

Series DS-1 Dry-Type Sprinklers **5.6K Pendent, Upright, and Horizontal Sidewall** **Quick Response, Standard Coverage**

General Description

TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm Bulb) and Standard Coverage, are decorative glass bulb automatic sprinklers designed for commercial use. Dry-Type Sprinklers are typically used where:

- pendent sprinklers are required on dry pipe systems that are exposed to freezing temperatures; for example, sprinkler drops from unheated portions of buildings.
- sprinklers and/or a portion of the connecting piping are exposed to freezing temperatures; for example, 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 areas such as loading docks, overhangs, and building exteriors.
- sprinklers are used on systems that are seasonally drained to avoid freezing; for example, vacation areas.

NOTICE

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 standards of any Authorities Having Jurisdiction. 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.

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

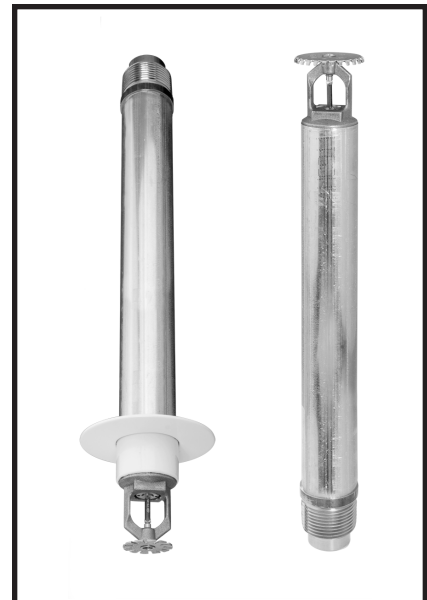
Model/Sprinkler Identification Numbers (SINs)

3/4-Inch NPT:

TY3935 - Pendent
TY3735 - Horizontal Sidewall

1-Inch NPT:

TY3235 - Pendent
TY3135 - Upright
TY3335 - Horizontal Sidewall



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.

		3/4-Inch NPT								
		TY3935 Pendent with Standard Recessed Escutcheon (Figure 4)			TY3935 Pendent with Standard Escutcheon (Figure 3) with Deep Escutcheon (Figure 5) without Escutcheon (Figure 6)			TY3735 Horizontal Sidewall with Top of Deflector-to-Ceiling Distance of 4 to 12 inches (100 to 300 mm) with Standard Escutcheon (Figure 8) with Deep Escutcheon (Figure 9) without Escutcheon (Figure 10)		
Temperature Rating	Bulb Color Code	Finish								
		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			1, 2			1*, 2*		
155°F (68°C)	Red									
175°F (79°C)	Yellow									
200°F (93°C)	Green									
286°F (141°C)	Blue	N/A								

Notes

- Listed by Underwriters Laboratories, Inc. (maximum order length of 48 inches)
- Listed by Underwriters Laboratories for use in Canada (maximum order length of 48 inches)

* Light and Ordinary Hazard Occupancies Only
N/A - Not Available

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

		1-Inch NPT																	
		TY3235 Pendent with Standard Recessed Escutcheon (Figure 4)			TY3235 Pendent with Standard Escutcheon (Figure 3) with Deep Escutcheon (Figure 5) without Escutcheon (Figure 6) TY3135 Upright without Escutcheon (Figure 7)			TY3335 Horizontal Sidewall with Top of Deflector-to-Ceiling Distance of 4 to 12 inches (100 to 300 mm) with Standard Escutcheon (Figure 8) with Deep Escutcheon (Figure 9) without Escutcheon (Figure 10)											
Temperature Rating	Bulb Color Code	Finish																	
		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																		
175°F (79°C)	Yellow																		
200°F (93°C)	Green																		
286°F (141°C)	Blue	N/A																	

Notes:

- Listed by Underwriters Laboratories, Inc. (maximum order length of 48 inches)
- Listed by Underwriters Laboratories for use in Canada (maximum order length of 48 inches)
- Approved by Factory Mutual Research Corporation (maximum order length of 48 inches)
- Approved by the City of New York under MEA 352-01-E
- The Upright Sprinkler without an Escutcheon (TY3135) is available in 1-Inch NPT only

* Light and Ordinary Hazard Occupancies Only
** Light Hazard Occupancies Only
N/A - Not Available

TABLE B
1-INCH NPT AND ISO 7-R1, SERIES DS-1 QUICK RESPONSE, STANDARD COVERAGE DRY-TYPE SPRINKLERS
– LABORATORY LISTINGS AND APPROVALS –

Technical Data

Approvals

UL and C-UL Listed
FM Approved
NYC Approved under MEA 352-01-E

Previous New York City Approval and MEA certification numbers apply to product as shown in this data sheet. In accordance with Section BC 3502 of the Construction Code, current NYC Approvals for use in the City of New York apply to all products that contain UL or FM Approvals and Listings; therefore, not all products currently Approved for use in the City of New York will carry an actual MEA Certification number.

