

tyco Fire Suppression & Building Products

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Series DS-1 Dry-Type Sprinklers **Quick Response, Standard Coverage** **5.6 K-factor, 3/4 and 1-Inch NPT**

General Description

The TYCO Series DS-1, 5.6 K-factor, 3/4 and 1-Inch NPT, Quick Response, Standard Coverage, Dry-Type Sprinklers are decorative, 3-mm 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

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.

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.

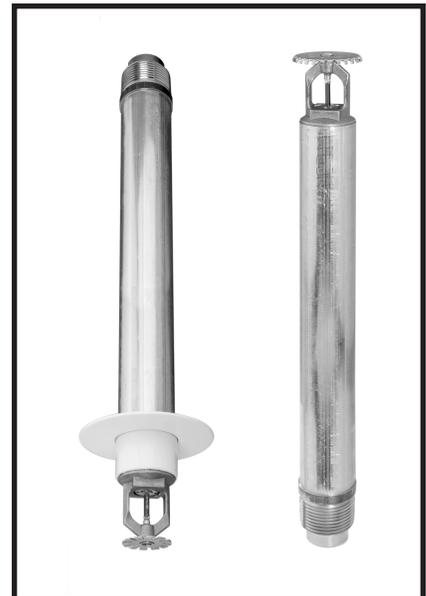
Model/Sprinkler Identification Numbers (SINs)

3/4-Inch NPT:

TY3935 - Pendent
TY3735 - Horizontal Sidewall

1-Inch NPT:

TY3235 - Pendent
TY3135 - Upright
TY3335 - Horizontal Sidewall



		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	1, 2			1, 2			1*, 2*		
175°F (79°C)	Yellow	1, 2			1, 2			1*, 2*		
200°F (93°C)	Green	1, 2			1, 2			1*, 2*		
286°F (141°C)	Blue	N/A			1, 2			1*, 2*		

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
**3/4-INCH NPT, 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		1, 2	1, 2, 3		1, 2	1*, 2*, 3**		1*, 2*
155°F (68°C)	Red	1, 2, 3		1, 2	1, 2, 3		1, 2	1*, 2*, 3**		1*, 2*
175°F (79°C)	Yellow	1, 2, 3		1, 2	1, 2, 3		1, 2	1*, 2*, 3**		1*, 2*
200°F (93°C)	Green	1, 2, 3		1, 2	1, 2, 3		1, 2	1*, 2*, 3**		1*, 2*
286°F (141°C)	Blue	N/A			1, 2, 3		1, 2	1*, 2*, 3**		1*, 2*

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).
- 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

Refer to Tables A and B.

Maximum Working Pressure

175 psi (12,1 bar)

