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P.O. Box 1110
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O & M Manual

Kirkland Townhomes
10143 NE 64th Street

7/6/2015

North Unit - A

Kirkland WA 98033

Item No	DESCRIPTION	MANUFACTURER	MFG. NO.	FINISH	APPROVED	REMARKS
1	Residential Riser Manifold	Tyco	513	Red		2
1	Backflow Preventor	Ames	2000B	Blk/Blue		2
2	Sprinkler Head	Tyco	TY-FRB	Chr/Brz		
2	Sprinkler Head	Tyco	DS-1	Chr		
2	Sprinkler Head	Tyco	LFII	Chr		
2	Storage Cabinet	FPPI		Red		
3	CPVC Pipe			Orange		
3	CPVC Hangers			Orange		
3	CPVC Coupling			Orange		
3	CPVC Fitting			Orange		
4	Electrical Bell	Potter	PBA-AC	Red		



UL, ULC, and FM Approved

Sizes Available: 6" (150mm), 8" (200mm) and 10" (250mm)

Voltages Available: 24VAC
120VAC
12VDC (10.2 to 15.6) Polarized
24VDC (20.4 to 31.2) Polarized

Service Use: Fire Alarm
General Signaling
Burglar Alarm

Environment: Indoor or outdoor use (See Note 1)
-40° to 150°F (-40° to 66°C)
(Outdoor use requires weatherproof backbox.)

Termination: AC Bells - 4 No. 18 AWG stranded wires
DC Bells - Terminal strip

Finish: Red powder coating

Optional: Model BBK-1 weatherproof backbox
Model BBX-1 deep weatherproof backbox

These vibrating type bells are designed for use as fire, burglar or general signaling devices. They have low power consumption and high decibel ratings. The unit mounts on a standard 4" (101mm) square electrical box for indoor use or on a model BBK-1 weatherproof backbox or BBX-1 deep weatherproof backbox for outdoor applications. Weatherproof backbox model BBK-1, Stock No. 1500001.

Notes:

1. Minimum dB ratings are calculated from integrated sound pressure measurements made at Underwriters Laboratories as specified in UL Standard 464. UL temperature range is -30° to 150°F (-34° to 66°C).
2. Typical dB ratings are calculated from measurements made with a conventional sound level meter and are indicative of output levels in an actual installation.
3. ULC only applies to MBA DC bells.

Size inches (mm)	Voltage	Model Number	Stock Number	Current (Max.)	Typical dB at 10 ft. (3m) (2)	Minimum dB at 10 ft. (3m) (1)
6 (150)	12VDC	MBA126	1750070	.12A	85	76
8 (200)	12VDC	MBA128	1750080	.12A	90	77
10 (250)	12VDC	MBA1210	1750060	.12A	92	78
6 (150)	24VDC	MBA246	1750100	.06A	87	77
8 (200)	24VDC	MBA248	1750110	.06A	91	79
10 (250)	24VDC	MBA2410	1750090	.06A	94	80
6 (150)	24VAC	PBA246	1806024*	.17A	91	78
8 (200)	24VAC	PBA248	1808024*	.17A	94	77
10 (250)	24VAC	PBA2410	1810024*	.17A	94	78
6 (150)	120VAC	PBA1206	1806120*	.05A	92	83
8 (200)	120VAC	PBA1208	1808120*	.05A	99	84
10 (250)	120VAC	PBA12010	1810120*	.05A	99	86

All DC bells are polarized and have built-in transient protection.

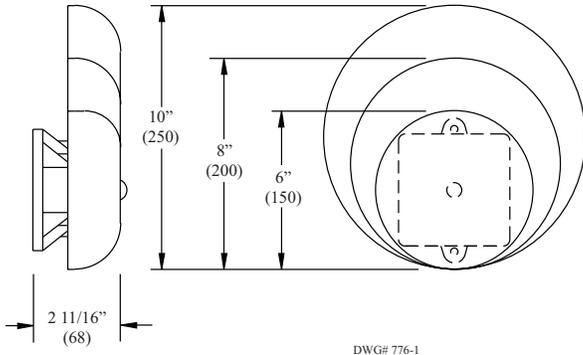
* Does not have ULC listing.

WARNING

In outdoor or wet installations, bell must be mounted with weatherproof backbox, BBK-1 or BBX-1. Standard electrical boxes will not provide a weatherproof enclosure. If the bell and/or assembly is exposed to moisture, it may fail or create an electrical hazard.

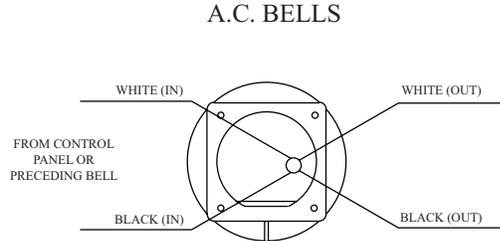
Bells Dimensions Inches (mm)

Fig. 1



Wiring (rear view)

Fig. 3



CAUTION:
WHEN ELECTRICAL SUPERVISION IS REQUIRED USE IN AND OUT LEADS AS SHOWN.

NOTES:

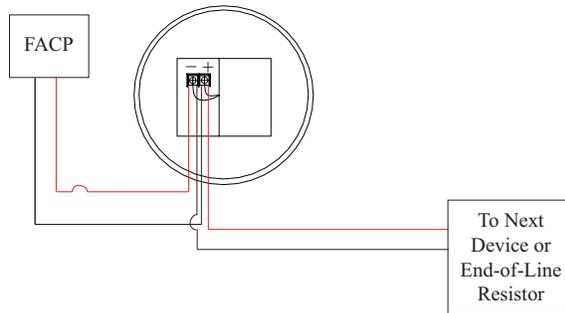
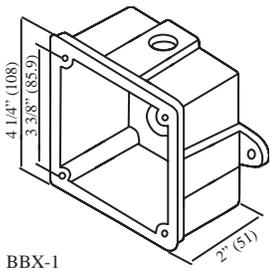
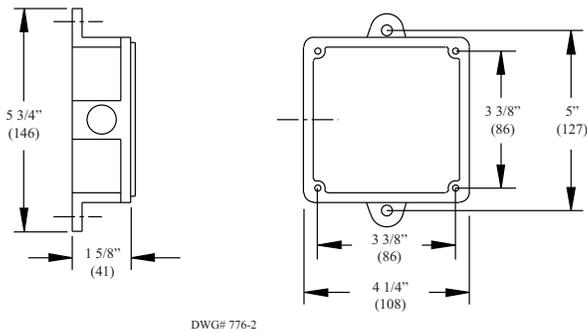
1. WHEN USING AC BELLS, TERMINATE EACH EXTRA WIRE SEPARATELY AFTER LAST BELL.
2. END-OF-LINE RESISTOR IS NOT REQUIRED ON AC BELLS.

DWG# 776-3

Weatherproof Backbox Dimensions Inches (mm)

Fig. 2

Box has one threaded 1/2" conduit entrance



Installation

1. The bell shall be installed in accordance with NFPA 13, 72, or local AHJ. The top of the device shall be no less than 90" AFF and not less than 6" below the ceiling.
2. Remove the gong.
3. Connect wiring (see Fig. 3).
4. Mount bell mechanism to backbox (bell mechanism must be mounted with the striker pointing down).
5. Reinstall the gong (be sure that the gong positioning pin, in the mechanism housing, is in the hole in the gong).
6. Test all bells for proper operation and observe that they can be heard where required (bells must be heard in all areas as designated by the authority having jurisdiction).

⚠ WARNING

Failure to install striker down will prevent bell from operating.

BlazeMaster[®] CPVC Fire Sprinkler Pipe & Fittings Submittal Sheet

General Description

Tyco[®] CPVC Pipe and Fittings produced by Tyco Fire & Building Products (TFBP) are designed exclusively for use in wet pipe automatic fire sprinkler systems. The Tyco CPVC Pipe and Fittings are produced from BlazeMaster[®] CPVC compound that is a specially developed thermoplastic compound composed of post chlorinated polyvinyl chloride (CPVC) resin and state of the art additives. Tyco CPVC Pipe and Fittings are easier to install than traditional steel pipe systems, and at the same time, provide superior heat resistance and strength as compared to traditional CPVC and PVC piping materials used in the plumbing trade. Various adapters are available to connect CPVC pipe to metallic piping. All female pipe thread adapters have brass inserts for durability. Grooved adapters connect directly to grooved end valves and metallic pipe, with flexible grooved end couplings.

NOTICE

Tyco[®] CPVC Pipe and Fittings produced with BlazeMaster[®] CPVC compound described herein must be installed and maintained in compliance with this document and 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.

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.

Technical Data

Sizes

3/4" to 3"

Maximum Working Pressure

175 psi

Approvals

UL, FM, C-UL, NSF, LPCB, MEA, and the City of Los Angeles. (Refer to Installation Handbook IH-1900 dated June 2008 for exact listing/approval information.)

Manufacture Source

U.S.A.

Material

- Pipe: ASTM F442, SDR 13.5
- Fittings: ASTM F438 (Sch. 40) and ASTM F439 (Sch. 80), ASTM F1970

Color

Orange



Installation

Tyco® CPVC Pipe and Fittings produced by Tyco Fire & Building Products (TFBP) are to be installed in accordance with Installation Handbook IH-1900 dated June 2008.

Care and Maintenance

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 authority having jurisdiction. The installing contractor or product manufacturer should be contacted relative to any questions.

Automatic sprinkler systems should be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

NOTICE

Before closing a fire protection system control valve for inspection or maintenance work on the fire protection system that it controls, permission to shut down the affected fire protection system must first be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

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.

Fig. 22 - Hanger for CPVC Plastic Pipe Single Fastener Strap Type



Size Range — 3/4" thru 2" CPVC pipe

Material — Pre-Galvanized Steel

Function — Intended to perform as a hanger to support CPVC piping used in automatic fire sprinkler systems. The product acts as a hanger when tab is upward and the fastener screw is in the horizontal position. Figure 22 can be installed on the top of a beam, but in this situation acts as a guide to the piping which is supported by the beam itself. It is not intended to support CPVC pipe from under a flat horizontal surface, such as a ceiling. For this type of installation, use the TOLCO® Fig. 23, Double Fastener Strap for CPVC Piping. Fig. 22, when inverted, with the hanger tab downward, can function as a restrainer to prevent the upward movement of the sprinkler head during activation.

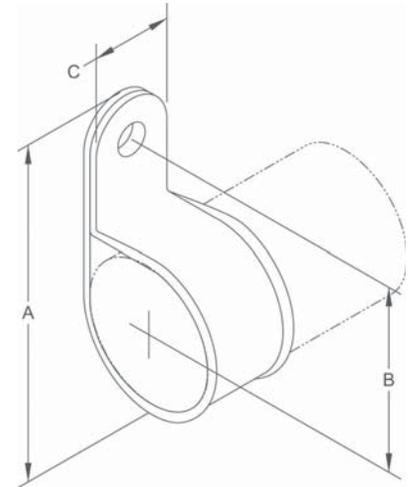
Approvals — Underwriters' Laboratories Listed in the USA (**UL**) and Canada (**cUL**) to support fire sprinkler piping. May be installed in wood using fasteners supplied with product, or into minimum 20 gauge steel using (1) 1/4" x 1" tek type screw. Meets and exceeds the requirements of NFPA 13, 13R and 13D.

Features — Fig. 22 incorporates features which protect the pipe and ease installation. The flared edge design protects CPVC pipe from any rough surface. It is easily attached to the building structure using the special UL Listed hex head self threading screw* furnished with the product. It is recommended that rechargeable electric drills fitted with a hex socket attachment to be used as installation tools. No impact tools (such as a hammer) are allowed. Damage has been known to result from installations using impact type tools. No pre-drilling of a pilot hole in wood is required.

Finish — Pre-Galvanized

Order By — Figure number and CPVC pipe size.

* **Hardened hex head self threading screw is furnished with the product and is the minimum fastener size acceptable.**



Dimensions • Weights

CPVC Pipe Size	A	B	C	Max. Hanger Spacing (Ft.)	Fastener Hex Head Size	Approx. Wt./100
3/4	27/16	15/16	13/16	5½	5/16	9
1	211/16	17/16	13/16	6	5/16	9
1¼	31/16	15/8	13/16	6½	5/16	11
1½	35/16	1¾	13/16	7	5/16	12
2	3¾	21/8	13/16	8	5/16	15

Fig. 23 - Hanger for CPVC Plastic Pipe Double Fastener Strap Type



Size Range — 3/4" thru 3" CPVC pipe

Material — Pre-Galvanized Steel

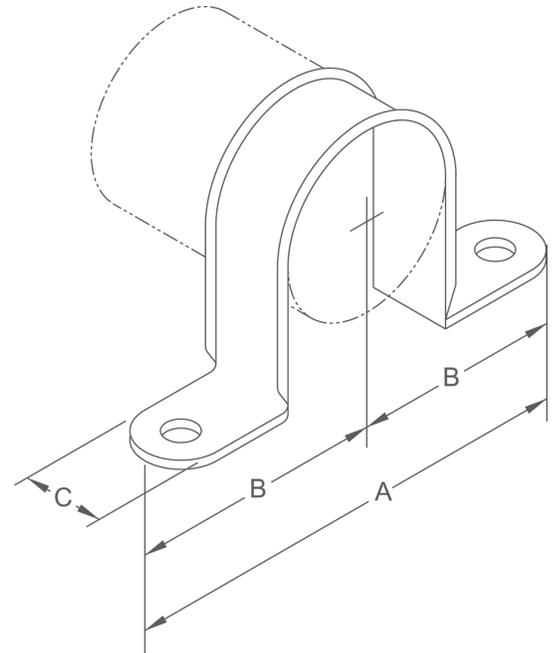
Function — Intended to perform as a hanger/restrainer to support CPVC piping used in automatic fire sprinkler systems. Fig. 23 can be installed on the top, bottom or side of a beam. The Fig. 23 also functions as a restrainer to prevent the upward movement of the sprinkler head during activation.

Approvals — Underwriters' Laboratories Listed in the USA (**UL**) and Canada (**cUL**) sizes 3/4" thru 2" to support fire sprinkler piping. May be installed in wood using fasteners supplied with product, or into minimum 20 gauge steel using (2) 1/4" x 1" tek type screw. Meets and exceeds the requirements of NFPA 13, 13R and 13D.

Features — Fig. 23 incorporates features which protect the pipe and ease installation. The flared edge design protects the CPVC pipe from any rough surface. It also incorporates snap restrainers allowing easier and faster installation. Easily attaches to the building structure using the two UL Listed hex head self threading screws* furnished with the product. It is recommended that rechargeable electric drills fitted with a hex socket attachment be used as installation tools. No impact tools (such as a hammer) are allowed. Damage has been known to result from installations using impact type tools. No pre-drilling of a pilot hole in wood is required.

Finish — Pre-Galvanized

Order By — Figure number and pipe size



* Hardened hex head self threading screw is furnished with the product and is the minimum fastener size acceptable.

Dimensions • Weights

CPVC Pipe Size	A	B	C	Max. Hanger Spacing (Ft.)	Fastener Hex Head Size	Approx. Wt./100
3/4	3 1/8	1 9/16	1 3/16	5 1/2	5/16	9
1	3 3/8	1 11/16	1 3/16	6	5/16	9
1 1/4	4 3/16	2 3/32	1 3/16	6 1/2	5/16	11
1 1/2	4 7/16	2 7/32	1 3/16	7	5/16	12
2	4 7/8	2 7/16	1 3/16	8	5/16	15
2 1/2	10 9/32	2 11/16	1 3/16	Consult Factory	5/16	22
3	11 7/8	3	1 3/16	Consult Factory	5/16	25

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 (e.g., 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 (e.g., 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 (NFPA), in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

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.

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.

The 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)

3/4 Inch NPT:

TY3935 – Pendent
TY3735 – Horizontal Sidewall

1 Inch NPT:

TY3235 – Pendent
TY3135 – Upright
TY3335 – Horizontal Sidewall

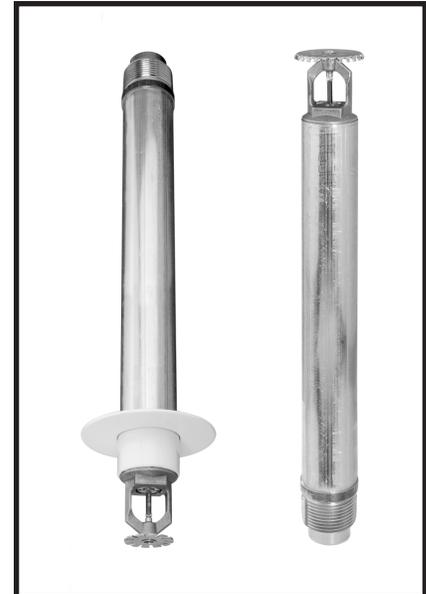
Technical Data

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-R 1

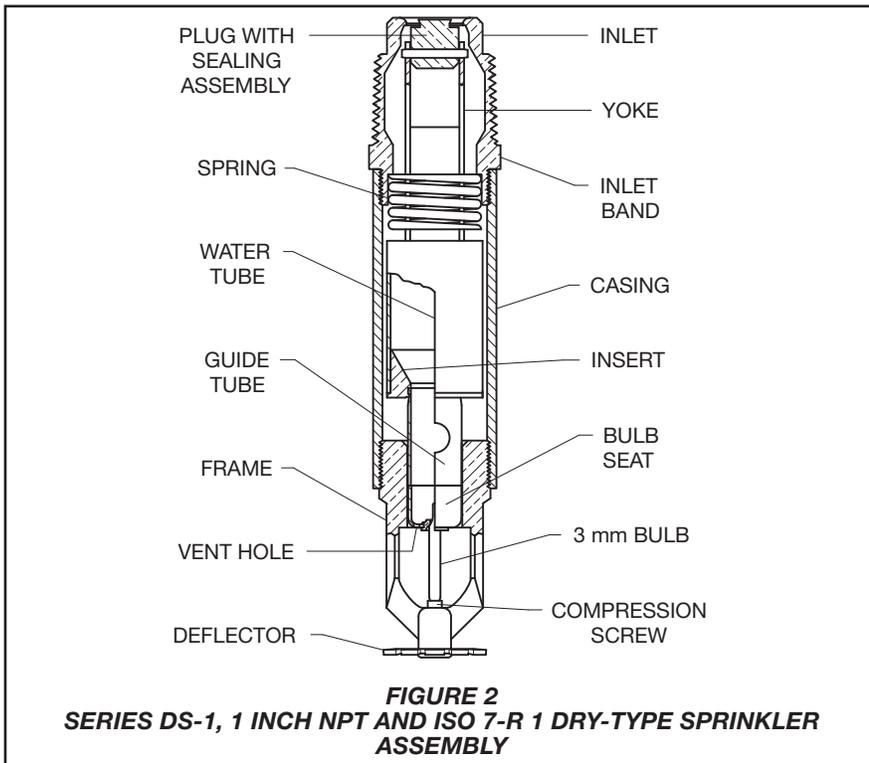
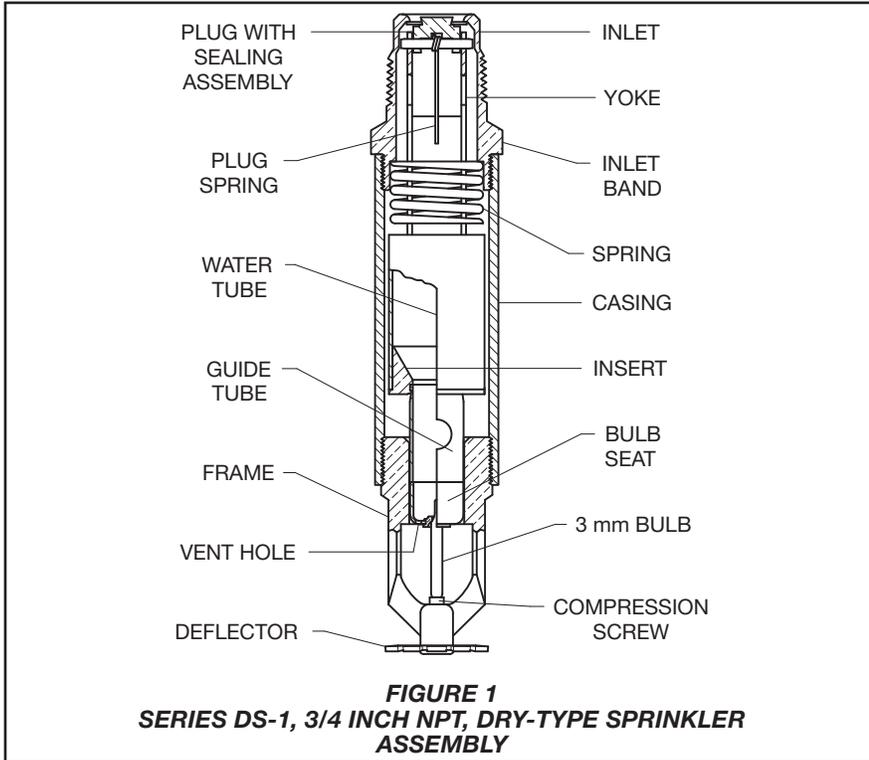
Discharge Coefficient
K=5.6 gpm/psi^{1/2}
(80,6 lpm/bar^{1/2})

Temperature Ratings
Refer to Tables A and B.

