Roof Construction

Unobstructed or obstructed construction; for example, smooth ceiling, bar joists, beam and girder, and so forth.

Where the depths of the solid structural members (beams and stem, for example) 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 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)

Minimum Spacing

8 feet (2,4 m)

Minimum Clearance to Commodity

36 inches (914 mm)

NFPA 13 Deflector-to-Ceiling Distance

6 to 18 inches (152 to 457 mm)

FM 2-0

Consult FM and/or FM Guidelines for allowable deflector-to-ceiling distances as well as thermal sensing element-to-ceiling criteria.

* Registered trademark of Dupont

Storage Type	NFPA	FM
Open Frame (that is, 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 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 2-0 and 8-9.
Idle Pallet Storage	Refer to NFPA 13, Chapter 12.	Refer to FM 2-0, 8-9, and 8-24.
Rubber Tire Storage	Refer to NFPA 13, Chapter 18.	Refer to FM 2-0 and 8-9.
Rolled Paper Storage (Refer to the standard.)	Refer to NFPA 13, Chapter 19.	Refer to FM 8-21.
Flammable Liquid Storage (Refer to the standard.)	Refer to NFPA 30.	N/A
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.)	Refer to NFPA 13, Chapter 20.	N/A

N/A = Non-Applicable

TABLE 1
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR
MODEL ESFR-25 PENDENT SPRINKLERS

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.

Installation

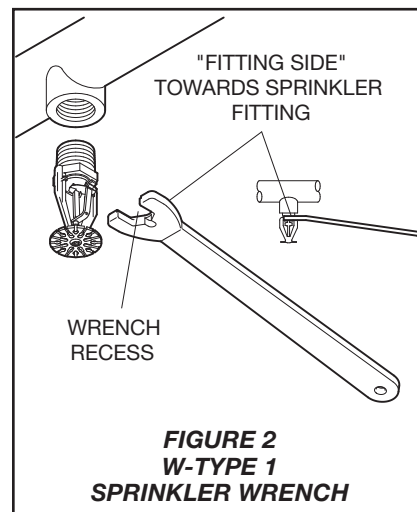
The TYCO Model ESFR-25 Pendent Sprinklers must be installed in accordance with the following instructions.

NOTICE

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.

Obtain a leak-tight 1-inch NPT sprinkler joint by applying a minimum-to-maximum torque of 20 to 30 ft.lbs. (26,8 to 40,2 Nm). Higher levels of torque can distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

1. Install the Model ESFR-25 Pendent Sprinkler in the pendent position (Figure 2).
2. 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 Sprinkler only by the Frame arms.
3. Wrench-tighten the Model ESFR-25 Sprinkler using only the W-Type 1 Sprinkler Wrench (Figure 2) and by fully engaging (seating) the wrench on the sprinkler wrench flats (Figure 1).
4. After installation, inspect the Link Assembly of each Model ESFR-25 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

The TYCO Model ESFR-25 Sprinklers must be maintained and serviced in accordance with the following instructions.

NOTICE

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 systems from the proper authorities and notify all personnel who may be affected by this action.

Exercise care to avoid damage before, during, and after installation. Never paint, plate, coat, or otherwise alter automatic sprinklers after they leave the factory.

Replace sprinklers that:

- were modified or over-heated.
- were damaged by dropping, striking, wrench twisting, wrench slippage, or the like.
- are leaking or exhibiting visible signs of corrosion.

Responsibility lies with the owner 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 sprinkler manufacturer regarding 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

Products manufactured by Tyco Fire Suppression & Building Products (TFSBP) are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by TFSBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFSBP or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by TFSBP to be defective shall be either repaired or replaced, at TFSBP's sole option. TFSBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFSBP shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

In no event shall TFSBP be liable, in contract, tort, strict liability or under any other legal theory, for incidental, indirect, special or consequential damages, including but not limited to labor charges, regardless of whether TFSBP was informed about the possibility of such damages, and in no event shall TFSBP's liability exceed an amount equal to the sales price.

The foregoing warranty is made in lieu of any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name. Refer to the Price List for complete listing of Part Numbers (P/Ns).

Sprinkler Assemblies

Specify: (temperature rating), natural brass, TY9226 Pendent Sprinkler, P/N (below).

165°F (74°C) P/N 58-441-1-165
214°F (101°C) P/N 58-441-1-214

Special-Order Sprinkler Assemblies with ISO 7/1 Thread Connections

Specify: (temperature rating), natural brass, TY9226 Pendent Sprinkler with thread connection per ISO 7/1, P/N (below).

165°F (74°C) P/N 58-442-1-165
214°F (101°C) P/N 58-442-1-214

Sprinkler Wrench

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