

RAPID RESPONSE Series LFII Residential Sprinkler 4.4 K-factor Horizontal Sidewall, Dry Type Wet Pipe System

General Description

The TYCO RAPID RESPONSE Series LFII Dry Type Residential Horizontal Sidewall (HSW) Sprinklers (TY2335) are dry-type decorative, fast response, frangible bulb sprinklers designed for use in residential occupancies such as homes, apartments, dormitories, and hotels.

The Series LFII Dry Type Residential Horizontal Sidewall Sprinklers are typically used where sprinklers and/or a portion of the connecting piping are exposed to freezing temperatures (e.g., horizontal sprinkler supplied from wet systems into unheated areas).

The Series LFII Dry Type Residential Horizontal Sidewall 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 recessed version is intended for use in areas with finished walls. It employs a two-piece Style 20 Recessed Escutcheon. The Recessed Escutcheon provides 1/4 in. (6,4 mm) of recessed adjustment or up to 1/2 in. (12,7 mm) of total adjustment from the

flush mounting surface position. The design of this escutcheon provides a level of flexibility in adjusting sprinkler supply connections.

The Series LFII Dry Type Residential Horizontal Sidewall Sprinklers have been designed with heat sensitivity and water characteristics proven to help in the control of residential fires and to improve the chance for occupants to escape or be evacuated.

NOTICE

The Series LFII Dry Type Residential Horizontal Sidewall Sprinklers (TY2335) described herein must be installed and maintained in compliance with this document and 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.

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.

Sprinkler Identification Number (SIN)

TY2335

Technical Data

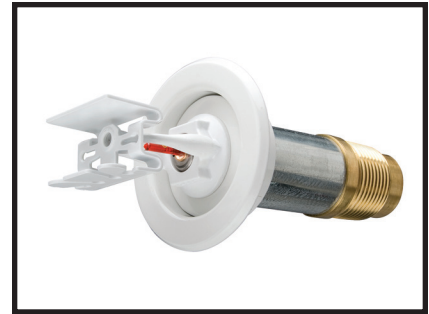
Approvals

UL Listed
Certified to all requirements of NSF/ANSI 61

(Refer to the Design Criteria section for details on these approvals.)

Maximum Working Pressure

175 psi (12,1 bar)



Discharge Coefficient
K=4.4 GPM/psi^{1/2} (63,4 LPM/bar^{1/2})

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

Sprinkler Temperature Rating
155°F (68°C)

Finishes
Natural Brass, Signal White, or Chrome Plated

Order Lengths
Minimum: 3-3/4 in. (95,3 mm)
Maximum: 24 in. (609,6 mm)