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
Plug Spring*	Stainless Steel
Sealing Assembly	Beryllium Nickel w/TEFLON
Escutcheon	Carbon Steel

* For 3/4 inch NPT only

Operation

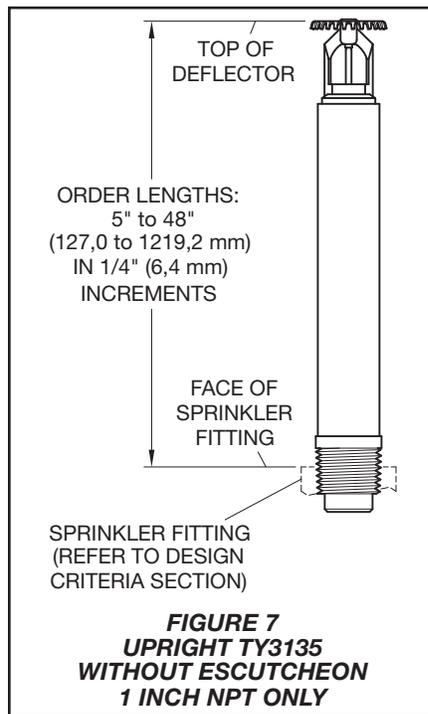
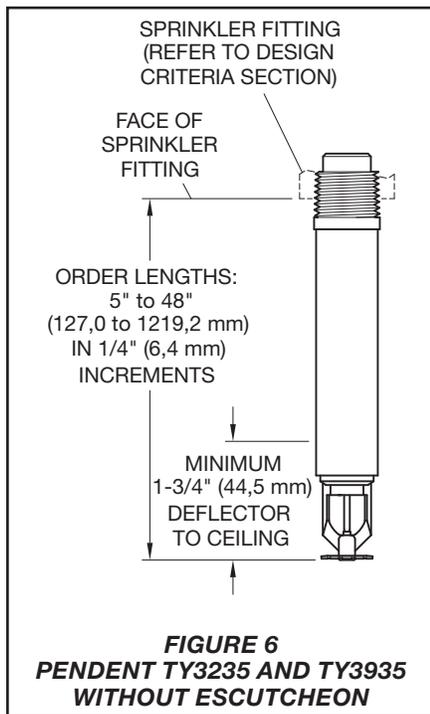
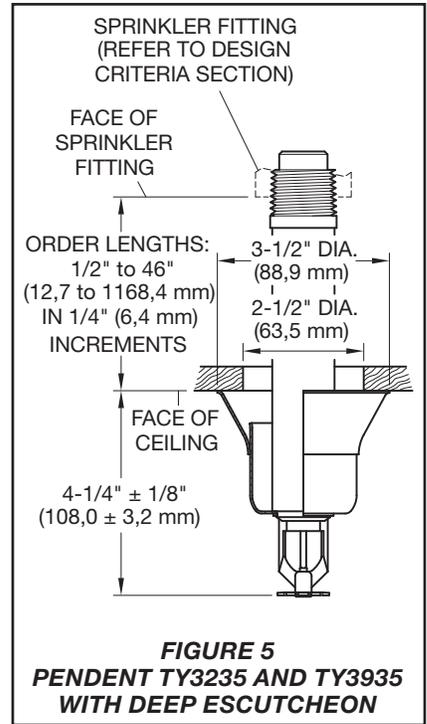
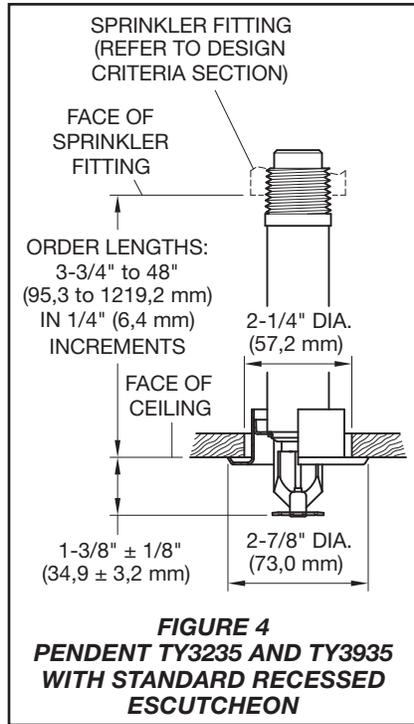
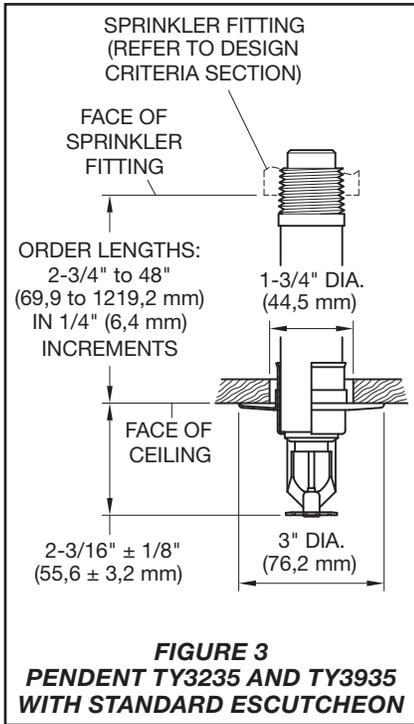
When the TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage are in service, water is prevented from entering the assembly by the Plug with Sealing Assembly in the Inlet of the Sprinkler. See Figures 1 and 2.

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.

		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									
Notes: * Light and Ordinary Hazard occupancies only 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 3/4 INCH NPT SERIES DS-1 QUICK RESPONSE, STANDARD COVERAGE DRY-TYPE SPRINKLERS LABORATORY LISTINGS AND APPROVALS										

		1 Inch NPT (and ISO 7-R 1)											
		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 ⁵ (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		
155°F (68°C)	Red												
175°F (79°C)	Yellow												
200°F (93°C)	Green												
286°F (141°C)	Blue	1, 2, 4						1*, 2*, 3**, 4			1*, 2*, 4		
Notes: * Light and Ordinary Hazard occupancies only ** Light Hazard occupancies only 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) 3. Approved by Factory Mutual Research Corporation (maximum order length of 48 inches) 4. Approved by the City of New York under MEA 352-01-E 5. The Upright Sprinkler without an Escutcheon (TY3135) is available in 1 inch NPT only N/A – Not Available													
TABLE B 1 INCH NPT (AND ISO 7-R 1) SERIES DS-1 QUICK RESPONSE, STANDARD COVERAGE DRY-TYPE SPRINKLERS LABORATORY LISTINGS AND APPROVALS													



Design Criteria

The TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage 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.

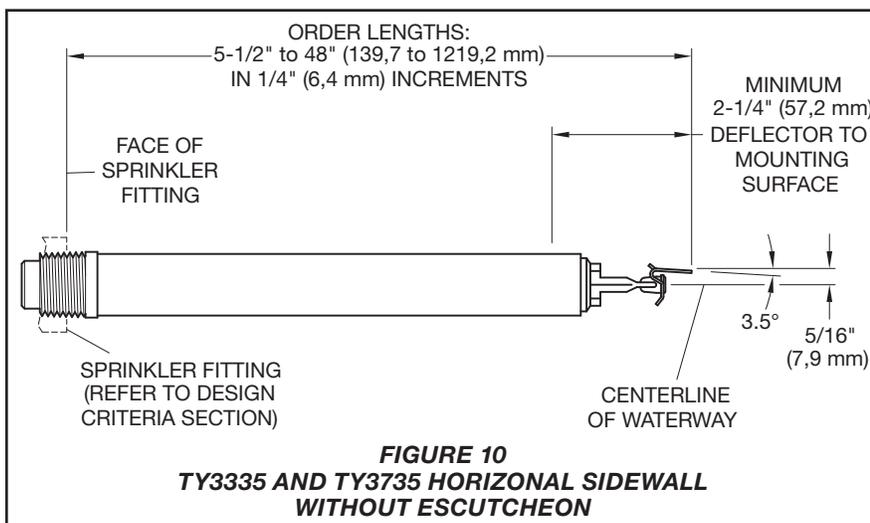
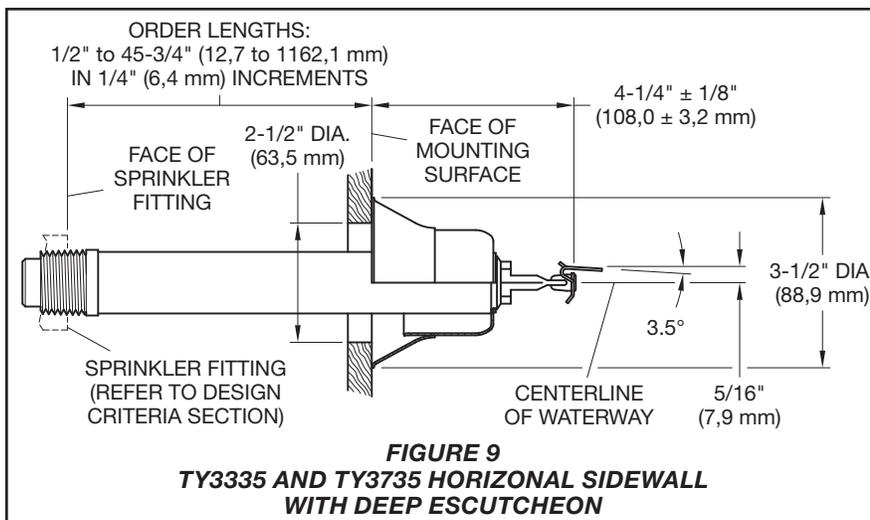
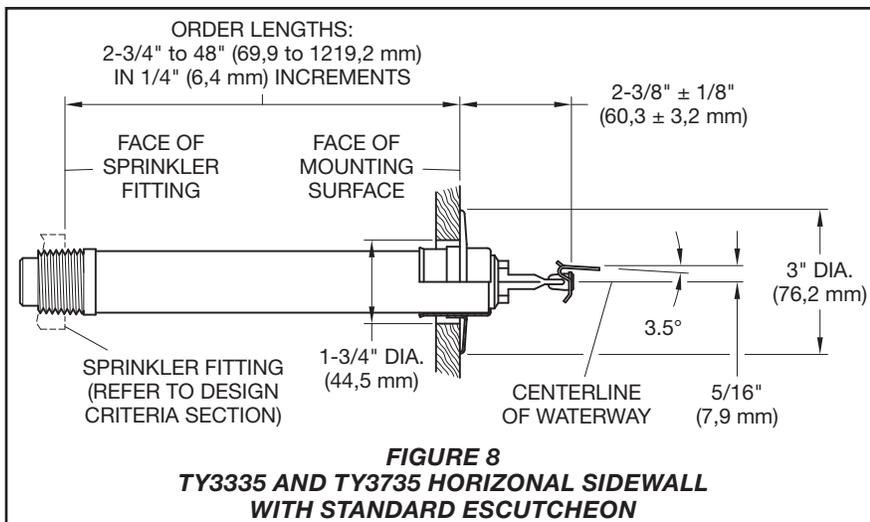
You can also install the Series DS-1 Dry-Type Sprinklers in the 3/4 or 1 inch NPT outlet of a GRINNELL Figure 730 Mechanical Tee. However, the use of the Figure 730 Tee for this arrangement is limited to wet pipe systems.

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 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).



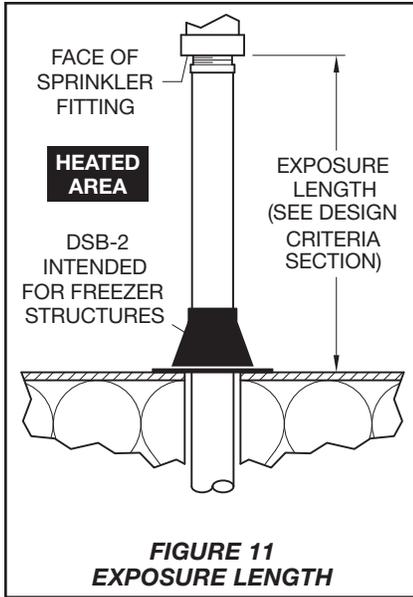


FIGURE 11
EXPOSURE LENGTH

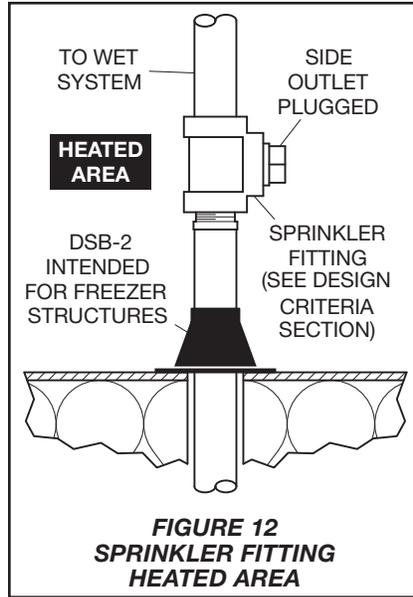


FIGURE 12
SPRINKLER FITTING HEATED AREA

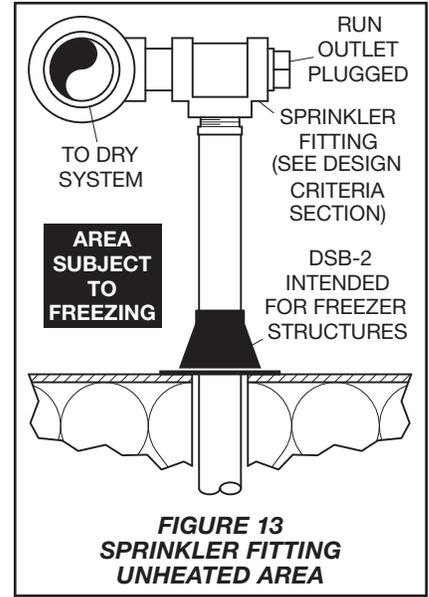


FIGURE 13
SPRINKLER FITTING UNHEATED AREA

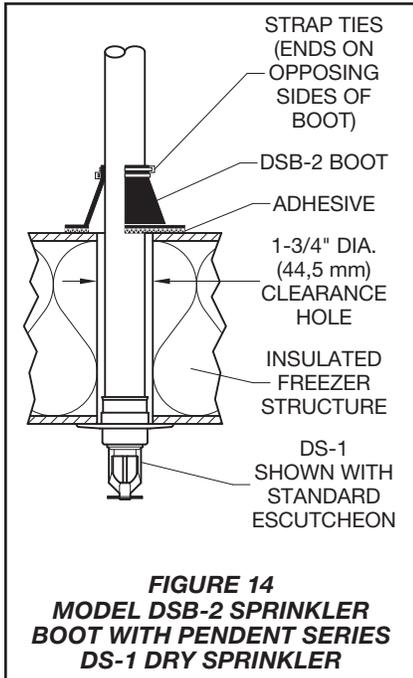


FIGURE 14
MODEL DSB-2 SPRINKLER BOOT WITH PENDENT SERIES DS-1 DRY SPRINKLER

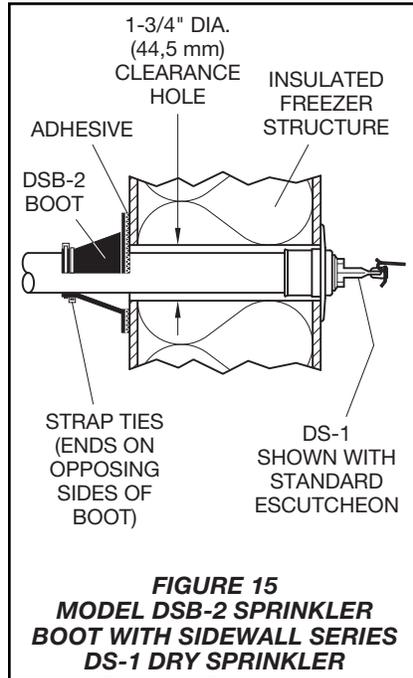


FIGURE 15
MODEL DSB-2 SPRINKLER BOOT WITH SIDEWALL SERIES DS-1 DRY SPRINKLER

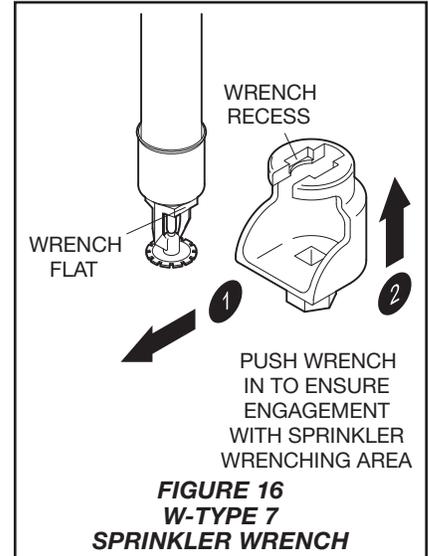


FIGURE 16
W-TYPE 7 SPRINKLER WRENCH

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 , Inches (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

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.

