Model ESFR-17
16.8 K-factor Dry Type Pendent Sprinklers
Early Suppression, Fast Response

General Description

TYCO Model ESFR-17 Dry Type Pendent Sprinklers are Early Suppression, Fast Response (ESFR) sprinklers having a nominal K-factor of 16.8. They are suppression mode sprinklers that are especially advantageous as a means of eliminating in-rack sprinklers when protecting high-piled box-in-box refrigerated storage areas.

The Model ESFR-17 Dry Type Pendent Sprinkler is FM Approved and has successfully undergone full-scale fire testing at FM Global, when used in conformance with applicable FM Global Property Loss Prevention Data Sheets.

The Model ESFR-17 Dry Type Sprinkler consists of an ESFR sprinkler permanently secured to a sprinkler drop featuring an inlet with both grooved and threaded connections. The drop between the inlet and sprinkler remains dry until the sprinkler operates, allowing for a pendent sprinkler installation on a wet pipe sprinkler system where the dry drop and sprinkler are located in an area subjected to freezing temperatures.

The Model ESFR-17 Dry Type Sprinklers are primarily used for ceiling only sprinkler protection (i.e., no need for in-rack sprinklers) and used to protect solid piled, palletized, and rack storage that is subject to freezing temperatures. The water supply is provided from a wet pipe system located outside of the refrigerated storage area. The Model ESFR-17 Dry Type Sprinklers feature all of the same design criteria as 16.8 K-factor ESFR Pendent Sprinklers, and substantially lowers the end head pressure requirement as compared to the 14.0 K-factor ESFR Dry Type Pendent Sprinklers.

Combining a 16.8 K-factor with a dry-type sprinkler design, the Model ESFR-17 Dry Type Sprinkler provides the system designer with features that offer flexibility when sizing system piping, as well as possibly reducing or eliminating the need for a system fire pump when protecting high-piled box-in-box refrigerated storage areas.

The ESFR-17 Dry Type Sprinkler also includes two Insulating Seal Assemblies that help seal the clearance space around the sprinkler casing. The seal assemblies are intended to slow the exchange of air between the heated area and the protected area to help prevent humidity and temperature differential in the area around the sprinkler. Condensation on the sprinkler and subsequent ice buildup on or around the sprinkler can occur that might damage the sprinkler or prevent proper operation in a fire situation.

To install the Insulating Seal Assemblies, follow the installation instructions in this data sheet. The Insulating Seal Assemblies are recommended to be installed on smooth, flat, and clean surfaces. If it is expected that environmental conditions may result in excessive condensation, additional sealing of the assembly is recommended.

There are specific situations, such as corrugated surfaces where alternate methods to seal the clearance hole are recommended. For additional guidance, contact Johnson Controls Technical Services.

IMPORTANT

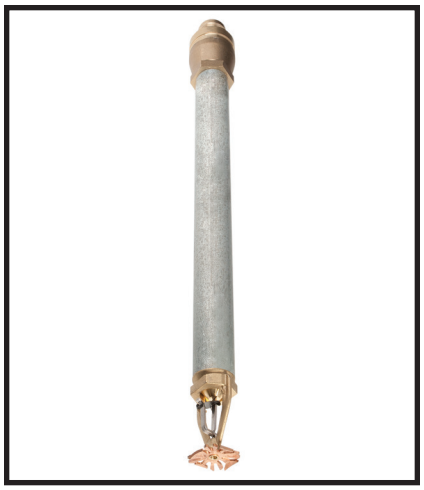
Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

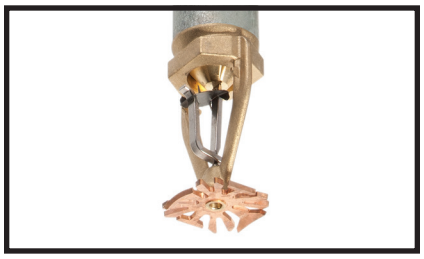
Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

NOTICE

The Model ESFR-17 Dry Type Pendent 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. 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.





