

Series DS-ECC — 5.6 K-factor Dry Pendent Concealed Sprinklers Quick Response, Extended Coverage

General Description

The Series DS-ECC, 5.6 K-factor, Extended Coverage, Light Hazard, Dry Pendent Concealed Sprinklers are decorative, 3 mm bulb type sprinklers featuring a flat cover plate designed to conceal the sprinkler. This type of sprinkler is typically used to provide a sprinkler drop from an unheated attic into an area where aesthetics is a concern, such as nursing homes, restaurants, schools, etc.

They are intended for use in automatic sprinkler systems designed in accordance with standard installation rules (e.g., NFPA 13). The fast response thermal sensitivity rating of the Series DS-ECC (TY3539) provides for a quick response extended coverage (QREC) rating up to an 18 ft. x 18 ft. coverage area.

Each unit includes a Cover Plate Assembly that conceals the sprinkler operating components above the ceiling. 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 installation of a suspended ceiling or application of the finish coating to a fixed ceiling. They also permit removal of suspended ceiling panels for access to building service equipment without

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.

having to first shut down the fire protection system and remove sprinklers. Also, the separable two-piece design of the Sprinkler provides for 1/2 inch (12,7 mm) of vertical adjustment.

The Series DS-ECC Sprinklers are shipped with a Disposable Protective Cap. The Protective Cap is temporarily removed for installation, and then it can be replaced to help 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, ceiling tiles, etc. by gently pushing the ceiling product against the Protective Cap. When the ceiling installation is complete the Protective Cap is removed and the Cover Plate Assembly installed.

WARNINGS

The Series DS-ECC Dry Pendent Concealed 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, 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.

The Series DS-ECC Dry Pendent Concealed Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section.

Model/Sprinkler Identification Numbers

TY3539 - (3 mm bulb)



Technical Data

Approvals for Series DS-ECC

UL and C-UL Listed.
(Refer to Design Criteria section.)

Maximum Working Pressure

175 psi (12,1 bar)

Inlet Thread Connection

1 inch NPT (Standard Order)
ISO 7-R1

Discharge Coefficient

K = 5.6 GPM/psi^{1/2}
(80,6 LPM/bar^{1/2})

Temperature Ratings

155°F/68°C Sprinkler/
135°F/57°C Plate
200°F/93°C Sprinkler/
165°F/74°C Plate

Adjustment

1/2 inch (12,7 mm)

Finishes

Cover Plate: Chrome Plated, Brass Plated, or White Painted (Custom paint matches and colors other than white are available on request.)

Physical Characteristics

Inlet	Copper
Plug	Copper
Yoke	Stainless Steel
Casing	Galvanized Carbon Steel
Insert	Bronze
Bulb Seat	Stainless Steel
Bulb	Glass
Deflector	Bronze
Frame	Bronze
Guide Tube	Stainless Steel
Water Tube	Stainless Steel
Spring	Stainless Steel
Sealing Assembly	Beryllium Nickel w/Teflon*
Support Cup	Chrome Plated Steel
Guide Pins	Stainless Steel
Compression Screw	Brass
Cover Plate	Brass
Retainer	Brass
Ejection Spring	Stainless Steel

* Registered Trademark of DuPont

Patents

U.S.A. Patent Number 5,188,185.

Operation

When the Series DS-ECC is in service, water is prevented from entering the assembly by the Plug & Belleville Sealing Assembly (Ref. Figure 1) in the Inlet of the Sprinkler.

When exposed to heat from a fire, the Cover Plate, which is normally soldered to the Retainer at three points, falls away to expose the Sprinkler Assembly. At this point the Deflector supported by the Guide Pins drops down to its operational position.

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 & Belleville Seal from the Inlet allowing the sprinkler to activate and flow water.

