

## **RAPID RESPONSE Series LFII Residential Sprinklers 4.2 K-factor Flush Pendent Wet Pipe and Dry Pipe Systems**

### **General Description**

The TYCO RAPID RESPONSE Series LFII Residential Flush Pendent Sprinklers (TY2284) are decorative, fast response, fusible solder sprinklers designed for use in residential occupancies such as homes, apartments, dormitories, and hotels. When aesthetics is the major consideration, the Series LFII Residential Sprinklers (TY2284) should be the first choice.

The Series LFII Residential Sprinklers are intended for use in the following scenarios:

- wet and dry pipe residential sprinkler systems for one- and two-family dwellings and mobile homes per NFPA 13D
- wet and dry pipe residential sprinkler systems for residential occupancies up to and including four stories in height per NFPA 13R
- wet and dry pipe sprinkler systems for the residential portions of any occupancy per NFPA 13

The flush design of the Series LFII Residential Sprinklers features a separable escutcheon providing 3/8 inch (9,5 mm) vertical adjustment. This adjustment reduces the accuracy to which the pipe drops to the sprinklers must be cut.

The Series LFII Residential Sprinklers have been designed with heat sensitivity and water distribution characteristics proven to help in the control

of residential fires and to improve the chance for occupants to escape or be evacuated.

#### **Dry Pipe System Application**

The Series LFII Residential Flush Pendent Sprinklers offers a laboratory approved option for designing dry pipe residential sprinkler systems, whereas, most residential sprinklers are laboratory approved for wet systems only.

Through extensive testing, it has been determined that the number of design sprinklers (hydraulic design area) for the Series LFII Residential Flush Pendent Sprinklers (TY2284) need not be increased over the number of design sprinklers (hydraulic design area) as specified for wet pipe sprinkler systems, as is customary for density/area sprinkler systems designed per NFPA 13.

Consequently, the Series LFII Residential Sprinklers (TY2284) offer the features of non-water filled pipe in addition to not having to increase the number of design sprinklers (hydraulic design area) for systems designed to NFPA 13, 13D, or 13R.

#### **NOTICE**

*The Series LFII Residential Flush Pendent Sprinklers (TY2284) described herein must be installed and maintained in compliance with this document and 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. Contact the installing contractor or sprinkler manufacturer with any questions.*