Installation

The TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage must be installed in accordance with this section.

General Instructions

The Series DS-1 Dry-Type Sprinklers 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.

- A leak-tight 3/4 inch NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 10 to 20 ft.-lbs. (13,4 to 26,8 Nm).
- A leak-tight 1 inch NPT sprinkler joint should be obtained 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.

Step 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.

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 (Ref. Figures 1 and 2)
- the W-Type 7 Sprinkler Wrench on the Wrench Flat (Ref. 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.

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.

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, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage 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, can delay the time to sprinkler operation in a fire situation.

A Vent Hole is provided in the Bulb Seat (Ref. 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 (e.g., an improper installation or an ice plug). Close the fire protection system control valve and drain the system 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. (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. 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.

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 and Part Number (P/N).

DS-1 Dry-Type Sprinklers

When ordering TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage, specify the following information:

- SIN:
 - Pendent – TY3935 or TY3235
 - Sidewall – TY3735 or TY3335
 - Upright – TY3135
- 5.6 K-factor
- Deflector Style:
 - Upright, Pendent, or Horizontal Sidewall
- Quick Response, Standard Coverage, Dry-Type Sprinkler
- 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-R 1
- Temperature Rating
- Sprinkler Finish
- Escutcheon Style and Finish, as applicable
- Part Number (P/N) from Table D

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

P/N* 60 - XXX - X - XXX

		SIN
01	Pendent with Standard Escutcheon (3/4" NPT)	TY3935 (Figure 3)
02	Pendent with Deep Escutcheon (3/4" NPT)	TY3935 (Figure 5)
03	Pendent with Standard Recessed Escutcheon (3/4" NPT)	TY3935 (Figure 4)
04	Pendent without Escutcheon (3/4" NPT)	TY3935 (Figure 6)

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)
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	SPRINKLER FINISH	ESCUTCHEON FINISH ¹
0	CHROME PLATED	SIGNAL WHITE (RAL9003)
1	NATURAL BRASS	SIGNAL WHITE (RAL9003)
2	NATURAL BRASS	BRASS PLATED
4	SIGNAL WHITE (RAL9003)	SIGNAL WHITE (RAL9003)
9	CHROME PLATED	CHROME PLATED

	TEMPERATURE RATINGS
0	135°F (57°C)
1	155°F (68°C)
2	175°F (79°C)
3	200°F (93°C)
4	286°F (141°C)

	SAMPLE ORDER LENGTHS ²
055	5.50"
082	8.25"
180	18.00"
187	18.75"
372	37.25"
480	48.00"

Notes:

- * Use Prefix "I" for ISO 7-R 1 Connection (e.g., I-60-010-4-055).
- 1. Escutcheon Finish applies to sprinklers provided with escutcheons.
- 2. 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 D
SERIES DS-1 DRY-TYPE SPRINKLERS
PART NUMBER SELECTION

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

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

Refer to Table A.

Maximum Working Pressure

175 psi (12,1 bar)

Inlet Thread Connections

1 inch NPT or
ISO 7-R 1

Discharge Coefficient

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

Temperature Ratings

Refer to 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

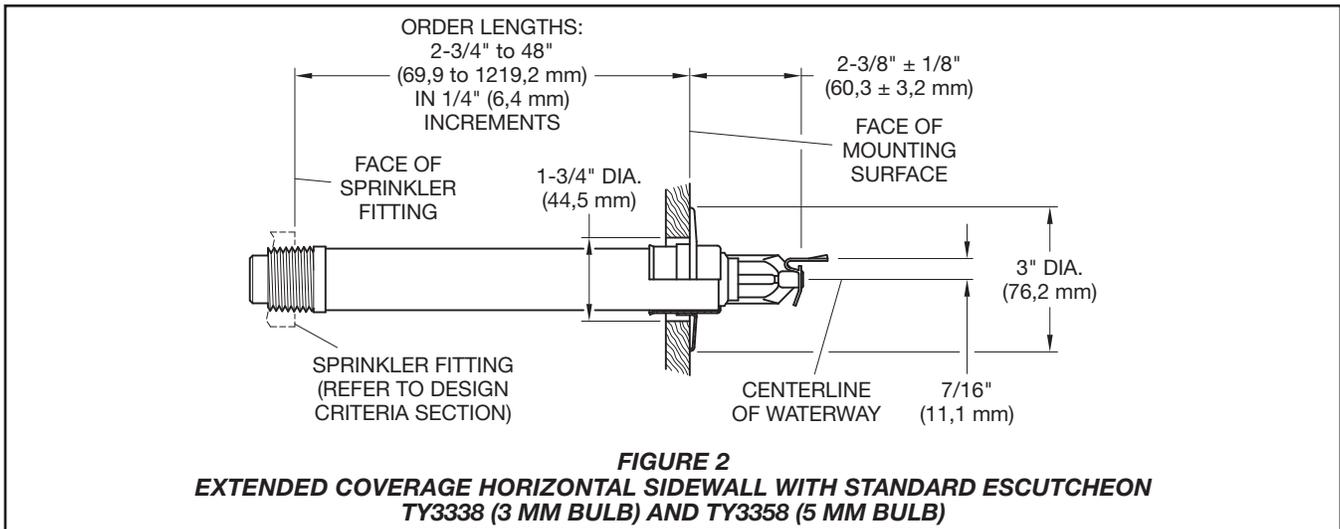
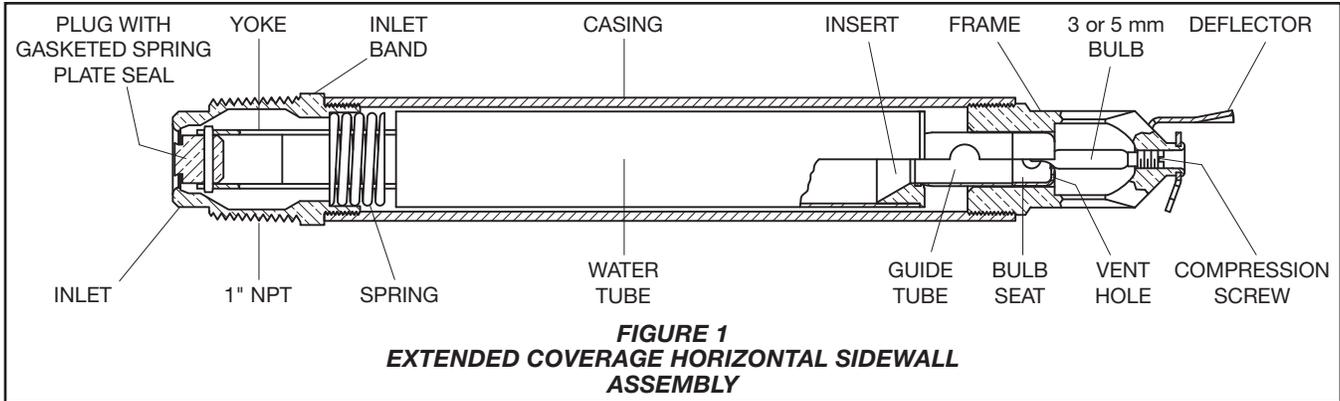


Operation

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 (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 and Gasketed Spring Plate Seal from the Inlet allowing the sprinkler to activate and flow water.



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 inch NPT Series DS-1 Dry-Type Sprinklers in the 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 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. Refer to the Exposure Length section.

For wet pipe system installations of 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 dry pipe system installations, use only the side outlet of maximum 2-1/2 inch 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.

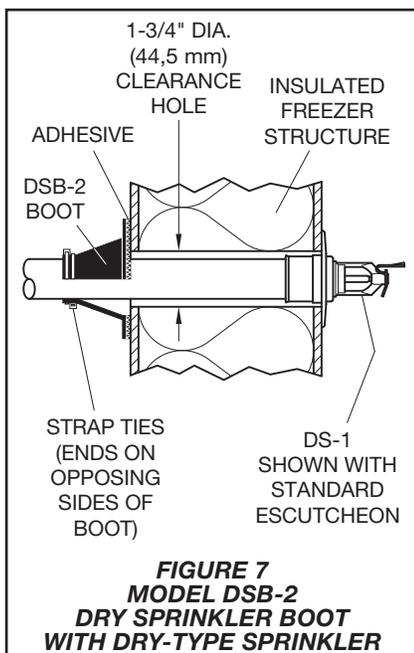
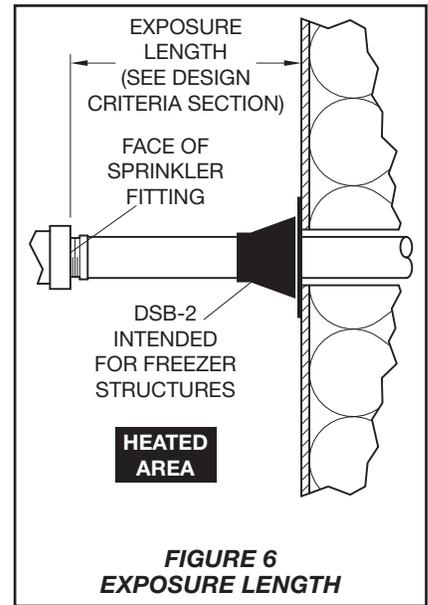
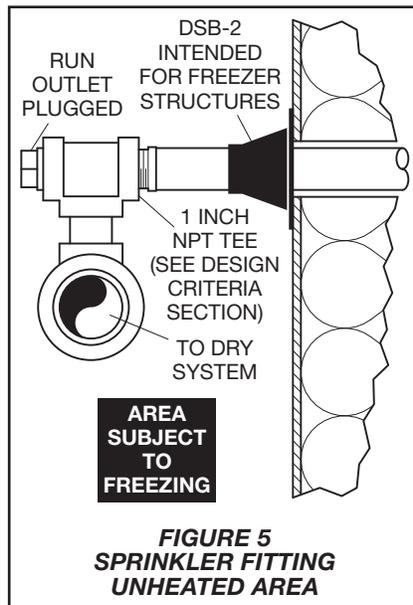
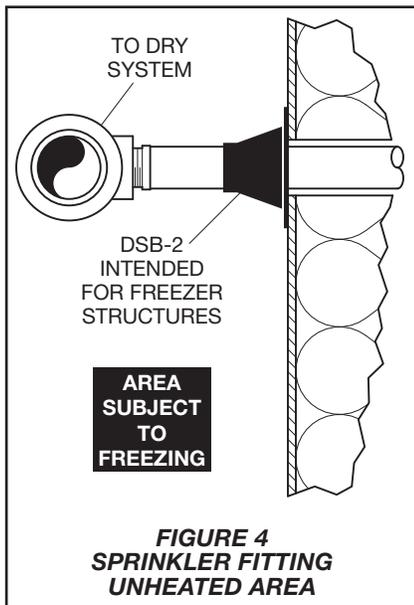
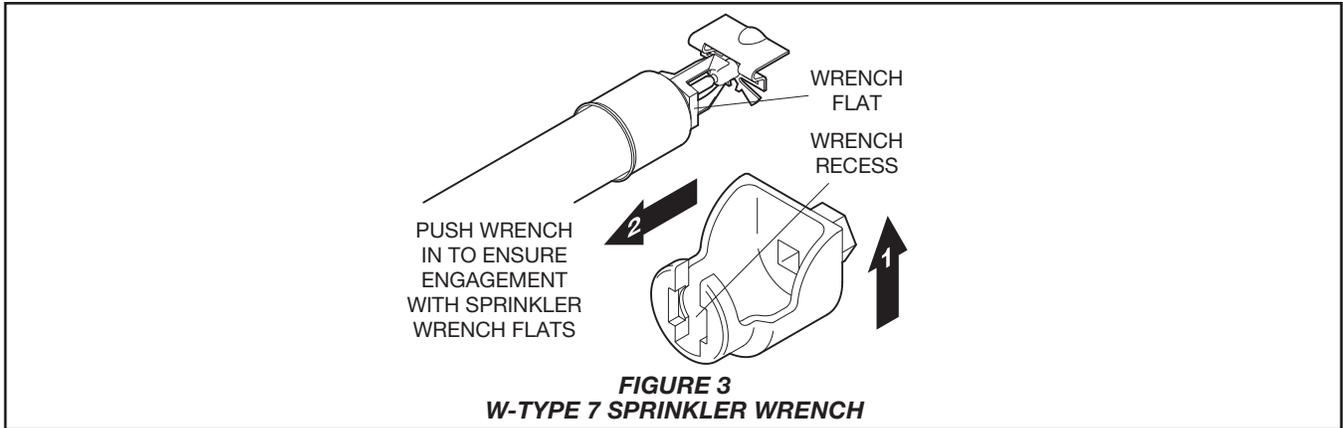
NOTICE

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

Temperature Rating	Bulb Color Code	TY3338 Horizontal Sidewall with Standard Escutcheon (3 mm Bulb Type)		
		TY3358 Horizontal Sidewall with Standard Escutcheon (5 mm Bulb Type) (Ref. Figure 2)		
		SPRINKLER FINISH		
		Natural Brass	Chrome Plated	Signal White
135°F (57°C)	Orange	1, 2, 3		
155°F (68°C)	Red			

- 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).
 3. Approved by the City of New York under MEA 352-01-E.

TABLE A
SERIES DS-1 EXTENDED COVERAGE HORIZONTAL SIDEWALL DRY-TYPE SPRINKLERS
LABORATORY LISTINGS AND APPROVALS

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, Inches (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)		

- Notes:**
1. The minimum allowable spacing between sprinklers to prevent cold soldering is 14 feet (4,3 m).
 2. To meet the deflector-to-ceiling distance of 4 to 12 inches (100 to 300 mm), the centerline of the sprinkler waterway must be 4-7/16 to 12-7/16 inches below the ceiling.

TABLE B
SERIES DS-1 EXTENDED COVERAGE HORIZONTAL SIDEWALL DRY-TYPE SPRINKLERS
UL AND C-UL INSTALLATION CRITERIA

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 , Inches (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. 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 by applying a minimum-to-maximum 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. 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 (Ref. Figure 1)
- the W-Type 7 Sprinkler Wrench on the Wrench Flat (Ref. 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 (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 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. (Ref. 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 (e.g., 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
350	EC Sidewall 3 mm Bulb (1" NPT), 135°F (57°C)	TY3338
351	EC Sidewall 3 mm Bulb (1" NPT), 155°F (68°C)	TY3338
950	EC Sidewall 5 mm Bulb (1" NPT), 135°F (57°C)	TY3358
951	EC Sidewall 5 mm Bulb (1" NPT), 155°F (68°C)	TY3358

	SPRINKLER FINISH	ESCUTCHEON FINISH
0	CHROME PLATED	SIGNAL WHITE (RAL9003)
1	NATURAL BRASS	SIGNAL WHITE (RAL9003)
2	NATURAL BRASS	BRASS PLATED
4	SIGNAL WHITE (RAL9003)	SIGNAL WHITE (RAL9003)
9	CHROME PLATED	CHROME PLATED

ORDER LENGTH**	
055	5.50"
082	8.25"
180	18.00"
187	18.75"
372	37.25"
480	48.00"

Notes:

* Use Prefix "I" for ISO 7-R 1 Connection (e.g., 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 inch 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 (Ref. Figure 2). After the measurement is taken, round it to the nearest 1/4 inch increment.
- Inlet Connections:
1 inch NPT or
ISO 7-R 1
- Temperature Rating
- Sprinkler Finish
- Standard Escutcheon and Finish

- Part Number from Table D

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).



Series 2000B

Double Check Valve Assemblies

Sizes: 1/2" – 2" (15 – 50mm)

Features

- Ease of maintenance with only one cover
- Top entry
- Replaceable seats and seat discs
- Modular construction
- Compact design
- 1/2" – 2" (15 – 50mm) Cast bronze body construction
- Top mounted ball valve test cocks
- Low pressure drop
- No special tools required
- 1/2" – 1" (15 – 25 mm) have tee handles



2" 2000B HC
(50mm)



3/4" 2000B
(20mm)

Available Models

Suffix:

B - Quarter turn ball valves

LBV - less ball valves

SH - stainless steel ball valve handles

HC - 2 1/2" inlet/outlet fire hydrant fitting (2" valve)

Pressure — Temperature

Temperature Range: 33°F – 140°F
(0.5°C – 60°C)

Maximum Working Pressure: 175psi
(12.1 bar)

Standards

AWWA Std. C510, IAPMO PS31

Series 2000B Double Check Valve Assemblies are designed to protect drinking water supplies for dangerous cross-connections in accordance with national plumbing codes and water authority requirements for non-health-hazard non-potable service applications such as irrigation, fire line, or industrial processing.

These valves meet the requirements of ASSE Std. 1015 and AWWA Std. C510 and are approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.

Specifications

A Double Check Valve Assembly shall be installed at each noted location. The assembly shall consist of two positive seating check modules with captured springs and rubber seat discs. The check module seats and seat discs shall be replaceable. Service of all internal components shall be through a single access cover secured with stainless steel bolts. The assembly shall also include two resilient seated isolation valves and four top mounted, resilient seated test cocks. The assembly shall meet the requirements of ASSE Std. 1015 and AWWA Std. C510. Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. Assembly shall be an Ames Company Series 2000B.

Approvals



Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.

LBV models not listed.

Horizontal and vertical "flow up" approval on all sizes.

WARNING

It is illegal to use this product in any plumbing system providing water for human consumption, such as drinking or dishwashing, in the United States. Before installing standard material product, consult your local water authority, building and plumbing codes.

Job Name _____ Contractor _____

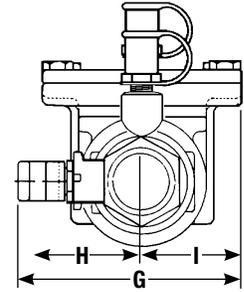
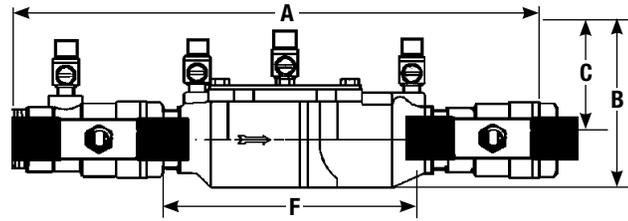
Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

Ames product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Ames Technical Service. Ames reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Ames products previously or subsequently sold.

