



Series LFII Residential Sprinklers 4.9 K-Factor Domed-Plate Concealed Pendent Wet Pipe and Dry Pipe Systems

General Description

The TYCO RAPID RESPONSE Series LFII Residential Domed-Plate Concealed Pendent 4.9 K-Factor Sprinklers (TY2234) are decorative, fast response, frangible bulb sprinklers designed for use in residential occupancies such as homes, apartments, dormitories, and hotels.

The Cover Plate/Retainer Assembly conceals the sprinkler operating components above the ceiling. The domed profile of the cover plate provides aesthetically appealing sprinkler design with lower flow rates than can be achieved by lower profile cover plates. The separable two-piece design of the Cover Plate and Support Cup Assemblies allows installation of the sprinklers and pressure testing of the fire protection system prior to the installation of the ceiling or application of a finish coating.

Also, the separable “push-on and thread-off” two-piece design of the Sprinkler provides for 1/2 inch (12,7 mm) of vertical adjustment.

The Series LFII Residential Sprinklers (TY2234) 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

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.

- 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

Historically residential sprinklers, based on their Listing, have been limited to wet pipe sprinkler systems to assure speed of water delivery for a given prescribed design area (number of design sprinklers). The Series LFII Residential Domed-Plate Concealed Pendent Sprinklers (TY2234) Listing now offers the laboratory approved option of designing dry pipe residential sprinkler systems.

Through extensive testing, it has been determined that the number of design sprinklers (hydraulic design area) for the Series LFII Residential Domed-Plate Concealed Pendent Sprinklers 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 Domed-Plate Concealed Pendent Sprinklers 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. Non-water filled pipe will permit options for areas sensitive to freezing.

These Residential Sprinklers have a 4.9 (70,6) K-Factor that provides the required residential flow rates at reduced pressures, enabling smaller pipe sizes and water supply requirements.

The Series LFII Residential Domed-Plate Concealed Pendent Sprinklers (TY2234) 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.



The Series LFII Residential Domed-Plate Concealed Pendent Sprinklers (TY2234) are shipped with a Disposable Protective Cap. The Protective Cap is temporarily removed for installation, and it must be replaced to protect the sprinkler while the ceiling is being installed or finished. The tip of the Protective Cap can also be used to mark the center of the ceiling hole into plaster board or ceiling tiles by gently pushing the ceiling product against the Protective Cap. When ceiling installation is complete, the Protective Cap must be removed and the Cover Plate Assembly installed. The Protective Cap must be removed to ensure proper performance of the sprinklers.

NOTICE

The Series LFII Residential Domed-Plate Concealed Pendent Sprinklers (TY2234) 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.

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.

Maximum Coverage Area ^(a) Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	WET PIPE SYSTEM Minimum Flow ^(b) and Residual Pressure		
		For Horizontal Ceiling (Maximum 2-Inch Rise for 12-Inch Run)	For Sloped Ceiling (Greater than 2-Inch Rise up to Maximum 4-Inch Rise for 12-Inch Run)	For Sloped Ceiling (Greater than 4-Inch Rise up to Maximum 8-Inch Rise for 12-Inch Run)
		155°F (68°C)	155°F (68°C)	155°F (68°C)
12 x 12 (3,7 x 3,7)	12 (3,7)	13 GPM (49,2 LPM) 7.0 psi (0,48 bar)	13 GPM (49,2 LPM) 7.0 psi (0,48 bar)	19 GPM (71,9 LPM) 15.0 psi (1,03 bar)
14 x 14 (4,3 x 4,3)	14 (4,3)	13 GPM (49,2 LPM) 7.0 psi (0,48 bar)	13 GPM (49,2 LPM) 7.0 psi (0,48 bar)	19 GPM (71,9 LPM) 15.0 psi (1,03 bar)
16 x 16 (4,9 x 4,9)	16 (4,9)	13 GPM (49,2 LPM) 7.0 psi (0,48 bar)	13 GPM (49,2 LPM) 7.0 psi (0,48 bar)	19 GPM (71,9 LPM) 15.0 psi (1,03 bar)
18 x 18 (5,5 x 5,5)	18 (5,5)	17 GPM (64,3 LPM) 12.0 psi (0,83 bar)	17 GPM (64,3 LPM) 12.0 psi (0,83 bar)	19 GPM (71,9 LPM) 15.0 psi (1,03 bar)
20 x 20 (6,1 x 6,1)	20 (6,1)	20 GPM (75,7 LPM) 16.7 psi (1,15 bar)	21 GPM (79,5 LPM) 18.4 psi (1,27 bar)	24 GPM (90,8 LPM) 24.0 psi (1,65 bar)

(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.

