

Series DS-1 – 5.6 K-factor Dry Type Sprinklers Standard Response, Standard Coverage

General Description

The Tyco® Series DS-1, 5.6 K-factor, Standard Response, Standard Coverage, Dry Type Sprinklers are decorative 5 mm glass bulb automatic sprinklers designed for the following typical uses:

- where pendent sprinklers are required on dry pipe systems that are exposed to freezing temperatures (e.g. sprinkler drops from unheated portions of buildings)
- where sprinklers and/or a portion of the connecting piping may be exposed to freezing temperatures (e.g. sprinkler drops from wet systems into freezers, sprinkler sprigs from wet systems into unheated attics, or horizontal piping extensions through a wall to protect an unheated area of a building)
- where sprinklers are used on systems that are seasonably drained to avoid freezing (e.g. vacation resort areas)

WARNINGS

The Series DS-1 Dry Type 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

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.

standards of any other 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. The installing contractor or sprinkler manufacturer should be contacted with any questions.

The Series DS-1 Dry Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section.

Model/Sprinkler Identification Numbers

TY3255 - (Pendent)
TY3155 - (Upright)
TY3355 - (Horizontal Sidewall)

Technical Data

Approvals

UL and C-UL Listed.
FM and NYC Approved.
(Refer to Table A)

Maximum Working Pressure
175 psi (12,1 bar)

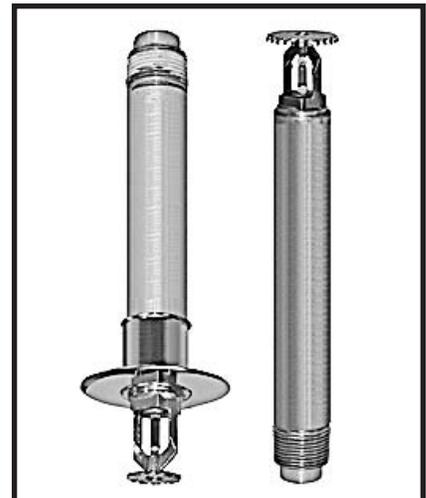
Inlet Thread Connection
1 inch NPT (Standard Order)
ISO 7-R1

Discharge Coefficient
K = 5.6 GPM/ps^{1/2}
(80,6 LPM/bar^{1/2})

Temperature Ratings
Refer to Table A

Finishes

Sprinkler: Natural Brass, Chrome Plated, White Polyester
Escutcheon: White Coated or Chrome Plated, Brass Plated



Physical Characteristics

Inlet Copper
Plug Copper
Yoke Stainless Steel
Casing Galvanized Carbon Steel
Insert Bronze
Bulb Seat Stainless Steel
Bulb Glass
Compression Screw Bronze
Deflector Bronze
Frame Bronze
Guide Tube Stainless Steel
Water Tube Stainless Steel
Spring Stainless Steel
Sealing Assembly
. Beryllium Nickel w/Teflon*
Escutcheon Carbon Steel
*Registered Trademark of DuPont

Patents

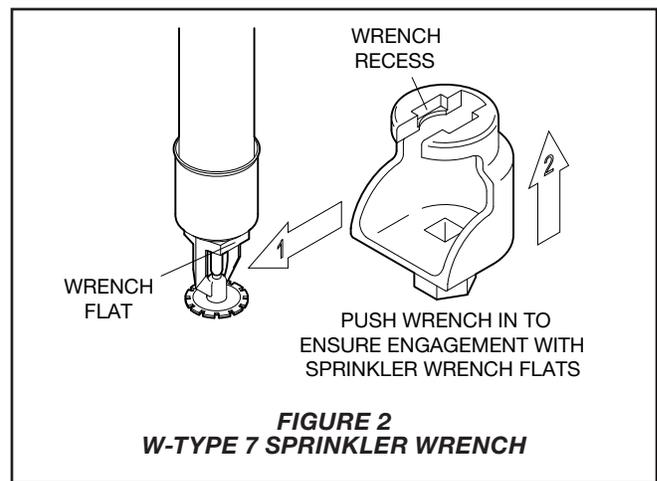
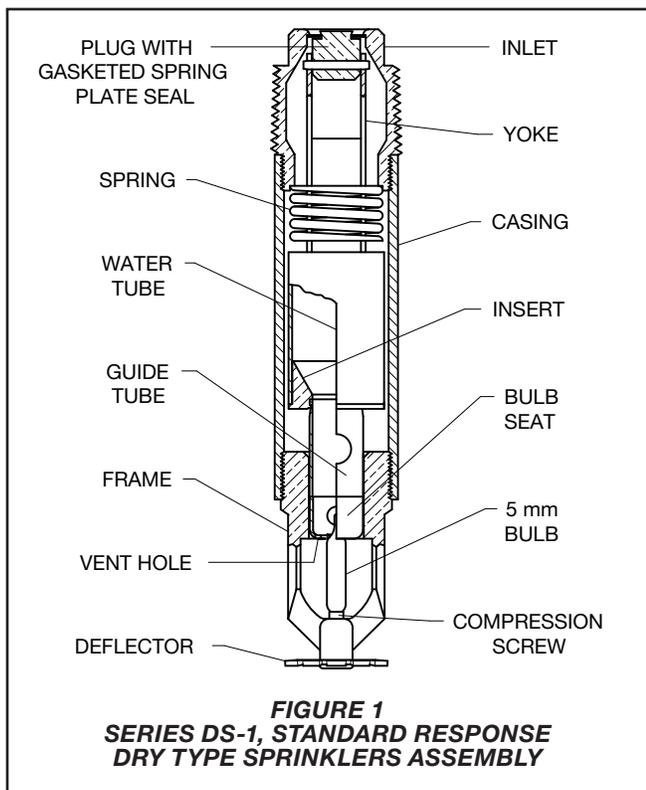
U.S.A. Patent No. 5,188,185