Refer to Tables A and B.

Maximum Working Pressure

175 psi (12,1 bar)

Inlet Thread Connections

3/4-Inch NPT
1-Inch NPT or ISO 7-R1

Discharge Coefficient

$K = 5.6 \text{ GPM/psi}^{1/2}$
(80,6 LPM/bar^{1/2})

Temperature Ratings

Refer to Tables A and B.

Finishes

Sprinkler: Natural Brass, Chrome Plated, White Polyester

Escutcheon: White Coated, 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
Plug Spring*.	Stainless Steel
Sealing Assembly	Beryllium Nickel w/Teflon**
Escutcheon	Carbon Steel

*For 3/4-Inch NPT only
**Registered trademark of DuPont

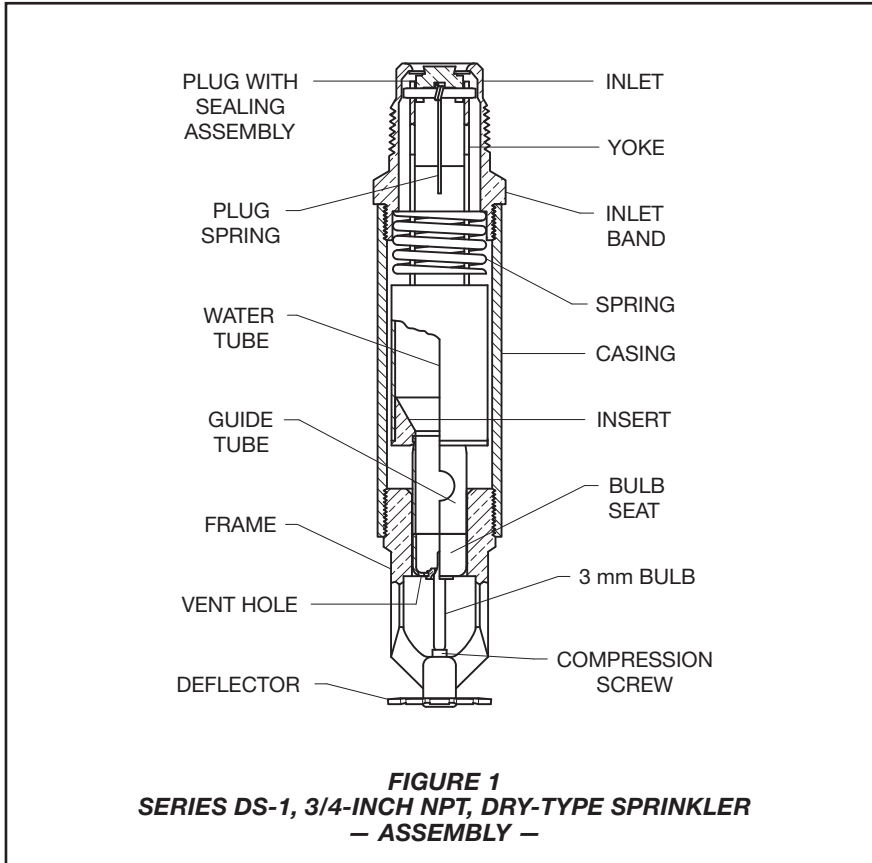


FIGURE 1
SERIES DS-1, 3/4-INCH NPT, DRY-TYPE SPRINKLER
— ASSEMBLY —

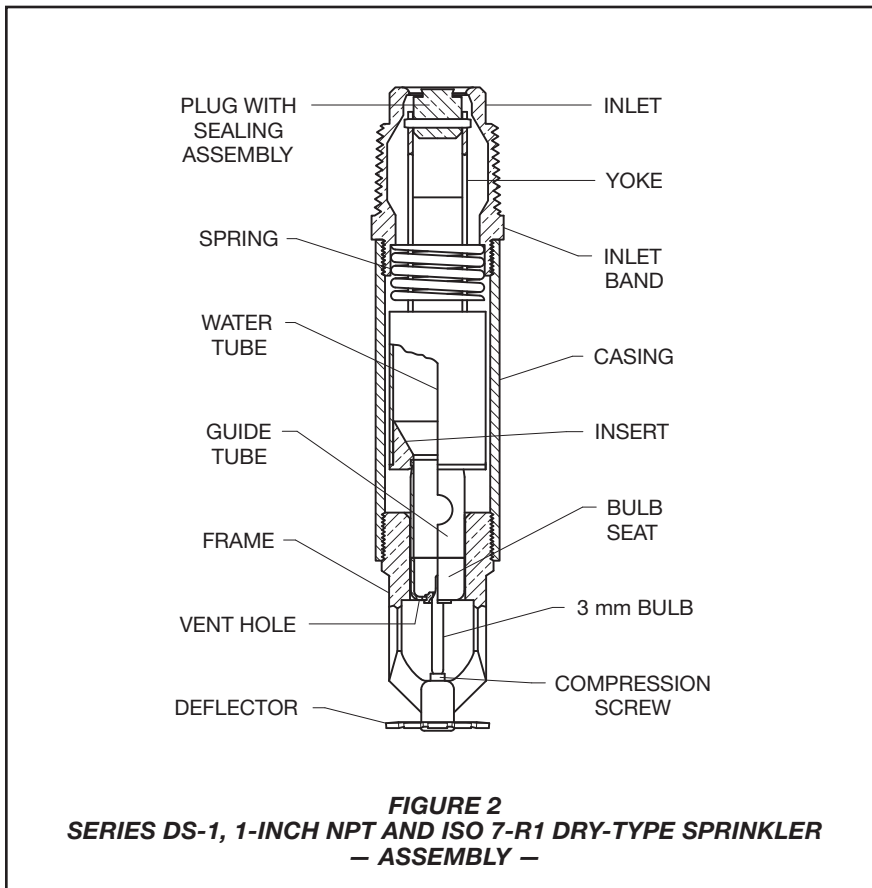