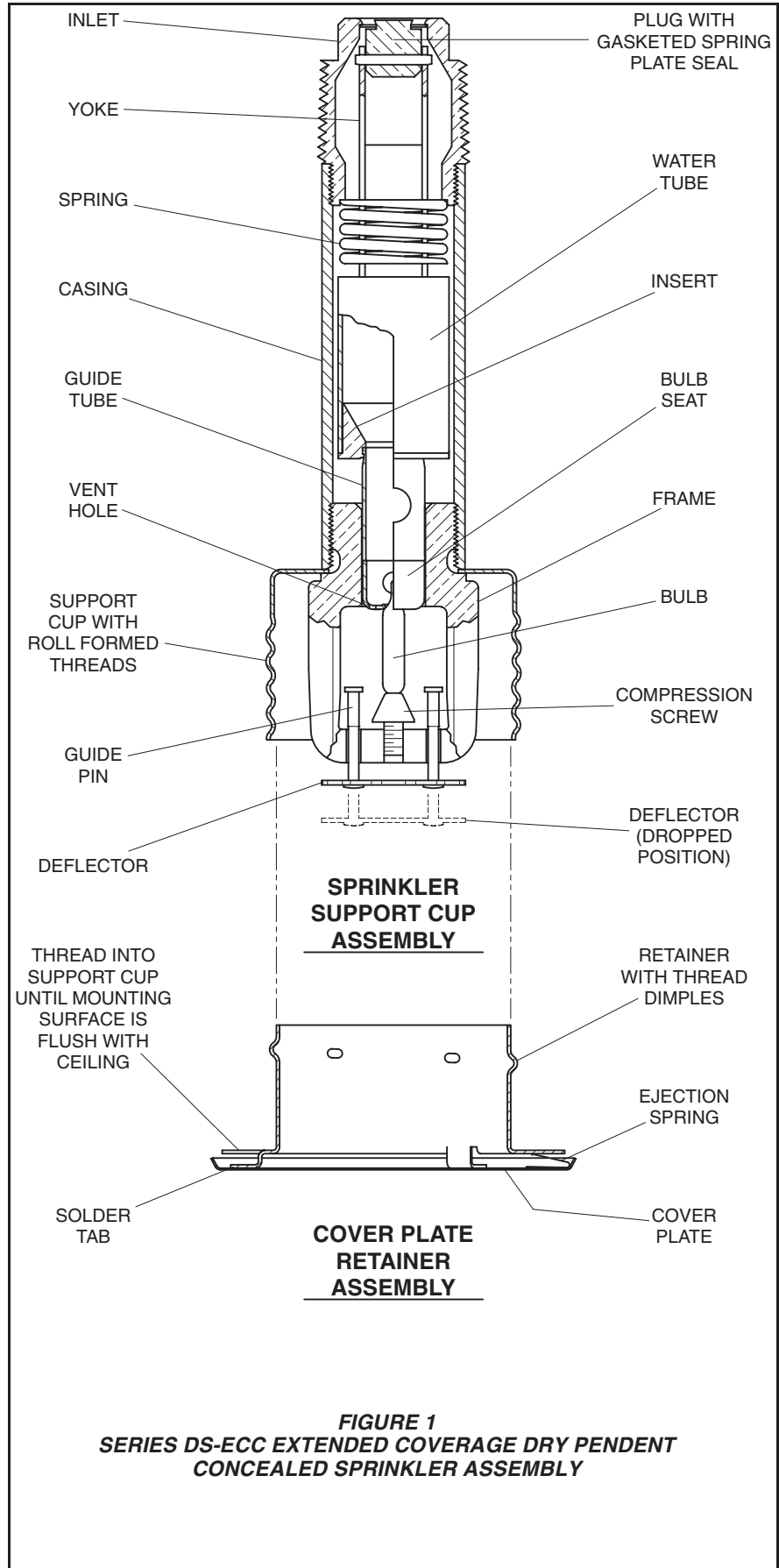


FIGURE 1
SERIES DS-ECC EXTENDED COVERAGE DRY PENDENT
CONCEALED SPRINKLER ASSEMBLY

Design Criteria

The DS-ECC (TY3539), Extended Coverage, Dry Pendent Concealed Sprinklers are UL and C-UL Listed for use in light hazard occupancies, using the design criteria in Table A, in addition to the requirements specified in the current NFPA 13 for extended coverage pendent sprinklers.

The Series DS-ECC Dry Pendent Concealed Sprinklers are only listed when installed with the Series RFI Concealed Cover Plates having a factory applied painted or metallic finish.

The Series DS-ECC 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.

The Series DS-ECC Dry Pendent Concealed Sprinkler is to be installed in the 1 inch NPT outlet or run of malleable or ductile iron threaded tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150) or cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125) with the end sprinkler fitting on a branch line to be plugged as shown in Figure 2.