Dimensions – Weights



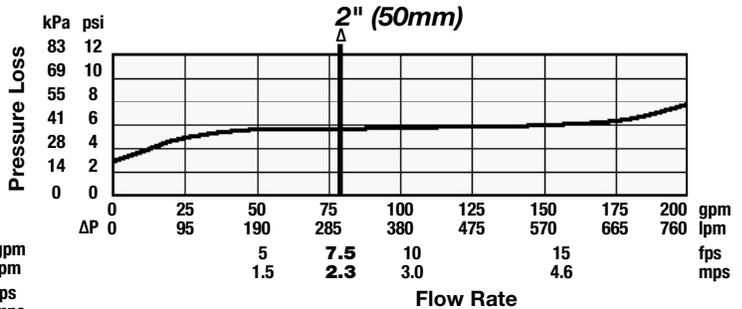
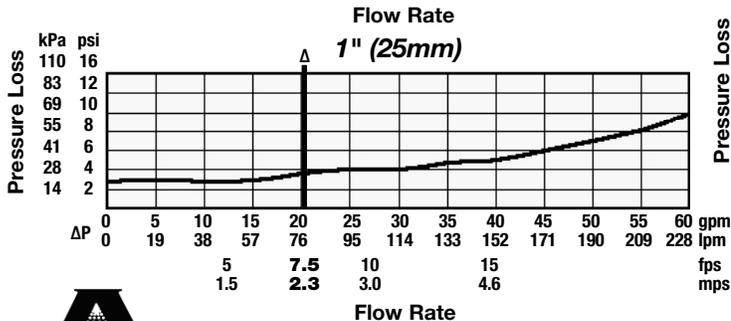
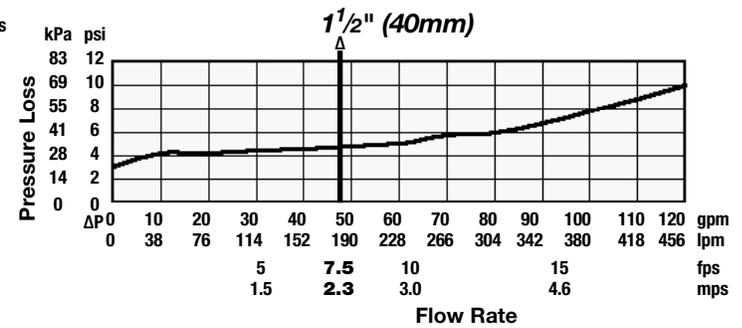
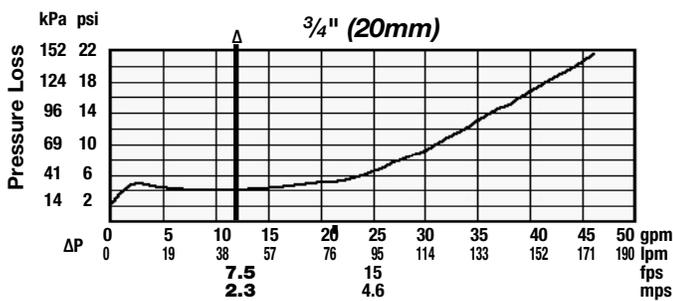
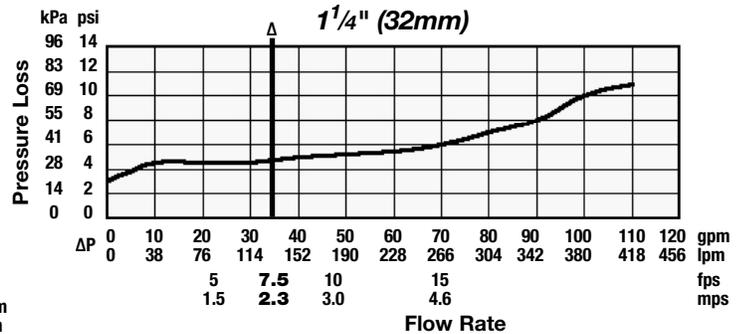
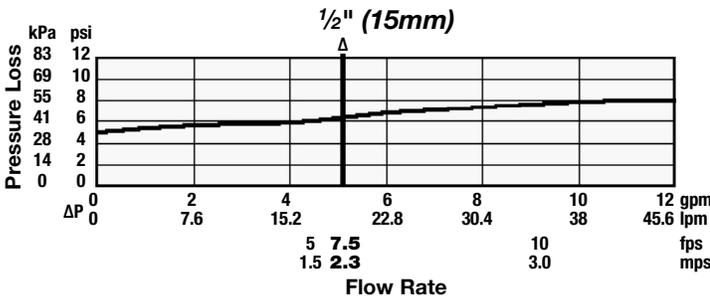
Suffix HC – Fire Hydrant Fittings dimension "A" = 23½" (594mm)

SIZE (DN)		DIMENSIONS										WEIGHT					
in.	mm	A		B		C		F		G		H		I		lbs.	kgs.
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
½	15	10	254	4¾	117	2⅞	62	5	127	3⅝	85	2⅞	59	2⅞	52	4.5	2
¾	20	11⅞	282	4	102	3⅞	79	6⅞	157	3⅞	87	2⅞	54	1⅞	33	5	2.3
1	25	13¼	337	5⅞	130	4	102	7½	191	3⅞	85	11⅞	43	11⅞	43	12	5.4
1¼	32	16⅝	416	5	127	3⅞	84	9½	241	5	127	3	76	2	50	15	6.8
1½	40	16¾	425	4⅞	124	3½	89	9¾	248	5⅞	148	3⅞	79	2⅞	68	15.86	7.2
2	50	19½	495	6¼	159	4	102	13⅝	340	6⅞	156	3⅞	87	2⅞	68	25.75	11.7

Strainer sold separately

Capacities

As compiled from documented Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California lab tests. ΔTypical maximum system flow rate (7.5 feet/sec., 2.3 meters/sec.)



A Watts Water Technologies Company

USA: Backflow Tel: (978) 689-6066 • Fax: (978) 975-8350 • AmesFireWater.com
 USA: Control Valves Tel: (713) 943-0688 • Fax: (713) 944-9445 • AmesFireWater.com
 Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • AmesFireWater.ca
 Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • AmesFireWater.com

Model 513 (13) Riser Manifold 1-1/2 thru 6 Inch (DN40 thru DN150) For NFPA 13 Sprinkler Systems

General Description

The Figure 513 (13) Riser Manifolds described in this technical data sheet provide the necessary waterflow alarm, pressure gauge, alarm test orifice, drain, and sight glass equipment in a single assembly for use in NFPA 13 sprinkler systems as follows:

NFPA 13*

- 1-1/2 Inch (DN40)
Male Thread x Female Thread
- 1-1/2 thru 6 Inch (DN40 thru DN150)
Groove x Groove

*Although the Riser Manifold described in this data sheet is intended for NFPA 13 sprinkler systems, it may be used for NFPA 13D or 13R residential sprinkler systems, where a test orifice of 5.6K (80K) is acceptable.

The variety of sizes and grooved end connections allow cost effective and easy transition to check valves, control valves, and system piping. The Riser Manifolds may be installed in either the horizontal (flow switch on top) or vertical (flow going up) for both single sprinkler rises and floor control in high rises.

WARNING

The Riser Manifolds 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 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.

Technical Data

Approvals

The Figure 513 (13) Riser Manifolds with a cover tamper switch for the waterflow alarm switch are UL Listed, ULC Listed, and FM Approved.

The Figure 513 (13) Riser Manifolds without a cover tamper switch for the waterflow alarm switch are UL Listed and FM Approved.

Maximum Working Pressure

175 psi (12,1 bar)

Test Orifice

5.6K (80K)

Assembly

The manifold body of the Figure 513 is ductile iron, whereas the manifold body of the Figure 13 is cast iron. The two assemblies are completely interchangeable in function, application, and end-to-end laying length.

Finish

Red painted.

Installation

The Riser Manifolds may be installed in either the horizontal (flow switch on top) or vertical (flow going up). The inlet of the Riser Manifold may be directly connected to a shut-off control valve.

NOTES

Where applicable pipe thread sealant is to be applied sparingly. Use of a non-hardening pipe thread sealant is recommended.

Never remove any piping component nor correct or modify any piping deficiencies without first depressurizing and draining the system.

Step 1. Install the manifold body with the flow arrow pointing in the downstream position using threaded con-



nections and/or listed mechanical grooved connections, as applicable

Step 2. Connect the drain line, and then close the drain valve.

Step 3. Refer to Figure 3 for wiring guidance. All wiring must be performed in accordance with the Authority Having Jurisdiction and/or the National Electrical Code.

Step 4. Refer to Figure 4 for optional relief valve.

Step 5. Place the system in service by filling the system with water. When filling the system, partially open the control valve to slowly fill the system. *Filling the system slowly will help avoid damaging the waterflow alarm switch.*

After the system is fully pressurized, completely open the control valve.

Step 6. Secure all supply valves open.

NO.	DESCRIPTION	QTY.	P/N
1	1-1/2" Manifold Body, Male x Female NPT	1	N/A
	Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSR-SF with Paddle, UL/FM	1	971-096-00
	VSR-SF with Paddle and Cover Tamper Switch, ULC/FM	1	976-519-02
3	300 psi/2000 kPa Water Pressure Gauge	1	2341

- NOTES:
1. Approximate weight, 11.2 lbs. (5,1 kg).
 2. ULC Listed Manifolds are equipped with Cover Tamper Switches installed internal to the Waterflow Alarm Switches.
 3. CH: Common Hardware

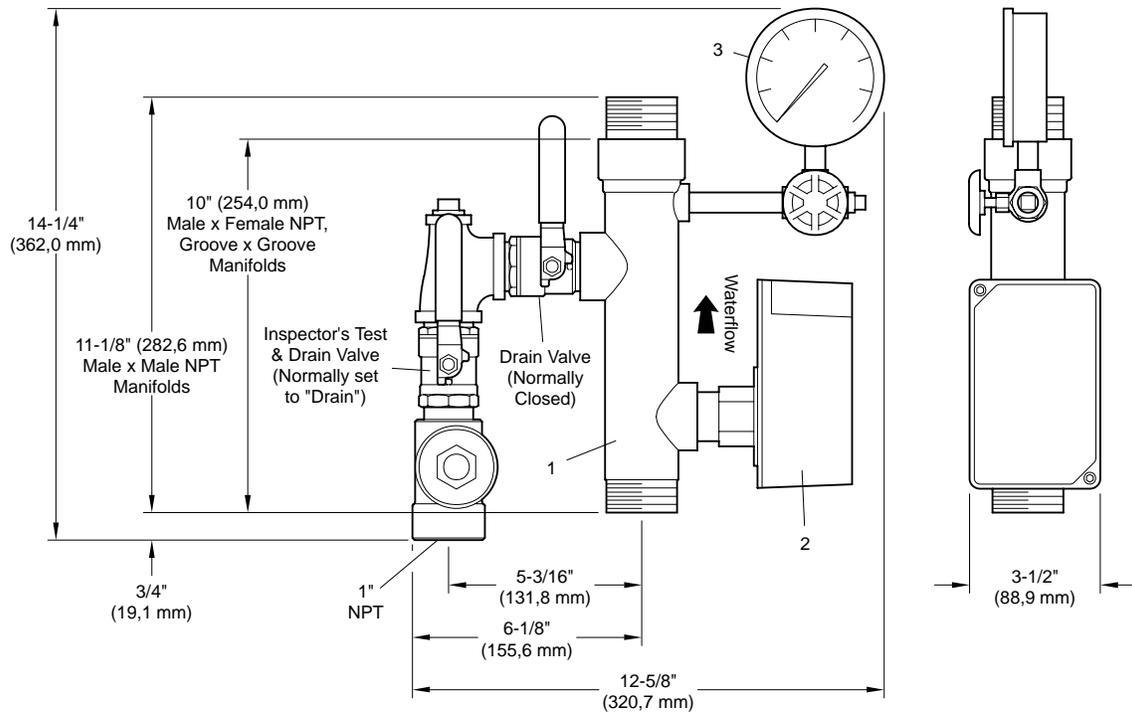


FIGURE 1
1-1/2 INCH (DN40) RISER MANIFOLD ASSEMBLY AND DIMENSIONS

2 INCH (DN50) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	2" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-01
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-01
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

4 INCH (DN100) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	4" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-04
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-04
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

6 INCH (DN150) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	6" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-05
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-05
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

2-1/2 INCH (DN65) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	2-1/2" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-02
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-02
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

Manifold Size	Nominal Installation Dimensions in Inches and (mm)							Drain Size	Weight lbs. (kg)
	A	B	C	D	E	F	G		
2 Inch (DN50)	16-3/4 (425,5)	13 (330,2)	9/16 (14,3)	5-3/8 (136,5)	6-3/8 (161,9)	13-1/16 (331,8)	3-1/2 (88,9)	1" NPT	13.5 (6,1)
2-1/2 Inch (DN65)	17-3/16 (436,6)	13 (330,2)	1 (25,4)	5-3/4 (146,1)	6-7/8 (174,6)	13-3/4 (349,3)	3-1/2 (88,9)	1-1/4" NPT	16.8 (7,6)
3 Inch (DN80)	17-3/16 (436,6)	13 (330,2)	1 (25,4)	6 (152,4)	7-1/8 (181,0)	14-1/4 (362,0)	3-1/2 (88,9)	1-1/4" NPT	18.7 (8,5)
4 Inch (DN100)	20-1/2 (520,7)	13 (330,2)	4-5/16 (109,5)	7-9/16 (192,1)	9-1/16 (230,2)	16-5/8 (422,3)	4-1/2 (114,3)	2" NPT	32.7 (14,8)
6 Inch (DN150)	20-1/2 (520,7)	13 (330,2)	4-5/16 (109,5)	8-1/2 (215,9)	10 (254,0)	18-1/2 (469,9)	6-5/8 (168,3)	2" NPT	41.6 (18,9)

3 INCH (DN80) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	3" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-03
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-03
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

NOTES:
 1. ULC Listed Manifolds are equipped with Cover Tamper Switches installed internal to the Waterflow Alarm Switches.
 2. CH: Common Hardware