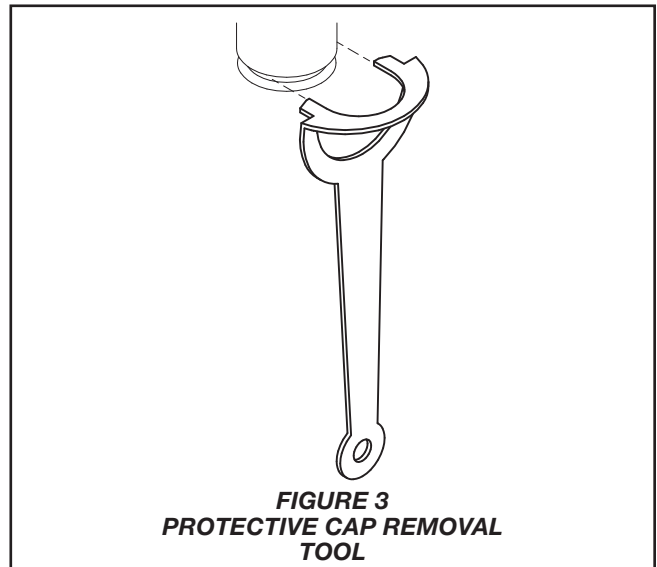
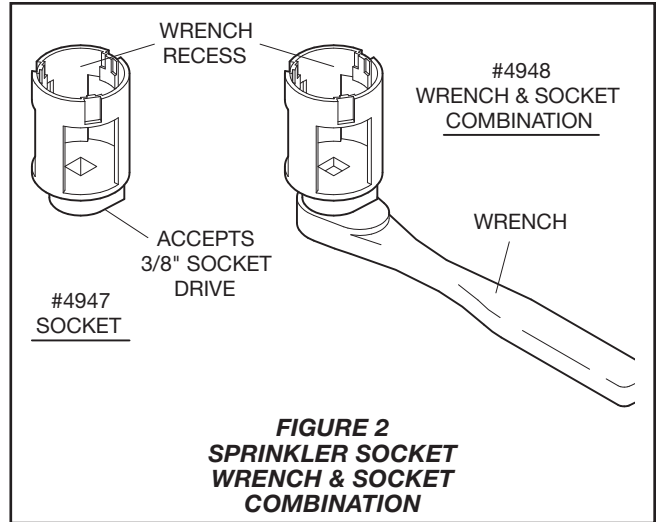
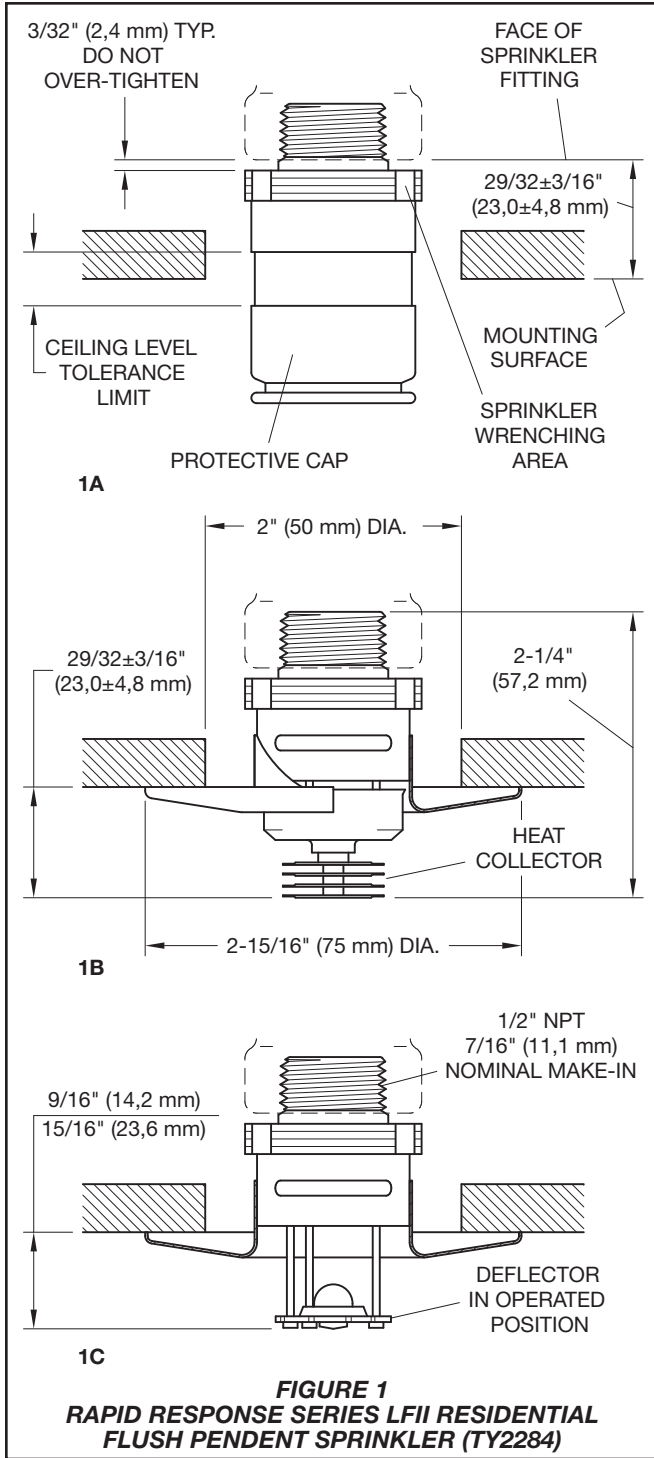


### **Sprinkler Identification Number (SIN)**

TY2284

#### **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.*



## Technical Data

### Approvals

UL Listed for use with wet pipe and dry pipe systems

C-UL Listed for use only with wet pipe systems

For details on approvals, refer to the Design Criteria section.

### Maximum Working Pressure

175 psi (12,1 bar)

### Discharge Coefficient

$K = 4.2 \text{ GPM/psi}^{1/2} (60,5 \text{ LPM/bar}^{1/2})$

### Temperature Rating

162°F (72°C)

### Vertical Adjustment

3/8 inch (9,5 mm)

### Finishes

Antique Brass

Signal White

Jet Black

Chrome

### Physical Characteristics

Body	Copper Alloy
Deflector	Copper
Valve Cap	Copper Alloy
Orifice Seal	PTFE
Heat Collectors	Copper

## Operation

The sprinkler assembly contains a small fusible solder element. When exposed to sufficient heat from a fire, the solder melts and enables the internal components of the sprinkler to fall away. At this point the sprinkler activates with the deflector dropping into its operated position (Figure 1C), permitting water to flow.

## Design Criteria

The TYCO RAPID RESPONSE Series LFII Residential Flush Pendant Sprinklers (TY2284) are UL and C-UL Listed for installation in accordance with this section.

### Residential Sprinkler Design Guide

When conditions exist that are outside the scope of the provided criteria, refer to the Residential Sprinkler Design Guide TFP490 for the manufacturer's recommendations that may be acceptable to any local authority having jurisdiction.

### System Types

Per the UL Listing, wet pipe and dry pipe systems may be utilized. Per the C-UL Listing, only wet pipe systems may be utilized.