Inlet Thread Connection

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

Discharge Coefficient

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

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

Patents

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

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

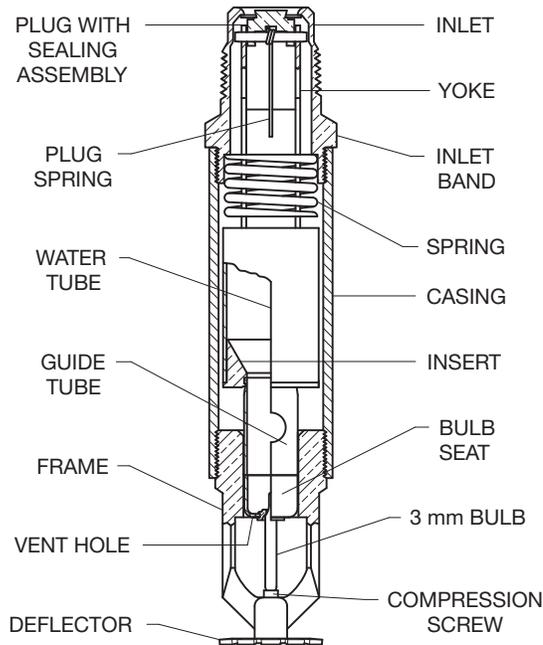