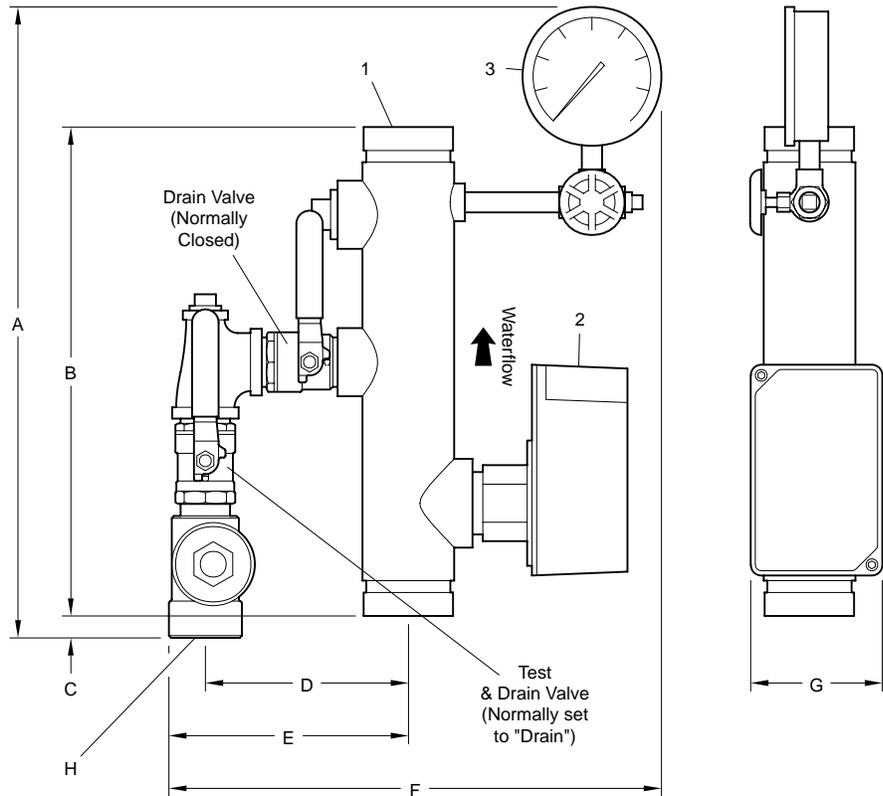
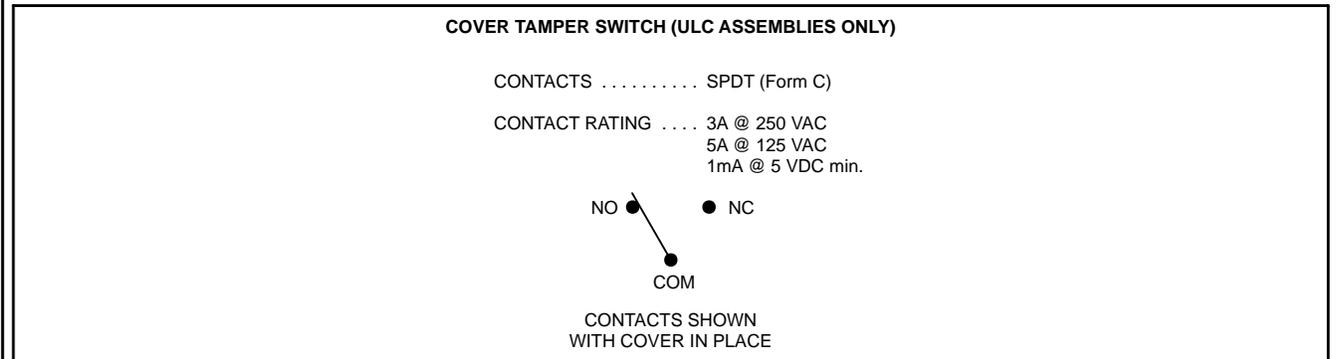
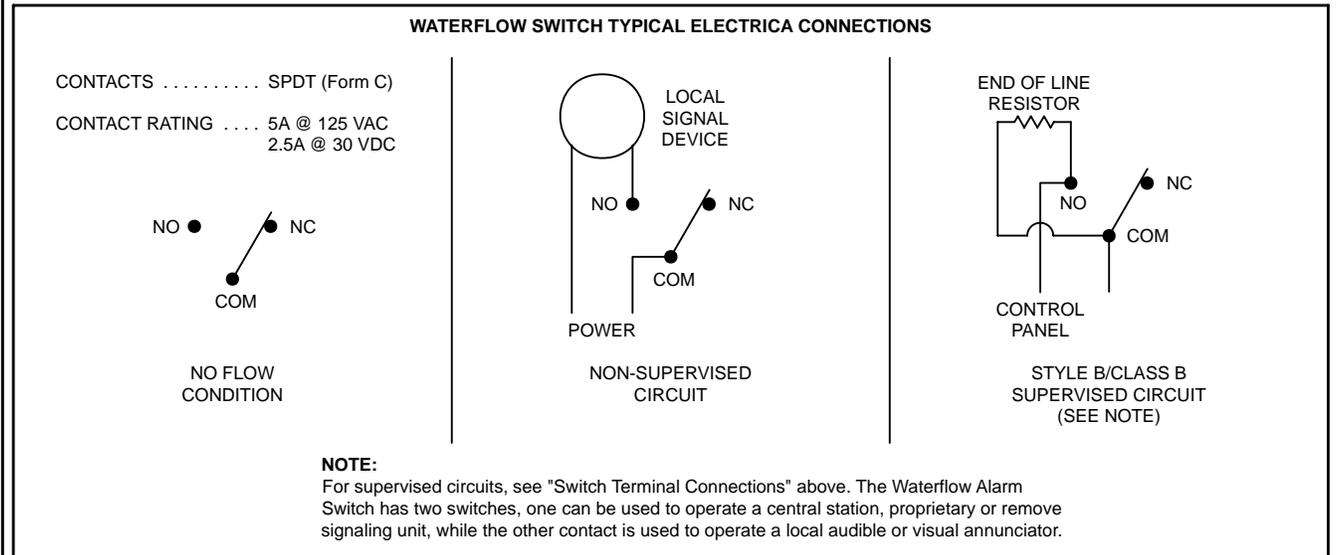
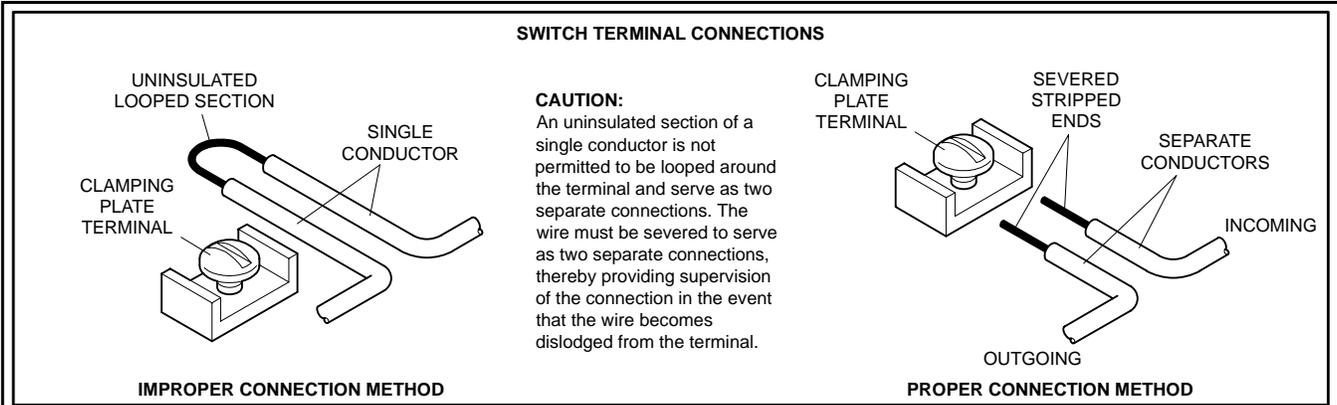
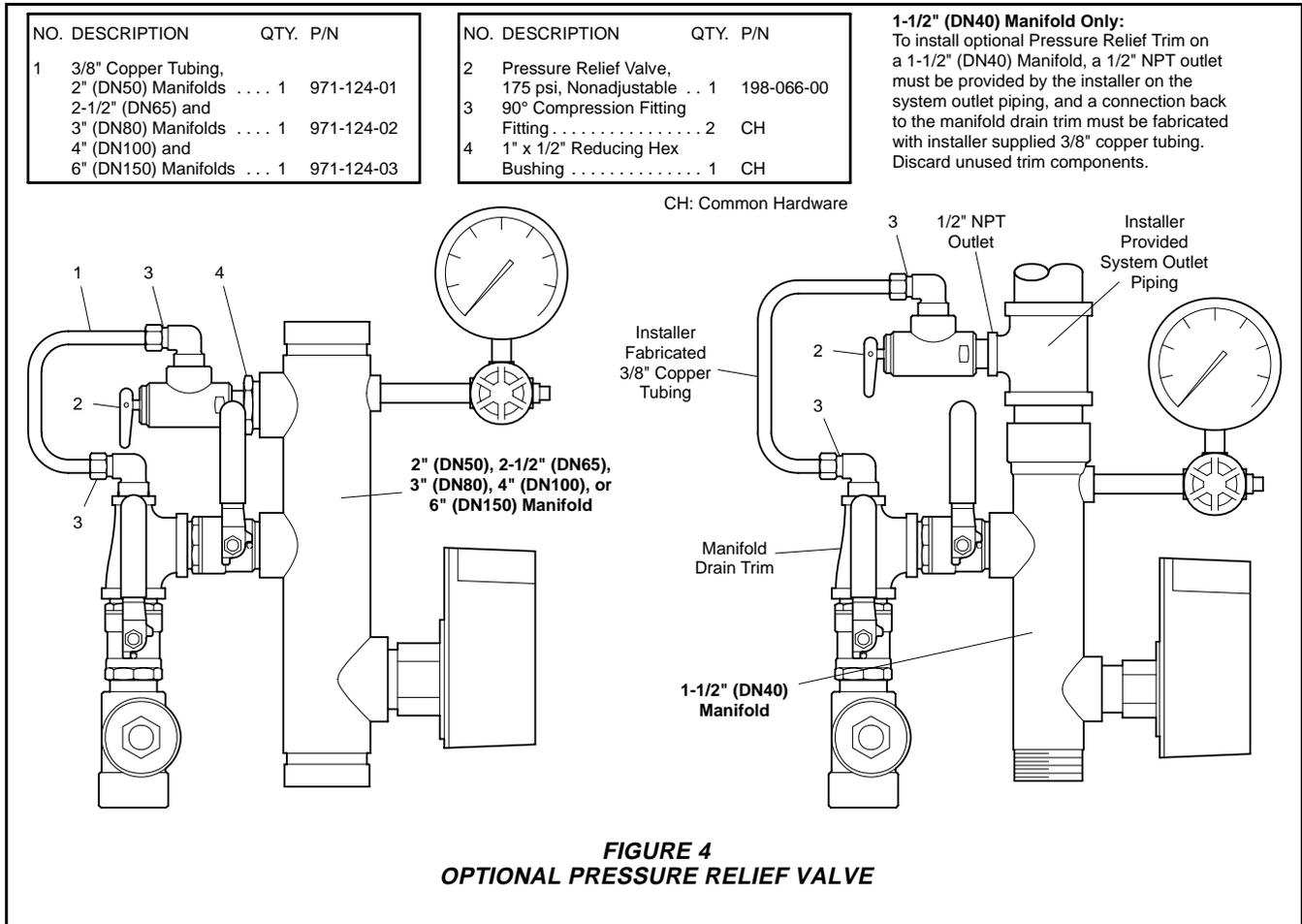


FIGURE 2
2 thru 6 INCH (DN50 thru DN150) RISER MANIFOLD ASSEMBLY AND DIMENSIONS



**FIGURE 3
WIRING GUIDANCE**



1-1/2" (DN40) Manifold Only:
To install optional Pressure Relief Trim on a 1-1/2" (DN40) Manifold, a 1/2" NPT outlet must be provided by the installer on the system outlet piping, and a connection back to the manifold drain trim must be fabricated with installer supplied 3/8" copper tubing. Discard unused trim components.

Care and Maintenance

The following inspection procedure must be performed as indicated, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected.

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 authority having jurisdiction. The installing contractor or product 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 codes.

NOTES

No attempt is to be made to repair any

Riser Manifold component in the field. Only the pressure gauge, waterflow alarm switch, or relief valve can be replaced. If any other problems are encountered the entire riser manifold must be replaced.

The alarm/flow test procedure will result in operation of the associated alarms. Consequently, notification must be given to the owner and the fire department, central station, or other signal station to which the alarms are connected, and notification must be given to the building occupants.

Before closing a fire protection system control valve for inspection or maintenance work on the fire protection system that it controls, permission to shut down the effected fire protection system must first be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

Alarm/Flow Test Procedure

Step 1. Place the test & drain Valve in the "test" position.

Step 2. Fully open the drain valve. Make certain that drainage water will not cause any damage or injury.

Step 3. Verify operation of associated alarms.

Step 4. Close the drain valve.

Step 5. Place the test & drain Valve in the "drain" position.

Step 6. Verify that the residual (flowing) pressure indicated by the pressure gauge is no less that originally recorded for the system when it was first installed.

Step 7. Close the drain valve.

Step 8. Verify that the static (not flowing) pressure indicated by the pressure gauge is no less that originally recorded for the system when it was first installed.

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 Information

Riser Manifold:

Specify: Size (specify), Figure 513, (specify connection type inlet x outlet) Riser Manifold (specify - without or with) a cover tamper switch for the waterflow alarm switch, P/N (specify).

NOTES

Orders for Figure 513 may be filled with a Figure 13. The two assemblies are completely interchangeable in function, application, and end-to-end laying length.

If a ULC Listing is required, the Riser Manifold must be ordered with a cover tamper switch for the waterflow alarm switch.

UL/ULC/FM Assemblies

With Cover Tamper Switch

1-1/2 Inch (DN40)	
MT x FT	P/N 4086
1-1/2 Inch (DN40)	
MT x MT	P/N 4087
2 Inch (DN50)	
G x G	P/N 4090
2-1/2 Inch (DN65)	
G x G	P/N 4091
3 Inch (DN80)	
G x G	P/N 4092
4 Inch (DN100)	
G x G	P/N 4095
6 Inch (DN150)	
G x G	P/N 4096

UL/FM Assemblies

Without Cover Tamper Switch

1-1/2 Inch (DN40)	
MT x FT	P/N 4055
1-1/2 Inch (DN40)	
MT x MT	P/N 4056
2 Inch (DN50)	
G x G	P/N 4060
2-1/2 Inch (DN65)	
G x G	P/N 4061
3 Inch (DN80)	
G x G	P/N 4062
4 Inch (DN100)	
G x G	P/N 4065
6 Inch (DN150)	
G x G	P/N 4066

Optional Pressure Relief Valve:

Specify: Operational Pressure Relief Valve and Trim for use with (specify size) Figure 513 or 13 Series Riser Manifold, P/N (specify).

1-1/2" or 2"	P/N 4063
2-1/2" or 3"	P/N 4072
4" or 6"	P/N 4073

Replacement Parts:

Specify: (description) for use with Figure 513 or 13 Riser Manifold, P/N (Ref. Figure 1 or 2, as applicable).

Description

Fire Protection Products, Inc. Spare Sprinkler Head Cabinets are designed to allow for spare sprinkler head storage as required by NFPA guidelines. The Spare Sprinkler Head Cabinets are available in six configurations. Three head, six head, six head ESFR, twelve head, twenty-four head and thirty-six head. All six styles are manufactured with “knockouts” to accommodate the most common size sprinklers. The shelf is located to allow for the storage of a typical sprinkler head wrench. Each cabinet is finished with a red enamel finish. Each spare head cabinet comes with a hinged door which remains closed to protect the spare sprinklers from the elements and features two holes on the back panel to allow for attachment to most surfaces utilizing the appropriate fasteners. Not intended for exposed or harsh environments.



Installation

Select the correct Spare Sprinkler Head Cabinet in accordance with the Automatic Sprinkler Systems Handbook. As per the 1989 Edition the correct number of spare sprinkler is as follows:

0-300 sprinklers, not less than 6; 300-1000, not less than 12; 1000 or more, not less than 24. Stock of spare sprinklers shall include all types and ratings installed.*

Once the correct Spare Sprinkler Head Cabinet has been selected, installation is accomplished by inserting the correct fastener in each of the two holes inside the cabinet, securing the cabinet securely to the wall. Then insert the correct number and type of sprinklers in accordance with the “handbook”.

**Final determination is subject to approval by the AHJ.*

Specifications

Material:
Painted Plain Steel

Finish:
Red enamel

Styles:
3 Spare sprinklers, 1/2 or 3/4
6 Spare sprinklers, 1/2 or 3/4
6 Spare, ESFR, 1/2, 3/4 or 1”
12 Spare sprinklers 1/2 or 3/4
24 Spare sprinklers
36 Spare sprinklers



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Series LFII Dry-Type Residential Sprinklers Recessed Pendent 4.9 K-Factor

General Description

The TYCO RAPID RESPONSE Series LFII Dry-Type Residential Recessed Pendent Sprinklers are decorative, fast response, frangible bulb sprinklers designed for use in residential occupancies such as homes, apartments, dormitories, and hotels. These sprinklers may be used in wet pipe, dry pipe, or preaction systems.

Residential sprinklers listed for dry pipe or preaction systems must undergo special testing at Underwriters Laboratories, Inc., including a 15-second delay while passing all UL1626 test criteria. The sprinklers described in this data sheet have undergone this special UL testing and are therefore listed for the types of residential designs cited below.

Dry-Type Sprinklers are typically used where:

- 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 unheated areas.
- sprinklers are used on systems that are seasonally drained to avoid freezing; for example, vacation areas.

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.

The Series LFII Dry-Type Residential Recessed Pendent Sprinklers are intended for use in residential sprinkler systems for one- and two-family dwellings and mobile homes per NFPA 13D; residential sprinkler systems for residential occupancies up to and including four stories in height per NFPA 13R; or, sprinkler systems for the residential portions of any occupancy per NFPA 13.

The Series LFII Dry-Type Residential Recessed Pendent Sprinklers are designed with heat sensitivity and water characteristics proven to help in controlling residential fires and improving the chance for occupants to escape or be evacuated.

The Series LFII Dry-Type Residential Recessed Pendent Sprinklers provide flexibility in adjusting sprinklers to the fixed pipe drops. The Recessed Escutcheon provides 1/4 inch (6,4 mm) of recessed adjustment or up to 1/2 inch (12,7 mm) of total adjustment from the flush mounting surface position.

NOTICE

The Series LFII Dry-Type Residential Recessed Pendent Sprinklers (TY2235) 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 LFII Dry-Type Residential Recessed Pendent Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section.



Model/Sprinkler Identification Number (SIN)

TY2235

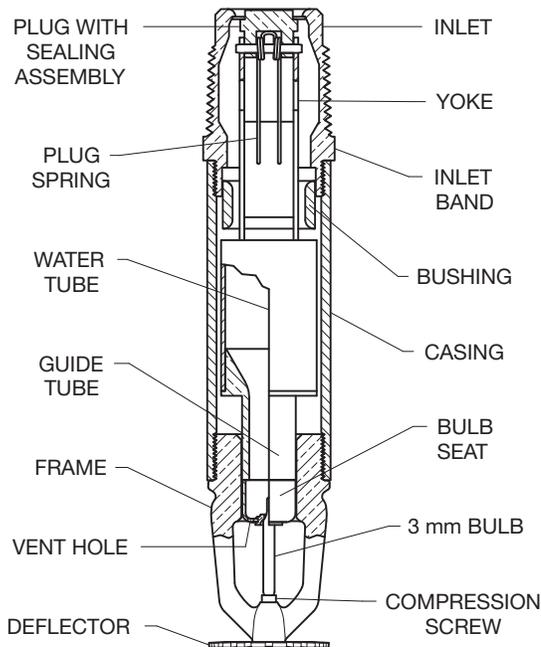


FIGURE 1
ASSEMBLY FOR SERIES LFII
DRY-TYPE RESIDENTIAL PENDENT SPRINKLER

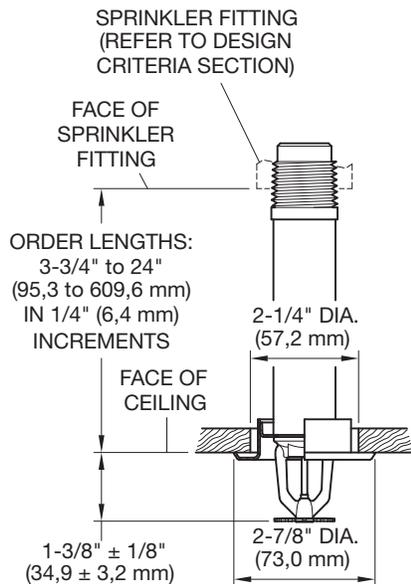


FIGURE 2
PENDENT WITH RECESSED ESCUTCHEON (TY2235)

Operation

When the TYCO Series LFII Dry-Type Residential Sprinkler is in service, water is prevented from entering the assembly by the Plug with Sealing Assembly (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 then release the Bulb Seat. System water or air pressure then unseats the Plug with Sealing Assembly. The Plug Spring turns the Plug with Sealing Assembly aside, allowing the sprinkler to activate and flow water.

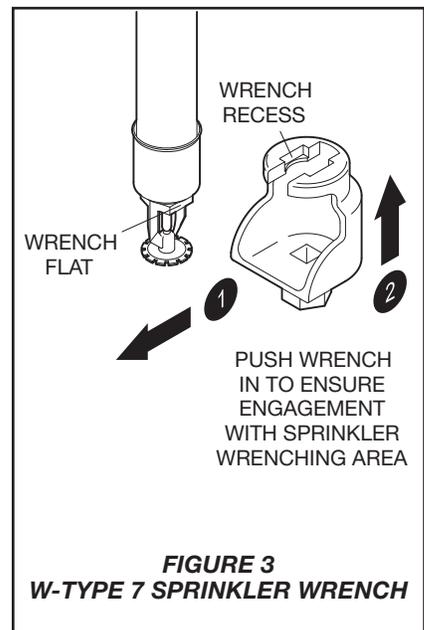


FIGURE 3
W-TYPE 7 SPRINKLER WRENCH

Design Criteria

The TYCO Series LFII Dry-Type Residential Recessed Pendent Sprinklers (TY2235) are UL Listed for installation in accordance with the criteria listed in this section.

When conditions exist that are outside the scope of the criteria provided in this section, refer to the technical data sheet entitled *Residential Sprinkler Design Guide (TFP490)* for the manufacturer's recommendations that may be acceptable to the local authority having jurisdiction.

This section describes the following design characteristics:

- System Types
- Water Delivery
- Hydraulic Design
- Obstruction to Water Distribution
- Operational Sensitivity
- Sprinkler Spacing
- Sprinkler Fitting
- Prevention of Branch Line Freezing

System Types

Wet pipe, dry pipe, and preaction systems may be utilized.

Water Delivery

For dry pipe and preaction systems, water delivery to the most remote sprinkler for a residential hazard shall not exceed 15 seconds as defined in Section 8.3.4.3 of the 2010 edition of NFPA 13D or Section 7.2.3.6.3 of the 2010 edition of NFPA 13.

Using the TYCO SPRINKFDT Water Delivery Calculation Program can help determine whether required delivery times will likely be achieved prior to performing the actual installation.

As an alternative to using a UL Listed water delivery calculation program and method, as referenced in NFPA 13D or NFPA 13, using an inspector's test connection is required to provide flow equivalent to the smallest orifice sprinkler, wherein the test orifice is located on the end of the pipe supplying the most remote sprinkler.

Hydraulic Design

Table A lists the minimum required sprinkler flow rate for systems designed to NFPA 13D or NFPA 13R as a function of temperature rating and the maximum allowable coverage areas. The sprinkler flow rate is the minimum required discharge from each of the total number of "design sprinklers," as specified in NFPA 13D or NFPA 13R.

For systems designed to NFPA 13, the number of required design sprinklers is the four most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is the greater of the following:

- flow rates listed in Table A for NFPA 13D and 13R as a function of temperature rating and the maximum allowable coverage area.
- minimum discharge of 0.1 GPM/sq. ft. over the design area comprised of the four most hydraulically demanding sprinklers for the actual coverage areas protected by four sprinklers.