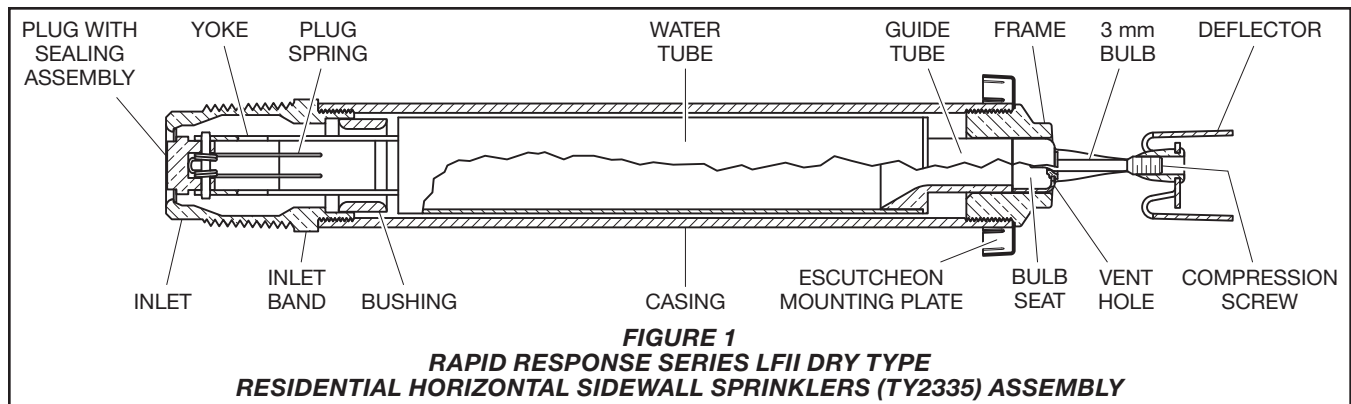
Physical Characteristics

Inlet	Brass
Plug	Brass
Yoke	Stainless Steel
Casing	Galvanized Steel
Insert	Bronze
Bulb Seat	Stainless Steel
Bulb	Glass
Compression Screw	Brass
Deflector	Brass
Frame	Brass
Guide Tube	Stainless Steel
Water Tube	Stainless Steel
Bushing	Brass
Plug Spring	Stainless Steel
Sealing Assembly	Beryllium Nickel w/TEFLON
Escutcheon	Carbon Steel

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.



Operation

When the TYCO RAPID RESPONSE Series LFII Dry Type Residential Horizontal Sidewall Sprinkler is in service, water is prevented from entering the assembly by the Plug with Sealing Assembly (Ref. Figure 1) in the Inlet of the Sprinkler.

The glass Bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass Bulb to release the Bulb Seat. The system's water pressure is then able to unseat the Plug with Sealing Assembly. The Plug Spring turns the Plug with Sealing Assembly aside, allowing the sprinkler to activate and flow water.

Design Criteria

The TYCO RAPID RESPONSE Series LFII Dry Type Residential Horizontal Sidewall Sprinklers (TY2335) are UL Listed for installation in accordance with this section.

Residential Sprinkler Design Guide
 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.

System Type
 Wet Pipe

Hydraulic Design (NFPA 13D and 13R)

For systems designed to NFPA 13D or NFPA 13R, the minimum required sprinkler flow rates are given in Table A 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.

Hydraulic Design (NFPA 13)

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 as a function of temperature rating and the maximum allowable coverage area.
- minimum discharge of 0.1 gpm/ft² over the design area comprised of the four most hydraulically demanding sprinklers for the actual coverage areas protected by four sprinklers.

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 Technical Data Sheet TFP490.

Operational Sensitivity

The sprinkler must be located relative to the mounting surface as shown in Figures 2 and 3.

Sprinkler Spacing

The minimum lateral spacing between sprinklers is 8 feet (2,4 m). The maximum lateral spacing between sprinklers cannot exceed the length of the coverage area (refer to Table A) hydraulically calculated (e.g., a maximum of 12 feet for a 12 ft x 12 ft coverage area or 18 feet for a 18 ft x 20 ft coverage area).

Sprinkler Fittings

The following fittings may be used:

- the 1 in. NPT outlet or run of a malleable or ductile iron threaded tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150)
- the 1 in. NPT outlet or run of a cast iron threaded tee fitting that meet the dimensional requirements of ANSI B16.4 (Class 125)

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

Only use the configuration in Figure 4 where the sprinkler fitting and water-filled pipe at the sprinkler fitting are not subject to freezing and where the length of the Series LFII Sprinkler has the minimum exposure length per Figure 5. Refer to the Exposure Length section and Table B.

- the 1 in. NPT outlet of a GRINNELL Figure 730 Mechanical Tee in wet pipe systems only
- the 1 in. NPT CPVC outlet of a 1 in. x 1 in. x 1 in. NPT Sprinkler Head Adapter Tee (P/N 80249) in wet systems only
- the 1 in. NPT CPVC outlet of a 1 in. x 1 in. NPT Female Adapter (P/N 80145) in wet systems only
- the 1 in. NPT outlet of a 1 in. x 1 in. x 1 in. NPT CPVC Sprinkler Head Adapter Tee (P/N 80259) in wet pipe systems only

NOTICE

Do not install the Series LFII Dry Type Residential Horizontal Sidewall Sprinklers into any other type fitting without first consulting the Tyco Fire Protection Products (TFPP) Technical Services. 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.