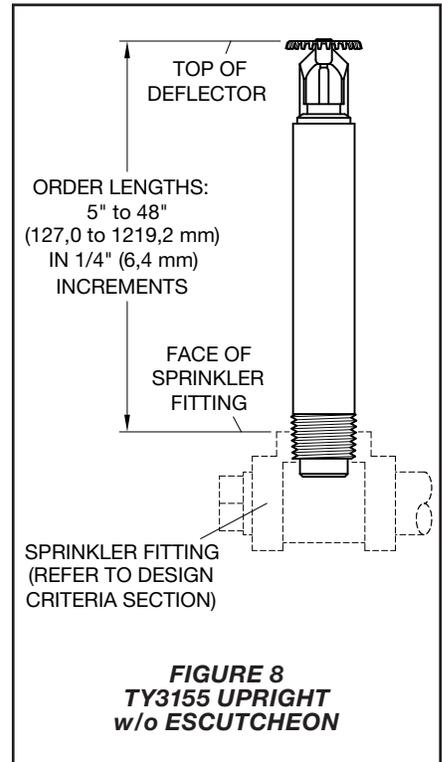
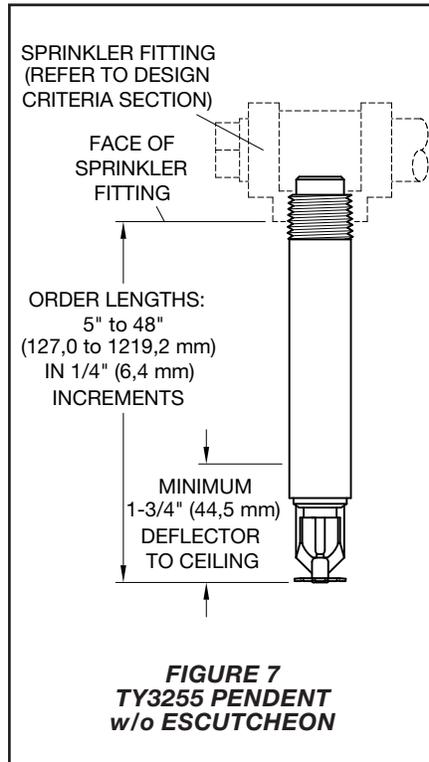
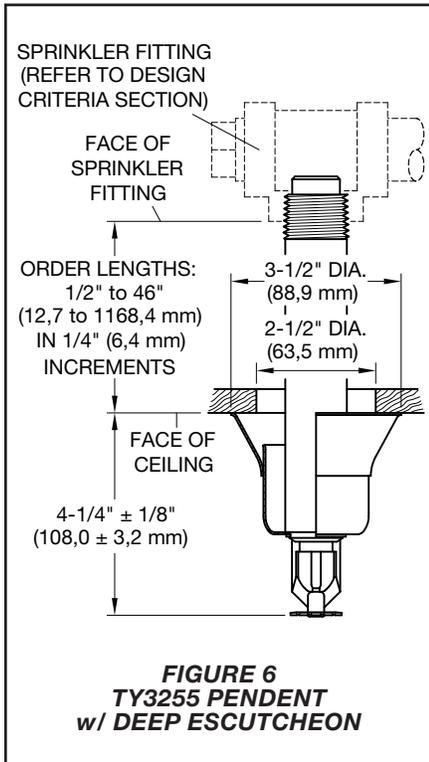
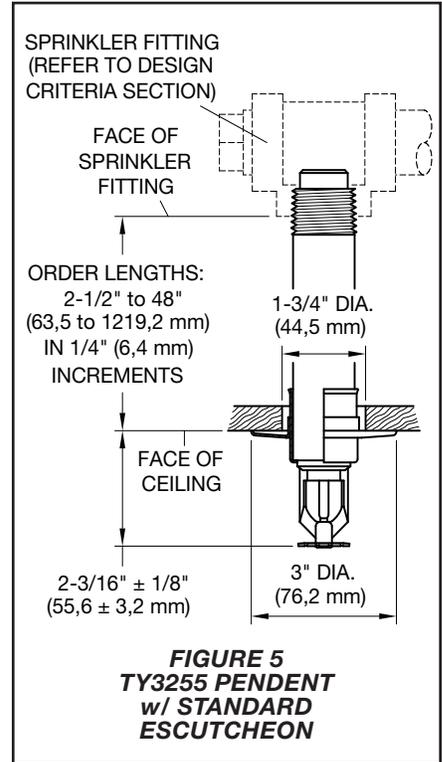
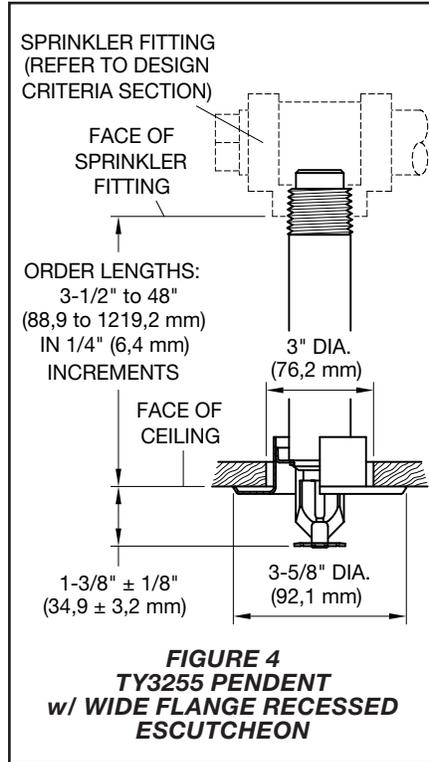
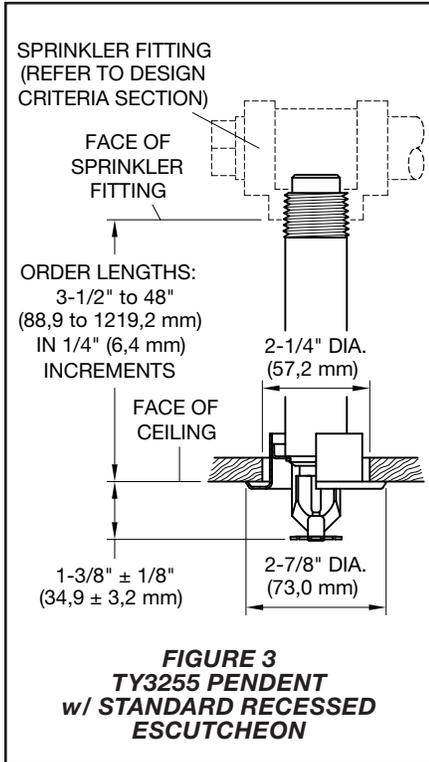
		SPRINKLER FINISH								
		TY3255 Pendent w/ Standard Recessed Escutcheon (Ref. Fig. 3) w/ Wide Flange Recessed Escutcheon (Ref. Fig. 4)			TY3255 Pendent w/ Std. Escutcheon (Ref. Fig. 5) w/ Deep Escutcheon (Ref. Fig. 6) w/o Escutcheon (Ref. Fig. 7) TY3155 Upright w/o Escutcheon (Ref. Fig. 8)			TY3355 Hor. Sidewall with top of Deflector-to-Ceiling distance of 4 to 12 inches (100 to 300 mm) w/ Std. Escutcheon (Ref. Fig. 9) w/ Deep Escutcheon (Ref. Fig. 10) w/o Escutcheon (Ref. Fig. 11)		
Temperature Rating	Bulb Color Code	Natural Brass	Chrome Plated	White Polyester	Natural Brass	Chrome Plated	White Polyester	Natural Brass	Chrome Plated	White Polyester
135°F/57°C	Orange	1, 2, 3, 4		1, 2, 4	1, 2, 3, 4		1, 2, 4	1*, 2*, 3**, 4		1*, 2*, 4
155°F/68°C	Red	1, 2, 3, 4		1, 2, 4	1, 2, 3, 4		1, 2, 4	1*, 2*, 3**, 4		1*, 2*, 4
175°F/79°C	Yellow	1, 2, 3, 4		1, 2, 4	1, 2, 3, 4		1, 2, 4	1*, 2*, 3**, 4		1*, 2*, 4
200°F/93°C	Green	1, 2, 3, 4		1, 2, 4	1, 2, 3, 4		1, 2, 4	1*, 2*, 3**, 4		1*, 2*, 4
286°F/141°C	Blue	N/A			1, 2, 3, 4		1, 2, 4	1*, 2*, 3**, 4		1*, 2*, 4
360°F/182°C	Mauve	N/A			1, 2, 3, 4		1, 2, 4	1*, 2*, 4		1*, 2*, 4