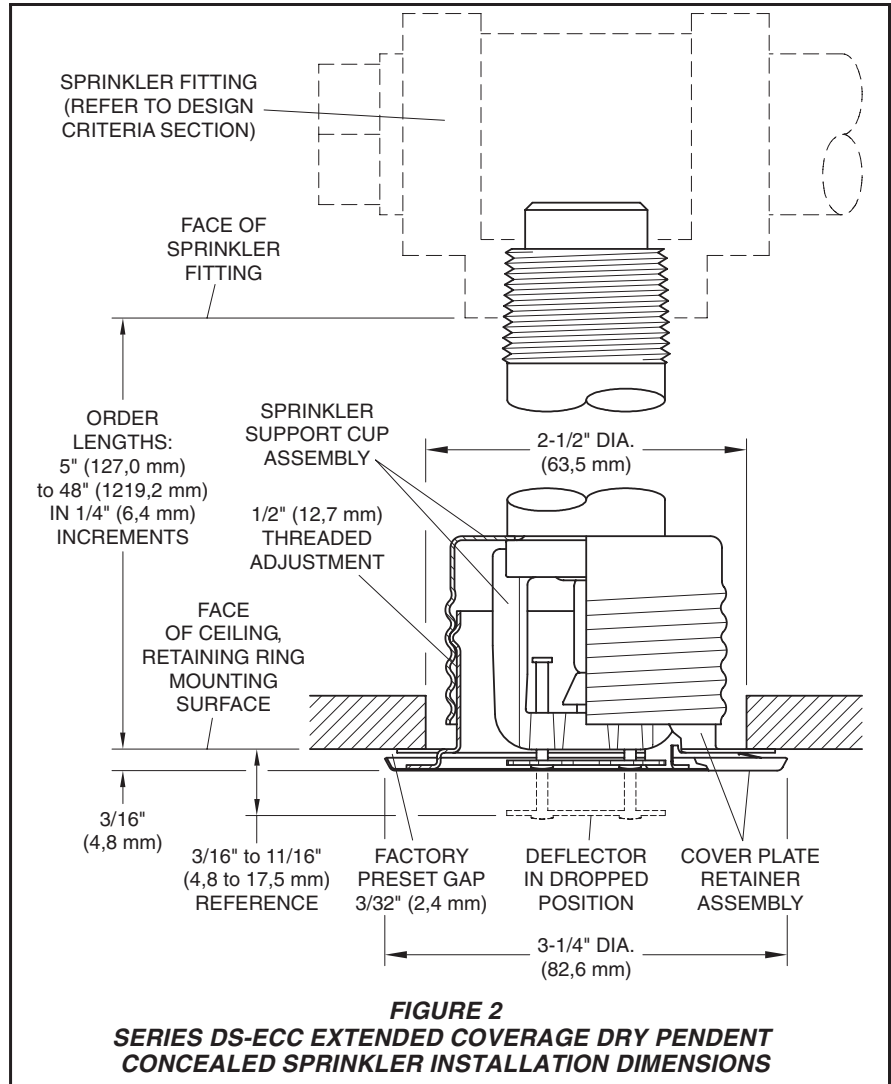
When installing 1 inch NPT Series DS-ECC Sprinklers on a dry pipe sprinkler system, only use the side outlet of maximum 2-1/2 inch size reducing tee's.

For wet pipe sprinkler systems, the Series DS-ECC Sprinklers may also be installed in the 1 inch NPT outlet of a Central Figure 730 Mechanical Tee or the following Tyco Fire Products CPVC fittings: (P/N 80145) 1" x 1" NPT Female Adapter or (P/N 80249) 1" x 1" x 1" NPT Sprinkler Head Adapter Tee.

NOTE

Do not install the Series DS-ECC into any other type fitting without first consulting the Technical Services Department. Failure to use the appropriate fitting may result in: failure of the sprinkler to properly operate due to formation of ice over the inlet Plug or binding of the inlet Plug; or, insufficient engagement of the inlet pipe threads with consequent leakage.

Branch, cross, and feed main piping connected to Dry Sprinklers and subject to freezing temperatures must be pitched for drainage in accordance with the minimum requirements of the National Fire Protection Association for dry pipe sprinkler systems.



