

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

General Description

TYCO Series DS-1 Dry-Type Sprinklers, 5.6 K-factor Horizontal Sidewall, Standard (5 mm Bulb) and Quick Response (3 mm Bulb) and Extended Coverage, are decorative glass bulb automatic sprinklers typically used where the sprinklers and/or a portion of the connecting piping may be exposed to freezing temperatures; for example, horizontal piping extensions through a wall to protect an unheated area of a building. Series DS-1 Dry-Type Sprinklers are designed for extended coverage use in light hazard occupancies.

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.

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 Identification Numbers (SINs)

TY3338 – 3 mm Bulb Type
TY3358 – 5 mm Bulb Type

Technical Data

Approvals

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

See Table A

Maximum Working Pressure

175 psi (12,1 bar)

Inlet Thread Connections

1 in. NPT or
ISO 7-R 1

Discharge Coefficient

K=5.6 gpm/psi^{1/2}
(80,6 lpm/bar^{1/2})

Temperature Ratings

See Table A

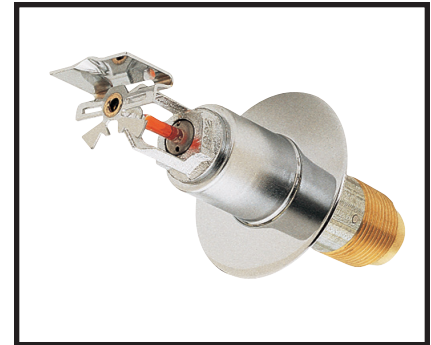
Finishes

Sprinkler: Natural Brass, Chrome Plated,
or Signal White

Escutcheon: Signal White, Chrome Plated,
or 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 Gasketed Spring
Plate Seal	.....	Beryllium Nickel w/TEFLON
Escutcheon	.....	Carbon Steel or Stainless Steel



Operation

When TYCO Series DS-1 Dry-Type Sprinklers are in service, water is prevented from entering the assembly by the Plug and Gasketed Spring Plate Seal (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 and Gasketed Spring Plate Seal from the Inlet allowing the sprinkler to activate and flow water.