Sprinkler Identification Number (SIN)

Refer to Table B for sprinkler identification number.

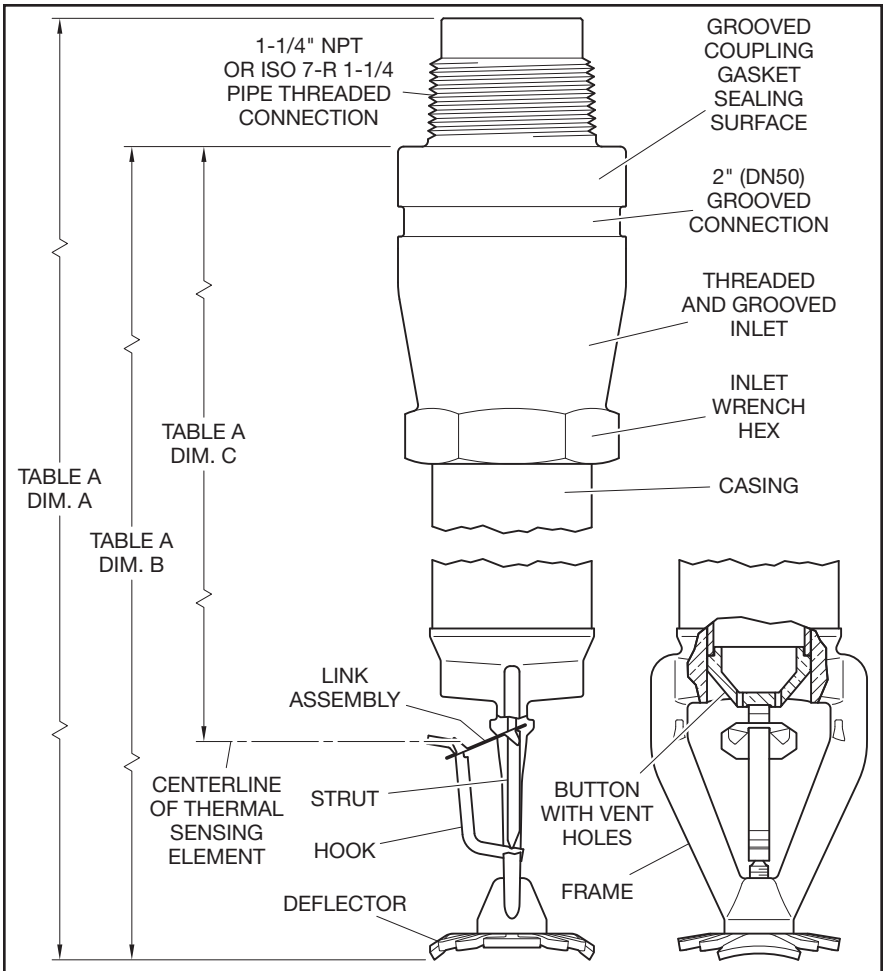


FIGURE 1
MODEL ESFR-17 DRY TYPE PENDENT SPRINKLER (TY7229)

DIM.	36 Inch (914 mm) Sprinkler	30 Inch (762 mm) Sprinkler	23 Inch (584 mm) Sprinkler
A	37.5 in. (952,5 mm)	31.3 in. (795 mm)	24.3 in. (617 mm)
B	36.2 (919,5 mm)	30.0 (762 mm)	23.0 (584 mm)
C	33.9 (861 mm)	27.7 (704 mm)	20.7 (526 mm)

TABLE A
SPRINKLER LENGTHS

Item	Description
Sprinkler Identification Number (SIN)	TY7229
K-factor, gpm/psi½ (lpm/bar½)	16.8 gpm/psi½ (241,9 lpm/bar½)
Thread Size	1-1/4 in. NPT or ISO 7-R 1-1/4
Sprinkler Orientation	Pendent
Maximum Working Pressure, psi (bar)	175 psi (12 bar)

TABLE B
MODEL ESFR-17 DRY TYPE PENDENT SPRINKLER
TECHNICAL DATA

Technical Data

Approvals
UL Listed
FM Approved
(Refer to Table D for specific details on Laboratory listings and approvals.)

