

## Series DS-1 – 5.6 K-factor, Dry-type Sprinklers Pendent, Upright, and Horizontal Sidewall Standard Response, Standard Coverage

### General Description

TYCO Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response (5 mm bulb), Standard Coverage Dry-type Sprinklers are decorative glass bulb automatic sprinklers 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 may be 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 unheated areas of a building such as loading docks, overhangs, and building exteriors)
- sprinklers are used on systems that are seasonably drained to avoid freezing (for example, vacation resort areas)

### NOTICE

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 (NFPA), in addition to the 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. Contact the installing contractor or product manufacturer with any questions.

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

### Sprinkler Identification Numbers (SINs)

TY3255 – Pendent  
TY3155 – Upright  
TY3355 – Horizontal Sidewall

### Technical Data

#### Approvals

UL and C-UL Listed  
FM Approved  
VdS Approved  
TY3255 w/Standard Escutcheon only  
NYC Approved  
under MEA 352-01-E  
LPCB Approved  
Reference No. 094a/11  
CE Certified  
Certificate of Conformity No. 0832-CPD-2015  
(See Tables A and B for details.)

**Maximum Working Pressure**  
175 psi (12,1 bar)

**Inlet Thread Connections**  
1 in. NPT  
ISO 7-R 1



**Discharge Coefficient**  
K=5.6 gpm/psi<sup>1/2</sup> (80,6 lpm/bar<sup>1/2</sup>)

**Temperature Ratings**  
See Tables A and B.

#### Finishes

Sprinkler: See Table D.  
Escutcheon: See Table D.

#### Physical Characteristics

Inlet	.....	Copper
Plug	.....	Copper
Yoke	.....	Stainless Steel
Casing	.....	Galvanized Carbon Steel
Insert	.....	Bronze
Bulb Seat	.....	Stainless Steel
Bulb (5 mm dia.)	.....	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 or Stainless Steel

### 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.

SPRINKLER TYPE	ESCUTCHEON TYPE	TEMPERATURE RATING	BULB COLOR CODE	SPRINKLER FINISH						
				NATURAL BRASS	CHROME PLATED	POLYESTER*				
PENDENT (TY3255)	STANDARD	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6		1, 2, 4, 5, 6				
		155°F (68°C)	Red							
		175°F (79°C)	Yellow							
		200°F (93°C)	Green							
		286°F (141°C)	Blue							
		360°F (182°C)	Mauve				1, 2, 3, 6	1, 2, 6		
	RECESSED	135°F (57°C)	Orange	1, 2, 3, 5		1, 2, 5				
		155°F (68°C)	Red							
		175°F (79°C)	Yellow							
		200°F (93°C)	Green							
		286°F (141°C)	Blue				1, 2			
		360°F (182°C)	Mauve				N/A			
	DEEP	135°F (57°C)	Orange	1, 2, 3, 4, 5		1, 2, 4, 5				
		155°F (68°C)	Red							
		175°F (79°C)	Yellow							
		200°F (93°C)	Green							
		286°F (141°C)	Blue							
		360°F (182°C)	Mauve							
		WITHOUT	135°F (57°C)				Orange	1, 2, 3		1, 2
			155°F (68°C)				Red			
			175°F (79°C)				Yellow			
200°F (93°C)			Green							
286°F (141°C)			Blue							
360°F (182°C)			Mauve							
UPRIGHT (TY3155)	WITHOUT	135°F (57°C)	Orange	1, 2, 3, 4, 5		1, 2, 4, 5				
		155°F (68°C)	Red							
		175°F (79°C)	Yellow							
		200°F (93°C)	Green							
		286°F (141°C)	Blue							
		360°F (182°C)	Mauve				1, 2, 3	1, 2		