TABLE A
SERIES LFII RESIDENTIAL DOMED-PLATE CONCEALED PENDENT SPRINKLERS (TY2234)
NFPA 13D AND NFPA 13R HYDRAULIC DESIGN CRITERIA
WET PIPE SYSTEMS

Maximum Coverage Area ^(a) Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	DRY PIPE SYSTEM Minimum Flow ^(b) and Residual Pressure
		For Horizontal Ceiling (Maximum 2-Inch Rise for 12-Inch Run)
		155°F (71°C)
12 x 12 (3,7 x 3,7)	12 (3,7)	13 GPM (49,2 LPM) 7.0 psi (0,48 bar)
14 x 14 (4,3 x 4,3)	14 (4,3)	14 GPM (53,0 LPM) 8.2 psi (0,57 bar)
16 x 16 (4,9 x 4,9)	16 (4,9)	15 GPM (56,8 LPM) 9.4 psi (0,65 bar)
18 x 18 (5,5 x 5,5)	18 (5,5)	20 GPM (75,7 LPM) 16.7 psi (1,15 bar)
20 x 20 (6,1 x 6,1)	20 (6,1)	22 GPM (83,3 LPM) 20.2 psi (1,39 bar)

(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.

TABLE B
SERIES LFII RESIDENTIAL DOMED-PLATE CONCEALED SPRINKLERS (TY2234)
NFPA 13D HYDRAULIC DESIGN CRITERIA
DRY PIPE SYSTEMS

Model/Sprinkler Identification Number (SIN)

TY2234

Technical Data

Approvals

- UL Listed for use with wet pipe and dry pipe systems
- C-UL Listed for use only with wet pipe systems
- NYC Approved under MEA 44-03-E

The Series LFII Residential Domed-Plate Concealed Pendent Sprinklers are only listed with the Series LFII Residential Domed-Plate Concealed Pendent Cover Plates having a factory applied finish.

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

Maximum Working Pressure
175 psi (12,1 bar)

Discharge Coefficient
K=4.9 GPM/psi^{1/2} (70,6 LPM/bar^{1/2})

Temperature Rating
155°F (68°C) Sprinkler with
139°F (59°C) Cover Plate

Vertical Adjustment
1/2 inch (12,7 mm)

Finishes
Refer to Ordering Procedure section.

Physical Characteristics

Frame	Brass
Button.	Bronze
Sealing Assembly.	Beryllium Nickel w/ Teflon*
Bulb (3 mm)	Glass
Compression Screw.	Brass
Deflector.	Copper
Button	
Ejection Spring.	Stainless Steel
Support Cup.	Steel
Cover Plate.	Brass
Retainer	Brass
Cover Plate	
Ejection Spring.	Stainless Steel

*Registered trademark of Dupont

Operation

When exposed to heat from a fire, the Cover Plate, which is normally soldered to the Support Cup at three points, falls away to expose the Sprinkler Assembly. 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 flow water.

Design Criteria

The RAPID RESPONSE Series LFII Residential Domed-Plate Concealed Pendent 4.9 K-Factor Sprinklers (TY2234) are UL and C-UL Listed for installation in accordance with the following criteria.

Note: 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 the 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.

For dry systems, corrosion-resistant or internally galvanized pipe shall be utilized with the sprinklers described in this data sheet.

For dry systems not using CPVC, pendent sprinklers shall be installed on return bends, where the sprinklers, return bends, and branch line piping (that is, potential areas for trapped water) are in areas at or above 40°F (4°C).

Refer to technical data sheet TFP485 about the use of Residential Sprinklers in residential dry pipe systems.

NOTICE

When corrosion-resistant or internally galvanized pipe and fittings with a potable water supply is utilized, return bends need not be installed. However, any portion of the piping that has the potential to trap water must be maintained at or above 40°F (4°C) unless provision to drain such areas is provided and maintained dry.