Grooved Connection
2 in. Standard Cut Grooved per Technical Data Sheet TFP1898

Finish
Refer to Physical Characteristics

Physical Characteristics

Threaded and Grooved Inlet	Bronze
Casing	Galvanized Steel Pipe
Frame	Brass
Deflector	Bronze
Hook	MONEL
Strut	MONEL
Link Assembly	Solder, Nickel

Additional Technical Data
Refer to Table B for additional technical data.

Operation

The casing between the inlet and the sprinkler remains dry until the sprinkler operates. 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 allowing water to flow through the casing and to the activated sprinkler.

Design Criteria

The following general guidelines and Table C, provide the key design criteria for the TYCO Model ESFR-17 Dry Type Pendent Sprinklers.

In all cases, the appropriate NFPA 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. Refer to Table C for additional information.

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

- **TFP312**
  Model ESFR-25 (TY9226)
  K=25.2 Pendent Sprinkler
- **TFP313**
  Model ESFR-22 (TY8226)
  K=22.4 Pendnet Sprinkler

Storage Type	NFPA	FM Global
Sprinkler Type	ESFR	Storage
Response Type	QR	QR
System Type	Wet	Wet
Temperature Rating ºF (ºC)[1]	165°F (74°C)[1] 212°F (100°C)	165°F (74°C)[1]
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

Notes:
1. Refer to Table D for specific details on Laboratory Listings and Approvals

N/A – Not Applicable

TABLE C
MODEL ESFR-17 DRY TYPE PENDENT SPRINKLER
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW

Sprinkler Type	Temperature Rating	Laboratory Listings and Approvals
Pendent K=16.8 (TY7229)	165°F (74°C)	1, 2
	212°F (100°C)	1

Notes:
1. UL Listed
2. FM Approved

TABLE D
LABORATORY LISTINGS AND APPROVALS

- **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

Ceiling Construction
Unobstructed or non-combustible obstructed construction, such as smooth ceiling, bar joists, beam and girder.

Ceiling Slope
Maximum 2 in. rise for 12 in. 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)

Maximum Spacing
12 ft (3,7 m) for ceiling heights up to 30 ft (9,1 m)

10 ft (3,1 m) for ceiling heights greater than 30 ft (9,1 m)

Minimum Spacing
8 ft (2,4 m)

Minimum Clearance to Commodity
36 in. (914 mm)