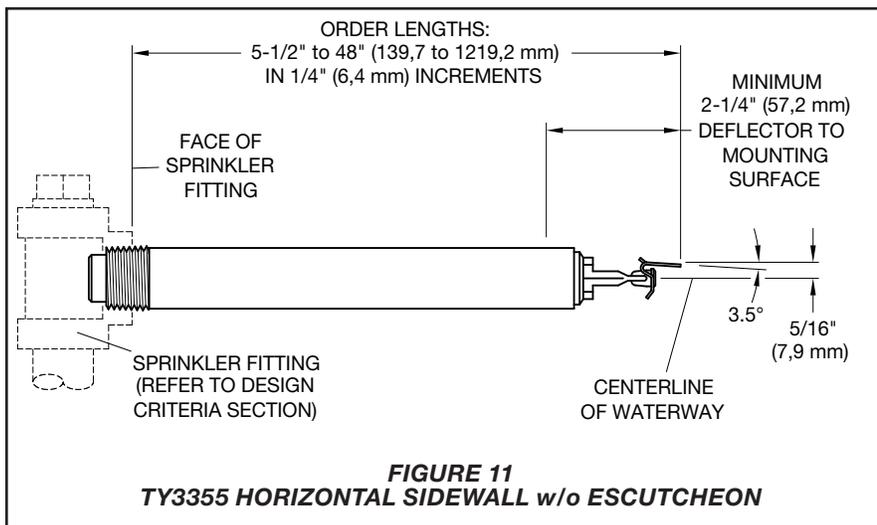
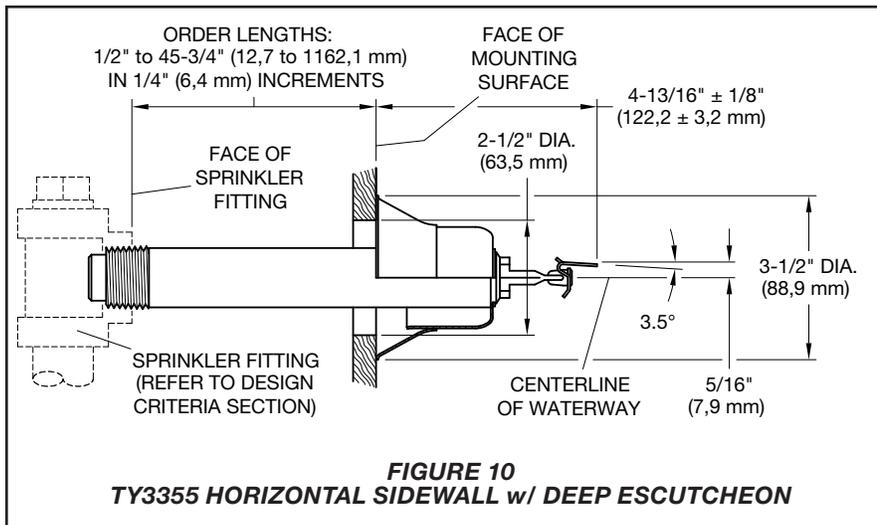
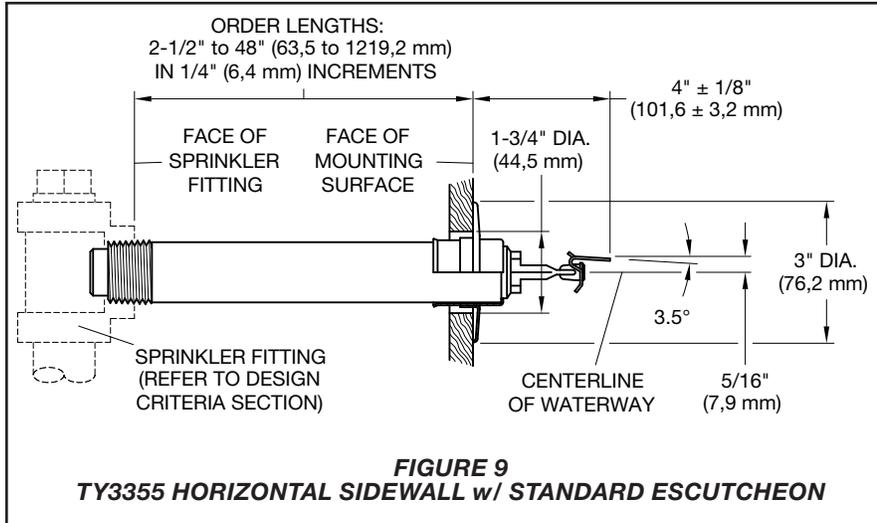
Notes:

1. Listed by Underwriters Laboratories, Inc (Maximum order length of 48 inches).
 2. Listed by Underwriters Laboratories for use in Canada (Maximum order length of 48 inches).
 3. Approved by Factory Mutual Research Corporation (Maximum order length of 48 inches)
 4. Approved by the City of New York under MEA 352-01-E.
- * Light and Ordinary Hazard Occupancies Only.
 ** Light Hazard Occupancies Only.
 N/A - Not Available.

TABLE A
SERIES DS-1, STANDARD RESPONSE - STANDARD COVERAGE, DRY TYPE SPRINKLERS
LABORATORY LISTINGS AND APPROVALS







Operation

When the Series DS-1 is in service, water is prevented from entering the assembly by the Plug & Belleville Sealing Assembly (Ref. Figure 1) in the Inlet of the Sprinkler. The glass Bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass Bulb, and the Bulb Seat is released. The compressed Spring is then able to expand and push the Water Tube as well as the Guide Tube outward. This action simultaneously pulls inward on the Yoke, withdrawing the Plug & Belleville Seal from the Inlet allowing the sprinkler to activate and flow water.

Design Criteria

The Tyco® Series DS-1 Sprinklers are intended for use in fire sprinkler systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (e.g., UL Listing is based on NFPA 13 requirements).

The 1 inch NPT Series DS-1 Sprinklers are to be installed in the 1 inch NPT outlet or run of malleable or ductile iron threaded tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150) or cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125). The Series DS-1 Sprinklers may also be installed in the 1 inch NPT outlet of a Grinnell Figure 730 Mechanical Tee; however, the use of the Figure 730 for this arrangement is limited to wet pipe systems.

Typically, the end sprinkler fitting on a branch line is plugged as shown in Figures 3 through 11. The DS-1 Sprinklers cannot be installed into an elbow fitting.

For wet pipe systems, the sprinkler drop may be installed as shown in Figure 12. The configuration in Figure 12 may only be used where the sprinkler fitting and water filled pipe above the sprinkler fitting is not subject to freezing and where the length of the DS-1 Sprinkler has the minimum exposure length per Figure 14.

For wet pipe systems, the DS-1 Sprinklers may also be installed in the following Tyco® CPVC fittings: (P/N 80145) 1" x 1" NPT Female Adapter or (P/N 80249) 1" x 1" x 1" NPT Sprinkler Head Adapter Tee.

For dry pipe systems, only use the side outlet of maximum 2-1/2 inch size

reducing tee's when locating the DS-1 Sprinklers directly below the branch line. Otherwise, use the configuration shown in Figure 13 to assure complete drainage of water from above the DS-1 Sprinklers and the branch line.

NOTE

Do not install the Series DS-1 into any other type fitting without first consulting the Technical Services Department. Failure to use the appropriate fitting may result in: failure of the sprinkler to properly operate due to formation of ice over the inlet Plug or binding of the inlet Plug; or, insufficient engagement of the inlet pipe threads with consequent leakage.

Branch, cross, and feedmain piping connected to Dry Sprinklers and subject to freezing temperatures must be pitched for drainage in accordance with the minimum requirements of the National Fire Protection Association for dry pipe sprinkler systems.

When Dry Sprinklers are to be used in wet pipe sprinkler systems protecting areas subject to freezing temperatures (e.g., sprinkler drops into freezers), consideration must be given to the appropriate length of the sprinkler that will prevent freezing of the water in the connecting pipes due to conduction. When the temperature surrounding the wet pipe sprinkler system is maintained at a minimum temperature of 40°F/4°C, the following are the minimum recommended lengths between the face of the sprinkler fitting and the outside surface of the protected area (i.e., length exposed to minimum ambient of 40°F/4°C – Ref. Figure 14):

- 12 inches (300 mm) when the temperature within the protected area is -20°F/-29°C
- 18 inches (450 mm) when the temperature within the protected area is -40°F/-40°C
- 24 inches (600 mm) when the temperature within the protected area is -60°F/-51°C

For protected area temperatures between those given above, the minimum recommended length from the face of the fitting to the outside of the protected area may be determined by interpolating between the indicated values.

