

## Series DS-3 — 11.2 K-factor\*\* Dry Type Sprinklers, Hor. Sidewall (Std. Response) Extended Coverage Ordinary Hazard (ECOH)

### General Description

The Series DS-3, 11.2 K-factor, Standard Response, Extended Coverage Ordinary Hazard (ECOH), Horizontal Sidewall, Dry Type Sprinklers are decorative glass bulb automatic sprinklers. They are intended for use in applications where the sprinklers and/or a portion of the connecting piping may be exposed to freezing temperatures (e.g., horizontal piping extensions through a wall to protect an unheated area of a building). The Series DS-3 Extended Coverage Horizontal Sidewall Sprinklers are designed for extended coverage use in ordinary hazard occupancies (ECOH) per NFPA 13.

The DS-3 provides protection of coverage areas up to 16 ft. x 20 ft. (320 ft<sup>2</sup>) as compared to standard coverage horizontal sidewall sprinklers having a maximum coverage area of 10 ft. x 10 ft. (100 ft<sup>2</sup>) for ordinary hazard occupancies.

#### WARNINGS

*The Series DS-3 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 other 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.*

*ing 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-3 Dry Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section.*

*Installation of Series DS-3 Sprinklers in a recessed installation will void all sprinkler warranties, as well as void the sprinkler's laboratory approvals.*

### Model/Sprinkler Identification Numbers

TY5339

### Technical Data

#### Approvals

UL and C-UL Listed.  
(Refer to Table A and the Design Criteria Section)

#### Maximum Working Pressure

175 psi (12,1 bar)

#### Inlet Thread Connection

1 inch NPT (Standard)  
ISO 7-R1

#### \*\*Discharge Coefficient

Refer to Table B

#### Temperature Ratings

155°F/68°C & 200°F/93°C

#### Finishes

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



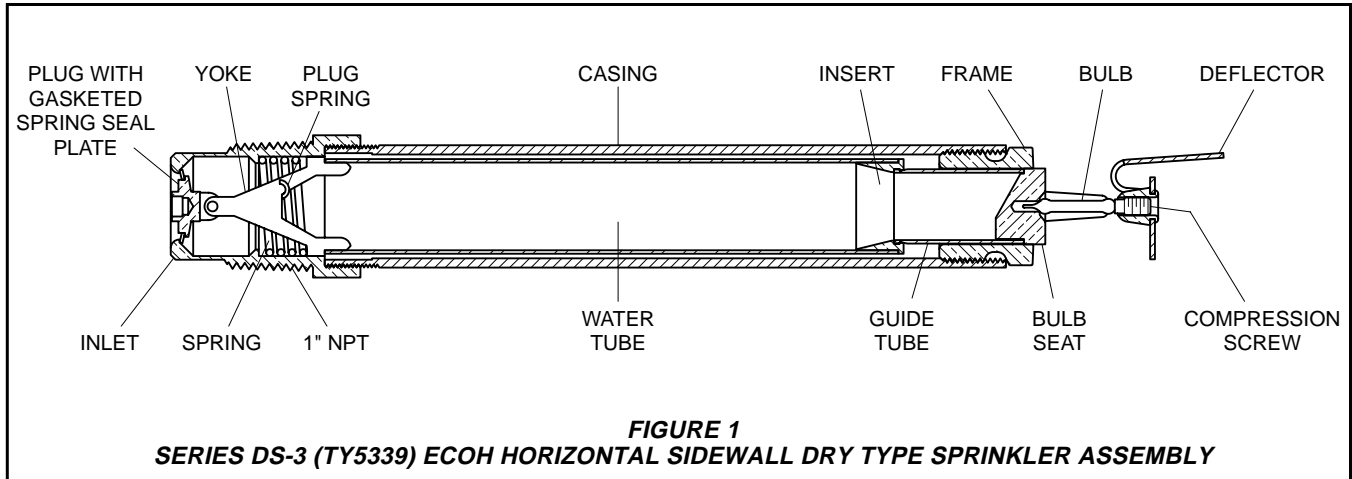
#### Physical Characteristics

Inlet . . . . .	Copper
Yoke . . . . .	Stainless Steel
Casing . . . . .	Galvanized Carbon Steel
Insert . . . . .	Bronze
Bulb Seat . . . . .	Bronze
Bulb . . . . .	Glass
Compression Screw . . . . .	Bronze
Deflector . . . . .	Bronze
Frame . . . . .	Bronze
Guide Tube . . . . .	Stainless Steel
Water Tube . . . . .	Stainless Steel
Spring . . . . .	Stainless Steel
Plug . . . . .	Copper
Sealing Assembly . . . . .	. . . . . Beryllium Nickel w/Teflon*
Pin . . . . .	Stainless Steel
Button Spring . . . . .	Stainless Steel
Helper Spring . . . . .	Stainless Steel
Escutcheon . . . . .	. . . . . Plated or Coated Carbon Steel