FIGURE 1
SERIES DS-1, 3/4-INCH NPT, QUICK RESPONSE
DRY-TYPE SPRINKLER ASSEMBLY

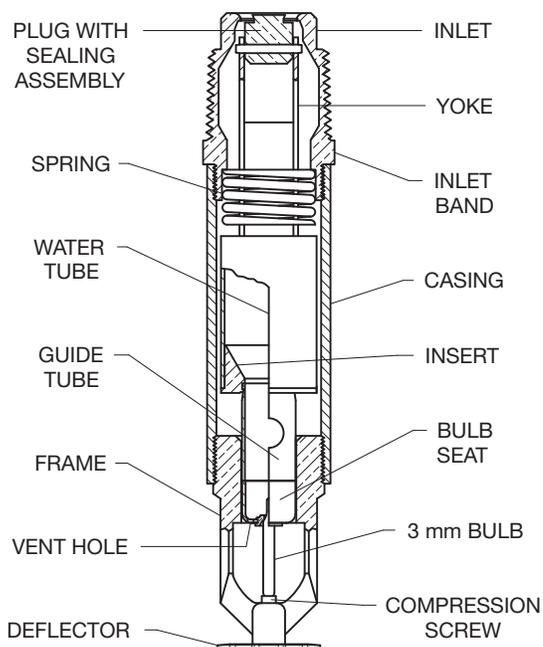
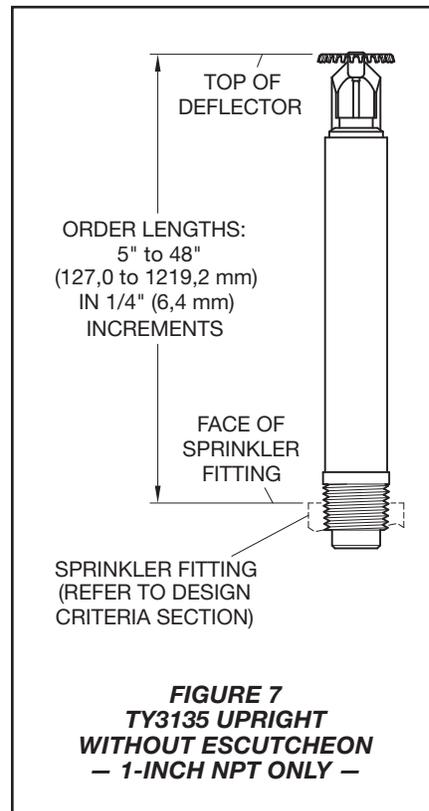
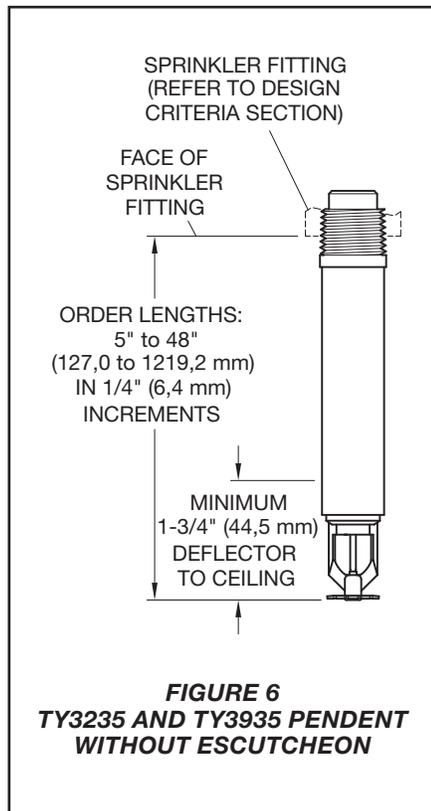
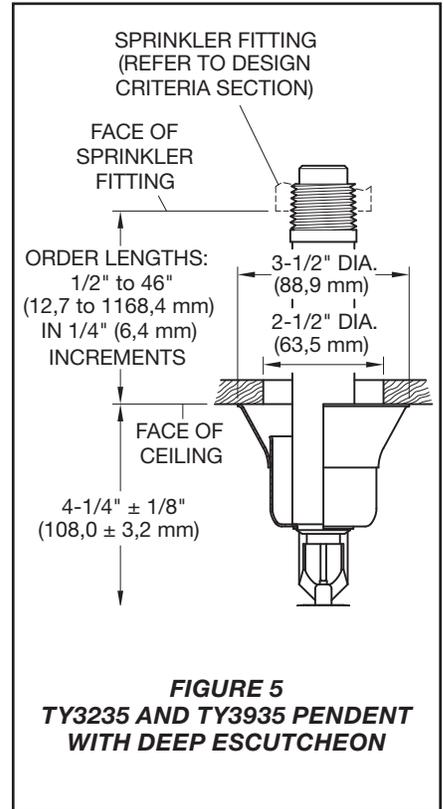
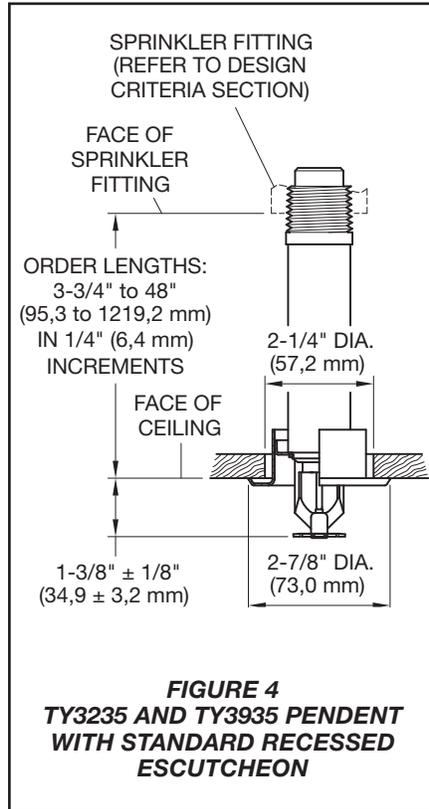
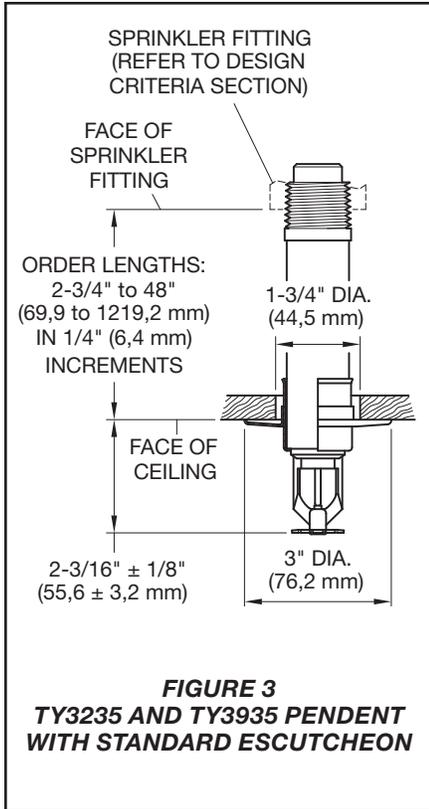
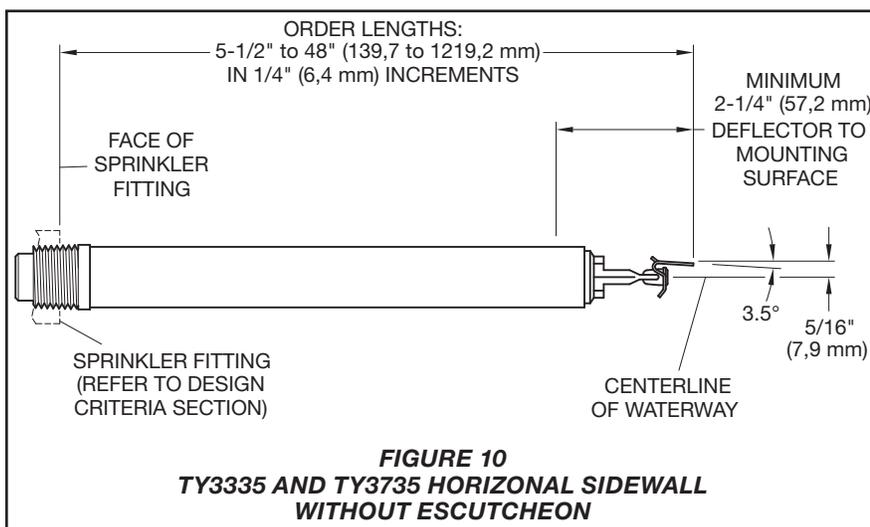