Water Delivery

When using the Series LFII Residential Pendent Sprinklers (TY2234) in dry pipe sprinkler systems, the requirements for "Dry System Water Delivery" per Section 8.3.4.3 of the 2010 edition of NFPA 13D apply. For a residential hazard, in no case shall the time of water delivery exceed 15 seconds for the most remote operating sprinkler.

Hydraulic Design (NFPA 13D and 13R)

The minimum required sprinkler flow rate for systems designed to NFPA 13D or NFPA 13R 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.

NOTICE

The number of "design sprinklers" specified in NFPA 13D and 13R for wet pipe systems is to be applied when designing dry pipe systems. There is no need to increase the design area, as is the case for density/area systems, in accordance with U.S. Patent 7,712,543.

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 for NFPA 13D and 13R as a function of temperature rating and the maximum allowable coverage area.
- A 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 being protected by the four sprinklers.

NOTICE

The number of "design sprinklers" specified in NFPA 13D and 13R for wet pipe systems is to be applied when designing dry pipe systems. There is no need to increase the design area, as is the case for density/area systems, in accordance with U.S. Patent 7,712,543.

The Series LFII Residential Domed-Plate Concealed Pendent Sprinklers must not be used in applications where the air pressure above the ceiling is greater than that below. Down drafts through the Support Cup could delay sprinkler operation in a fire situation.

Obstruction To Water Distribution

Sprinklers are to be located in accordance with the obstruction rules defined by NFPA 13 for residential sprinklers.

Operational Sensitivity

The sprinklers are to be installed relative to the ceiling mounting surface as shown in Figure 2.

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) being hydraulically calculated; maximum 12 feet for a 12 ft. x 12 ft. coverage area, or 20 feet for a 20 ft. x 20 ft. coverage area).

Installation

The RAPID RESPONSE Series LFII Residential Domed-Plate Concealed Pendent 4.9 K-Factor Sprinklers (TY2234) 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).

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 an Escutcheon Plate by under- or over-tightening the Sprinkler. Re-adjust the position of the sprinkler fitting to suit.

1. Install the pendent sprinkler in only the pendent position with the centerline of the sprinkler perpendicular to the mounting surface.
2. Remove the Protective Cap.

NOTICE

Do not remove the Sprinkler Strap (Figure 1) until the sprinkler system is to be placed in service.

3. With pipe-thread sealant applied to the pipe threads, and using the W-Type 7 Wrench shown in Figure 2, install and tighten the Sprinkler/Support Cup Assembly into the fitting. The W-Type 7 Wrench will accept a 1/2 inch ratchet drive.
4. Replace the Protective Cap by pushing it upwards until it bottoms out against the Support Cup. The Protective Cap helps prevent damage to the Deflector and Arms during ceiling installation and/or during application of the finish coating of the ceiling. It 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.

NOTICE

As long as the Sprinkler Strap (Figure 1) or the Protective Cap (Figure 3) remains in place, the system is considered to be "Out Of Service".

5. After the ceiling has been completed with the 2-1/2 inch (63 mm) diameter clearance hole and in preparation for installing the Cover Plate/Retainer Assembly, remove and discard the Protective Cap and the Sprinkler Strap.
Note: Refer to Technical Data Sheet TFP700 regarding instructions for the removal of the Sprinkler Strap.
6. Push the Cover Plate/Retainer Assembly into the Support Cup, and as necessary, make the final adjustment of the Cover Plate with respect to the ceiling by turning the Cover Plate/Retainer Assembly clockwise until its flange just comes in contact with the ceiling.

If it becomes necessary to remove the Cover Plate, it can be removed by unscrewing in a counter-clockwise direction.

If the Cover Plate/Retainer Assembly cannot be engaged with the Support Cup or the Cover Plate/Retainer Assembly cannot be engaged sufficiently to contact the ceiling, the Sprinkler Fitting must be repositioned.

Care and Maintenance

The RAPID RESPONSE Series LFII Residential Domed-Plate Concealed Pendent 4.9 K-Factor Sprinklers (TY2234) 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.

Owners must assure that the sprinklers are not used for hanging of 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.