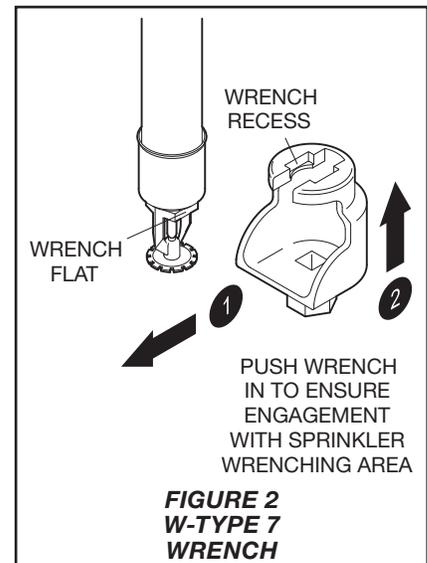
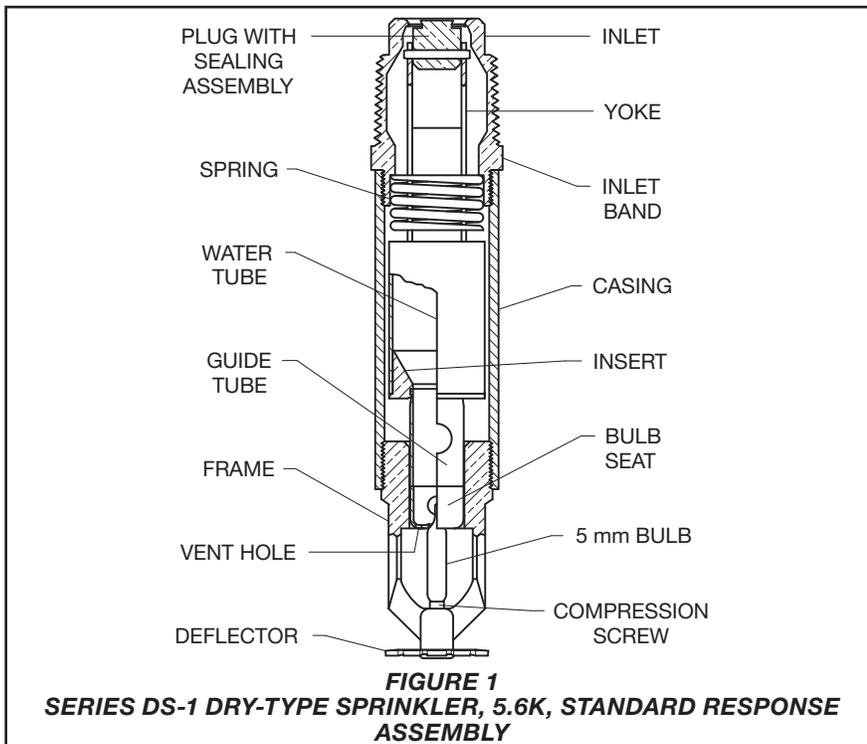
- Notes:**
1. Listed by Underwriters Laboratories, Inc. (UL), maximum order length of 48 in.
  2. Listed by Underwriters Laboratories for use in Canada (C-UL), maximum order length of 48 in.
  3. Approved by FM Global (FM Approvals), maximum order length of 48 in.
  4. Loss Prevention Certification Board (LPCB) and CE conformity apply to these temperature ratings only
  5. Approved by the City of New York under MEA 352-01-E
  6. Approved by VdS
- \* Frame and deflector only  
N/A – Not Applicable