Exposure Length

When using Series LFII Dry Type Residential Horizontal Sidewall Sprinklers in wet pipe sprinkler systems to protect areas subject to freezing temperatures,

Maximum Coverage Area ^(a,b) Width x Length Ft x Ft (m x m)	Maximum Spacing Feet (m)	WET PIPE SYSTEM Minimum Flow and Residual Pressure ^(c,d) 155°F (68°C)				
		Flow gpm (lpm)	Pressure psi (bar)	Deflector to Ceiling	Installation Type	Minimum Spacing Feet (m)
12 x 12 (3,7 x 3,7)	12 (3,7)	13 (49,2)	8.7 (0,60)	4 in. to 6 in.	Recessed or Plain Barreled	8 (2,4)
14 x 14 (4,3 x 4,3)	14 (4,3)	14 (53,0)	10.1 (0,70)			
16 x 16 (4,9 x 4,9)	16 (4,9)	18 ^(e) (68,1)	16.7 ^(e) (1,15)			
16 x 18 (4,9 x 5,5)	16 (4,9)	21 ^(g) (79,5)	22.8 ^(g) (1,57)			
16 x 20 (4,9 x 6,1)	16 (4,9)	25 (94,6)	32.3 (2,23)			
12 x 12 (3,7 x 3,7)	12 (3,7)	15 (56,8)	11.6 (0,80)	6 in. to 12 in.		
14 x 14 (4,3 x 4,3)	14 (4,3)	16 ^(f) (60,6)	13.2 ^(f) (0,91)			
16 x 16 (4,9 x 4,9)	16 (4,9)	19 (71,9)	18.6 (1,28)			
16 x 18 (4,9 x 5,5)	16 (4,9)	22 ^(h) (83,3)	25 ^(h) (1,72)			
16 x 20 (4,9 x 6,1)	16 (4,9)	30 ⁽ⁱ⁾ (113,6)	46.5 ⁽ⁱ⁾ (3,20)			

Notes:

- a. For coverage area dimensions less than or between those indicated, use the minimum required flow for the next highest coverage area for which hydraulic design criteria are stated.
- b. This dimension refers to the Width (backwall where the sprinkler is located) times the Length (horizontal throw of the sprinkler).
- c. The requirement is based on minimum flow in gpm (lpm) from each sprinkler. The associated residual pressures are calculated using the nominal K-factor. Refer to Hydraulic Design under the Design Criteria section for details.
- d. For NFPA 13 residential applications, the greater of 0.1 gpm/ft² over the design area or the flow in accordance with the criteria in this table must be used.
- e. For sprinklers installed prior to May 1, 2015, a flow rate of 17 gpm at a pressure of 14.9 psi may be used.
- f. For sprinklers installed prior to May 1, 2015, a flow rate of 15 gpm at a pressure of 11.6 psi may be used.
- g. For sprinklers installed prior to May 1, 2015, a flow rate of 19 gpm at a pressure of 18.6 psi may be used.
- h. For sprinklers installed prior to May 1, 2015, a flow rate of 20 gpm at a pressure of 20.7 psi may be used.
- i. For sprinklers installed prior to May 1, 2015, a flow rate of 25 gpm at a pressure of 32.3 psi may be used.

**TABLE A
WET PIPE SYSTEM
SERIES LFII DRY TYPE HORIZONTAL SIDEWALL SPRINKLERS
NFPA 13D, 13R AND 13 HYDRAULIC DESIGN CRITERIA**

use Table B to determine the appropriate exposed sprinkler 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 5 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 Sprinklers must be sealed, in accordance with the NATIONAL FIRE PROTECTION ASSOCIATION. Due to temperature differences between the 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.