RESPONSE RATING	SPACING	MINIMUM FLOW/PRESSURE
QUICK	16' x 16' (4,9 m x 4,9 m)	26.0 GPM / 21.6 PSI (98,4 LPM / 1,49 BAR)
QUICK	18' x 18' (5,5 m x 5,5 m)	33.0 GPM / 34.7 PSI (124,9 LPM / 2,39 BAR)

TABLE A
SERIES DS-ECC (TY3539)
155°F/68°C AND 200°F/93°C EXTENDED COVERAGE DRY PENDENT CONCEALED SPRINKLER HYDRAULIC DESIGN CRITERIA

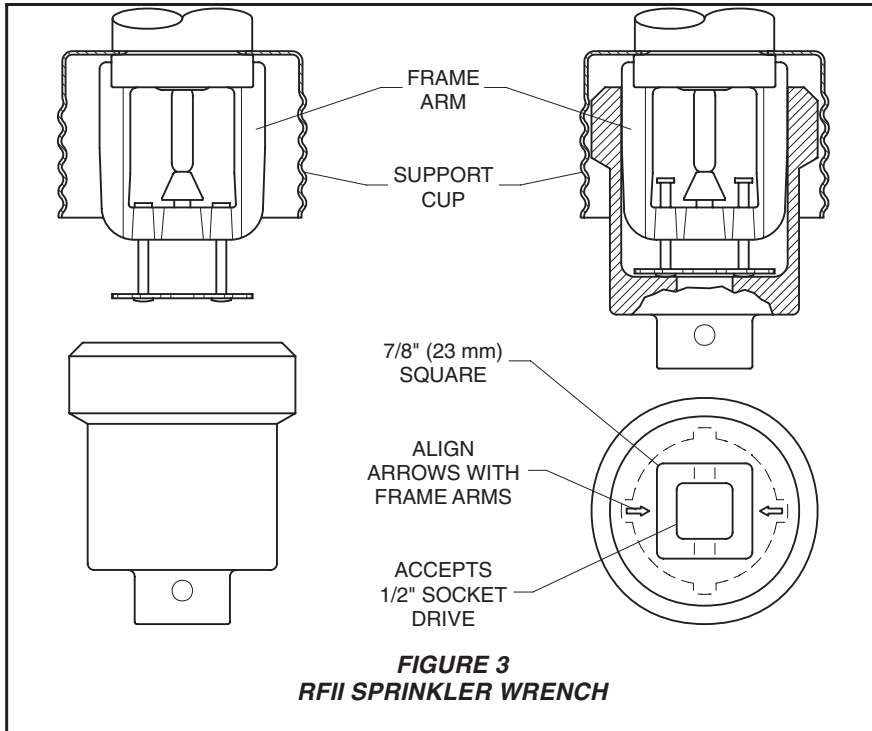


FIGURE 3
RFII SPRINKLER WRENCH

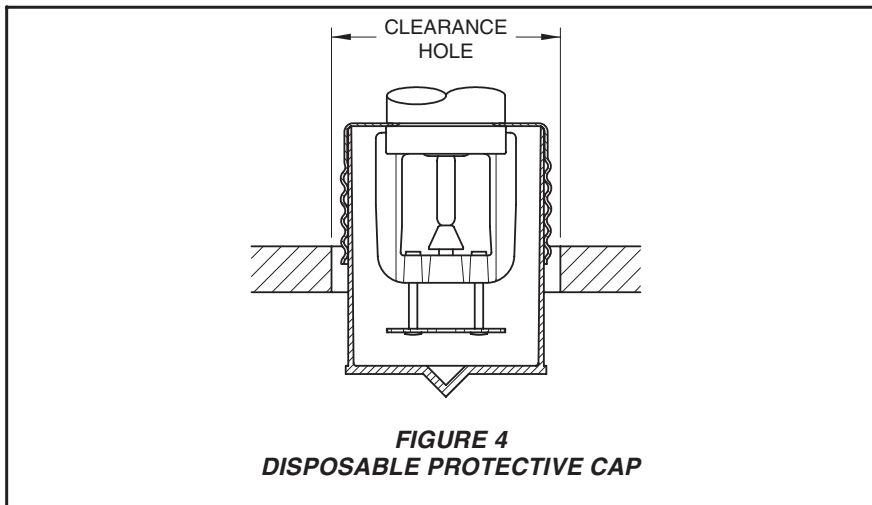


FIGURE 4
DISPOSABLE PROTECTIVE CAP

When Dry Sprinklers are to be used in wet pipe sprinkler systems protecting areas subject to freezing temperatures (e.g., sprinkler drops into freezers), consideration must be given to the appropriate length of the sprinkler that will prevent freezing of the water in the connecting pipes due to conduction. When the temperature surrounding the wet pipe sprinkler system is maintained at a minimum temperature of 40°F/4°C, the following are the minimum recommended lengths between the face of the sprinkler fitting and the outside surface of the protected area (i.e., length exposed to minimum ambient of 40°F/4°C):

- 12 inches (300 mm) when the temperature within the protected area is -20°F/-29°C
- 18 inches (450 mm) when the temperature within the protected area is -40°F/-40°C
- 24 inches (600 mm) when the temperature within the protected area is -60°F/-51°C

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.

NOTE

When Dry Sprinklers penetrate a ceiling or wall into an area subject to freezing, the clearance space around the Sprinkler Casing must be completely sealed in order to prevent the leakage of moist air into the freezing area which might result in the formation of condensate around the Frame, Deflector, Bulb Seat, or Bulb. Failure to prevent the formation of condensate could result in the build-up of ice around the releasing components. This could result in inadvertent operation of the sprinkler or impaired operation due to reduced thermal sensitivity.

Installation

The Series DS-ECC Dry Pendent Concealed Sprinklers must be installed in accordance with the following instructions:

NOTES

The Series DS-ECC 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 with a 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 the Sprinkler Assembly by under- or over-tightening the Sprinkler/Support Cup Assembly. Readjust the position of the sprinkler fitting to suit.

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