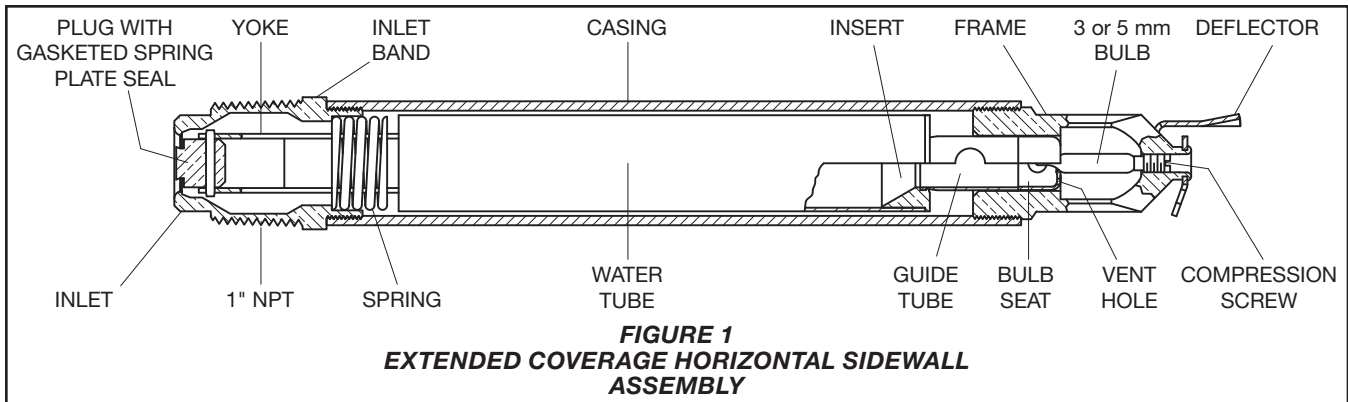


FIGURE 1
EXTENDED COVERAGE HORIZONTAL SIDEWALL ASSEMBLY

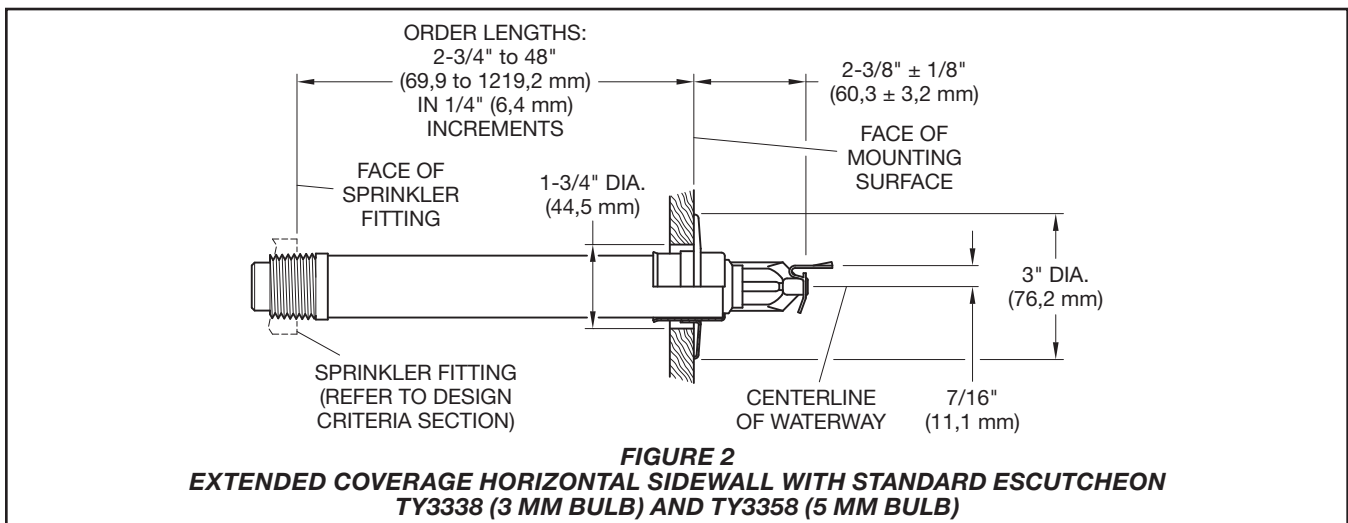


FIGURE 2
EXTENDED COVERAGE HORIZONTAL SIDEWALL WITH STANDARD ESCUTCHEON TY3338 (3 MM BULB) AND TY3358 (5 MM BULB)

Design Criteria

TYCO Series DS-1 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.

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 5.

You can also install Series DS-1 Dry-Type Sprinklers in the outlet.

The configuration shown in Figure 6 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 6. 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 branch line. Otherwise, use the configuration shown

in Figure 4 to assure complete water drainage from above Series DS-1 Dry-Type Sprinklers and the branch line. Failure to do so may result in pipe freezing and water damage.