The 2007 edition of NFPA 13, Section 8.4.10.2 requires that dry sprinklers connected to wet pipe sprinkler systems protecting insulated freezer structures have the clearance space around the sprinkler barrel sealed. The use of the Model DSB-2 Dry Sprinkler Boot described in Technical Data Sheet TFP591, and illustrated in Figures 15 and 16, will meet the intent of NFPA 13.

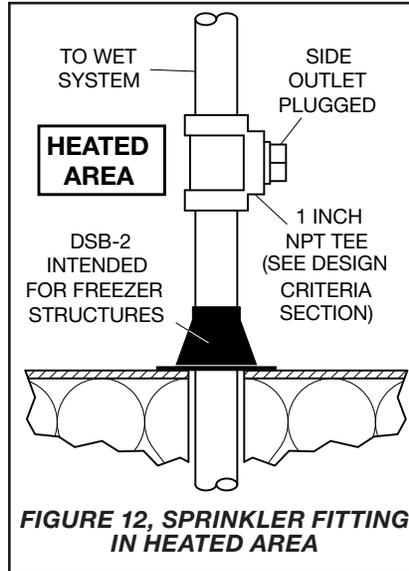


FIGURE 12, SPRINKLER FITTING IN HEATED AREA

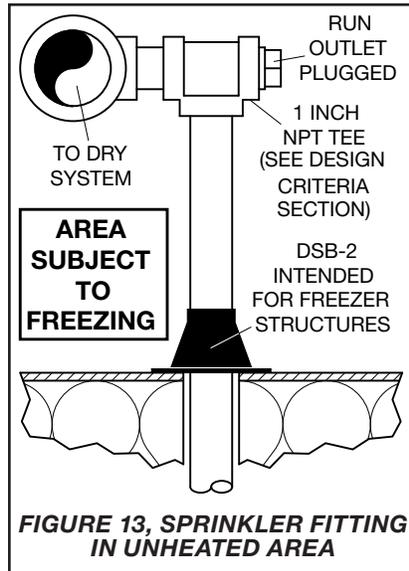


FIGURE 13, SPRINKLER FITTING IN UNHEATED AREA

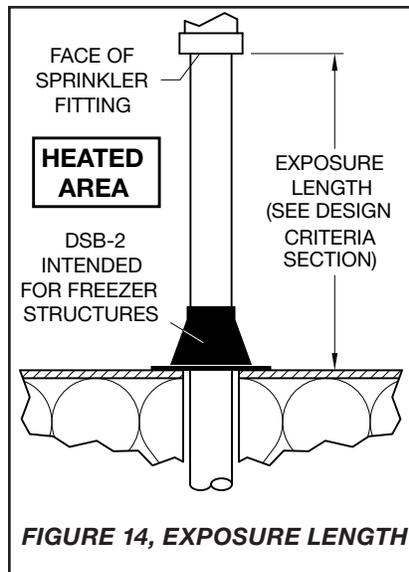


FIGURE 14, EXPOSURE LENGTH

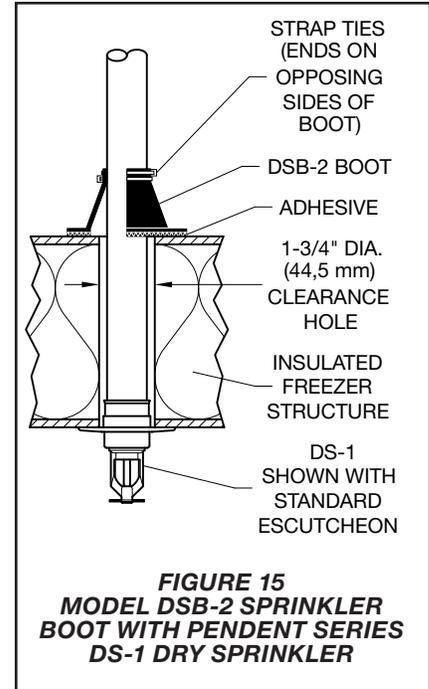


FIGURE 15 MODEL DSB-2 SPRINKLER BOOT WITH PENDENT SERIES DS-1 DRY SPRINKLER

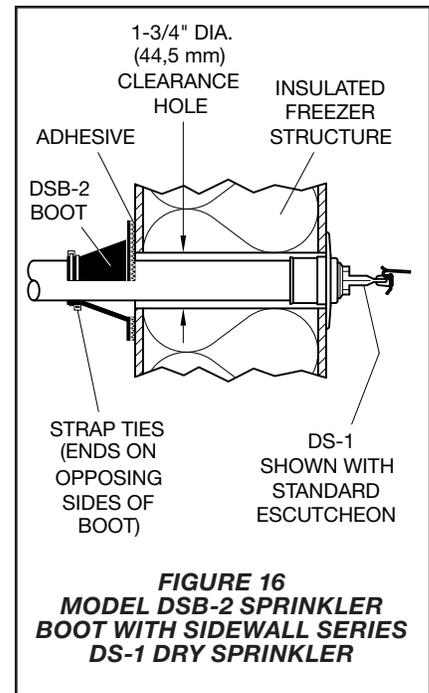


FIGURE 16 MODEL DSB-2 SPRINKLER BOOT WITH SIDEWALL SERIES DS-1 DRY SPRINKLER

Installation

The Series DS-1 Dry Type Sprinklers must be installed in accordance with the following instructions:

NOTES

The Series DS-1 must only be installed in fittings that meet the requirements of the Design Criteria section.

Refer to the Design Criteria section for other important requirements regarding piping design and sealing of the clearance space around the Sprinkler Casing.

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch (1,6 mm) for the 135°F/57°C rating to 1/8 inch (3,2 mm) for the 360°F/182°C rating.

A 1 inch NPT sprinkler joint should be obtained with a minimum to maximum torque of 20 to 30 ft. lbs. (26,8 to 40,2 Nm). Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in an Escutcheon Plate by under- or over-tightening the Sprinkler. Readjust the position of the sprinkler fitting to suit.

Step 1. Pendent sprinklers must be installed only in the pendent position, and upright sprinklers must be installed only in the upright position. The deflector of a pendent or upright sprinkler is to be parallel to the ceiling.

Horizontal sidewall sprinklers are to be installed in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. The word "TOP" on the Deflector is to face towards the ceiling.

Step 2. With pipe thread sealant applied to the inlet threads, hand tighten the sprinkler into the sprinkler fitting.

Step 3. Wrench tighten the sprinkler by wrenching on the Casing with a pipe wrench whenever the casing is readily accessible. Otherwise, use a W-Type 7 Sprinkler Wrench (Ref. Figure 2). The wrench recess of the W-Type 7 is to be applied to the sprinkler wrench flats (Ref. Figure 2).

Step 4. After the ceiling/wall has been installed/finished, slide on the outer-piece of the Escutcheon until it comes in contact with the ceiling/wall. Do not lift the ceiling panel out of its normal position.