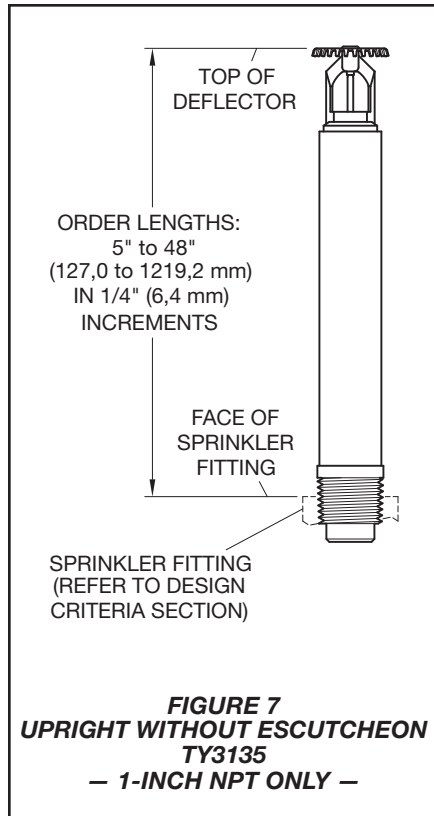
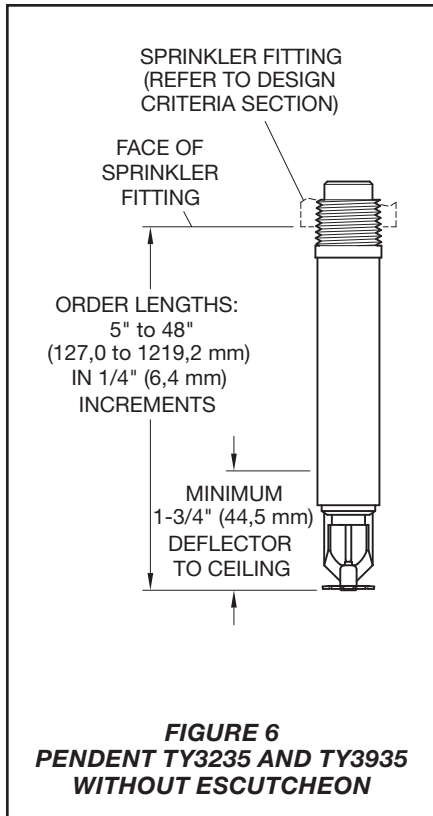
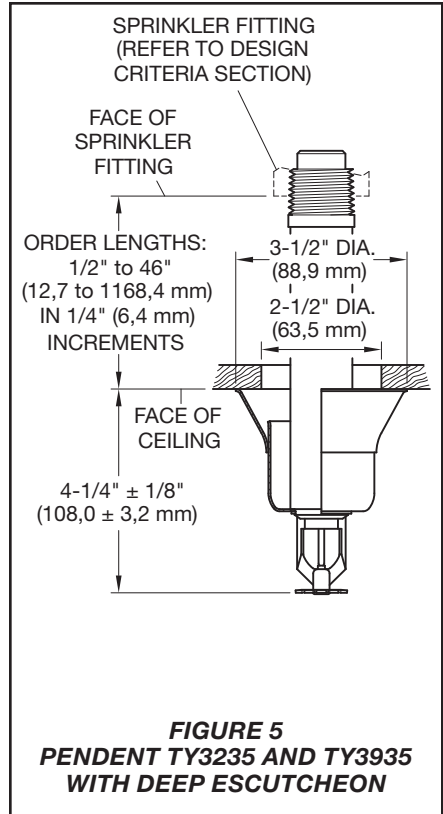
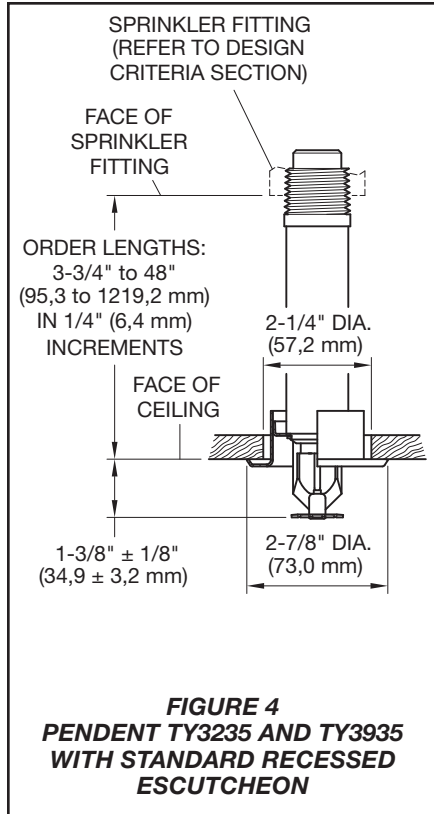
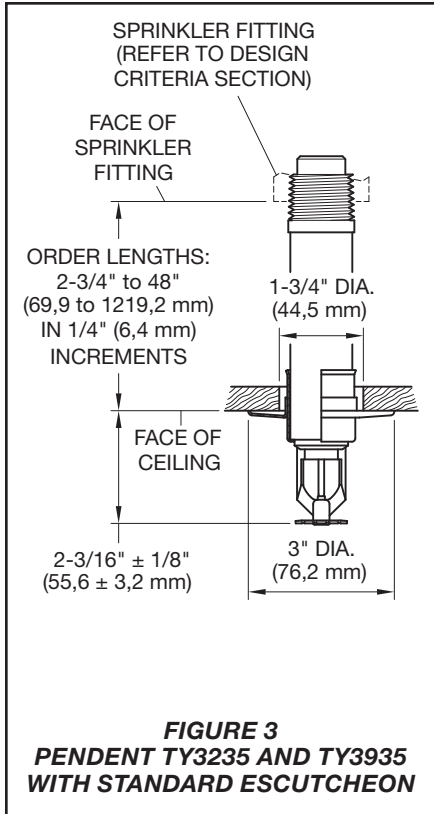
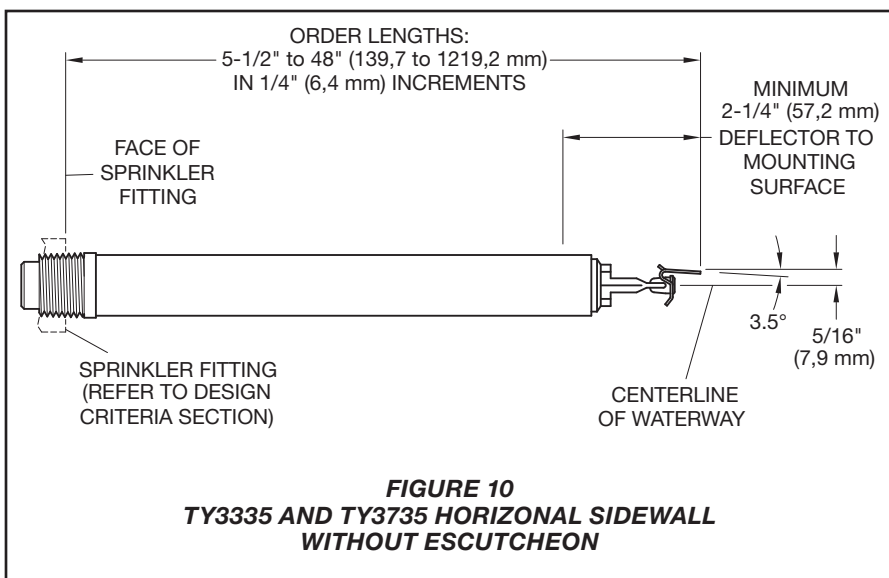
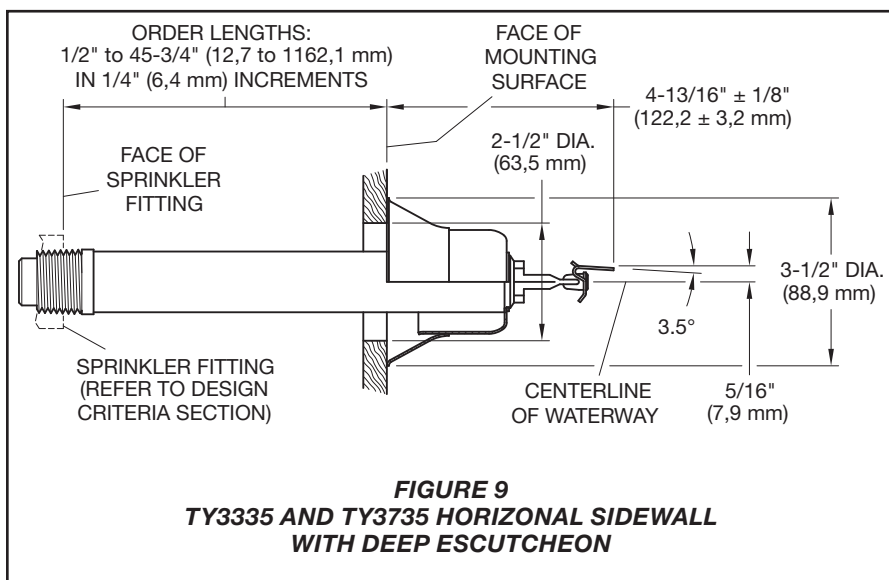
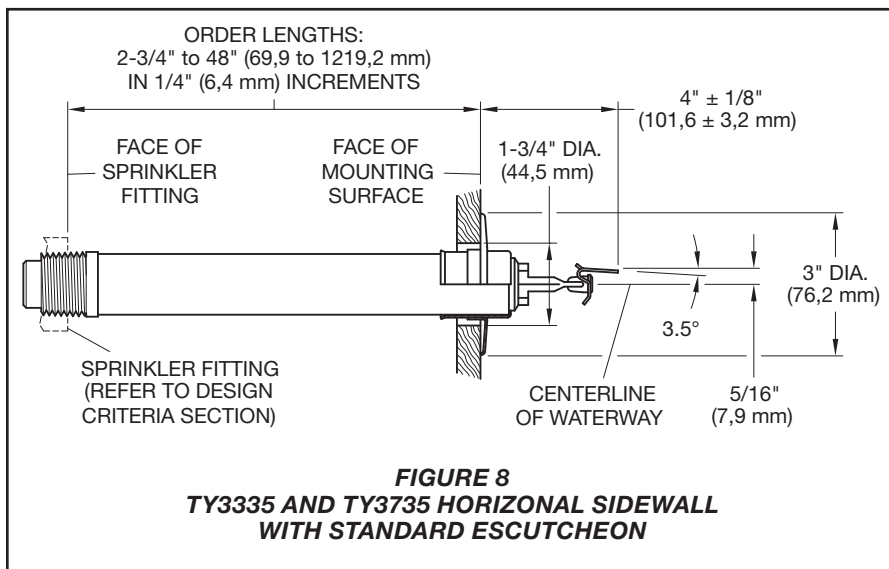