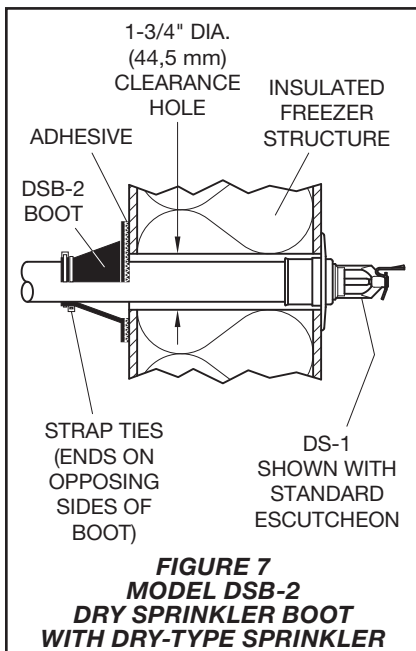
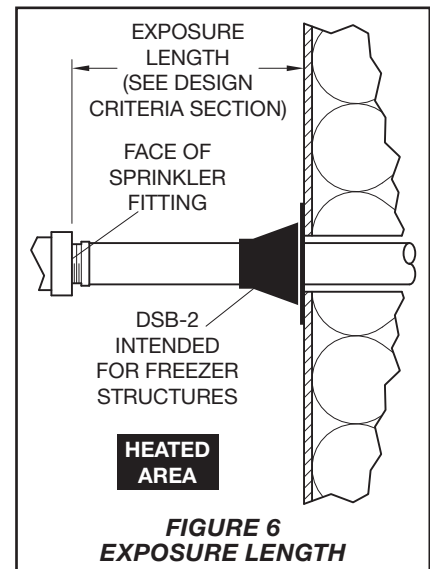
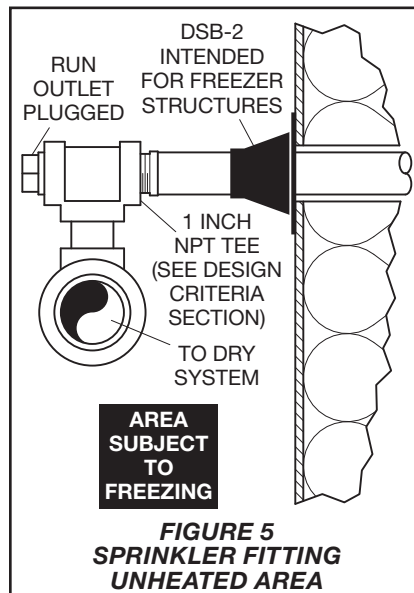
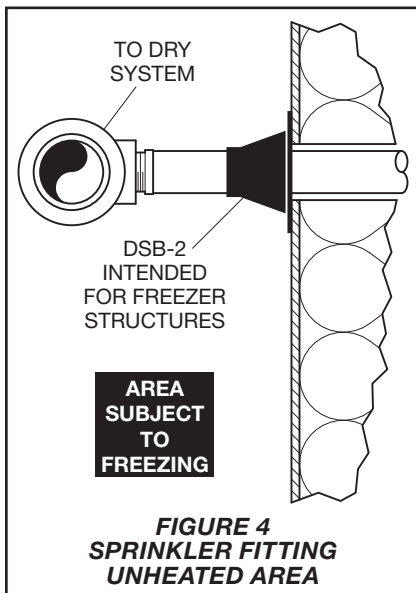
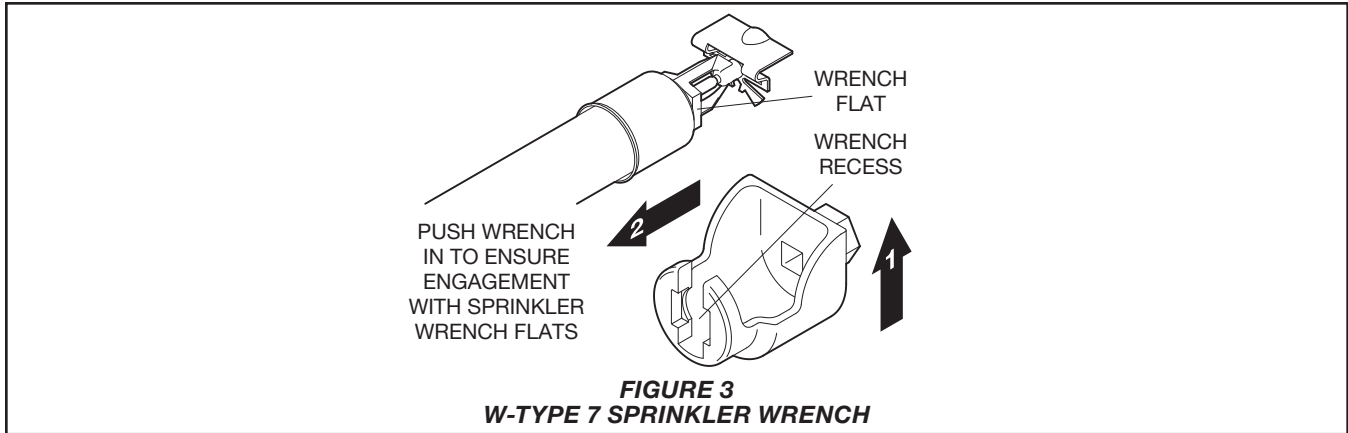
NOTICE

Do not install Series DS-1 Dry-Type Sprinklers into any other type fitting. 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 6 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 Figure 7, can provide the recommended seal.