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:

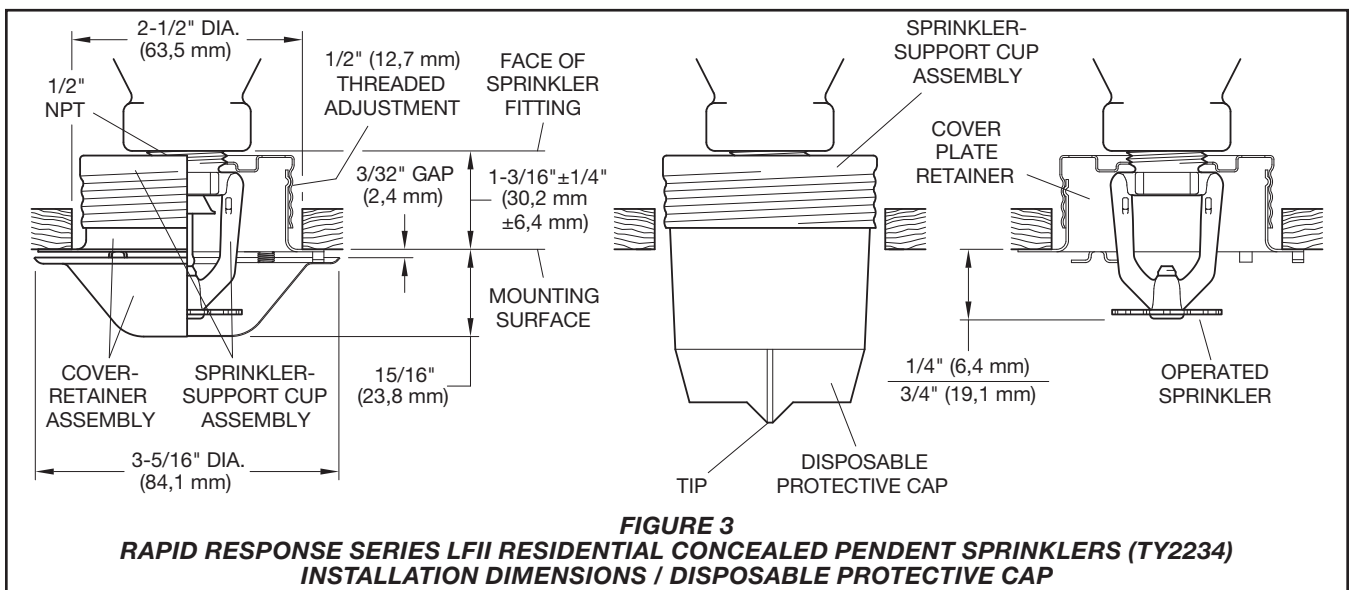
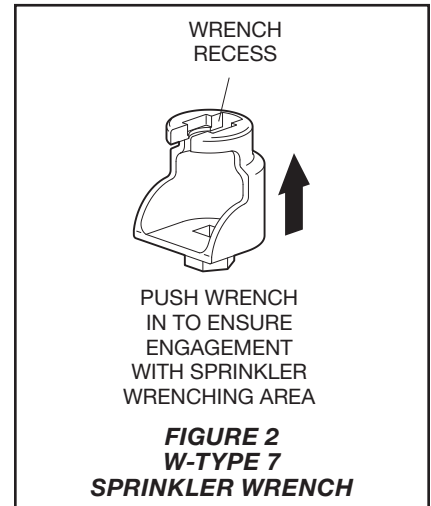
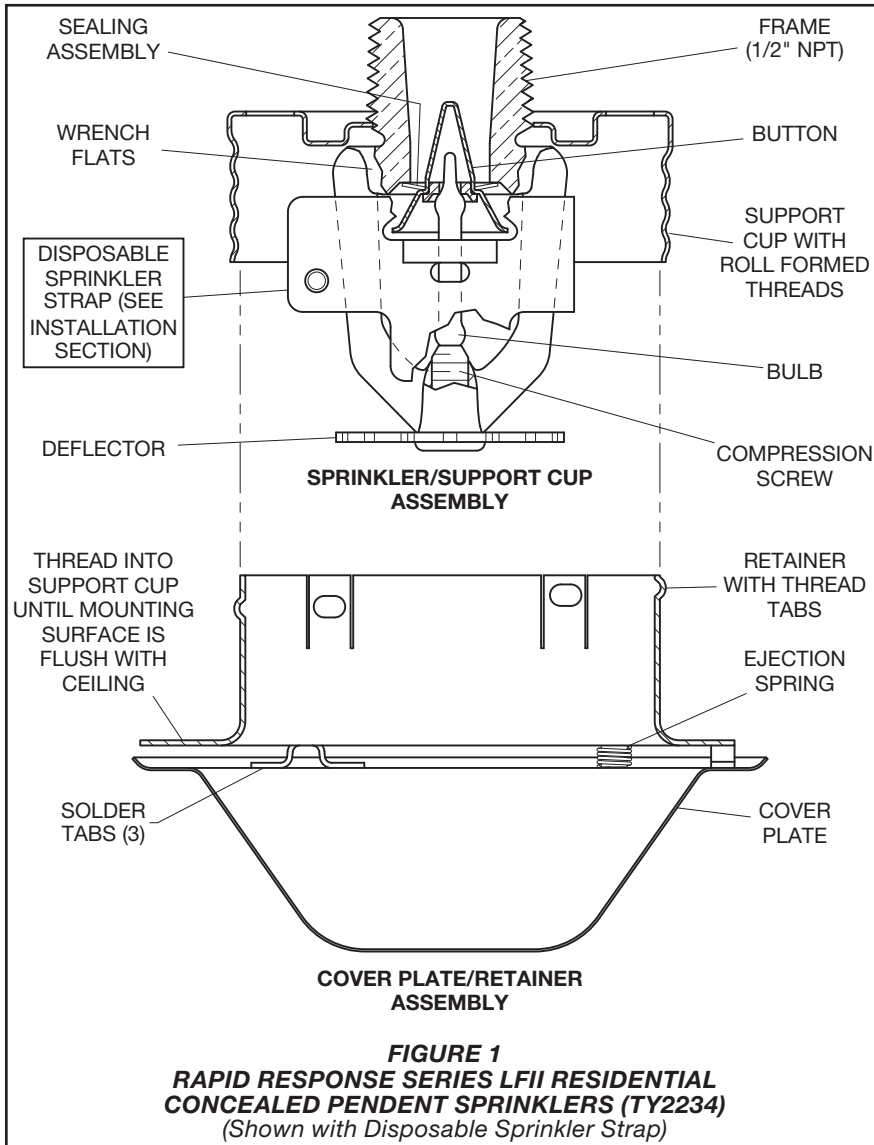
- were modified or over-heated.
- were damaged by dropping, striking, wrench twisting, wrench slippage, or the like.
- are leaking or exhibiting visible signs of corrosion.
- were exposed to corrosive products of combustion but have not operated, if you cannot easily remove combustion by-products with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