FIGURE 2
SERIES DS-1, 1-INCH NPT AND ISO 7-R1 DRY-TYPE SPRINKLER
— ASSEMBLY —





Operation

When the TYCO Series DS-1 Dry-Type Sprinkler is in service, water is prevented from entering the assembly by the Plug with Sealing Assembly in the Inlet of the Sprinkler. See Figures 1 and 2.

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 with Sealing Assembly from the Inlet and 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; for example, UL Listing is based on NFPA 13 requirements.

Sprinkler Fittings

Install the 3/4 or 1-Inch NPT Series DS-1 Dry-Type Sprinklers in the 3/4 or 1-Inch NPT outlet or run of the following fittings:

- 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 the DS-1 Sprinklers into an elbow fittings. The Inlet of the sprinkler can contact the interior of the elbow, potentially damaging the Inlet seal.

The unused outlet of the threaded tee is plugged as shown in Figure 13.

You can also install the Series DS-1 Dry-Type Sprinklers in the 3/4 or 1-Inch NPT outlet of a GRINNELL Figure 730 Mechanical Tee. However, the use of the Figure 730 Tee for this arrangement is limited to wet pipe systems.

The configuration shown in Figure 12 is only applicable for wet pipe systems where the sprinkler fitting and water-filled pipe above the sprinkler fitting are not subject to freezing and where the length of the Dry-Type Sprinkler has the minimum exposure length depicted in Figure 11. Refer to the Exposure Length section.

For wet pipe system installations of the 1-Inch NPT Series DS-1 Dry-Type Sprinklers connected to CPVC piping, use only the following TYCO CPVC fittings:

- 1" x 1" NPT Female Adapter (P/N 80145)
- 1" x 1" x 1" NPT Sprinkler Head Adapter Tee (P/N 80249).

For wet pipe system installations of the the 3/4-Inch NPT Series DS-1 Sprinklers connected to CPVC piping, use in the 3/4" x 3/4" NPT Female Adapter (P/N 80142).

For dry pipe system installations, use only the side outlet of maximum 2-1/2-inch reducing tee when locating the Series DS-1 Sprinklers directly below the branch line. Otherwise, use the configuration shown in Figure 13 to assure complete water drainage from above the Series DS-1 Dry-Type Sprinklers and the branch line. Failure to do so may result in pipe freezing and water damage.

