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 (for example, 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.

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.

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

Note: Sprinklers with a polyester finish are UL Listed as corrosion-resistant sprinklers.

See the Design Criteria section for details on these approvals.

Maximum Working Pressure

175 psi (12.1 bar)

Discharge Coefficient

K=4.4 GPM/psi⁰.⁵ (63.4 LPM/bar⁰.⁵)

Inlet Thread Connections

1 in. NPT
ISO 7-R 1

Sprinkler Temperature Rating

155°F (68°C)

Finishes

Natural Brass, Signal White Polyester Coated, or Chrome Plated
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 (see Figure 1) in the Inlet of the Sprinkler.

The glass Bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass Bulb 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 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.
MINIMUM RECOMMENDED LENGTHS OF EXPOSED SPRINKLER BARRELS IN WET PIPE SYSTEMS

<table>
<thead>
<tr>
<th>Coverage Area Width x Length ft x ft (m x m)</th>
<th>Maximum Spacing ft (m)</th>
<th>Flow gpm (lpm)</th>
<th>Pressure psi (bar)</th>
<th>Deflector to Ceiling</th>
<th>Installation Type</th>
<th>Minimum Spacing ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.7 x 3.7)</td>
<td>12 (3.7)</td>
<td>13 (49.2)</td>
<td>8.7 (0.60)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 x 14 (4.3 x 4.3)</td>
<td>14 (4.3)</td>
<td>14 (53.0)</td>
<td>10.1 (0.70)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 x 16 (4.9 x 4.9)</td>
<td>16 (4.9)</td>
<td>18 (68.1)</td>
<td>16.7 (1.15)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 x 18 (4.9 x 5.5)</td>
<td>16 (4.9)</td>
<td>21 (79.5)</td>
<td>22.8 (1.57)</td>
<td></td>
<td>Recessed or Plain Barreled</td>
<td>8 (2.4)</td>
</tr>
<tr>
<td>16 x 20 (4.9 x 6.1)</td>
<td>16 (4.9)</td>
<td>25 (94.6)</td>
<td>32.3 (2.23)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 x 12 (3.7 x 3.7)</td>
<td>12 (3.7)</td>
<td>15 (56.8)</td>
<td>11.6 (0.80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 x 14 (4.3 x 4.3)</td>
<td>14 (4.3)</td>
<td>16 (60.6)</td>
<td>13.2 (0.91)</td>
<td></td>
<td>6 in. to 12 in.</td>
<td></td>
</tr>
<tr>
<td>16 x 16 (4.9 x 4.9)</td>
<td>16 (4.9)</td>
<td>19 (71.9)</td>
<td>18.6 (1.28)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 x 18 (4.9 x 5.5)</td>
<td>16 (4.9)</td>
<td>22 (83.3)</td>
<td>25 (1.72)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 x 20 (4.9 x 6.1)</td>
<td>16 (4.9)</td>
<td>30 (113.6)</td>
<td>46.5 (3.20)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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. See 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.

**NOTICE**

Do not install the Series LFII Dry Type Residential Horizontal Sidewall Sprinklers into any other type fitting without first consulting Johnson Controls 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, 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. See Figure 5 for an example.
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

ORDER LENGTHS:
3-3/4" to 24" (95,3 to 609,6 mm)
IN 1/4" (6,4 mm) INCREMENTS

ORDER LENGTHS:
5-1/2" to 24" (139,7 to 609,6 mm)
IN 1/4" (6,4 mm) INCREMENTS

MINIMUM 2-1/4" (57,2 mm)
MAXIMUM 6" (152,4 mm)
DEFLECTOR TO MOUNTING SURFACE

5/16" (7,9 mm)
CENTERLINE OF WATERWAY
**Installation**

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

**General Instructions**

The Series LFII Dry Type Residential Horizontal Sidewall 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, see 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 (see 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 (see 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 (see 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 Sidewall 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 (see Figure 1) to indicate if the Series LFII Dry Type Residential Horizontal Sidewall 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. See 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, for example, 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.

### 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, see 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

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**TABLE C**

RAPID RESPONSE SERIES LFII DRY-TYPE RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLERS

<table>
<thead>
<tr>
<th>PART NUMBER SELECTION</th>
</tr>
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<tbody>
<tr>
<td>SIN</td>
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<tr>
<td><strong>TEMPERATURE RATING</strong></td>
</tr>
<tr>
<td>1 155°F (68°C)</td>
</tr>
<tr>
<td><strong>SPRINKLER FINISH</strong></td>
</tr>
<tr>
<td>2 NATURAL BRASS</td>
</tr>
<tr>
<td>4 SIGNAL WHITE (RAL9003) POLYESTER²</td>
</tr>
<tr>
<td>9 CHROME PLATED</td>
</tr>
<tr>
<td><strong>ESCUTCHEON FINISH</strong></td>
</tr>
<tr>
<td>BRASS PLATED</td>
</tr>
<tr>
<td>SIGNAL WHITE (RAL9003) POLYESTER</td>
</tr>
<tr>
<td>CHROME PLATED</td>
</tr>
<tr>
<td><strong>ORDER LENGTH (EXAMPLES)</strong></td>
</tr>
<tr>
<td>055 5.50 in.</td>
</tr>
<tr>
<td>082 8.25 in.</td>
</tr>
<tr>
<td>180 18.00 in.</td>
</tr>
<tr>
<td>187 18.75 in.</td>
</tr>
<tr>
<td>240 24.00 in.</td>
</tr>
</tbody>
</table>

Notes:
1. Use Prefix “I” for ISO 7-R 1 Inlet Thread Connection (e.g., I-63-121-9-180)
2. UL Listed as corrosion-resistant

**ORDER LENGTH (EXAMPLES)**

<table>
<thead>
<tr>
<th>ORDER LENGTH (EXAMPLES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>055 5.50 in.</td>
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<td>240 24.00 in.</td>
</tr>
</tbody>
</table>

**SPRINKLER FINISH**

**ESCUTCHEON FINISH**

**TEMPERATURE RATING**

**ORDER LENGTH (EXAMPLES)**

**ORDER LENGTH (EXAMPLES)**