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**

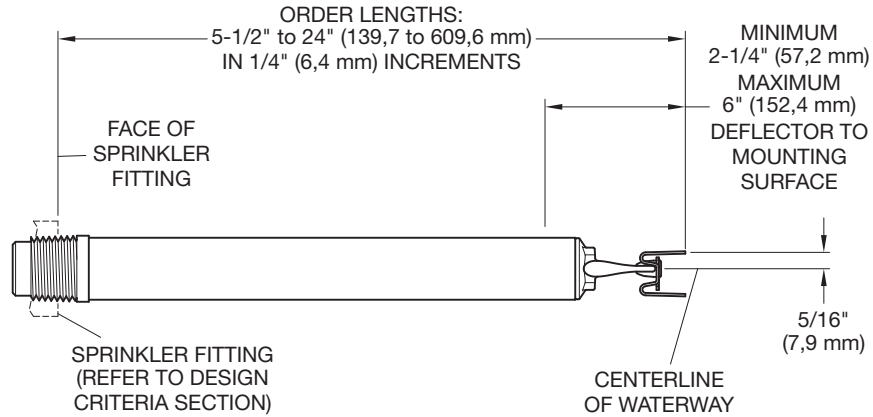


FIGURE 2
RAPID RESPONSE SERIES LFII DRY TYPE RESIDENTIAL
HORIZONTAL SIDEWALL SPRINKLERS WITHOUT ESCUTCHEON

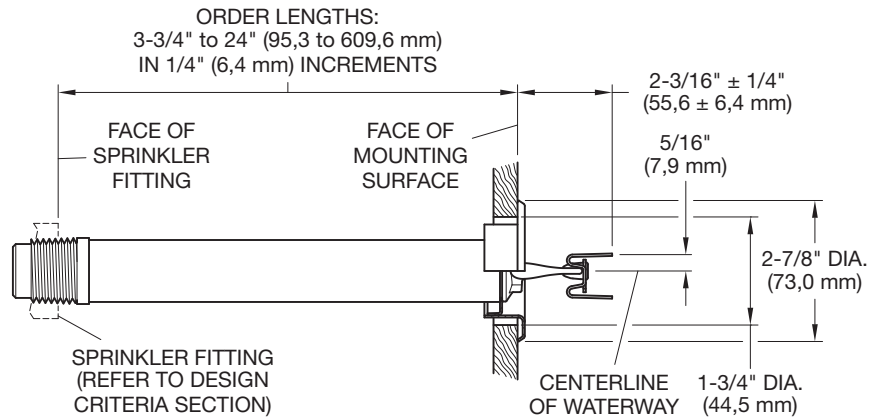


FIGURE 3
RAPID RESPONSE SERIES LFII DRY TYPE RESIDENTIAL HORIZONTAL
SIDEWALL SPRINKLERS WITH STYLE 20 RECESSED ESCUTCHEON

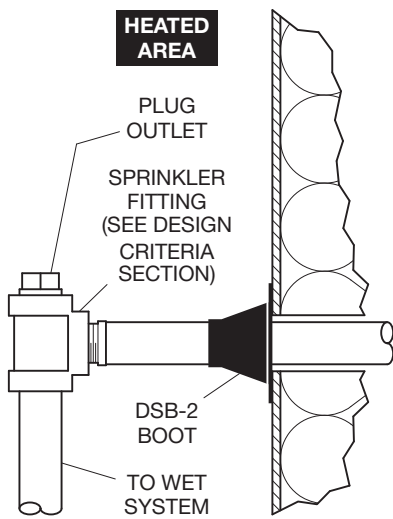


FIGURE 4
SPRINKLER FITTING IN
HEATED AREA

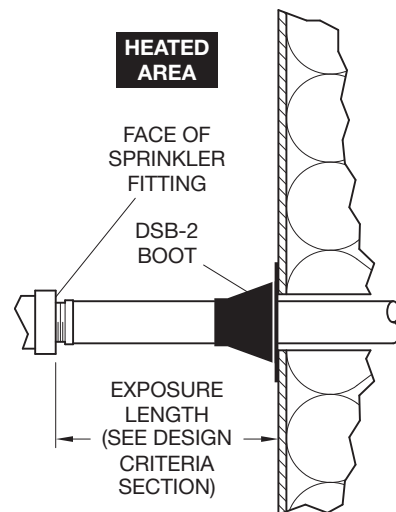
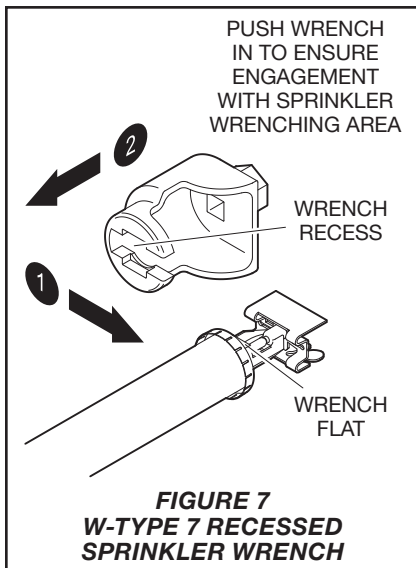
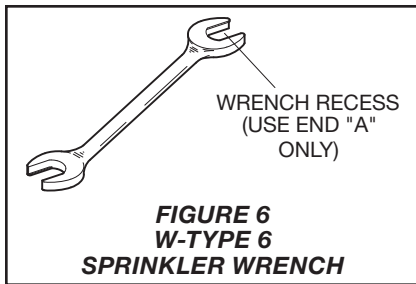


FIGURE 5
SPRINKLER BARREL
EXPOSURE LENGTH



Use of the Model DSB-2 Dry Sprinkler Boot, described in Technical Data Sheet TFP591 and shown in Figures 4 and 5, can provide the recommended seal.