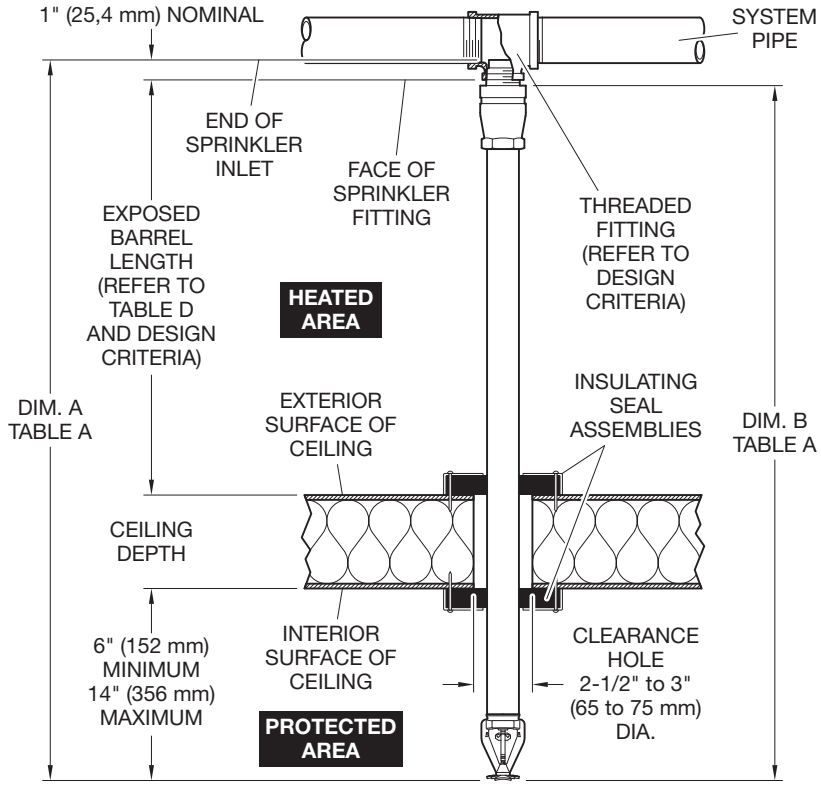


FIGURE 2
THREADED CONNECTION INSTALLATION

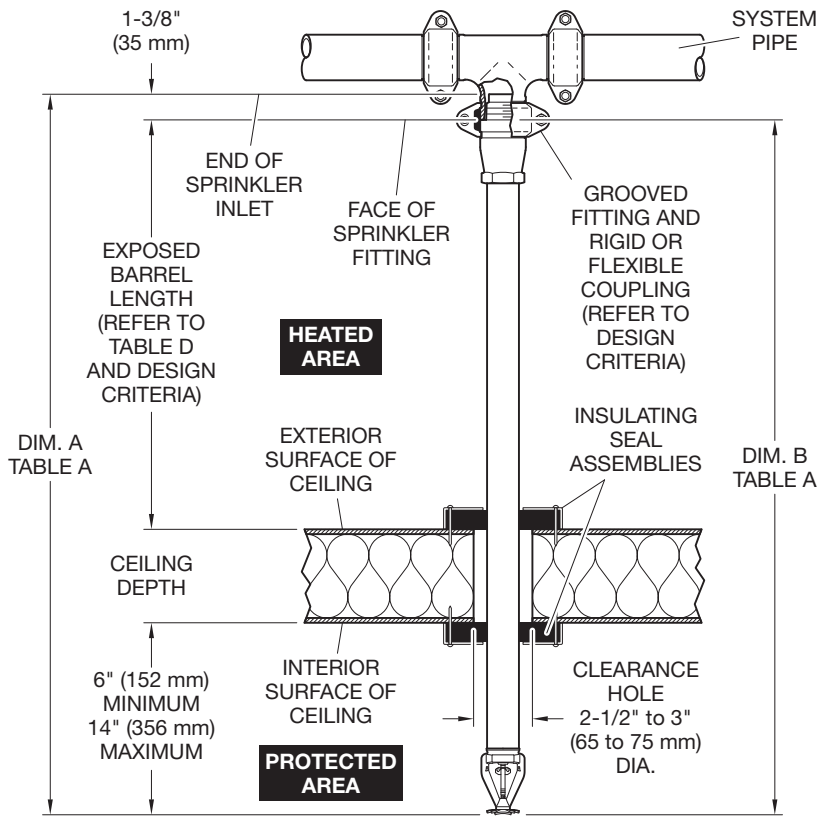


FIGURE 3
GROOVED CONNECTION INSTALLATION

Ambient Temp. of Protected Area[a]	Exposed Barrel Ambient Temperature[b][c]		
	40°F (4°C)	50°F (10°C)	60°F (16°C)
	Minimum Exposed Barrel Length Inches (mm)		
40°F (4°C)	0	0	0
30 °F (-1°C)	0	0	0
20°F (-7°C)	4 (101,6)	0	0
10°F (-12°C)	8 (203)	1 (25,4)	0
0°F (-18°C)	12 (305)	3 (76)	0
-10°F (-23°C)	14 (356)	4 (101,6)	1 (25,4)
-20°F (-29°C)	14 (356)	6 (152)	3 (76)
-30°F (-34°C)	16 (406)	8 (203)	4 (101,6)
-40°F (-40°C)	18 (457)	8 (203)	4 (101,6)
-50°F (-46°C)	20 (508)	10 (254)	6 (152)
-60°F (-51°C)	20 (508)	10 (254)	6 (152)