Temperature Rating	Bulb Color Code	<p align="center">TY3338 Horizontal Sidewall with Standard Escutcheon (3 mm Bulb Type)</p> <p align="center">TY3358 Horizontal Sidewall with Standard Escutcheon (5 mm Bulb Type)</p> <p align="center">(See Figure 2)</p>		
		SPRINKLER FINISH		
		Natural Brass	Chrome Plated	Signal White
135°F (57°C)	Orange	1, 2, 3		
155°F (68°C)	Red			
<p>Notes:</p> <p>1. Listed by Underwriters Laboratories, Inc. (maximum order length of 48 in.)</p> <p>2. Listed by Underwriters Laboratories for use in Canada (maximum order length of 48 in.)</p> <p>3. Approved by the City of New York under MEA 352-01-E</p>				
<p>TABLE A SERIES DS-1 EXTENDED COVERAGE HORIZONTAL SIDEWALL DRY-TYPE SPRINKLERS LABORATORY LISTINGS AND APPROVALS</p>				

Application	Coverage¹ W. x L. ft x ft (m x m)	Minimum Flow, gpm (lpm)	Minimum Pressure, psi (bar)	Temperature Rating	Top of Deflector-to-Ceiling Distance², in. (mm)
TY3338 Horizontal Sidewall (3 mm Bulb Type) For Quick Response, Light Hazard Extended Coverage per NFPA 13	16 x 16 (4,9 x 4,9)	26 (98)	21.6 (1,49)	135°F and 155°F (57°C and 68°C)	4 to 12 (100 to 300)
	16 x 18 (4,9 x 5,5)	29 (110)	26.8 (1,85)		
	16 x 20 (4,9 x 6,1)	32 (121)	32.7 (2,25)		
	18 x 16 (5,5 x 4,9)	29 (110)	26.8 (1,85)		
TY3358 Horizontal Sidewall (5 mm Bulb Type) For Standard Response, Light Hazard Extended Coverage per NFPA 13	16 x 16 (4,9 x 4,9)	26 (98)	21.6 (1,49)		
	16 x 18 (4,9 x 5,5)	29 (110)	26.8 (1,85)		
	16 x 20 (4,9 x 6,1)	32 (121)	32.7 (2,25)		
	18 x 16 (5,5 x 4,9)	29 (110)	26.8 (1,85)		
<p>Notes:</p> <p>1. The minimum allowable spacing between sprinklers to prevent cold soldering is 14 ft (4,3 m)</p> <p>2. To meet the deflector-to-ceiling distance of 4 to 12 in. (100 to 300 mm), the centerline of the sprinkler waterway must be 4-7/16 to 12-7/16 in. below the ceiling</p>					
<p>TABLE B SERIES DS-1 EXTENDED COVERAGE HORIZONTAL SIDEWALL DRY-TYPE SPRINKLERS UL AND C-UL INSTALLATION CRITERIA</p>					

Ambient Temperature Exposed to Discharge End of Sprinkler	Temperatures for Heated Area ¹		
	40°F (4°C)	50°F (10°C)	60°F (16°C)
	Minimum Exposed Barrel Length ² , 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

Installation

TYCO Series DS-1 Dry-Type Sprinklers must be installed in accordance with this section.

General Instructions

Series DS-1 Dry-Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section. See 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 in. (1,6 mm).

A leak-tight 1 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 20 to 30 lb-ft (26,8 to 40,2 N-m). 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. Re-adjust the position of the sprinkler fitting to suit.

Step 1. Install horizontal sidewall sprinklers 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 a non-hardening pipe-thread sealant such as TEFLON tape applied to the Inlet threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 3. Wrench-tighten the sprinkler using either:

- a pipe wrench on the Inlet Band or the Casing, see Figure 1
- the W-Type 7 Sprinkler Wrench on the Wrench Flat, see Figure 3

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.

Step 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.

Care and Maintenance

TYCO Series DS-1 Dry-Type Sprinklers must be maintained and serviced in accordance with this section.

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, may delay the time to sprinkler operation in a fire situation.

A Vent Hole is provided in the Bulb Seat (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 seepage past the Inlet seal and that the sprinkler needs to be removed for determining the cause of leakage (for example, 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 which 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 replaced if they cannot 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 to the sprinklers – 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. See the Installation Section.

If a sprinkler must be removed, do not reinstall it or a replacement without reinstalling the Cover Plate Assembly. If a Cover Plate Assembly becomes dislodged during service, replace it immediately.

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, such as NFPA 25, in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with 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.