Examples of sprinkler designs follow:

- *Example 1* — Protection is planned for a corridor that is 8 feet wide. Consequently, the actual coverage area under consideration is 8 ft. x 20 ft. Using the Series LFII Dry-Type Residential Sprinkler, the flow rate listed in Table A for a 20 ft. x 20 ft. coverage area is 21 GPM. However, based on a minimum discharge of 0.1 GPM/sq. ft., the expected flow rate is 16 GPM (8 ft. x 20 ft = 160 sq.ft.). For this example, a minimum flow rate of 21 GPM for this sprinkler design is required.
- *Example 2* — Protection is planned for a long, narrow room that is 12 feet wide. Consequently, the actual coverage area under consideration is 12 ft. x 20 ft. Using the Series LFII Dry-Type Residential Sprinkler, the flow rate listed in Table A for a 20 ft. x 20 ft. coverage area is 21 GPM. However, based on a minimum discharge of 0.1 GPM/sq. ft., the expected flow rate is 24 GPM (12 ft. x 20 ft = 240 sq.ft.). For this example, a minimum flow rate of 24 GPM for this sprinkler design is required.

Obstruction to Water Distribution

Sprinklers are to be located in accordance with the obstruction rules of NFPA 13D, 13R, and 13 as applicable for residential sprinklers as well as with the obstruction criteria described within the TYCO technical data sheet TFP490.

Operational Sensitivity

The sprinkler must be located relative to the mounting surface as shown in Figure 3.

Sprinkler Spacing

The minimum spacing between sprinklers is 8 feet (2,4 m). The maximum spacing between sprinklers cannot exceed the length of the hydraulically-calculated coverage area (refer to Table A); for example, a maximum of 12 feet for a 12 ft. x 12 ft. coverage area or 20 feet for a 20 ft. x 20 ft. coverage area.

Sprinkler Fittings

Install the 1-inch NPT Series LFII Dry-Type Residential Recessed Pendent Sprinklers in the 1-inch NPT outlet or run of one 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).

For dry pipe systems, only use the side outlet of maximum 2-1/2 inch size reducing tees when locating the Series LFII Dry-Type Residential Recessed Pendent Sprinklers directly below the branch line. Otherwise, use the configuration shown in Figure 6 to assure complete drainage from above the Series LFII Sprinklers and the branch line.

Do not install the Series LFII Dry-Type Residential Recessed Pendent Sprinklers into elbow fittings. The Inlet of the sprinkler can contact the interior of the elbow, potentially damaging the Inlet seal.

Typically, the end sprinkler fitting on a branch line is plugged as shown in Figure 6.

The Series LFII Dry-Type Sprinklers can also be installed in the 1-inch NPT outlet of a GRINNELL Figure 730 Mechanical Tee. However, the use of the Figure 730 for this arrangement is limited to wet pipe systems.

Only use the configuration in Figure 4 where the sprinkler fitting and water-filled pipe above the sprinkler fitting are not subject to freezing and where the length of the Series LFII Sprinkler has the minimum exposure length per Figure 6. Refer to the Exposure Length section and Table B.

For wet pipe system installations of the 1-inch NPT Series LFII Dry-Type Residential Recessed Pendent Sprinklers connected to CPVC piping, use only the following TYCO CPVC fittings:

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

For residential dry pipe systems subject to freezing, use the of 1" x 1" x 1" NPT CPVC Sprinkler Head Adapter Tee (P/N 80259).

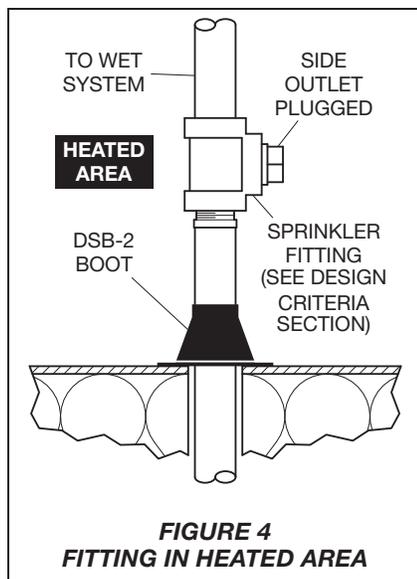


FIGURE 4
FITTING IN HEATED AREA

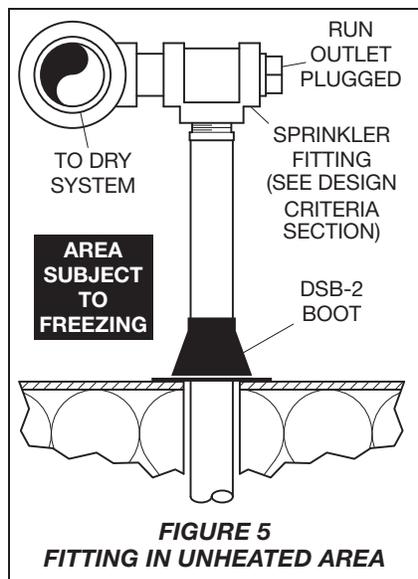


FIGURE 5
FITTING IN UNHEATED AREA

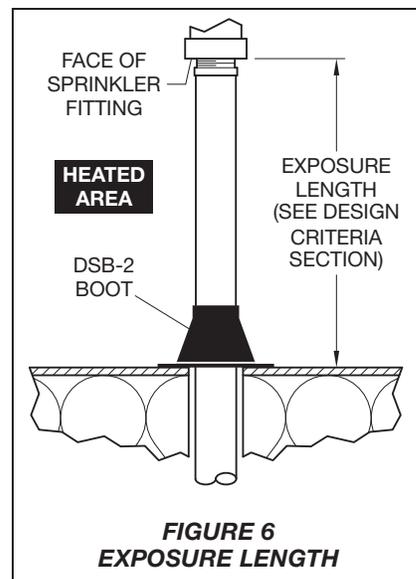


FIGURE 6
EXPOSURE LENGTH

NOTICE

Do not install the Series LFII Dry-Type Residential Recessed Pendent Sprinklers into any other type fitting without first consulting the Technical Services Department. Failure to use the appropriate fitting may result in 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

Branch, cross, and feed-main piping connected to Series LFII Dry-Type Residential Recessed Pendent Sprinklers and subject to freezing temperatures must be pitched to allow proper drainage, in accordance with the minimum requirements of the National Fire Protection Association for dry pipe sprinkler systems.

Exposure Length

When using Series LFII Dry-Type Residential Recessed Pendent Sprinklers in wet pipe sprinkler systems to protect areas subject to freezing temperatures, use Table B 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 6 for an example.

Clearance Space

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 Residential Recessed Pendent Sprinklers must be sealed, in accordance with the National Fire Protection Association. 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 4 through 6, can provide the recommended seal.

Installation

The TYCO Series LFII Dry-Type Residential Recessed Pendent Sprinklers must be installed in accordance with the following instructions.

NOTICE

The Series LFII Dry-Type Residential Recessed Pendent Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section. For other important requirements regarding piping design and sealing of the clearance space around the Sprinkler Casing, refer to the Design Criteria section.

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).

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 or Frame with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in an Escutcheon Plate or Cover-Retainer Assembly 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 with the deflector parallel to the ceiling.
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.
3. Wrench-tighten the sprinkler using a pipe wrench on the Inlet Band or the Casing (refer to Figure 1) or using the W-Type 7 Sprinkler Wrench on the Wrench Flat (refer to Figure 3). Apply the Wrench Recess of the W-Type 7 Sprinkler Wrench to the Wrench Flat.

Note: If sprinkler removal is 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.

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 B
MINIMUM RECOMMENDED LENGTHS OF EXPOSED SPRINKLER BARRELS
IN WET PIPE SYSTEMS

Care and Maintenance

The TYCO Series LFII Dry-Type Residential Recessed Pendent Sprinklers (TY2235) must be maintained and serviced in accordance with the following instructions. Otherwise, inadvertent sprinkler operation or non-operation in the event of a fire can result.

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 a Recessed Escutcheon Plate to cover a clearance hole can delay sprinkler operation in a fire situation.

A Vent Hole is provided in the Bulb Seat (Figure 1) to indicate if the Series LFII Dry-Type Residential Sprinkler is remaining dry. Evidence of leakage from the Vent Hole indicates potential leakage past the Plug with Sealing Assembly 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 to sprinklers before, during, and after installation. Never paint, plate, coat, or otherwise alter automatic sprinklers after they leave the factory.

Replace sprinklers that:

- were modified or over-heated.
- were damaged by dropping, striking, wrench twisting, wrench slippage, or the like.
- are leaking or exhibiting visible signs of corrosion.
- were exposed to corrosive products of combustion but have not operated, if you cannot easily remove combustion by-products with a cloth.
- have a cracked Bulb or have lost liquid from the Bulb. Refer to the Installation section in this data sheet.

Responsibility lies with the owner 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 authorities having jurisdiction. Contact the installing contractor or sprinkler manufacturer regarding 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.

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).

Pendent Sprinkler with Recessed Escutcheon

Specify the following information:

- Series LFI Dry-Type Residential Sprinkler (TY2235),
- with Recessed Escutcheon,
- 4.9 K-Factor,
- Temperature Rating of: 155°F (68°C) or 175°F (79°C) wet pipe systems only,
- Sprinkler Finish (value from Table C),
- Recessed Escutcheon Finish (value from Table C),
- Order Length (value from Figure 2), and
- Inlet Thread Connection (1-inch NPT or ISO 7-R1).
- P/N (from Table C).

Separately Ordered Sprinkler Wrench

Specify W-Type 7 Sprinkler Wrench (Figure 2), P/N 56-850-4-001.

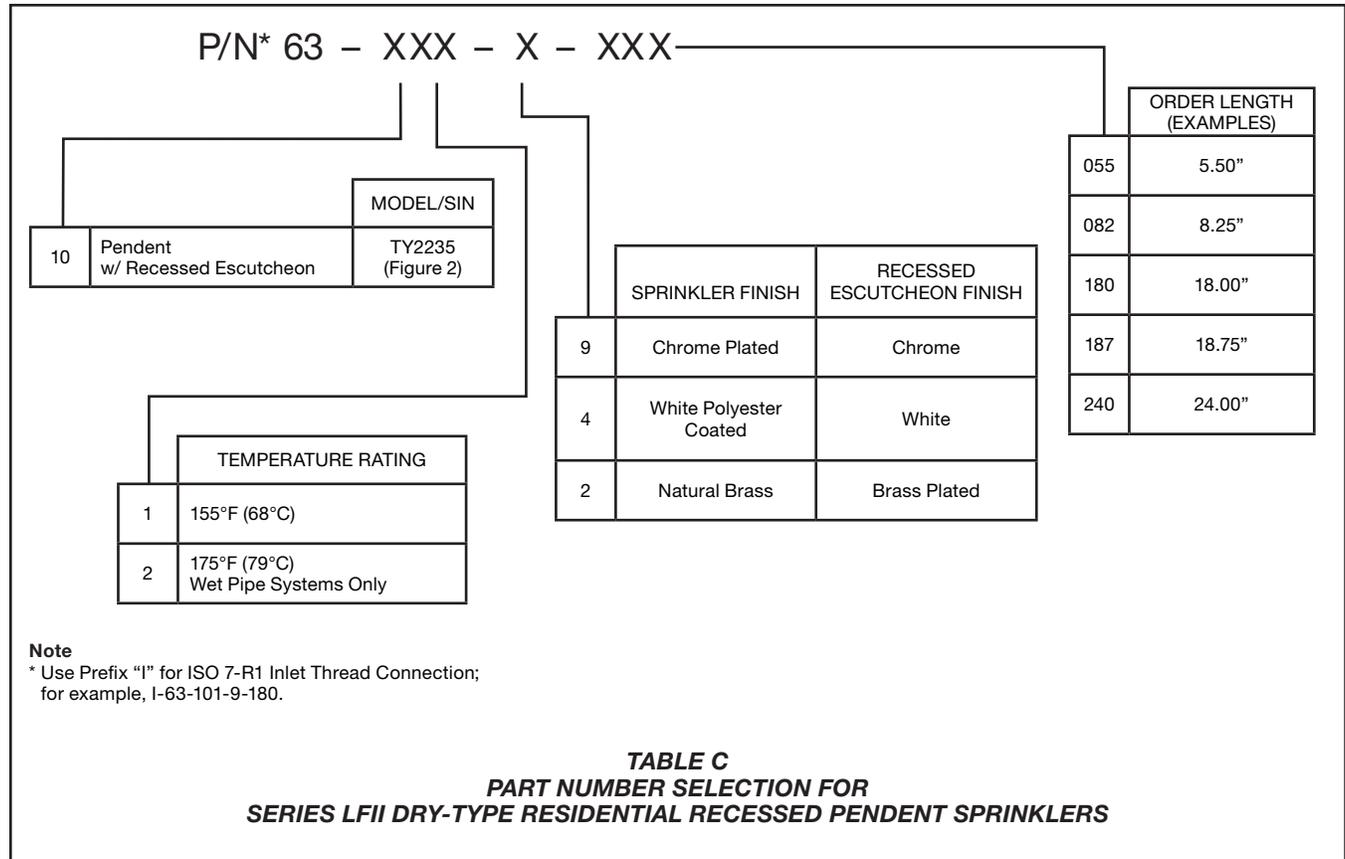


Fig. 24 - Hanger for CPVC Plastic Pipe Double Fastener Strap Type - Side Mount



Size Range — 3/4" thru 2" CPVC pipe

Material — Pre-Galvanized Steel

Function — Intended to perform as a hanger/restrainer to support CPVC piping used in automatic fire sprinkler systems. Can be installed on the top or on the bottom of a beam. The Fig. 24 can also function as a restrainer to prevent the upward movement of the sprinkler head during activation.

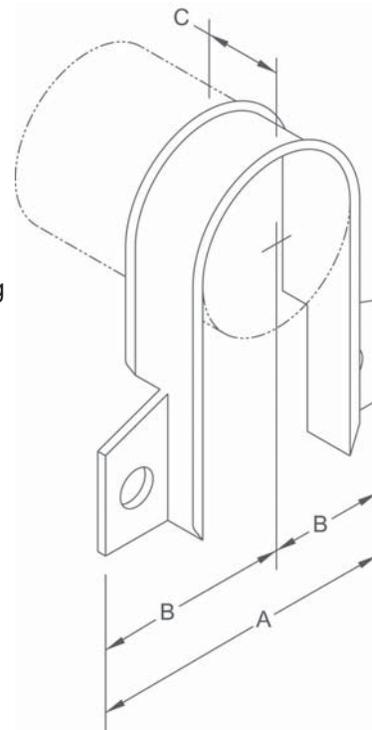
Approvals — Underwriters' Laboratories Listed in the USA (**UL**) and Canada (**cUL**) to support fire sprinkler piping. May be installed in wood using fasteners supplied with product, or into minimum 20 gauge steel using (2) 1/4" x 1" tek type screws. Meets and exceeds the requirements of NFPA 13, 13R and 13D.

Features — Fig. 24 incorporates features which protect the pipe and ease installation. The flared edge design protects the CPVC pipe from any rough surface. Easily attaches to the building structure using the two UL Listed hex head self threading screws* furnished with the product. It is recommended that rechargeable electric drills fitted with a hex socket attachment be used as installation tools. No impact tools (such as a hammer) are allowed. Damage has been known to result from installations using impact type tools. No pre-drilling of a pilot hole in wood is required.

Finish — Pre-Galvanized

Order By — Figure number and pipe size

* **Hardened hex head self threading screw is furnished with the product and is the minimum fastener size acceptable.**



Dimensions • Weights

CPVC Pipe Size	A	B	C	Max. Hanger Spacing (Ft.)	Fastener Hex Head Size	Approx. Wt./100
3/4	2 ⁵ / ₁₆	1 ⁵ / ₃₂	1 ³ / ₁₆	5 ¹ / ₂	5/16	9
1	2 ⁵ / ₈	1 ⁵ / ₁₆	1 ³ / ₁₆	6	5/16	9
1 ¹ / ₄	3	1 ¹ / ₂	1 ³ / ₁₆	6 ¹ / ₂	5/16	11
1 ¹ / ₂	3 ³ / ₄	1 ⁵ / ₈	1 ³ / ₁₆	7	5/16	12
2	3 ¹¹ / ₁₆	1 ²⁷ / ₃₂	1 ³ / ₁₆	8	5/16	15

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Series TY-FRB – 2.8, 4.2, 5.6, and 8.0 K-Factor Upright, Pendent, and Recessed Pendent Sprinklers Quick Response, Standard Coverage

General Description

The TYCO Series TY-FRB, 2.8, 4.2, 5.6, and 8.0 K-factor, Upright and Pendent Sprinklers described in this data sheet are quick response, standard coverage, decorative 3 mm glass bulb-type spray sprinklers designed for use in light or ordinary hazard, commercial occupancies such as banks, hotels, and shopping malls.

The recessed version of the Series TY-FRB Pendent Sprinkler, where applicable, is intended for use in areas with a finished ceiling. This recessed pendent sprinkler uses one of the following,

- A two-piece Style 10 (1/2 inch NPT) or Style 40 (3/4 inch NPT) Recessed Escutcheon with 1/2 inch (12,7 mm) of recessed adjustment or up to 3/4 inch (19,1 mm) of total adjustment from the flush pendent position, or a
- A two-piece Style 20 (1/2 inch NPT) or Style 30 (3/4 inch NPT) Recessed Escutcheon with 1/4 inch (6,4 mm) of recessed adjustment or up to 1/2 inch (12,7 mm) of total adjustment from the flush pendent position.

The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut.

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.

Corrosion-resistant coatings, where applicable, are utilized to extend the life of copper alloy sprinklers beyond that which would otherwise be obtained when exposed to corrosive atmospheres. Although corrosion-resistant coated sprinklers have passed the standard corrosion tests of the applicable approval agencies, the testing is not representative of all possible corrosive atmospheres. Consequently, it is recommended that the end user be consulted with respect to the suitability of these coatings for any given corrosive environment. The effects of ambient temperature, concentration of chemicals, and gas/chemical velocity, should be considered, as a minimum, along with the corrosive nature of the chemical to which the sprinklers will be exposed.

An intermediate level of the Series TY-FRB Pendent Sprinklers is detailed in Technical Data Sheet TFP356, and Sprinkler Guards are detailed in Technical Data Sheet TFP780.

NOTICE

The Series TY-FRB Concealed Pendent Sprinklers described herein must be installed and maintained in compliance with this document and 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.