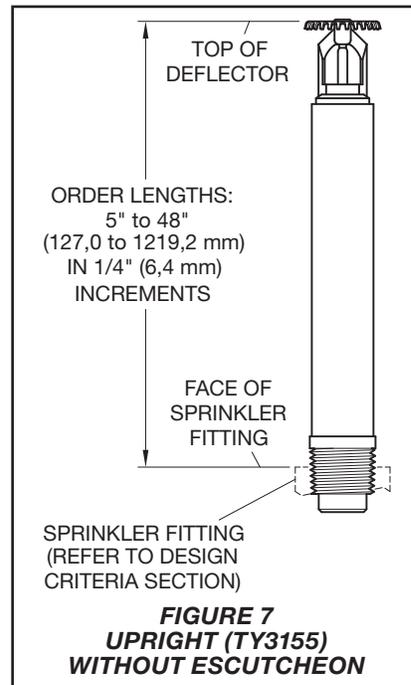
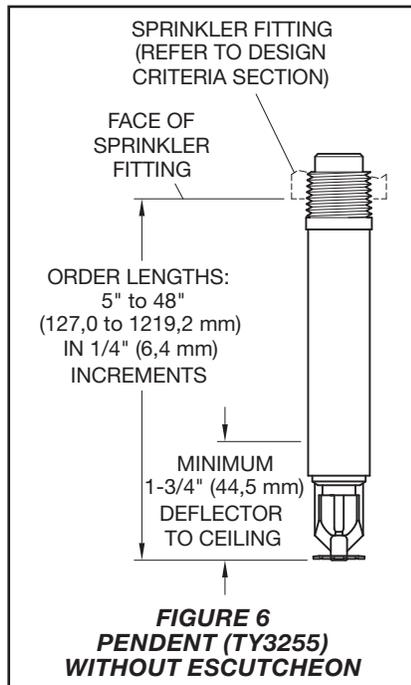
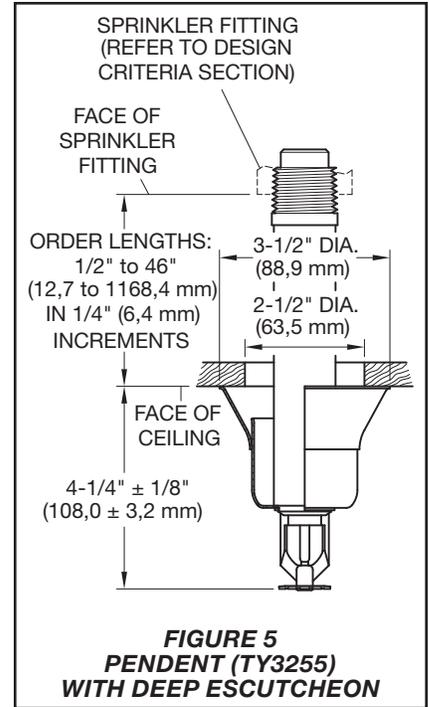
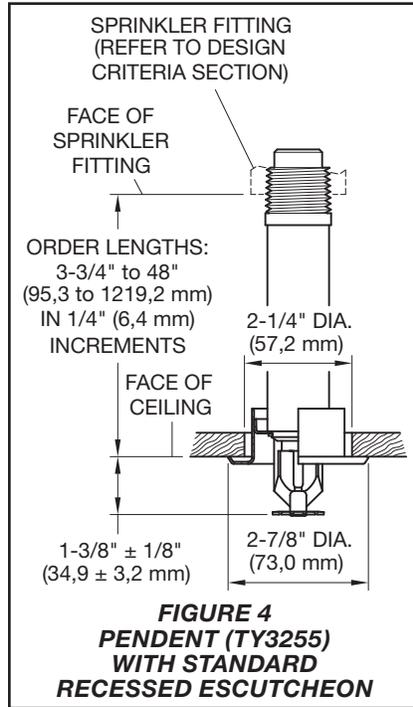
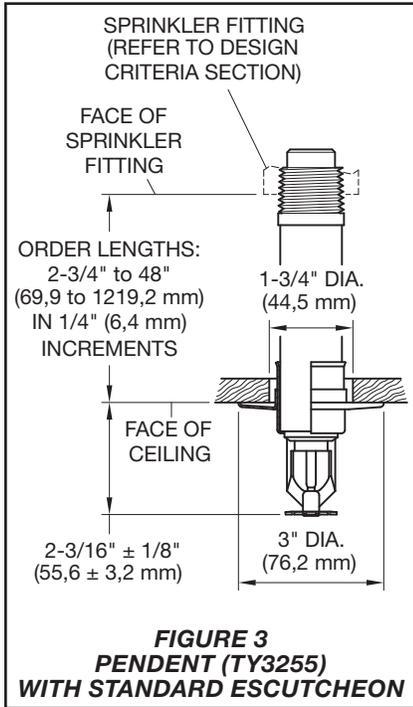
**TABLE A**  
**SERIES DS-1 PENDENT & UPRIGHT DRY-TYPE SPRINKLERS, 5.6K, STANDARD RESPONSE**  
**LABORATORY LISTINGS AND APPROVALS**