### Ceiling Types

Smooth flat horizontal, or beamed, or sloped, in accordance with the 2013 Edition of NFPA 13D, 13R, or 13 as applicable.

### Hydraulic Design (NFPA 13D and 13R)

For systems designed to NFPA 13D or NFPA 13R, the minimum required sprinkler flow rate are given in Tables A and B 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. The number of "design sprinklers" specified in NFPA 13D and 13R for wet pipe systems is to be applied when designing dry pipe systems.

### Hydraulic Design (NFPA 13)

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

- The flow rates given in Tables A and B as a function of temperature rating and the maximum allowable coverage area.
- A minimum discharge of 0.1 gpm/ft<sup>2</sup> over the "design area" comprised of the four most hydraulically demanding sprinklers for the actual coverage areas being protected by the four sprinklers.

The number of "design sprinklers" specified in NFPA 13 for wet pipe systems is to be applied when designing dry pipe systems.

### Dry Pipe System Water Delivery

When using the Series LFII Residential Pendant Sprinklers (TY2284) in dry pipe sprinkler systems, the time for water delivery must not exceed 15 seconds for the most remote operating sprinkler.

### 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 sprinklers are to be installed in the flush position per Figure 1 with the provided escutcheon.

### Sprinkler Spacing

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

### Precautionary Warnings for Corrosive Environments

The Series LFII Residential Flush Sprinkler (TY2284) must be installed in a non-corrosive environment. The improper use of corrosive agents such as flux, or other products that contain chloride ions, whether applied internally or externally to the sprinkler system, may result in corrosion of the sprinkler heads, or stress corrosion cracking, which in turn may cause the sprinkler heads to develop leaks, operate unexpectedly or improperly.

Accordingly, it is essential that the Series LFII Residential Flush Sprinkler (TY2284) be installed only by experienced fire sprinkler engineers, who comply fully with NFPA 13, 13D, 13R and 25, ASTM B 813, ASTM B 828 and Copper Development Association (CDA).

### Copper Sprinkler System Piping

Any time copper piping is used in any part of a fire sprinkler system, the copper piping must be installed in conformance with all applicable standards and requirements for copper piping, including: NFPA 13, 13D, 13R and 25, ASTM B 813, ASTM B 828, and Copper Development Association (CDA). Any soldering in any part of a sprinkler system, either internally or externally, must be done with use of only an ASTM B 813 approved flux. Residual flux must be thoroughly removed from both the interior and exterior surfaces of the piping before installing the sprinkler heads. The use of improper flux, or the failure to thoroughly remove proper flux, may result in corrosion of the sprinkler heads or stress corrosion cracking, which in turn may cause the sprinkler heads to develop leaks, operate unexpectedly or improperly.

Maximum Coverage Area <sup>(a)</sup> Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	WET PIPE SYSTEM Minimum Flow and Residual Pressure <sup>(b, c)</sup>				
		Ordinary Temp Rating 162°F (72°C)		Heat Collector to Ceiling	Installation Type	Minimum Spacing Ft. (m)
		Flow GPM (L/min)	Pressure PSI (bar)			
12 x 12 (3,7 x 3,7)	12 (3,7)	13 (49,2)	9.6 (0,66)	Smooth Ceilings 23/32 to 1-3/32 inches	Flush	8 (2,4)
14 x 14 (4,3 x 4,3)	14 (4,3)	13 (49,2)	9.6 (0,66)			
16 x 16 (4,9 x 4,9)	16 (4,9)	14 (53,0)	11.1 (0,77)	Beamed Ceilings per NFPA 13D or 13R 23/32 inches below bottom of beam		
18 x 18 (5,5 x 5,5)	18 (5,5)	18 (68,1)	18.4 (1,27)			
20 x 20 (6,1 x 6,1)	20 (6,1)	22 (83,3)	27.4 (1,89)			

- (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) 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.
- (c) For NFPA 13 residential applications, the greater of 0.1 gpm/ft<sup>2</sup> over the design area or the flow in accordance with the criteria in this table must be used.

**TABLE A**  
**WET PIPE SYSTEM**  
**SERIES LFII RESIDENTIAL 4.2 K-FACTOR FLUSH PENDENT SPRINKLERS (TY2284)**  
**NFPA 13D, 13R, AND 13 HYDRAULIC DESIGN CRITERIA**