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#### Patents

Patent Pending



		SPRINKLER FINISH		
		TY5539		
Temperature Rating	Bulb Color Code	Natural Brass	Chrome Plated	White Polyester
155°F/68°C	Red		1, 2	
200°F/93°C	Green		1, 2	

**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).

**TABLE A**  
**SERIES DS-3, ECOH HORIZONTAL SIDEWALL DRY TYPE SPRINKLERS LABORATORY LISTINGS AND APPROVALS**

K-FACTOR LENGTH, Inches (mm)	K-FACTOR, GPM/psi <sup>1/2</sup> (LPM/bar <sup>1/2</sup> )
2-1/2 to 14-3/4 (63 mm to 375 mm)	11.2 (161,3)
15 to 18-3/4 (381 mm to 476 mm)	10.9 (157,0)
19 to 23 (483 mm to 584 mm)	10.8 (155,5)
23-1/4 to 26-3/4 (591 mm to 679 mm)	10.7 (154,1)
27-1/4 to 31-1/4 (692 mm to 794 mm)	10.6 (152,6)
31-1/2 to 35-1/4 (800 mm to 895 mm)	10.5 (151,2)
35-1/2 to 39-1/2 (902 mm to 1003 mm)	10.4 (149,8)
39-3/4 to 43-1/2 (1010 mm to 1105 mm)	10.3 (148,3)
43-3/4 to 48 (1111 mm to 1219 mm)	10.2 (146,9)

**Note:** K-Factor Length is determined as follows:  
**Flush:** "Order Length" (Fig. 2) plus 1/2 inch (12,7 mm).  
**Extended:** "Order Length" (Fig. 3) plus 3-1/4 inch (82,6 mm).  
**Without Escutcheon:** "Order Length" (Fig. 4) minus 2 inches (50,8 mm).

**TABLE B**  
**DISCHARGE COEFFICIENTS**

## Operation

When the Series DS-3 is in service, water is prevented from entering the assembly by the Plug with 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 with Sealing Assembly from the Inlet allowing the sprinkler to activate and flow water.

**SERIES DS-3 (TY5339) ECOH HORIZONTAL SIDEWALL SPRINKLER  
OH Group 1 (0.15 gpm/sq.ft.)**

Response Rating	Coverage Area <sup>(1)</sup> , Ft. x Ft. (m x m)	Minimum Flow <sup>(2)</sup> , GPM (LPM)	Minimum Pressure <sup>(2)</sup> , PSI (BAR)	Deflector-To-Ceiling Distance <sup>(3)</sup> , In. (mm)	Sprinkler Temperature Rating, °F	Minimum Spacing <sup>(4)</sup> , Ft. (m)
Standard	16 x 16 (4,9 x 4,9)	38 (144)	11.5 (0,79)	6 to 12 (150 to 300)	155, 200	8 (2,4)
Standard	16 x 18 (4,9 x 5,5)	43 (163)	14.7 (1,01)	6 to 12 (150 to 300)	155, 200	8 (2,4)
Standard	16 x 20 (4,9 x 6,1)	48 (182)	18.4 (1,27)	6 to 12 (150 to 300)	155, 200	8 (2,4)

**SERIES DS-3 (TY5339) ECOH HORIZONTAL SIDEWALL SPRINKLER  
OH Group 2 (0.20 gpm/sq.ft.)**

Response Rating	Coverage Area <sup>(1)</sup> , Ft. x Ft. (m x m)	Minimum Flow <sup>(2)</sup> , GPM (LPM)	Minimum Pressure <sup>(2)</sup> , PSI (BAR)	Deflector-To-Ceiling Distance <sup>(3)</sup> , In. (mm)	Sprinkler Temperature Rating, °F	Minimum Spacing <sup>(4)</sup> , Ft. (m)
Standard	16 x 16 (4,9 x 4,9)	51 (193)	20.7 (1,43)	6 to 12 (150 to 300)	155, 200	8 (2,4)
Standard	16 x 18 (4,9 x 5,5)	58 (220)	26.8 (1,85)	6 to 12 (150 to 300)	155, 200	8 (2,4)
Standard	16 x 20 (4,9 x 6,1)	64 (242)	32.7 (2,25)	6 to 12 (150 to 300)	155, 200	8 (2,4)

**NOTES**

1. Backwall (where sprinkler is located) by sidewall (length of throw).

2. Requirement is based on minimum flow in GPM from each sprinkler. The indicated residual pressures are based on the nominal K-factor of 11.2.