Step 2. With pipe thread sealant applied to the inlet threads, hand tighten the sprinkler into the sprinkler fitting.

Step 3. Wrench tighten the sprinkler by wrenching on the Casing with a pipe wrench whenever the casing is readily accessible. Otherwise, use a RFII Sprinkler Wrench (Ref. Figure 3). The RFII Sprinkler Wrench is to be applied to the Sprinkler as shown in Figure 3.

When using the RFII Sprinkler Wrench, temporarily remove the Protective Cap, temporarily remove the Protective Cap (Ref. Figure 4) 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 up against the center point of the Protective Cap.

NOTE

As long as the Protective Cap remains

in place, the system is considered to be "Out of Service".

Step 4. After the ceiling has been completed with the 2-1/2 inch (63,5 mm) diameter clearance hole and in preparation for installing the Cover Plate Assembly, remove and discard the Protective Cap, and verify that the Deflector moves up and down freely. If the Sprinkler has been damaged and the Deflector does not move up and down freely, replace the entire Sprinkler assembly. Do not attempt to modify or repair a damaged sprinkler.

Step 5. Screw on the Cover Plate/Retainer Assembly until the Retainer (Ref. Figure 2) contacts with the ceiling. Do not continue to screw on the Cover Plate/Retainer Assembly such that it lifts a ceiling panel out of its normal position. 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 Series DS-ECC Dry Pendent Concealed Sprinklers must be maintained and serviced in accordance with the following instructions:

NOTES

Absence of the Cover Plate Assembly may delay sprinkler operation in a fire situation.

When properly installed, there is a nominal 3/32 inch (2,4 mm) air gap between the lip of the Cover Plate and the ceiling, as shown in Figure 2. This air gap is necessary for proper operation of the sprinkler. If the ceiling is to be repainted after the installation of the Sprinkler, care must be exercised to ensure that the new paint does NOT seal off any of the air gap.

Factory painted Cover Plates MUST NOT be repainted. They should be replaced, if necessary, by factory painted units.

Do not pull the Cover Plate relative to the Enclosure. Separation may result.

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

A Vent Hole is provided in the Bulb

Seat (Ref. 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 weepage 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 that are found to be leaking or exhibiting visible signs of corrosion must be replaced.