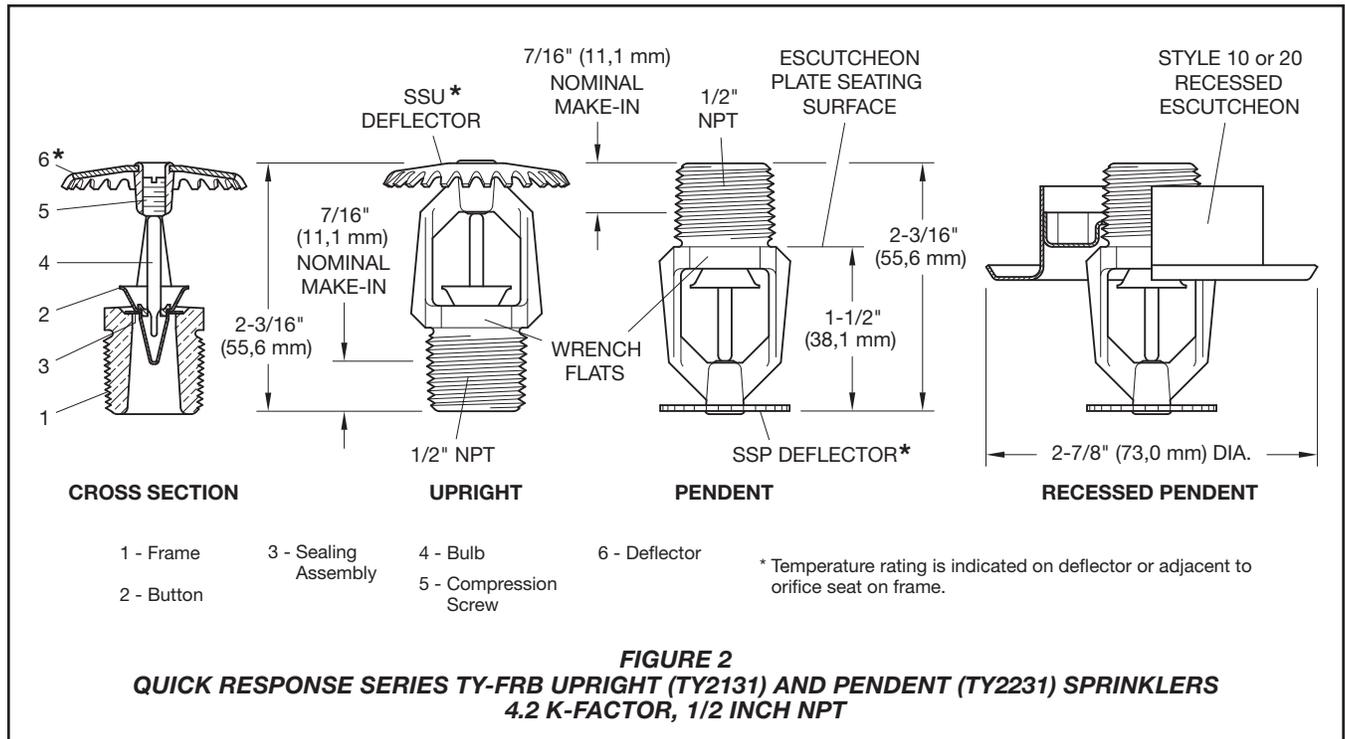
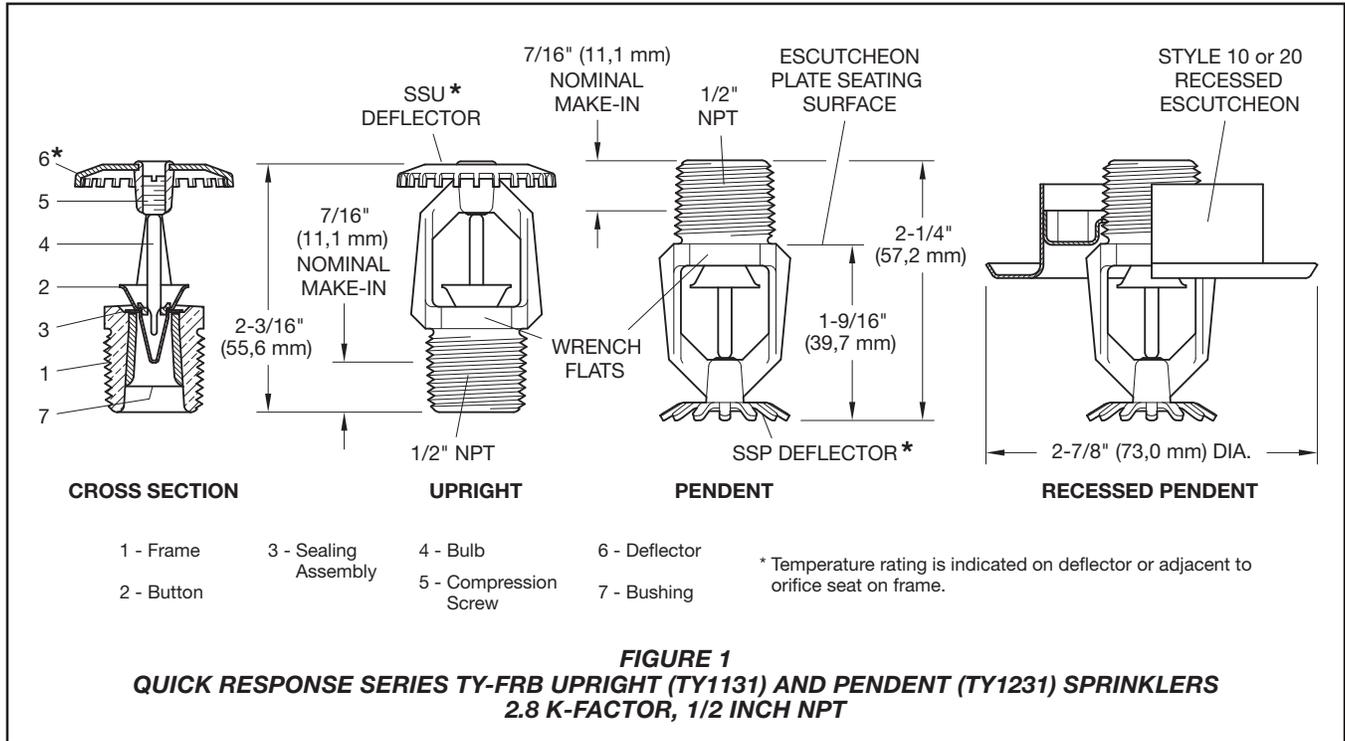
Owners are responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.

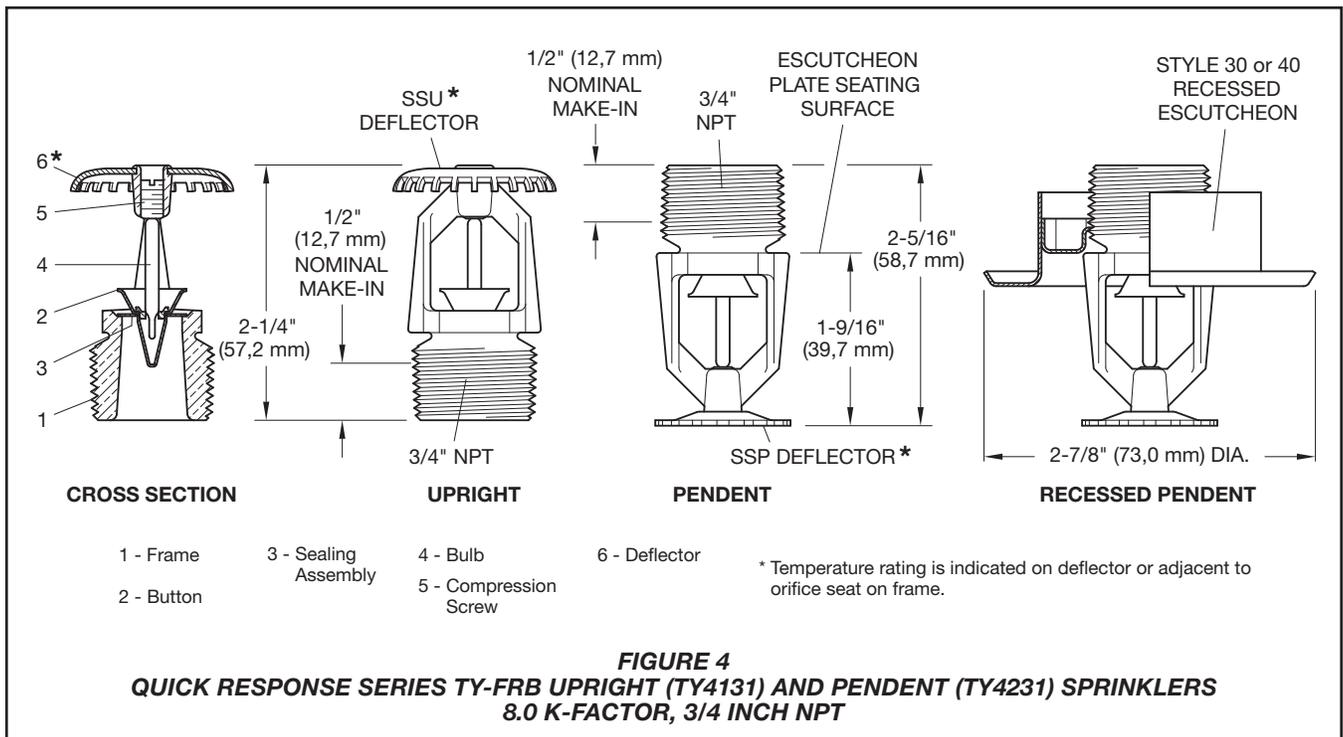
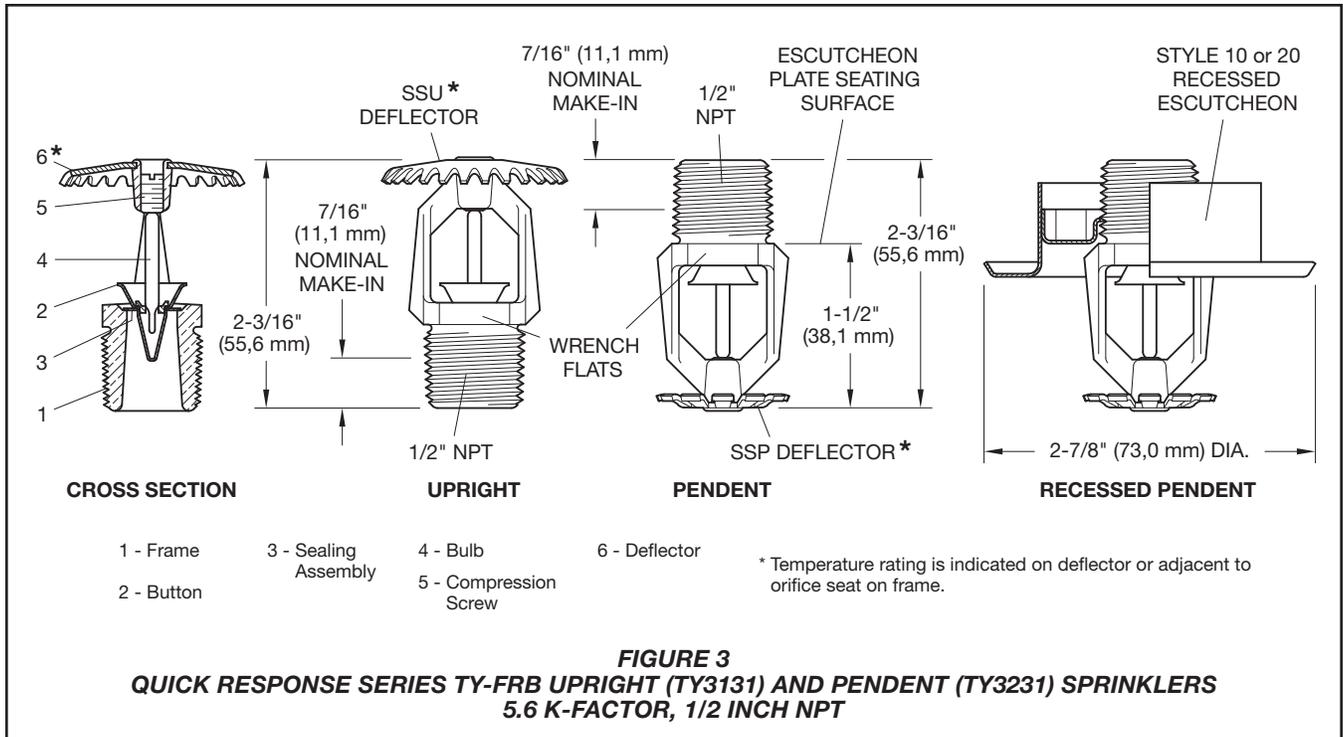


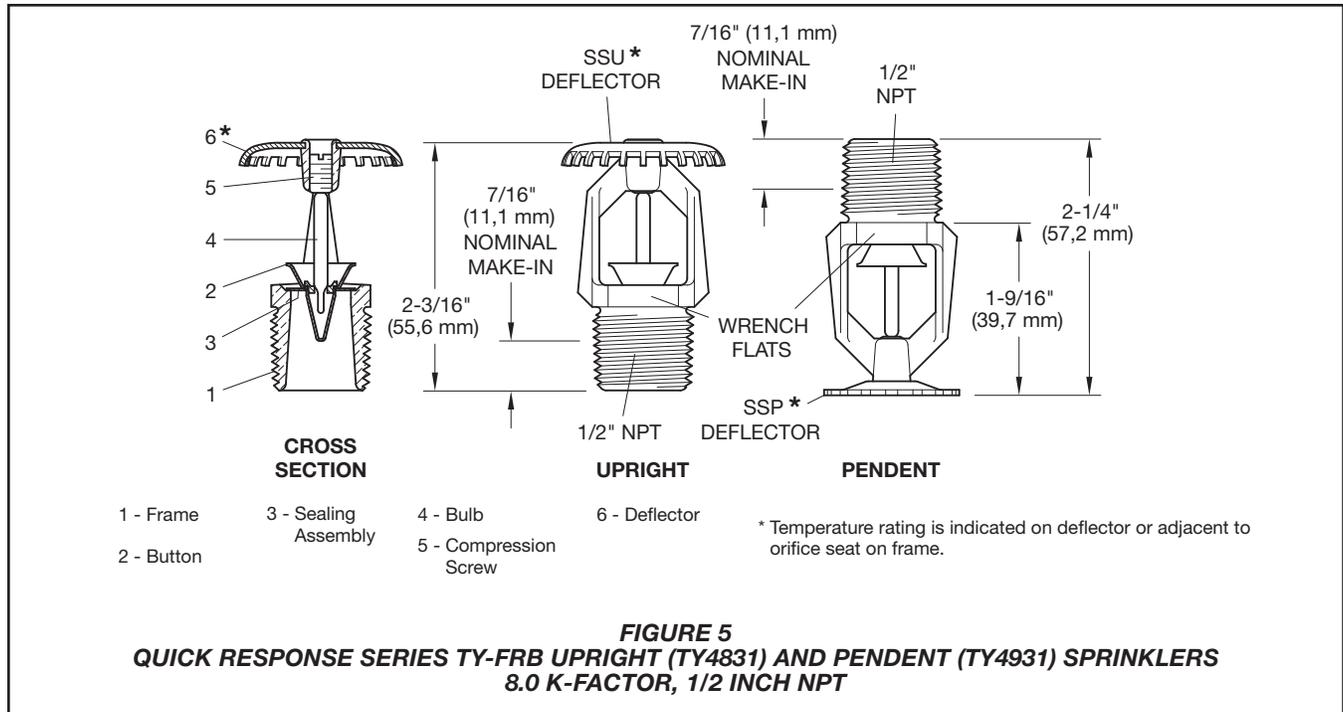
Model/Sprinkler Identification Number (SIN)

TY1131:	Upright	2.8K, 1/2" NPT
TY1231:	Pendent	2.8K, 1/2" NPT
TY2131:	Upright	4.2K, 1/2" NPT
TY2231:	Pendent	4.2K, 1/2" NPT
TY3131:	Upright	5.6K, 1/2" NPT
TY3231:	Pendent	5.6K, 1/2" NPT
TY4131:	Upright	8.0K, 3/4" NPT
TY4231:	Pendent	8.0K, 3/4" NPT
TY4831:	Upright*	8.0K, 1/2" NPT
TY4931:	Pendent*	8.0K, 1/2" NPT

*Eastern Hemisphere Sales Only







Technical Data

Approvals

UL and C-UL Listed
FM, LPCB, and NYC Approved
Refer to Table A and B for complete approval information including corrosion-resistant status.

Maximum Working Pressure

Refer to Table C.

Discharge Coefficient

K=2.8 GPM/psi^{1/2} (40,3 LPM/bar^{1/2})
K=4.2 GPM/psi^{1/2} (60,5 LPM/bar^{1/2})
K=5.6 GPM/psi^{1/2} (80,6 LPM/bar^{1/2})
K=8.0 GPM/psi^{1/2} (115,2 LPM/bar^{1/2})

Temperature Rating

Refer to Table A and B.

Finishes

Sprinkler: Refer to Table A and B.
Recessed Escutcheon: White Coated, Chrome Plated, or Brass Plated.

Physical Characteristics

Frame Bronze
Button Brass/Copper
Sealing Assembly Beryllium
Nickel w/Teflon†
Bulb Glass
Compression Screw Bronze
Deflector Copper/Bronze
Bushing (K=2.8) Bronze

Operation

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, allowing the sprinkler to activate and water to flow.

Design Criteria

The TYCO Series TY-FRB Pendent and Upright Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (such as, UL Listing is based on the requirements of NFPA 13, and FM Approval is based on the requirements of FM's Loss Prevention Data Sheets). Only the Style 10, 20, 30, or 40 Recessed Escutcheon, as applicable, is to be used for recessed pendent installations.

Installation

The TYCO Series TY-FRB Sprinklers must be installed in accordance with the following instructions.

NOTICE

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 and 3/32 inch (2,4 mm) for the 286°F/141°C temperature ratings.

Obtain a leak-tight 1/2 inch NPT sprinkler joint by applying a minimum to maximum torque of 7 to 14 ft.lbs. (9,5 to 19,0 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 the Escutcheon Plate by under- or over-tightening the sprinkler. Re-adjust the position of the sprinkler fitting to suit.

The Series TY-FRB Pendent and Upright Sprinklers must be installed in accordance with the following instructions.

1. Install Pendent sprinklers in the pendent position. Install upright sprinklers in the upright position.
2. With pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.
3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (Figure 14). With reference to Figures 1 through 5, apply the W-Type 6 Sprinkler Wrench to the sprinkler wrench flats.

† Registered Trademark of Dupont

K FACTOR	TYPE	TEMPERATURE	SPRINKLER FINISH (See Note 5)			
			BULB LIQUID COLOR	NATURAL BRASS	CHROME PLATED	WHITE*** POLYESTER
2.8 1/2" NPT	PENDENT (TY1231) and UPRIGHT (TY1131)	135°F/57°C	Orange		1, 2, 3, 4	
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
		286°F/141°C	Blue			
	RECESSED PENDENT (TY1231)* Figure 6	135°F/57°C	Orange			
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
		RECESSED PENDENT (TY1231)** Figure 7	135°F/57°C			
	155°F/68°C		Red			
	175°F/79°C		Yellow			
	200°F/93°C		Green			
	4.2 1/2" NPT	PENDENT (TY2231) and UPRIGHT (TY2131)	135°F/57°C			
155°F/68°C			Red			
175°F/79°C			Yellow			
200°F/93°C			Green			
286°F/141°C			Blue			
RECESSED PENDENT (TY2231)* Figure 8		135°F/57°C	Orange			
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
RECESSED PENDENT (TY2231)** Figure 9		135°F/57°C	Orange			
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			

NOTES:

1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the City of New York under MEA 354-01-E.
5. Where Polyester Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers.