Maximum Coverage Area <sup>(a)</sup> Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	DRY PIPE SYSTEM Minimum Flow and Residual Pressure <sup>(b, c)</sup>				
		Ordinary Temp Rating 162°F (72°C)		Heat Collector to Ceiling	Installation Type	Minimum Spacing Ft. (m)
		Flow GPM (L/min)	Pressure PSI (bar)			
12 x 12 (3,7 x 3,7)	12 (3,7)	13 (49,2)	9.6 (0,66)	Smooth Ceilings 23/32 to 1-3/32 inches	Flush	8 (2,4)
14 x 14 (4,3 x 4,3)	14 (4,3)	13 (49,2)	9.6 (0,66)			
16 x 16 (4,9 x 4,9)	16 (4,9)	13 (49,2)	9.6 (0,66)	Beamed Ceilings per NFPA 13D or 13R 23/32 inches below bottom of beam		
18 x 18 (5,5 x 5,5)	18 (5,5)	17 (64,4)	16.4 (1,13)			
20 x 20 (6,1 x 6,1)	20 (6,1)	20 (75,7)	22.7 (1,56)			

- (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) The Minimum Flow 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.
- (c) For NFPA 13 residential applications, the greater of 0.1 gpm/ft<sup>2</sup> over the design area or the flow in accordance with the criteria in this table must be used.

**TABLE B**  
**DRY PIPE SYSTEM**  
**SERIES LFII RESIDENTIAL 4.2 K-FACTOR FLUSH PENDENT SPRINKLERS (TY2284)**  
**NFPA 13D, 13R, AND 13 HYDRAULIC DESIGN CRITERIA**

## Installation

The TYCO RAPID RESPONSE Series LFII Residential Flush Pendent Sprinklers (TY2284) must be installed in accordance with this section.

### General Instructions

The Protective Cap is to remain on the sprinkler during installation until the ceiling installation is complete. The Protective Cap must be removed to place the sprinkler in service.

A leak-tight 1/2 inch NPT sprinkler joint should be obtained 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 sprinkler by under- or over-tightening the Sprinkler/Support Cup Assembly. Re-adjust the position of the sprinkler fitting to suit.

Each sprinkler must be inspected before installation. Do not use any sprinkler that exhibits any deformations or cracks, including cracks on the protective cap.

**Step 1.** The sprinkler must be installed only in the pendent position and with the sprinkler waterway centerline perpendicular to the mounting surface.

**Step 2.** Install the sprinkler fitting so that the distance from the face of the fitting to the mounting surface will be nominally 29/32 inches (23,0 mm) as shown in Figure 1A.

**Step 3.** With pipe thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

**Step 4.** Tighten the sprinkler using only the Sprinkler Socket or Wrench & Socket Combination (Figure 2). The wrench recess of the socket is to be applied to the sprinkler wrenching area (Figure 1A).

**Step 5.** Use the "ceiling level tolerance limit" indicator on the Protective Cap to check for proper installation height. Relocate the sprinkler fitting as necessary. If desired, the Protective Cap may also be used to locate the center of the clearance hole by gently pushing the ceiling material against the center point of the Cap.

**Step 6.** After the ceiling has been completed with the 2 inch (50 mm diameter clearance hole, use the Protective Cap Removal Tool (Figure 3) to remove the Protective Cap and then push on the Escutcheon until its flange just comes in contact

with the ceiling. Do not continue to push the Escutcheon such that it lifts a ceiling panel out of its normal position. If the Escutcheon cannot be engaged with the sprinkler, or the Escutcheon cannot be engaged sufficiently to contact the ceiling, relocate the sprinkler fitting as necessary.

## Care and Maintenance

The TYCO RAPID RESPONSE Series LFII Residential Flush Pendent Sprinklers (TY2284) 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 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.

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 or overheated sprinklers must be replaced.

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.

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 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

For warranty terms and conditions, visit [www.tyco-fire.com](http://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).

### Sprinkler Assembly

Specify: Series LFII (TY2284), K = 4.2, Residential Flush Pendent Sprinkler without Escutcheon and having a (specify) finish, P/N (specify):

Antique Brass. . . . . P/N 51-123-1-162  
Signal White (RAL9003). . . . . P/N 51-123-4-162  
Jet Black (RAL9005) . . . . . P/N 51-123-6-162  
Chrome Plated. . . . . P/N 51-123-0-162

### Escutcheon

Specify: Escutcheon for Series LFII (TY2284), K = 4.2, Residential Flush Pendent Sprinkler with (specify) finish, P/N (specify):

Antique Brass. . . . . P/N 56-123-1-001  
Signal White (RAL9003). . . . . P/N 56-123-4-001  
Jet Black (RAL9005) . . . . . P/N 56-123-6-001  
Chrome. . . . . P/N 56-123-9-001

### Accessories

Specify: Wrench and Socket for Series LFII (TY2284) Residential Flush Pendent Sprinkler, P/N 56-000-4-948

Specify: Socket for Series LFII (TY2284) Residential Flush Pendent Sprinkler, P/N 56-000-4-947

Specify: Protective Cap Removal Tool for Series LFII Residential Flush Pendent Sprinkler (TY2284), P/N 56-000-4-300