NOTICE

Do not install the Series DS-1 Dry-Type Sprinkler into any other type fitting without first consulting the Technical Services Department. Failure to use the appropriate fitting may result in one of the following:

- *Failure of the sprinkler to operate properly due to formation of ice over the inlet Plug or binding of the Inlet Plug.*
- *Insufficient engagement of the Inlet pipe threads with consequent leakage.*

Drainage

In accordance with the minimum requirements of the National Fire Protection Association for dry pipe sprinkler systems, branch, cross, and feed-main piping connected to Dry Sprinklers and subject to freezing temperatures must be pitched for proper drainage.

Exposure Length

When using Dry Sprinklers in wet pipe sprinkler systems to protect areas subject to freezing temperatures, use Table C to determine a sprinkler's appropriate

exposed barrel length to prevent water from freezing in the connecting pipes due to conduction. The exposed barrel length measurement must be taken from the face of the sprinkler fitting to the surface of the structure or insulation that is exposed to the heated area. Refer to Figure 11 for an example.

Clearance Space

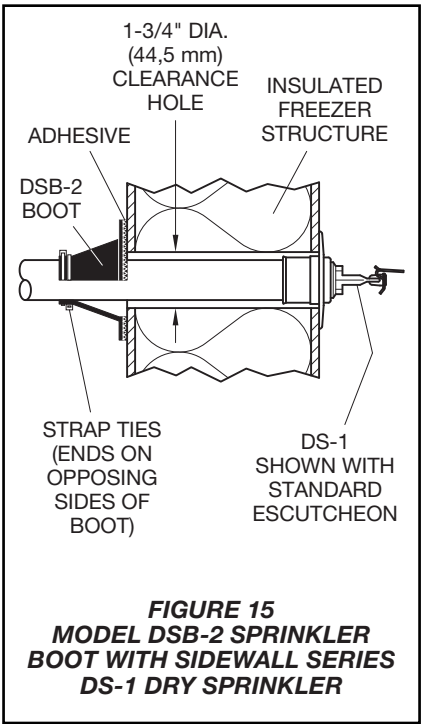
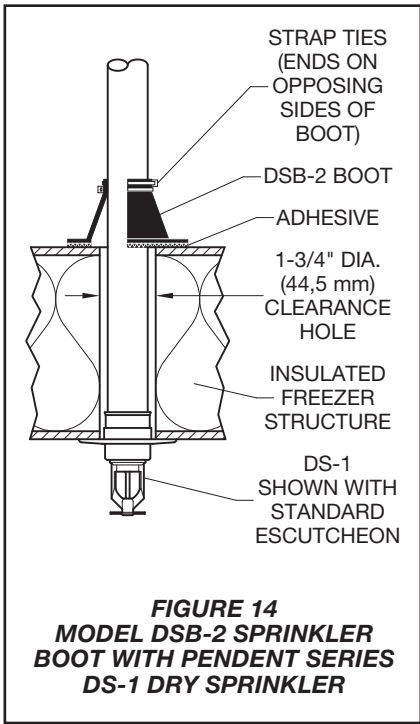
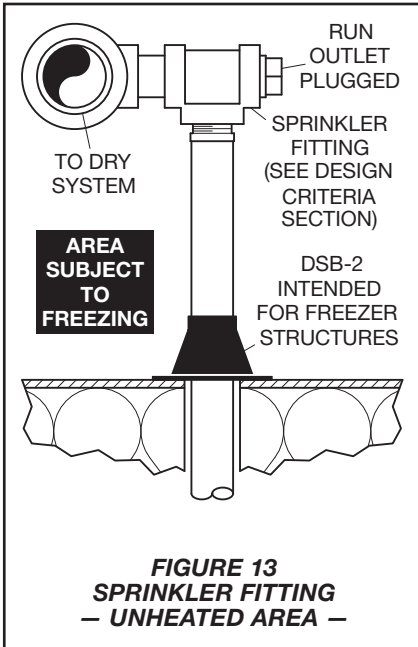
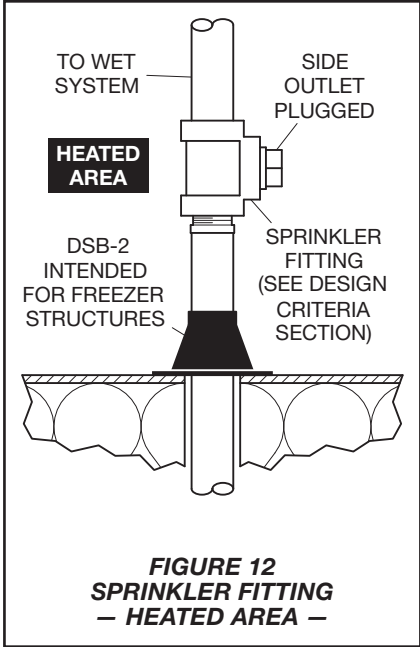
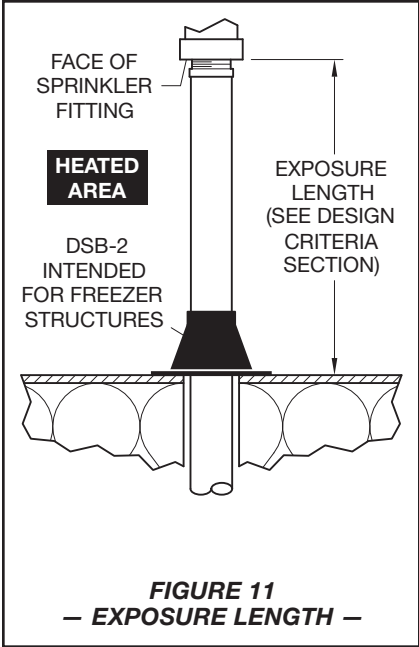
In accordance with Section 8.4.9.2 of the 2010 edition of NFPA 13, when connecting an area subject to freezing and an area containing a wet pipe sprinkler system, the clearance space around the sprinkler barrel of Dry-Type Sprinklers must be sealed. Due to temperature differences between two areas, the potential for the formation of condensation in the sprinkler and subsequent ice build-up is increased. If this condensation is not controlled, ice build-up can occur that might damage the dry-type sprinkler and/or prevent proper operation in a fire situation.