For the Cover Plate/Retainer Assembly, the following items apply:

- When properly installed, a nominal 3/32 inch (2,4 mm) air gap exists between the lip of the Cover and the ceiling, as shown in Figure 3. This air gap is necessary for proper sprinkler operation. The air gap allows heat flow from a fire to pass below and above the Cover, helping to assure appropriate release of the Cover in a fire situation. If repainting the ceiling after installation is required, exercise care to ensure that new paint does not seal off any of the air gap.
- Do not pull the Cover relative to the Retainer. Separation may result.
- Never repaint factory-painted Covers. When necessary, replace Covers with factory-painted units.

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 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 Assembly

Series LFII Residential Domed-Plate Concealed Pendent Sprinkler (TY2234), K=4.9, without Cover Plate Assembly, P/N 51-873-1-155.

Cover Plate Assembly

Cover Plate Assembly having a (specify) finish for the Series LFII Residential Domed-Plate Concealed Pendent Sprinkler (TY2234), K=4.9, and P/N (below).

Chrome.....P/N 56-873-9-135
Signal White (a)
(RAL 9003).....P/N 56-873-4-135
Pure White (b)
(RAL 9010).....P/N 56-873-3-135
CustomP/N 56-873-X-135

(a) Previously known as Bright White.
(b) Eastern Hemisphere sales only.

Sprinkler Wrench

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