Notes:
a. The area below the ceiling is referred to as the protected area. Ambient temperature is the temperature at the discharge end of the sprinkler. For protected area temperatures that range between the listed temperatures, use the next cooler temperature.
b. Lengths are inclusive of wind velocities up to 30 mph (48,3 km/h) and assume a minimum 40°F (4°C) in heated area.
c. Minimum exposed barrel length when Insulating Seal Assembly is installed on exterior surface of ceiling:
- Threaded Fitting Installation 5 in. (125 mm) (Ref. Figure 2)
- Grooved Fitting Installation 4-1/2 in. (114 mm) (Ref. Figure 3)

TABLE E
MINIMUM EXPOSED BARREL LENGTH REQUIRED PER AMBIENT TEMPERATURE

NFPA
Deflector-to-Ceiling Distance
6 to 14 in. (152 to 356 mm)

FM Global
Centerline of Thermal Sensing Element-to-Ceiling Distance
Refer to FM Global 2-0 for Storage Sprinklers.

Sprinkler Threaded Fittings
1-1/4 in. NPT Model ESFR-17 Dry Type Sprinklers are to be installed in the 1-1/4 in. NPT outlet or run of the following fittings:

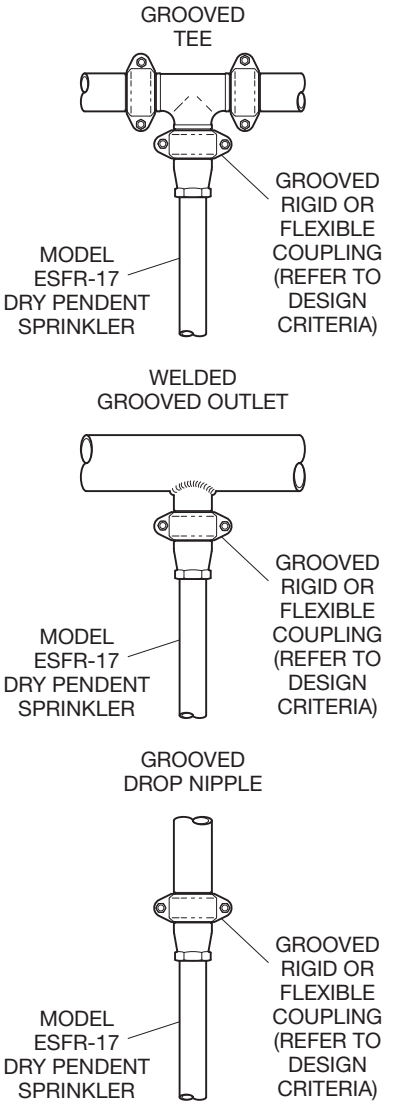


FIGURE 4
TYPICAL GROOVED CONNECTION OPTIONS

- malleable or ductile iron threaded tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150)
- cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125)

Do not install Model ESFR-17 Dry Type Sprinkler into elbow fittings. The inlet of the sprinkler can contact the interior of the elbow and result in damage to the assembly, resulting in leakage.

The Model ESFR-17 Dry Type Sprinkler can also be installed in the 1-1/4 in. NPT outlet of a GRINNELL Figure 730 Mechanical Tee.