* Installed with Style 10 (1/2" NPT) or Style 40 (3/4" NPT) 3/4" Total Adjustment Recessed Escutcheon, as applicable.

** Installed with Style 20 (1/2" NPT) or Style 30 (3/4" NPT) 1/2" Total Adjustment Recessed Escutcheon, as applicable.

*** Frame and Deflector only. Listings and approvals apply to color (Special Order).

N/A: Not Available

TABLE A
LABORATORY LISTINGS AND APPROVALS FOR
2.8 AND 4.2 K-FACTOR SPRINKLERS

K FACTOR	TYPE	TEMPERATURE	SPRINKLER FINISH (See Note 8)			
			BULB LIQUID COLOR	NATURAL BRASS	CHROME PLATED	WHITE*** POLYESTER
5.6 1/2" NPT	PENDENT (TY3231) and UPRIGHT (TY3131)	135°F/57°C	Orange	1, 2, 3, 4, 5, 6, 7		1, 2, 3, 5
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
		286°F/141°C	Blue			
	RECESSED PENDENT (TY3231)* Figure 10	135°F/57°C	Orange	1, 2, 4, 5		N/A
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
		286°F/141°C	Blue			
	RECESSED PENDENT (TY3231)** Figure 11	135°F/57°C	Orange	1, 2, 3, 4, 5		N/A
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
286°F/141°C		Blue				
8.0 3/4" NPT	PENDENT (TY4231) and UPRIGHT (TY4131)	135°F/57°C	Orange	1, 2, 3, 4, 5, 6, 7		1, 2, 5
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
		286°F/141°C	Blue			
	RECESSED PENDENT (TY4231)* Figure 12	135°F/57°C	Orange	1, 2, 5		N/A
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
		286°F/141°C	Blue			
	RECESSED PENDENT (TY4231)** Figure 13	135°F/57°C	Orange	1, 2, 3, 5		N/A
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
286°F/141°C		Blue				
8.0 1/2" NPT	PENDENT (TY4931) and UPRIGHT (TY4831)	135°F/57°C	Orange	1, 2, 4, 5, 6		1, 2, 5
		155°F/68°C	Red			
		175°F/79°C	Yellow			
		200°F/93°C	Green			
		286°F/141°C	Blue			

NOTES:

1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 007k/04) as Quick Response Sprinklers. However, LPCB does not rate the thermal sensitivity of recessed sprinklers.
5. Approved by the City of New York under MEA 354-01-E.
6. VdS Approved (For details, contact Tyco Fire Suppression & Building Products, Enschede, Netherlands, Tel. 31-53-428-4444/Fax 31-53-428-3377.)
7. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06) as Quick Response Sprinklers.
8. Where Polyester Coated and Lead-Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers. Where Lead-Coated Sprinklers are noted to be FM Approved, the sprinklers are FM Approved as a Corrosion-Resistant Sprinklers.

* Installed with Style 10 (1/2" NPT) or Style 40 (3/4" NPT) 3/4" Total Adjustment Recessed Escutcheon, as applicable.

** Installed with Style 20 (1/2" NPT) or Style 30 (3/4" NPT) 1/2" Total Adjustment Recessed Escutcheon, as applicable.

*** Frame and Deflector only. Listings and approvals apply to color (Special Order).

N/A: Not Available

TABLE B
LABORATORY LISTINGS AND APPROVALS FOR
5.6 AND 8.0 K-FACTOR SPRINKLERS

K FACTOR	TYPE	SPRINKLER FINISH			
		NATURAL BRASS	CHROME PLATED	WHITE POLYESTER	LEAD COATED
2.8 1/2" NPT	PENDENT (TY1231) and UPRIGHT (TY1131)	175 PSI (12,1 BAR)			N/A
	RECESSED PENDENT (TY1231)				
4.2 1/2" NPT	PENDENT (TY2231) and UPRIGHT (TY2131)	175 PSI (12,1 BAR)			N/A
	RECESSED PENDENT (TY2231)				
5.6 1/2" NPT	PENDENT (TY3231) and UPRIGHT (TY3131)	250 PSI (17,2 BAR) OR 175 PSI (12,1 BAR) (SEE NOTE 1)			175 PSI (12,1 BAR)
	RECESSED PENDENT (TY3231)				N/A
8.0 3/4" NPT	PENDENT (TY4231) and UPRIGHT (TY4131)	175 PSI (12,1 BAR)			175 PSI (12,1 BAR)
	RECESSED PENDENT (TY4231)				N/A
8.0 1/2" NPT	PENDENT (TY4931) and UPRIGHT (TY4831)	175 PSI (12,1 BAR)			175 PSI (12,1 BAR)

NOTES:

1. The maximum working pressure of 250 psi (17,2 bar) only applies to the Listing by Underwriters Laboratories Inc. (UL); the Listing by Underwriters Laboratories, Inc. for use in Canada (C-UL); and, the Approval by the City of New York.

TABLE C
MAXIMUM WORKING PRESSURE

The Series TY-FRB Recessed Pendent Sprinklers must be installed in accordance with the following instructions.

1. After installing the Style 10, 20, 30, or 40 Mounting Plate, as applicable, over the sprinkler threads and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.
2. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (Figure 15). With reference to Figures 1 to 4, apply the W-Type 7 Recessed Sprinkler Wrench to the sprinkler wrench flats.
3. After ceiling installation and finishing, slide on the Style 10, 20, 30, or 40 Closure over the Series TY-FRB Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the ceiling.

Care and Maintenance

The TYCO Series TY-FRB 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 sprinkler operation in a fire situation.

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

Replace sprinklers that:

- were modified or over-heated.
- were damaged by dropping, striking, wrench twisting, wrench slippage, or the like.
- are leaking or exhibiting visible signs of corrosion.
- were exposed to corrosive products of combustion but have not operated, if you cannot easily remove combustion by-products with a cloth.
- have a cracked bulb or have lost liquid from the bulb. Refer to the Installation section in this data sheet.

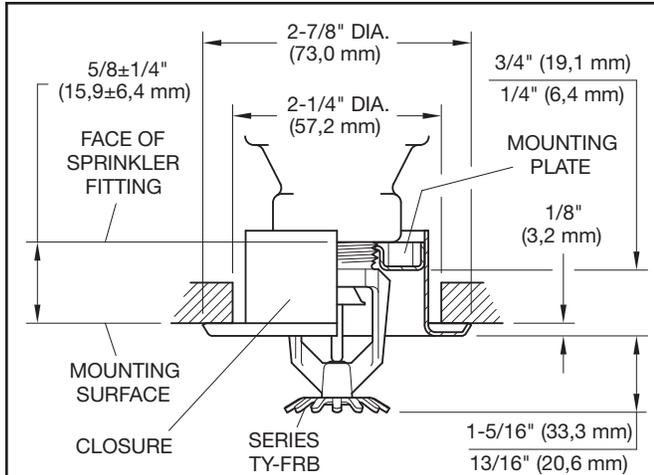


FIGURE 6
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
2.8 K-FACTOR, 1/2 INCH NPT

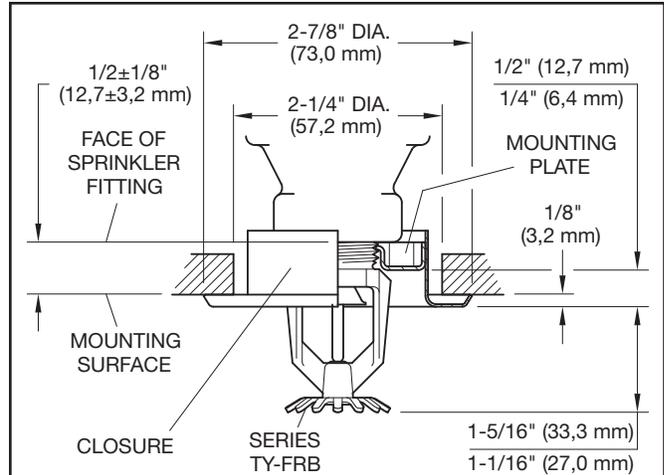


FIGURE 7
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
2.8 K-FACTOR, 1/2 INCH NPT

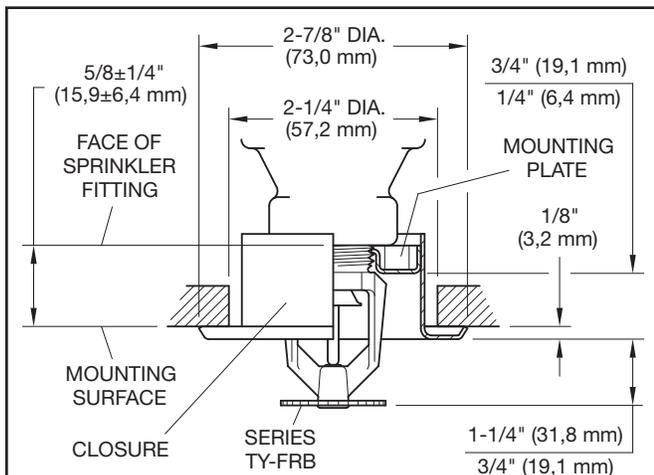


FIGURE 8
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
4.2 K-FACTOR, 1/2 INCH NPT

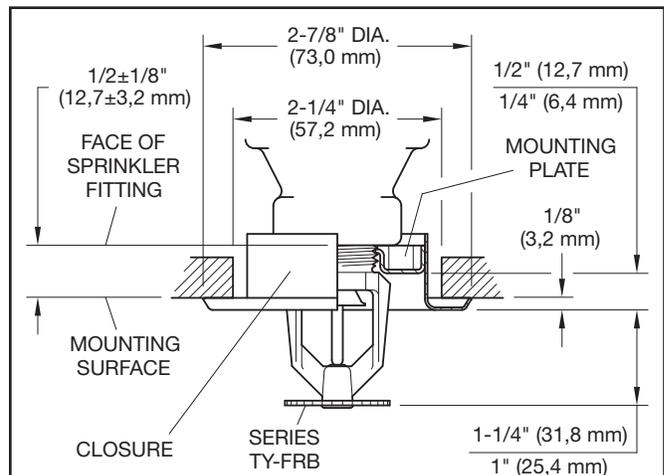


FIGURE 9
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
4.2 K-FACTOR, 1/2 INCH NPT

Initial and frequent visual inspections of random samples are recommended for corrosion-resistant sprinklers to verify the integrity of the corrosion-resistant material of construction. Thereafter, annual inspections per NFPA 25 should suffice.

Inspections of corrosion-resistant sprinklers are recommended at close range, instead of from the floor level per NFPA. Inspection at close range can better determine the exact sprinkler condition and the long-term integrity of the corrosion-resistant material, which can be affected by the corrosive conditions present.

Responsibility lies with the owner 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. Contact the installing contractor or sprinkler manufacturer regarding 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.

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. (Ref. Installation Section).

Initial and frequent visual inspections of random samples are recommended for corrosion-resistant sprinklers to verify the integrity of the corrosion-resistant material of construction. Thereafter, annual inspections per NFPA 25 should suffice.

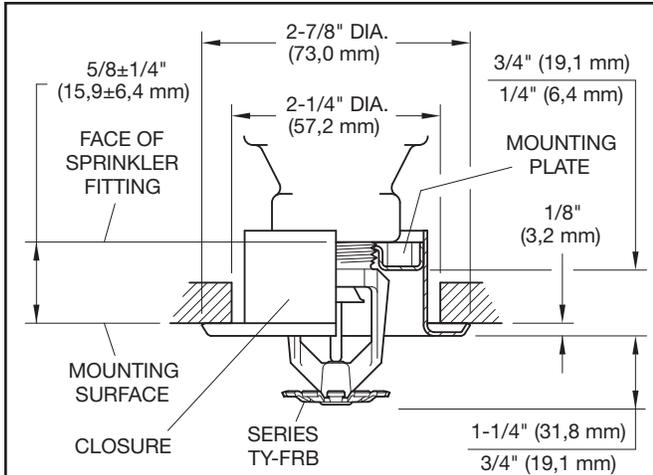


FIGURE 10
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
5.6 K-FACTOR, 1/2 INCH NPT

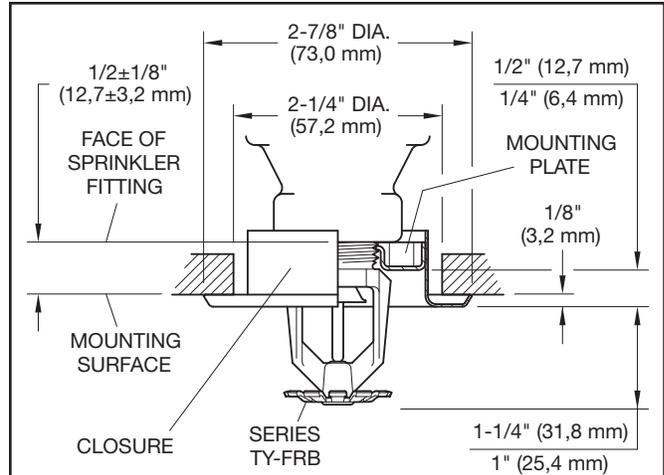


FIGURE 11
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
5.6 K-FACTOR, 1/2 INCH NPT

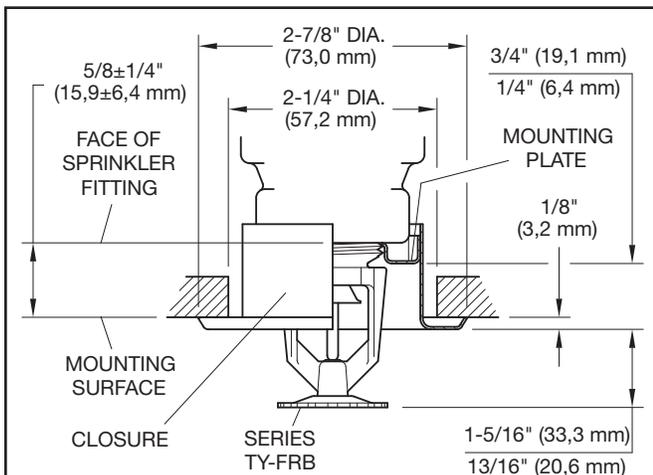


FIGURE 12
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 40 RECESSED ESCUTCHEON
8.0 K-FACTOR, 3/4 INCH NPT

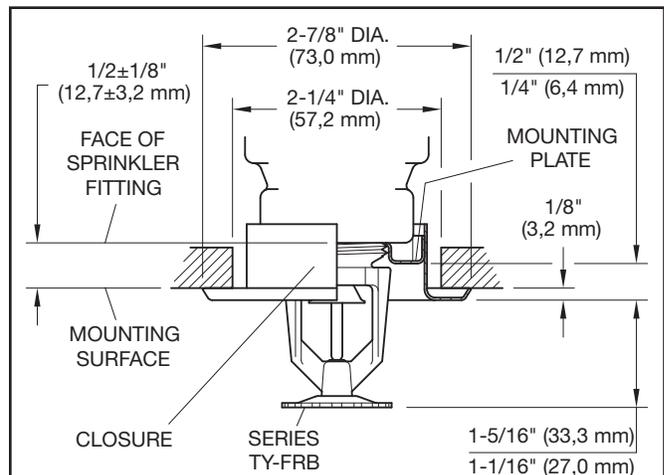


FIGURE 13
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 30 RECESSED ESCUTCHEON
8.0 K-FACTOR, 3/4 INCH NPT

Inspections of corrosion-resistant sprinklers are recommended at close range, instead of from the floor level per NFPA. Inspection at close range can better determine the exact sprinkler condition and the long-term integrity of the corrosion-resistant material, which can be affected by the corrosive conditions present.

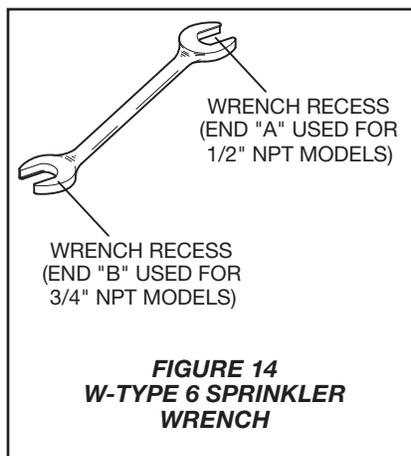


FIGURE 14
W-TYPE 6 SPRINKLER
WRENCH

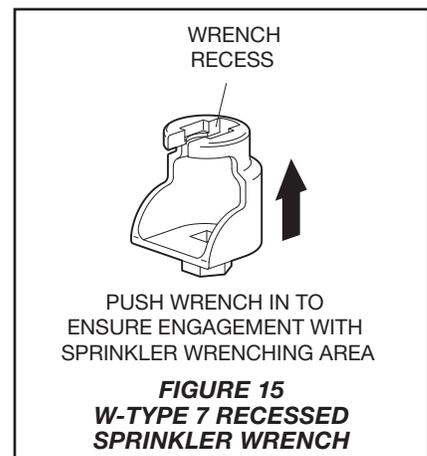


FIGURE 15
W-TYPE 7 RECESSED
SPRINKLER WRENCH

P/N 57 - XXX - X - XXX

		MODEL/SIN			TEMPERATURE RATINGS	
330	2.8K UPRIGHT (1/2"NPT)	TY1131	1	NATURAL BRASS	135	135°F (57°C)
331	2.8K PENDENT (1/2"NPT)	TY1231	4	WHITE POLYESTER	155	155°F (68°C)
340	4.2K UPRIGHT (1/2"NPT)	TY2131	3	WHITE (RAL9010)*	175	175°F (79°C)
341	4.2K PENDENT (1/2"NPT)	TY2231	9	CHROME PLATED	200	200°F (93°C)
370	5.6K UPRIGHT (1/2"NPT)	TY3131	7	LEAD COATED	286	286°F (141°C)
371	5.6K PENDENT (1/2"NPT)	TY3231				
390	8.0K UPRIGHT (3/4"NPT)	TY4131				
391	8.0K PENDENT (3/4"NPT)	TY4231				
360	8.0K UPRIGHT (1/2"NPT)	TY4831*				
361	8.0K PENDENT (1/2"NPT)	TY4931*				

* Eastern Hemisphere sales only.

TABLE D
PART NUMBER SELECTION
SERIES TY-FRB PENDENT AND UPRIGHT SPRINKLERS

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).

Sprinkler Assemblies with NPT Thread Connections

Specify: (Specify Model/SIN), Quick Response, (specify K-factor), (specify temperature rating), Series TY-FRB (specify Pendent or Upright) Sprinkler with (specify type of finish or coating), P/N (specify from Table D).

Recessed Escutcheon:

Specify: Style (10, 20, 30, or 40) Recessed Escutcheon with (specify*) finish, P/N (specify*).

Sprinkler Wrench

Specify: W-Type 6 Sprinkler Wrench, P/N 56-000-6-387.

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

* Refer to Technical Data Sheet TFP770.