3. The centerline of the sprinkler waterway is located below the deflector as shown in Figures 2, 3, and 4.

4. Minimum spacing is for lateral distance between sprinklers located along a single wall. Otherwise adjacent sprinklers (i.e., sidewall sprinklers on an adjacent wall, on an opposite wall, or pendent sprinklers) must be located outside of the maximum listed protection area of the extended coverage sidewall sprinkler being utilized.

**TABLE C  
UL AND C-UL LISTING COVERAGE AND FLOW RATE CRITERIA**

## Design Criteria

The Series DS-3, 11.2 K-factor, Standard Response, Extended Coverage Ordinary Hazard (ECOH), Horizontal Sidewall, Dry Type Sprinklers are for use in ordinary hazard occupancies with non-combustible unobstructed construction and with a ceiling slope not exceeding 2 inches per foot (9.2°), using the design criteria provided in Table C, (as well as any additional requirements specified in NFPA 13 for Extended Coverage Sidewall Spray Sprinklers).

A 36 inch (914 mm) clearance must be maintained between the top of the sprinkler deflector and any miscellaneous storage.

The DS-3 may be installed on sloped ceilings in loading docks with a maxi-

mum roof slope of 4 inches per foot (18.4°) as shown in Figure 5 and using the design criteria provided in Table C.

The Series DS-3 Dry Type Sprinkler is 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) with the end sprinkler fitting on a branch line to be plugged as shown in Figure 2.

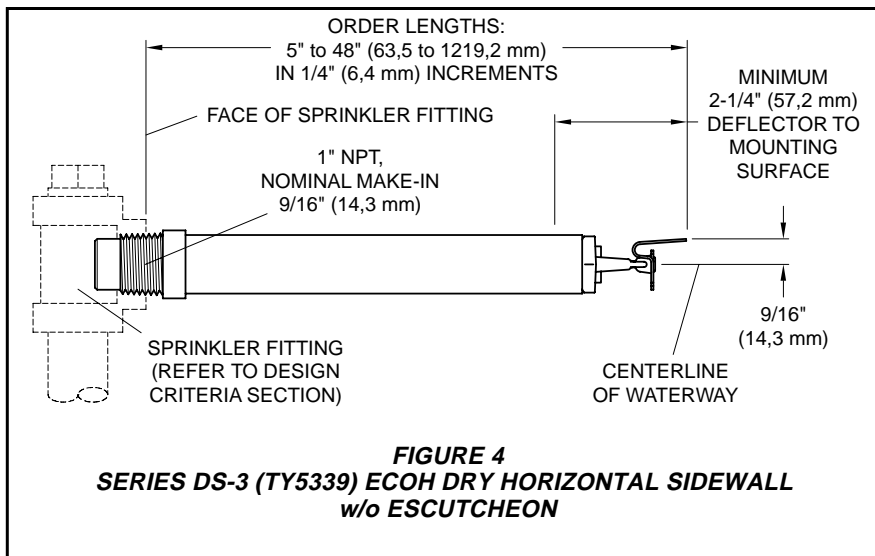
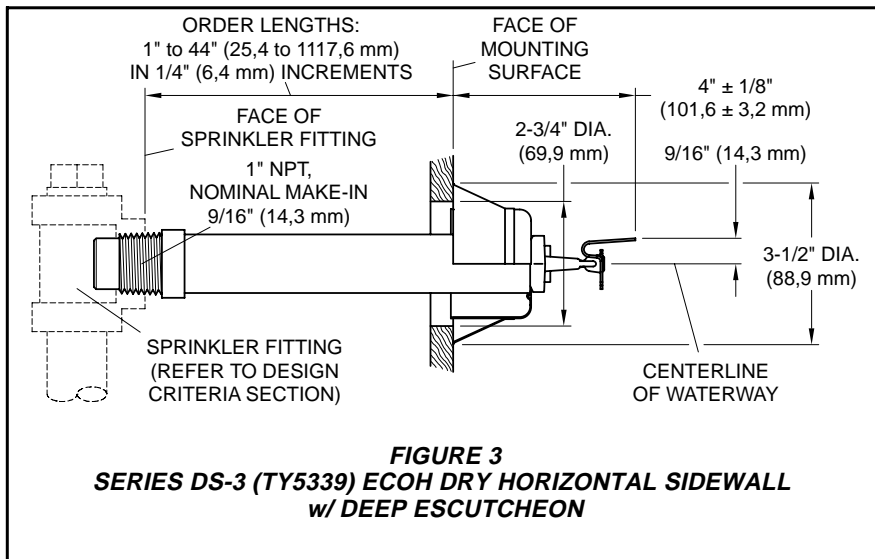
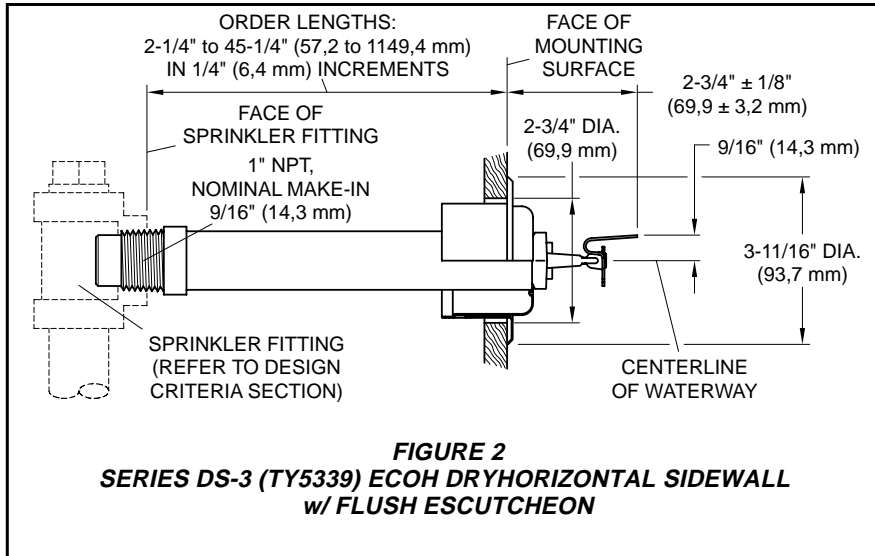
For wet pipe sprinkler systems, the Series DS-3 Dry Type Sprinklers may also be installed in the 1 inch NPT outlet of a Grinnell Figure 730 Mechanical Tee or the following Tyco Fire Products CPVC fittings: (P/N 80145) 1" x 1" NPT Female Adapter or (P/N 80249) 1" x 1" x 1" NPT Sprinkler Head Adapter Tee.