In the case of the outer piece of the Deep Escutcheon, hold the outer piece in contact with the mounting surface (ceiling), and then rotate the inner piece approximately 1/4 turn with respect to the outer piece, to hold the Deep Escutcheon firmly together.

Care and Maintenance

The Tyco® Series DS-1 Dry Type Sprinklers must be maintained and serviced in accordance with the following instructions:

NOTES

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, may delay the time to sprinkler operation in a fire situation.

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

A Vent Hole is provided in the Bulb Seat (Ref. Figure 1) to indicate if the Dry Sprinkler is remaining dry. Evidence of leakage from the Vent Hole is an indication that there may be weepage past the Inlet seal and that the sprinkler needs to be removed for determining the cause of leakage (e.g. an improper installation or an ice plug). The fire protection system control valve must be closed and the system drained before removing the sprinkler.

Sprinklers that 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 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 - 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 other authorities having jurisdiction. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.

Automatic sprinkler systems should 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 & Building Products (TFBP) 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 TFBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFBP 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 TFBP to be defective shall be either repaired or replaced, at TFBP's sole option. TFBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFBP 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 TFBP 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 TFBP was informed about the possibility of such damages, and in no event shall TFBP'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

Dry Sprinklers:

Contact your local distributor for availability, and please specify the following:

1. Sprinkler.

- Model/SIN.
- Standard Response, Standard Coverage, Dry Type Sprinkler
- Deflector Style.
- 5.6 K-factor.
- Order Length.

Dry Type Sprinklers are furnished based upon Order Length as measured per Figures 3 through 11, as applicable. After the measurement is taken, round it to the nearest 1/4 inch increment.

- Inlet Connection (1 Inch NPT or ISO 7-R1)
- Temperature Rating.
- Sprinkler Finish.
- Escutcheon Style and Finish, as applicable.
- Part Number from Table B. (Part numbers are for 1 inch NPT standard order sprinklers. Orders for all other sprinkler assemblies must be accompanied by a complete description.)