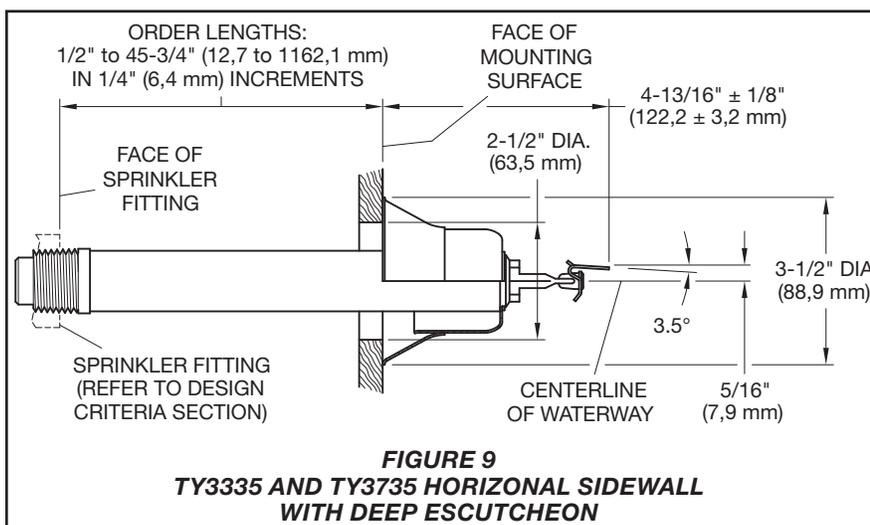
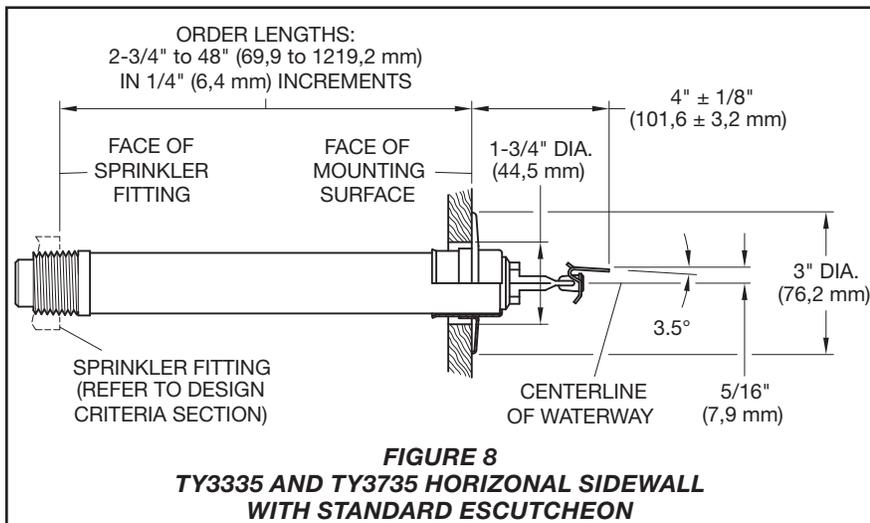


FIGURE 2
SERIES DS-1, 1-INCH NPT AND ISO 7-R1, QUICK RESPONSE
DRY-TYPE SPRINKLER ASSEMBLY





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 Figures 12 and 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
MINIMUM RECOMMENDED LENGTHS OF EXPOSED SPRINKLER BARRELS
IN WET PIPE SYSTEMS