Installation

TYCO RAPID RESPONSE Series LFII Dry Type Residential Horizontal Side-wall Sprinklers must be installed in accordance with this section.

General Instructions

The Series LFII Dry Type Residential Horizontal Side-wall 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 in. (1,6 mm).

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

Note: Install horizontal sidewall sprinklers only in the horizontal position with their centerline of waterway parallel to the ceiling. The word TOP on the Deflector is to face towards the ceiling.

Step 1. 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 2. Wrench-tighten the sprinkler using a pipe wrench on the Inlet Band or the Casing (Ref. Figure 1), or using the W-Type 6 or W-Type 7 Sprinkler Wrench as follows:

- For plain-barrel horizontal sidewall sprinklers, apply the Wrench Recess End "A" of the W-Type 6 Sprinkler Wrench (Ref. Figure 6) to the Wrench Flat.
- For recessed horizontal sidewall sprinklers, apply the Wrench Recess of the W-Type 7 Sprinkler Wrench to the Wrench Flat (Ref. Figure 7).

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.

Step 3. After installation of the gypsum board or other wall/soffit finish material, slide the Style 20 Recessed Escutcheon Closure over the sprinkler. Push the closure over the mounting plate until its flange contacts the wall.

Care and Maintenance

TYCO RAPID RESPONSE Series LFII Dry Type Residential Horizontal Side-wall Sprinklers (TY2335) 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 a Recessed Escutcheon Plate or a Domed Concealed Cover Plate to cover a clearance hole

can delay sprinkler operation in a fire situation.

The owner must assure that the sprinklers are not used for hanging any objects and that the sprinklers are only cleaned by means of gently dusting with a feather duster; otherwise, non-operation in the event of a fire or inadvertent operation may result.

A Vent Hole is provided in the Bulb Seat (Ref. Figure 1) to indicate if the Series LFII Dry Type Residential Horizontal Side-wall 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 (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. Refer to the Installation section for additional information.

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 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* 63 — XXX — X — XXX

		SIN	TEMPERATURE RATING	SPRINKLER FINISH	ESCUTCHEON FINISH	ORDER LENGTH (EXAMPLES)	
12	HORIZONTAL SIDEWALL WITH RECESSED ESCUTCHEON	TY2335	1 155°F (68°C)	2 NATURAL BRASS	BRASS PLATED	055	5.50 in.
13	HORIZONTAL SIDEWALL WITHOUT ESCUTCHEON	TY2335		4 SIGNAL WHITE (RAL9003) POLYESTER	SIGNAL WHITE (RAL9003) POLYESTER	082	8.25 in.
				9 CHROME PLATED	CHROME PLATED	180	18.00 in.
						187	18.75 in.
						240	24.00 in.

Notes:
 * Use Prefix "I" for ISO 7-R 1 Inlet Thread Connection (e.g., I-63-121-9-180)

TABLE C
RAPID RESPONSE SERIES LFII DRY-TYPE RESIDENTIAL HORIZONTAL SIDEWALL 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 and part number (P/N).

Horizontal Sidewall Sprinkler Assemblies

Note: Unless otherwise indicated refer to Table C.

Specify: Series LFII Dry Type Residential Horizontal Sidewall Sprinkler, SIN TY2335, with (specify Recessed or without) Escutcheon, 4.4 K-factor, Temperature Rating 155°F (68°C), Sprinkler Finish (specify), Escutcheon Finish (specify if applicable), Order Length (specify value per Figure 4 or 5), Inlet Thread Size (1 in. NPT or ISO 7-R 1), P/N (specify)

Separately Ordered Sprinkler Wrench

Specify: W-Type 6 Sprinkler Wrench (Figure 6), P/N 56-000-6-387

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

Separately Ordered Escutcheon

Specify: Style 20 Recessed Escutcheon with (specify*) finish, P/N (specify*)

* Refer to Technical Data Sheet TFP770