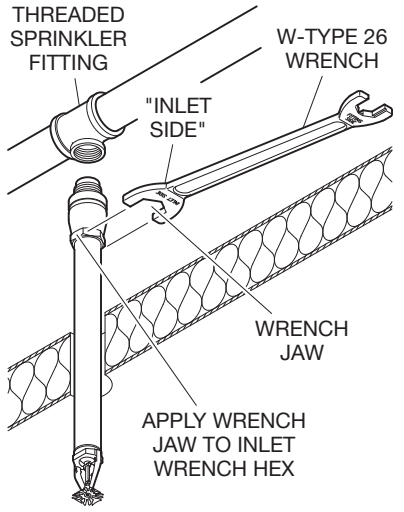


FIGURE 5
W-TYPE 26 SPRINKLER WRENCH

Sprinkler Grooved Connection
The Model ESFR-17 Dry Type Sprinklers can be installed in typical grooved connection scenarios illustrated in Figure 4.

For flexible couplings, use of the 2 in. Figure 705 GRINNELL Flexible Couplings with “C” Shape Pre-Lubricated Grade “A” EPDM Gasket (Ref. TFP1820) is recommended.

For rigid couplings, use of the 2 in., Figure 577 GRINNELL G-FIRE Grooved Rigid Coupling with “C” Shape Pre-Lubricated Grade “A” EPDM Gasket (Ref. TFP1854) is recommended.

When using tees, use of the Figure 219 GRINNELL Grooved Ductile Iron Cast Fittings (Ref. TFP1810) is recommended.

NOTICE

Do not install Model ESFR-17 Dry Type Sprinkler into any other type fitting connection without first consulting TFPP Technical Services. Failure to use the appropriate fitting may result in insufficient engagement of the inlet pipe threads with consequent leakage.

Exposure Length
When using Model ESFR-17 Dry Type Sprinklers to protect areas subject to freezing temperatures, use Figures 2 and 3, and Table E to determine a sprinkler’s appropriate exposed barrel length to prevent water from freezing in the connection pipes due to conduction. The exposed barrel length measurement must be taken from the face of the sprinkler fitting to the exterior surface of the structure or insulation that is exposed to the heated area.

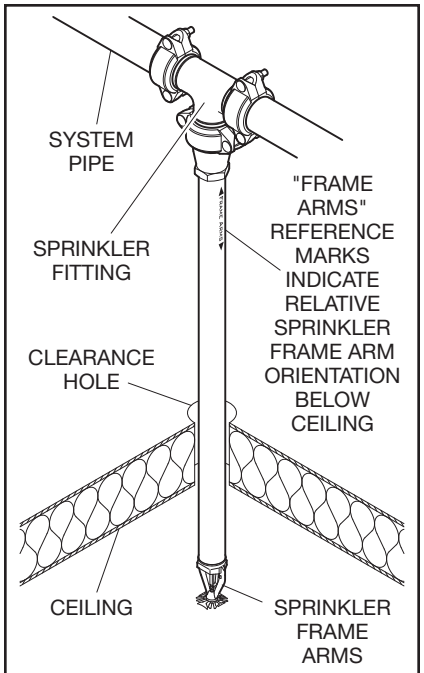


FIGURE 6
SPRINKLER FRAME ARMS ORIENTATION MARK

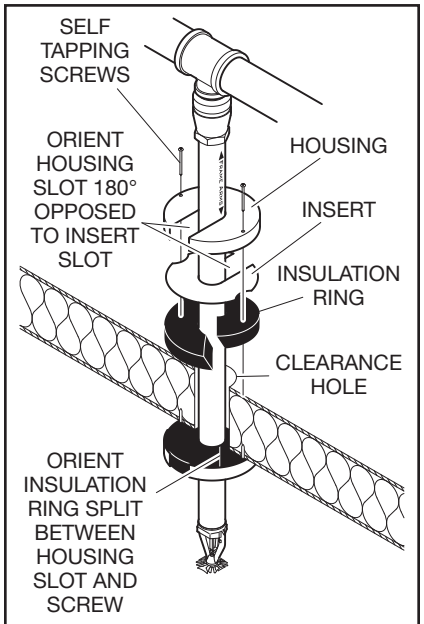


FIGURE 7
INSULATING SEAL ASSEMBLY INSTALLATION