2. W-Type 7 Sprinkler Wrench.

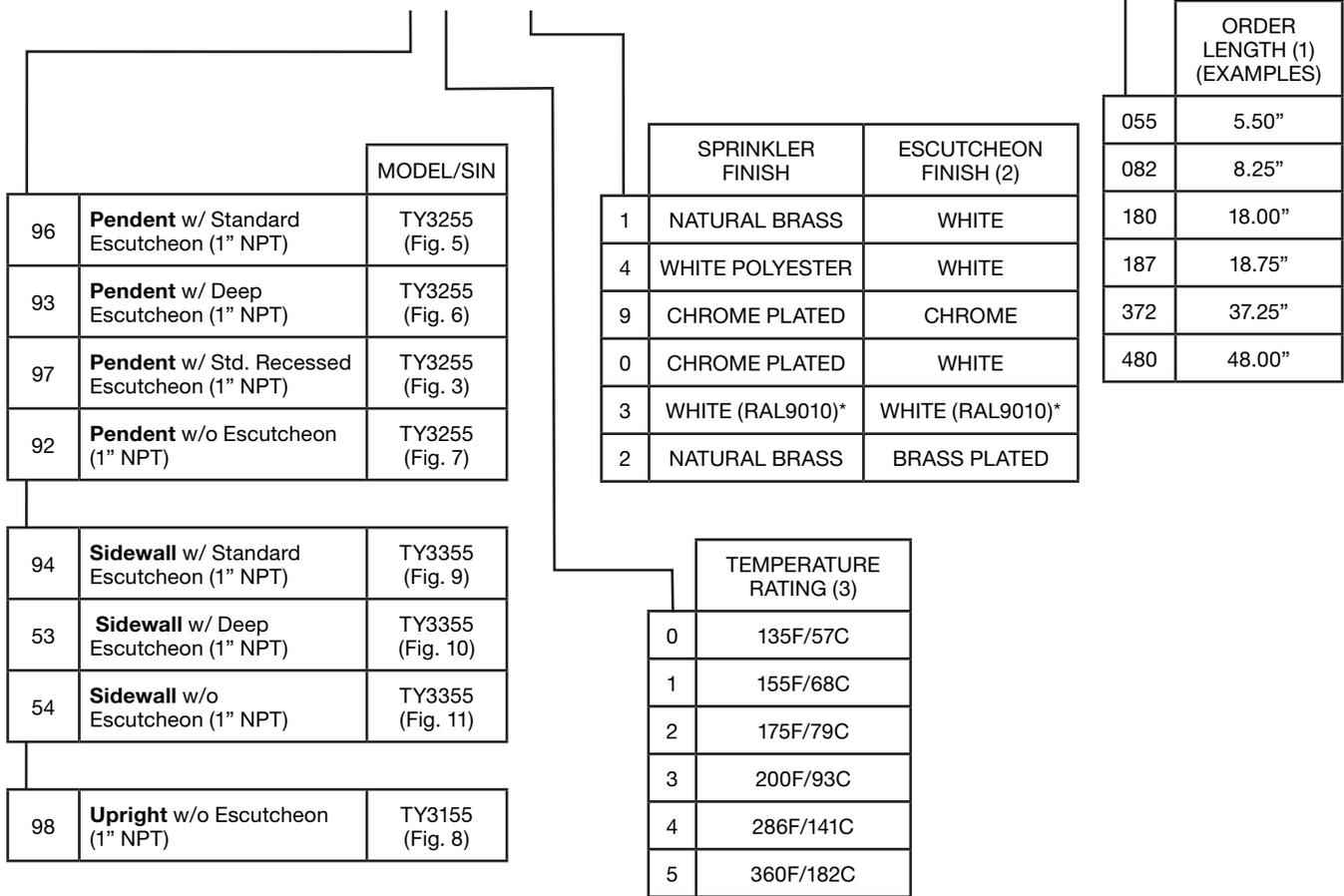
Refer to the Price List for complete listing of Part Numbers.

Model DSB-2:

Specify: Model DSB-2 Dry Sprinkler Boot*, P/N 63-000-0-002.

* Includes one Boot, two Strap Ties, and 1/3 oz. of Adhesive (quantity of adhesive is sufficient for installing one Boot)

P/N 60 - XXX - X - XXX



NOTES

(1). Dry Type Sprinklers are furnished based upon "Order Length" as measured per Figures 3 through 11, as applicable, and for each individual sprinkler where it is to be installed. After the measurement is taken, round it to the nearest 1/4 inch increment.

(2). Escutcheon Finish applies to sprinklers provided with escutcheons.

(3). 286F/141C and 360/182C temperature ratings apply to non-recessed sprinkler assemblies.

* Eastern Hemisphere sales only.

TABLE B
PART NUMBER SELECTION
SERIES DS-1, STANDARD RESPONSE, STANDARD COVERAGE, DRY TYPE SPRINKLERS
(Use Prefix "1" for ISO 7-R1 Connection, e.g., 1-60-961-1-180)