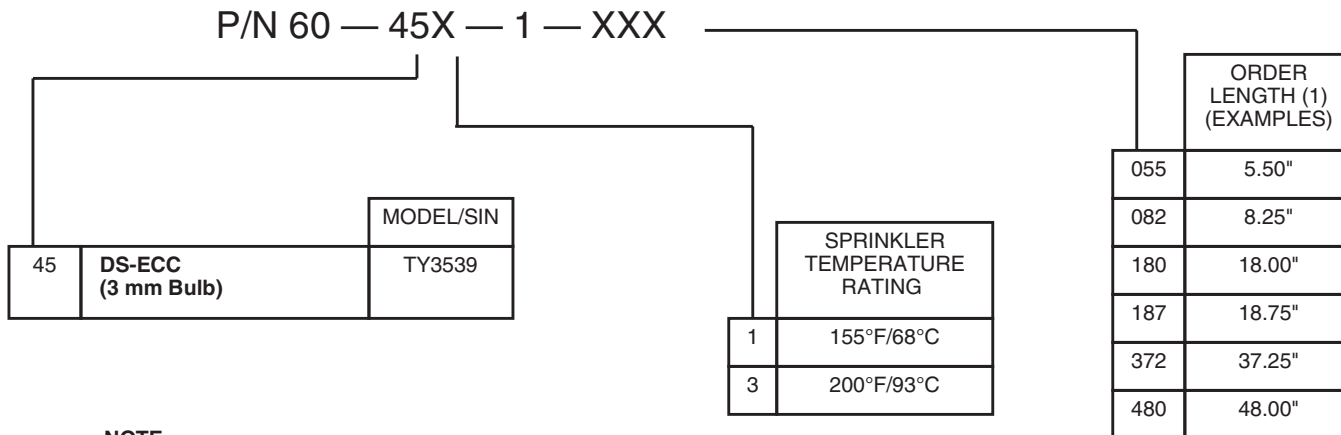
Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage - 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. The installing contractor or sprinkler 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.



NOTE

(1). Dry Pendent Concealed Sprinklers are furnished based upon "Order Length" as measured per Figures 2, 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 B
PART NUMBER SELECTION
SERIES DS-ECC, EXTENDED COVERAGE, DRY PENDENT CONCEALED SPRINKLERS
WITH 1 INCH NPT CONNECTION
(Use Prefix "I" for ISO 7-R1 Connection, e.g., I-60-451-180)

Limited Warranty

Products manufactured by Tyco Fire Products 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 Tyco Fire Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire Products 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 Tyco Fire Products to be defective shall be either repaired or replaced, at Tyco Fire Products' sole option. Tyco Fire Products neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. Tyco Fire Products 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 TYCO FIRE PRODUCTS 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 TYCO FIRE PRODUCTS WAS INFORMED ABOUT THE POSSIBILITY OF SUCH DAMAGES, AND IN NO EVENT SHALL TYCO FIRE PRODUCTS' 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.

Ordering Procedure

When placing an order, indicate the full product name. Contact your local distributor for availability.

Sprinkler Assembly:

Specify: TY3539, (specify temperature rating), Series DS-ECC Extended

Coverage Dry Pendent Concealed Pendent Sprinkler with (specify inch) Order Length and (specify 1 inch NPT or ISO 7-R1) Connection, P/N (specify from Table B).

NOTE

Dry Pendent Concealed 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.

Separately Ordered Cover Plate:

Specify: (specify temperature rating) Series RFII Concealed Cover Plate with (specify finish), P/N (specify).

	135°F/57°C ^(A)	165°F/74°C ^(B)
Brass	56-792-1-135	56-792-1-165
Bright Brass	56-792-2-135	56-792-2-165
Chrome	56-792-9-135	56-792-9-165
Brushed Chrome	56-792-8-135	56-792-8-165
White	56-792-0-135	56-792-0-165
Bright White	56-792-4-135	56-792-4-165
Off White	56-792-5-135	56-792-5-165
White (RAL9010)*	56-792-3-135	56-792-3-165
Black	56-792-6-135	56-792-6-165
Custom	56-792-X-135	56-792-X-165

(A) For use with 155°F/68°C sprinklers.

(B) For use with 200°F/93°C sprinklers.

* Eastern Hemisphere sales only.

Sprinkler Wrench:

Specify: RFII Sprinkler Wrench, P/N 56-000-1-075.