P/N* 60 – XXX – X – XXX

			SIN	SPRINKLER FINISH		ESCUTCHEON FINISH		ORDER LENGTH**	
350	EC Sidewall 3 mm Bulb (1 in. NPT), 135°F (57°C)		TY3338	0	CHROME PLATED	SIGNAL WHITE (RAL9003)	055	5.50 in.	
351	EC Sidewall 3 mm Bulb (1 in. NPT), 155°F (68°C)		TY3338	1	NATURAL BRASS	SIGNAL WHITE (RAL9003)	082	8.25 in.	
950	EC Sidewall 5 mm Bulb (1 in. NPT), 135°F (57°C)		TY3358	2	NATURAL BRASS	BRASS PLATED	180	18.00 in.	
951	EC Sidewall 5 mm Bulb (1 in. NPT), 155°F (68°C)		TY3358	4	SIGNAL WHITE (RAL9003)	SIGNAL WHITE (RAL9003)	187	18.75 in.	
				8	CHROME PLATED	STAINLESS STEEL	372	37.25 in.	
				9	CHROME PLATED	CHROME PLATED	480	48.00 in.	

Notes:
 * Use Prefix "I" for ISO 7-R 1 Connection (for example, I-60-351-1-180).
 ** Dry-Type Sprinklers are furnished based upon "Order Length" as measured per Figure 2. After the measurement is taken, round it to the nearest 1/4 in. increment.

TABLE D
SERIES DS-1 STANDARD AND QUICK RESPONSE, STANDARD COVERAGE, DRY-TYPE SPRINKLERS
PART NUMBER SELECTION

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name, including description and Part Number (P/N).

Dry Sprinklers

When ordering 5.6 K-factor Series DS-1 Horizontal Sidewall, Standard or Quick Response, Extended Coverage Dry-Type Sprinklers, specify the following information:

- SIN:
TY3338 – Quick Response
TY3358 – Standard Response
- Bulb Size (3 or 5 mm)
- Order Length:
Dry-Type Sprinklers are furnished based upon Order Length as measured from the face of the wall to the face of the sprinkler fitting, see Figure 2. After the measurement is taken, round it to the nearest 1/4 in. increment.
- Inlet Connections:
1 in. NPT or
ISO 7-R 1
- Temperature Rating
- Sprinkler Finish
- Standard Escutcheon and Finish
- Part Number from Table D

Replacement Escutcheons

Order replacement escutcheons separately.

Specify: (specify type), (specify) finish, P/N (specify):

Standard (Push-On)

White Color	91-106-0-007
Brass Plated.	91-106-2-007
Chrome Plated.	91-106-9-007

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 (1) Boot, two (2) Strap Ties, and 1/3 oz of Adhesive (a sufficient quantity for installing one boot).



TFP520

Change History Appendix

ISSUE DATE	NOTES
09-21	Added Replacement Escutcheons to Ordering Procedure.
11-19	Removed consulting Technical Services Department statement from Sprinkler Fittings subsection Notice.
03-19	Added chrome plated sprinkler with stainless steel escutcheon finish option.
08-18	Updated Tyco® branding and document format; Added Johnson Controls copyright; Added disclaimer stating specifications and information subject to change without notice; Added reference to Regulatory and Health Warning Technical Data Sheet TFP2300.
09-14	Corrected column headings in Table D Part Number Selection as Sprinkler Finish and Escutcheon Finish.
06-13	Updated and standardized RAL color finishes; Clarified method for measuring proper HSW sprinkler with escutcheon installations, now indicating distance from mounting surface to face of deflector, formerly to end of deflector.
05-11	Clarified NYC Approved; Updated minimum order and exposed barrel lengths; Improved Design Criteria section; Updated patent information.
05-08	Corrected description of TY3358 in Table A to 5 mm Bulb, formerly 3 mm Bulb.
01-08	Corrected part number for Natural Brass Sprinkler with Brass Plated Escutcheon.
12-07	Added Model DSB-2 Dry Sprinkler Boot; Added NFPA 13 requirements for use of DSB-2; Added illustrations providing guidance on alternative piping connections to dry type sprinklers for freeze protection or system drainage; Added Natural Brass sprinkler with Brass plate escutcheon finish option.
04-04	Added reference to Installer Warning data sheet TFP700; Added guidance on use of compatible CPVC fittings.
01-03	Added new Tyco Fire & Building Products masthead.
02-02	New Technical Data Sheet TFP520 describes the Series DS-1, Extended Coverage Horizontal Sidewall Dry Type Sprinkler.