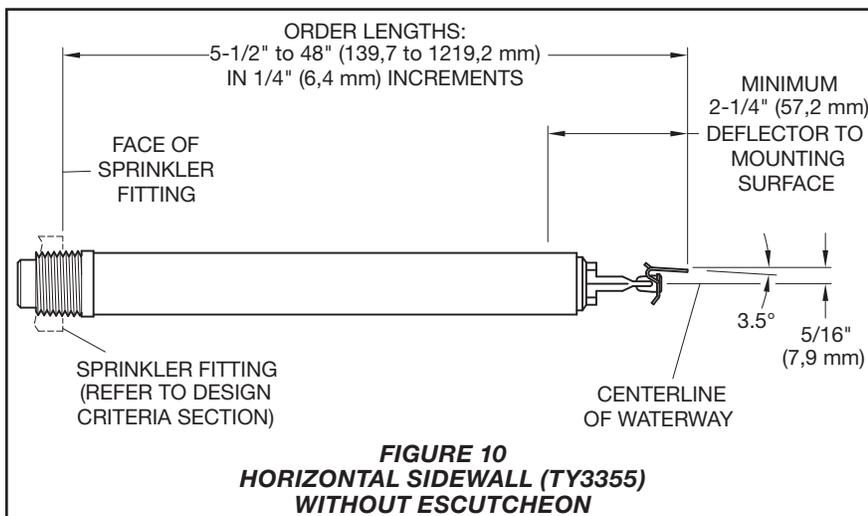
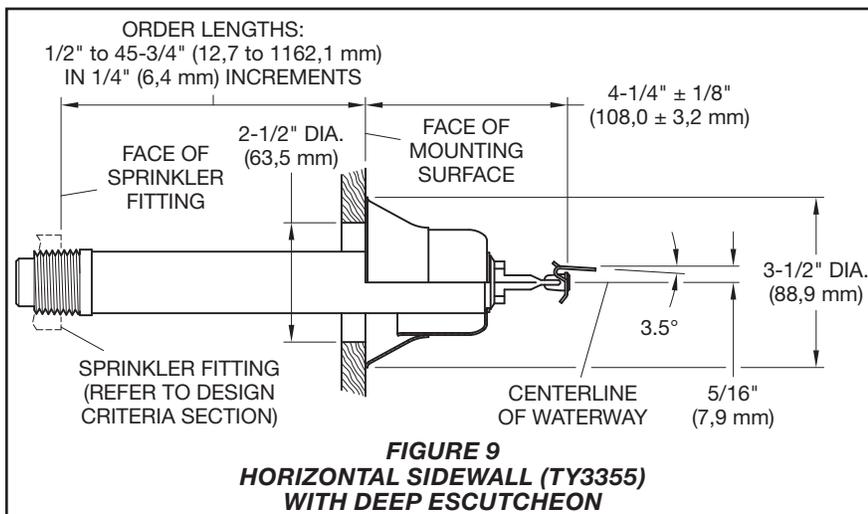
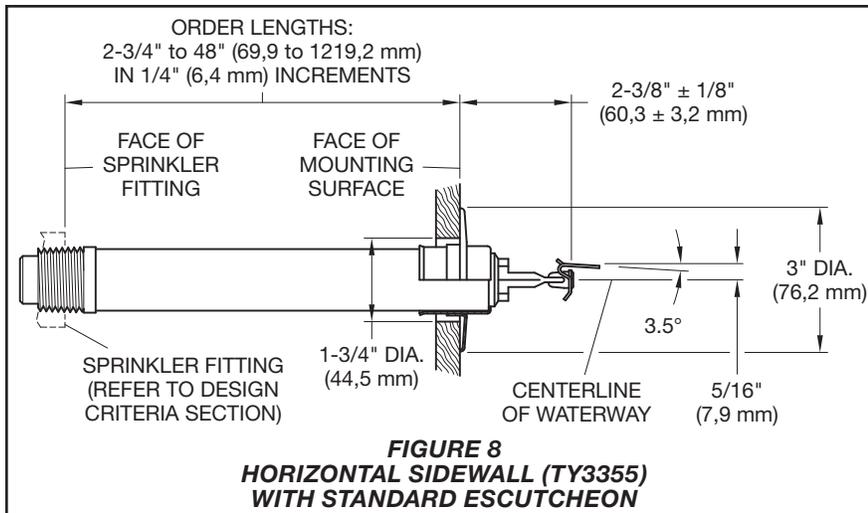
SPRINKLER TYPE	ESCUTCHEON TYPE	TEMPERATURE RATING	BULB COLOR CODE	SPRINKLER FINISH		
				NATURAL BRASS	CHROME PLATED	POLYESTER***
HSW* (TY3355)	STANDARD	135°F (57°C)	Orange	1**, 2**, 3**, 4, 5		1**, 2**, 4, 5
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
		360°F (182°C)	Mauve			
	DEEP	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
		360°F (182°C)	Mauve			
	WITHOUT	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
		360°F (182°C)	Mauve			
				1**, 2**, 5		1**, 2**