**NOTE**

*Do not install the Series DS-3 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., horizontal extensions 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):

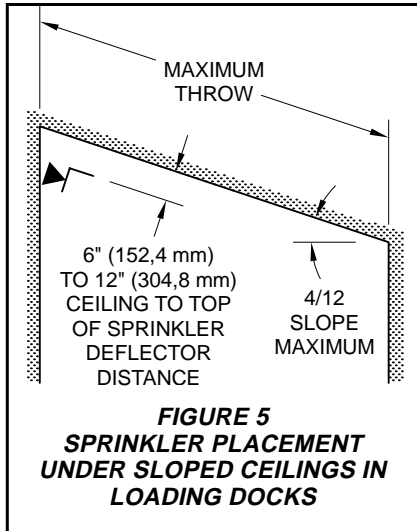
- 12 inches (300 mm) when the temperature within the protected area is -20°F/-29°C
- 18 inches (450 mm) when the temperature within the protected area is -40°F/-40°C
- 24 inches (600 mm) when the temperature within the protected area is -60°F/-51°C

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.

**NOTES**

*When Dry Sprinklers penetrate a wall into an area subject to freezing, the clearance space around the Sprinkler Casing must be completely sealed in order to prevent the leakage of moist air into the freezing area which might result in the formation of condensate around the Frame, Deflector, Bulb Seat, or Bulb. Failure to prevent the formation of condensate could result in the build-up of ice around the releasing components. This could result in an inadvertent operation of the sprinkler or impaired operation due to reduced thermal sensitivity.*

*Refer to Technical Data Sheet TFP590 for information on a Dry Sprinkler Boot that has been specifically designed to help close the air gap around a clearance hole in a wall or ceiling through which a dry type sprinkler has penetrated.*



## Installation

The Series DS-3 Dry Type Sprinklers must be installed in accordance with the following instructions:

### NOTES

*The Series DS-3 must only be installed in fittings that meet the requirements of the Design Criteria section.*

*Do not grasp the sprinkler by the deflector (Ref. Figure 7).*

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

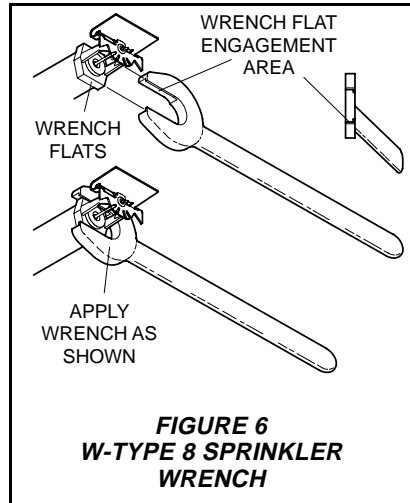
*Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch (1,6 mm).*

*A leak tight 1 inch NPT sprinkler joint should be obtained with a 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.** 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 8 Sprinkler Wrench (Ref. Figure 6). The wrench recess of the W-Type 8 is to be applied to the sprinkler wrench flats (Ref. Figure 6).

**Step 4.** After the wall has been installed/finished, slide on the outer piece of the Escutcheon until it comes in contact with the ceiling/wall.

## Care and Maintenance

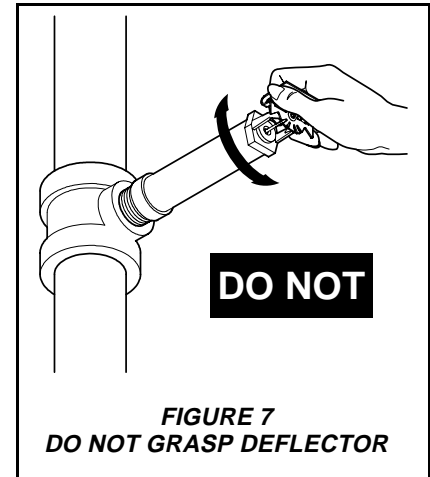
The Series DS-3 Dry Type Sprinklers must be maintained and serviced in accordance with the following instructions:

### 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 notch is provided in the Bulb Seat (Ref. Figure 1) to indicate if the Dry Sprinkler is remaining dry. Evidence of leakage from the notch that is positioned on the lower edge of the Bulb Seat 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.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national code.

P/N 61 — XXX — X — XXX

		MODEL/SIN			ORDER LENGTH (1) (EXAMPLES)		
			SPRINKLER FINISH	ESCUTCHEON FINISH (2)			
161	<b>Flush Escutcheon</b> (1"NPT), 155F/68C	TY5339	1	NATURAL BRASS	BRASS PLATED	055	5.50"
163	<b>Flush Escutcheon</b> (1"NPT), 200F/93C	TY5339	4	WHITE POLYESTER	WHITE COATED	082	8.25"
171	<b>Deep Escutcheon</b> (1"NPT), 155F/68C	TY5339	9	CHROME PLATED	CHROME PLATED	180	18.00"
173	<b>Deep Escutcheon</b> (1"NPT), 200F/93C	TY5339	0	CHROME PLATED	WHITE COATED	187	18.75"
151	<b>Without Escutcheon</b> (1"NPT), 155F/68C	TY5339				372	37.25"
153	<b>Without Escutcheon</b> (1"NPT), 200F/93C	TY5339				480	48.00"

**NOTES**

- (1). Dry Type Sprinklers are furnished based upon "Order Length" as measured per Figure 2, 3, and 4. After the measurement is taken, round it to the nearest 1/4 inch increment.
- (2) Does not apply to assemblies without escutcheon..

**TABLE D  
PART NUMBER SELECTION  
SERIES DS-3 ECOH HORIZONTAL SIDEWALL DRY TYPE SPRINKLERS  
(Use Prefix "I" for ISO 7-R1 Connection, e.g., I-61-161-1-180)**

## 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

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

1. Sprinkler.
  - Model DS-3/TY5339.
  - ECOH Horizontal Sidewall Dry Type Sprinkler.
  - 11.2 K-factor.
  - 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 (Ref. Figures 2, 3, and 4). After the measurement is taken, round it to the nearest 1/4 inch increment.*

- 1 Inch NPT or ISO 7/1 Inlet Connection.
  - Temperature Rating.
  - Sprinkler Finish.
  - Escutcheon Type.
  - Part Number from Table D.
2. W-Type 8 Sprinkler Wrench.

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