Use of the Model DSB-2 Dry Sprinkler Boot, described in technical data sheet TFP591 and shown in Figures 14 and 15, can provide the recommended seal.

Ambient Temperature Exposed to Discharge End of Sprinkler	Temperatures for Heated Area ^(a)		
	40°F (4°C)	50°F (10°C)	60°F (16°C)
	Minimum Exposed Barrel Length, Inches (mm) ^(b)		
40°F (4°C)	0	0	0
30°F (-1°C)	0	0	0
20°F (-7°C)	4 (100)	0	0
10°F (-12°C)	8 (200)	1 (25)	0
0°F (-18°C)	12 (305)	3 (75)	0
-10°F (-23°C)	14 (355)	4 (100)	1 (25)
-20°F (-29°C)	14 (355)	6 (150)	3 (75)
-30°F (-34°C)	16 (405)	8 (200)	4 (100)
-40°F (-40°C)	18 (455)	8 (200)	4 (100)
-50°F (-46°C)	20 (510)	10 (255)	6 (150)
-60°F (-51°C)	20 (510)	10 (255)	6 (150)

Notes:
(a) For protected area temperatures that occur between values listed above, use the next cooler temperature.
(b) These lengths are inclusive of wind velocities up to 30 mph (18,6 kph).

TABLE C
EXPOSED SPRINKLER BARRELS IN WET PIPE SYSTEMS
– MINIMUM RECOMMENDED LENGTHS –



Installation

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

NOTICE

The Series DS-1 Dry-Type Sprinkler 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 286°F (141°C) rating.

- Obtain a leak-tight 3/4-Inch NPT sprinkler joint by applying a minimum-to-maximum torque of 10 to 20 ft. lbs. (13,4 to 26,8 Nm).
- 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.

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

1. Install pendent sprinklers only in the pendent position, and install upright sprinklers only in the upright position. The deflector of a pendent or upright sprinkler must be parallel to the ceiling.

Install horizontal sidewall sprinklers in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. Ensure the word "TOP" on the Deflector faces the ceiling.

2. With a non-hardening pipe-thread sealant such as Teflon¹ tape applied to the Inlet threads, hand-tighten the sprinkler into the sprinkler fitting.

3. Wrench-tighten the sprinkler using either:

- a pipe wrench on the Inlet Band or the Casing (Figures 1 and 2)
- the W-Type 7 Sprinkler Wrench on the Wrench Flat (Figure 16).

Apply the Wrench Recess of the W-Type 7 Sprinkler Wrench to the Wrench Flat.

Note: *If sprinkler removal becomes necessary, remove the sprinkler using the same wrenching method noted above. Sprinkler removal is easier when a non-hardening sealant was used and torque guidelines were followed. After removal, inspect the sprinkler for damage.*

4. After installing the ceiling or wall and applying a ceiling finish, slide on the outer piece of the Escutcheon until it comes in contact with the ceiling or wall. Do not lift the ceiling panel out of its normal position.

When using the Deep Escutcheon, hold the outer piece in contact with the mounting surface (ceiling or wall). 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.

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.

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

A Vent Hole is provided in the Bulb Seat (Figures 1 and 2) to indicate if the Dry-Type Sprinkler is remaining dry. Evidence of leakage from the Vent Hole indicates potential leakage past the Inlet seal and the need to remove the sprinkler to determine the cause of leakage; for example, an improper installation or an ice plug. Close the fire protection system control valve and drain the system before removing the sprinkler.