- Notes:**
- Listed by Underwriters Laboratories, Inc. (UL), maximum order length of 48 in.
  - Listed by Underwriters Laboratories for use in Canada (C-UL), maximum order length of 48 in.
  - Approved by FM Global (FM Approvals), maximum order length of 48 in.
  - Loss Prevention Certification Board (LPCB) and CE conformity apply to these temperature ratings only
  - Approved by the City of New York under MEA 352-01-E
- \* Horizontal sidewall with top of deflector-to-ceiling distance of 4 to 12 in. (100 to 300 mm)  
 \*\* Light and ordinary hazard occupancies only  
 \*\*\* Light hazard occupancies only  
 \*\*\*\* Frame and deflector only

**TABLE B**  
**SERIES DS-1 HORIZONTAL SIDEWALL (HSW) DRY-TYPE SPRINKLER, 5.6K, STANDARD RESPONSE**  
**LABORATORY LISTINGS AND APPROVALS**







## Operation

When TYCO Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response, Standard Coverage Dry-type Sprinklers are in service, water is prevented from entering the assembly by the Plug with Sealing Assembly (see 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 with Sealing Assembly from the Inlet, allowing the sprinkler to activate and flow water.

## Design Criteria

TYCO Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response, Standard Coverage Dry-type 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). For more information on LPCB Approval, contact Johnson Controls at the following office:

Kopersteden 1  
7547 TJ Enschede  
The Netherlands  
Tel: +31-(0)53-428-4444  
Fax: +31-(0)53-428-3377

### Sprinkler Fittings

Install 1 in. NPT Series DS-1 Dry-type Sprinklers in the 1 in. 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 Series DS-1 Dry-type Sprinklers into elbow fittings. The Inlet of the sprinkler can contact the interior of the elbow.

The unused outlet of the threaded tee is plugged as shown in Figure 12.

Ambient Temperature Exposed to Discharge End of Sprinkler	Temperatures for Heated Area <sup>(1)</sup>		
	40°F (4°C)	50°F (10°C)	60°F (16°C)
	Minimum Exposed Barrel Length <sup>(2)</sup> , in. (mm)		
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:**  
1. For protected area temperatures that occur between values listed above, use the next cooler temperature.  
2. 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**

You can also install Series DS-1 Dry-type Sprinklers in the 1 in. NPT outlet of a GRINNELL Figure 730 Mechanical Tee and GRINNELL G-FIRE Figure 522; however, the use of the Figure 730 Tee and Figure 522 for this arrangement is limited to wet pipe systems.

The configuration shown in Figure 13 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. See the Exposure Length section.

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

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

For dry pipe system installations, use only the side outlet of maximum 2-1/2 in. reducing tee when locating Series DS-1 Dry-type Sprinklers directly below the branchline; otherwise, use the configuration shown in Figure 12 to assure complete water drainage from above Series DS-1 Dry-type Sprinklers and the branchline. Failure to do so may result in pipe freezing and water damage.

**NOTICE**

*Do not install Series DS-1 Dry-type Sprinklers into any other type fitting without first consulting the Johnson Controls Technical Services. 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. See Figure 11 for an example.

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.

**Clearance Space**

In accordance with 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.