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

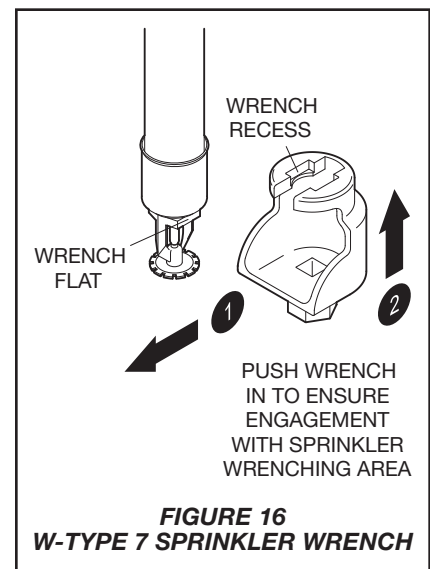
Never repaint factory-painted Cover Plates. When necessary, replace cover plates with factory-painted units. Non-factory applied paint can adversely delay or prevent sprinkler operation in the event of a fire.

Replace sprinklers that:

- were damaged by dropping, striking, wrench twisting, wrench slippage, or the like.
- were modified or over-heated.
- have cracked bulbs or have lost liquid from the bulbs. Refer to the Installation Section in this data sheet.
- are leaking or exhibiting visible signs of corrosion.

Responsibility lies with owners 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 other Authorities Having Jurisdiction. The installing contractor or sprinkler manufacturer should be contacted relative to 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.



¹ Registered trademark of DuPont

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 and Part Number (P/N).

Dry-Type Sprinklers

Specify this dry-type sprinkler as follows:

- Model/SIN from Page 1
- Quick 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 10. After taking the measurement, round it to the nearest 1/4 inch increment.
- Inlet Connections
3/4-Inch NPT, 1-Inch NPT, or ISO 7-R1
- Temperature Rating
- Sprinkler Finish
- Escutcheon Style and Finish, as applicable
- Part Number (P/N) from Table C

The Upright Sprinkler without an Escutcheon (TY3135) is available in 1-Inch NPT only.

Part Numbers are for 3/4-Inch and 1-Inch NPT standard order sprinklers. Orders for all other sprinkler assemblies must be accompanied by a complete description. Refer to the Price List for a complete listing of Part Numbers.

Sprinkler Wrench

Specify: W-Type 7 Sprinkler Wrench, P/N 56-850-4-001.

Sprinkler Boot

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

This Part Number includes one Boot, two Strap Ties, and 1/3 oz. of Adhesive. The quantity of adhesive is sufficient for installing one Boot.

P/N* 60 – XXX – X – XXX

		MODEL/SIN	SPRINKLER FINISH		ESCUTCHEON FINISH (1)	
01	Pendent with Standard Escutcheon (3/4" NPT)	TY3935 (Figure 3)	1	NATURAL BRASS	WHITE	
02	Pendent with Deep Escutcheon (3/4" NPT)	TY3935 (Figure 5)	4	WHITE POLYESTER	WHITE	
03	Pendent with Standard Recessed Escutcheon (3/4" NPT)	TY3935 (Figure 4)	9	CHROME PLATED	CHROME	
04	Pendent without Escutcheon (3/4" NPT)	TY3935 (Figure 6)	0	CHROME PLATED	WHITE	
			2	NATURAL BRASS	BRASS PLATED	
05	Sidewall with Standard Escutcheon (3/4" NPT)	TY3735 (Figure 8)				
06	Sidewall with Deep Escutcheon (3/4" NPT)	TY3735 (Figure 9)				
07	Sidewall without Escutcheon (3/4" NPT)	TY3735 (Figure 10)				
36	Pendent with Standard Escutcheon (1" NPT)	TY3235 (Figure 3)				
33	Pendent with Deep Escutcheon (1" NPT)	TY3235 (Figure 5)				
37	Pendent with Standard Recessed Escutcheon (1" NPT)	TY3235 (Figure 4)				
32	Pendent without Escutcheon (1" NPT)	TY3235 (Figure 6)				
34	Sidewall with Standard Escutcheon (1" NPT)	TY3335 (Figure 8)				
43	Sidewall with Deep Escutcheon (1" NPT)	TY3335 (Figure 9)				
44	Sidewall without Escutcheon (1" NPT)	TY3335 (Figure 10)				
38	Upright without Escutcheon (1" NPT)	TY3135 (Figure 7)				
			TEMPERATURE RATINGS (2)		SAMPLE ORDER LENGTHS (3)	
			0	135°F (57°C)	055	5.50"
			1	155°F (68°C)	082	8.25"
			2	175°F (79°C)	180	18.00"
			3	200°F (93°C)	187	18.75"
			4	286°F (141°C)	372	37.25"
					480	48.00"

Notes

* Use Prefix "I" for ISO 7-R1 Connection; for example, I-60-010-4-055.

1. Escutcheon Finish applies to sprinklers provided with escutcheons.
2. 286°F (141°C) temperature rating applies to non-recessed sprinkler assemblies.
3. Dry-Type Sprinklers are furnished based upon "Order Length" as measured per Figures 3 through 10, 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.

TABLE C
SERIES DS-1 DRY-TYPE SPRINKLERS
– PART NUMBER SELECTION –