

RAVEN 5.6K Institutional Sprinklers Pendent and Horizontal Sidewall Quick Response, Standard and Extended Coverage

General Description

TYCO RAVEN 5.6K Institutional Pendent and Horizontal Sidewall Sprinklers are quick response spray sprinklers designed for use in areas such as correctional, detention, and mental health care facilities as well as other commercial buildings. Both the pendent and horizontal sidewall styles are available for standard or extended coverage applications.

- The assembly is designed with tamper-resistant features.
- This protected, unobtrusive design helps reduce the opportunity for individuals to injure themselves or others with sprinkler components.
- The flush design is aesthetically appealing by concealing all operating parts.

NOTICE

RAVEN Institutional Sprinklers described herein must be installed and maintained in compliance with this document and with 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.

Tyco Fire Protection Products specifically disclaims any liability for damages or injury (including death) arising out of or caused by manipulation, dismantling, or misuse of RAVEN Institutional Sprinklers or the use or attempted use of the RAVEN Institutional Sprinklers or

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.

any component thereof as an instrument unrelated to its intended function as a fire protection device.

Owners are responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted with any questions.

Sprinkler Identification Numbers (SINs)

SIN	DOT COLOR*	APPLICATION
TY3281	Black	Pendent Standard Coverage
TY3282	Green	Pendent Extended Coverage
TY3381	Red	HSW Standard Coverage
TY3382	Purple	HSW Extended Coverage

* Refer to Figures 1 through 4 for SIN Color Dot location.

Technical Data

Approvals
UL and C-UL Listed

Maximum Working Pressure
175 psi (12,1 bar)

Inlet Thread Connection
1/2 inch NPT

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



Temperature Rating
165°F (74°C)

Finish
Sprinkler: Chrome or White
Escutcheon: Chrome or White

Physical Characteristics
Body Brass
Deflector Assembly Bronze
Sealing Assembly Beryllium Nickel with TEFLON
Link Assembly Copper

Design Criteria

General Criteria

Only Escutcheons shown in Figures 5 and 6 can be utilized with TYCO RAVEN Institutional Sprinklers. A maximum of two Spacers can be used to adjust the Escutcheons.

NOTICE

Use of more than two Spacers may result in disabling the tamper-resistant design of TYCO RAVEN Institutional Sprinklers and the principle functions of helping to avoid false sprinkler operations and to avoid opportunity for individuals to injure themselves or others with components of the sprinkler.

Integrity of the tamper-resistant design of RAVEN Escutcheons is dependent on the piping installation design. When installed properly, the Escutcheon is held fast (that is, tight with no movement or gap) to the mounting surface (ceiling or wall, as applicable) by tightening the sprinkler assembly into the sprinkler fitting.

A proper installation requires all of the following:

- The sprinkler fitting must be properly located with respect to distance from the face of the sprinkler fitting to the face of the mounting surface (Figures 5 and 6);
- The sprinkler fitting must be rigidly secured and immobile; and,
- The centerline of the sprinkler fitting must be perpendicular to the mounting surface to assure that the escutcheon sits squarely against the mounting surface around the entire perimeter of the Institutional Escutcheon.

Figure 7 illustrates a technique to adjust the location of the sprinkler fitting to help assure immobility of the sprinkler fitting and to help maintain perpendicularity of the sprinkler fitting to the mounting surface.

While Figure 7 illustrates a horizontal installation, it can be applied to pendent installations.

When applied, the technique shown in Figure 7 allows the sprinkler/supply pipe to be pulled back into the mounting surface from behind the wall or above the ceiling before tightening the

retaining flange set screw, which will help overcome problems with assuring that the escutcheon is held fast to the mounting surface (that is, tight with no movement or gap). Also, this installation technique allows for easy removal of the sprinkler/supply pipe for installations where access is behind the wall or above the ceiling.

Standard Coverage Criteria

RAVEN Standard Coverage, Institutional Pendent and Horizontal Sidewall Sprinklers (TY3281 and TY3381) are intended for use with fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (for example, UL Listing is based on NFPA 13 requirements).

RAVEN Horizontal Sidewall Sprinklers (TY3381) must be installed with a deflector-to-ceiling distance of 4 to 12 inches (100 to 300 mm). To meet this requirement, the centerline of the sprinkler waterway must be located 4-7/16 to 12-7/16 inches (112,7 to 315,9 mm) below the ceiling (Figure 7).

5.6K Extended Coverage Pendent (TY3282)

Response Rating	Coverage Area ft. x ft. (m x m)	Minimum Flow ⁽¹⁾ GPM (LPM)	Minimum Pressure ⁽²⁾ psi (bar)	Deflector-To-Ceiling Distance in. (mm)	Sprinkler Temperature Rating °F (°C)	Minimum Spacing ft. (m)
Quick	16 x 16 (4,9 x 4,9)	26 (98)	21.6 (1,49)	Flush Mounted	165 (74)	8 (2,4)

5.6K Extended Coverage Horizontal Sidewall (TY3382)

Response Rating	Coverage Area ft. x ft. (m x m)	Minimum Flow ⁽¹⁾ GPM (LPM)	Minimum Pressure ⁽²⁾ psi (bar)	Deflector-To-Ceiling Distance ⁽³⁾ in. (mm)	Sprinkler Temperature Rating °F (°C)	Lateral Minimum Spacing ⁽⁴⁾ ft. (m)
Quick	16 x 16 (4,9 x 4,9)	26 (98)	21.6 (1,49)	4 to 12 (100 to 300)	165 (74)	8 (2,4)

NOTES

1. Requirement is based on minimum flow in GPM (LPM) from each sprinkler.
2. Indicated residual pressures are based on the nominal K-factor.
3. Centerline of the sprinkler waterway is located 7/16 inch (11,1 mm) below the deflector (Figure 7).
4. Minimum spacing is for lateral distance between sprinklers located along a single wall. Otherwise adjacent sprinklers (that is, sidewall sprinklers on an adjacent wall, on an opposite wall, or pendent sprinklers) must be located outside of the maximum listed protection area of the extended coverage sidewall sprinkler being utilized.

TABLE A
RAVEN INSTITUTIONAL SPRINKLERS
– UL AND C-UL LISTING EXTENDED COVERAGE AND FLOW RATE CRITERIA –

Extended Coverage Criteria

RAVEN Extended Coverage, Institutional Pendent and Horizontal Sidewall Sprinklers (TY3282 and TY3382) must be installed in accordance with the flow rate criteria provided in Table A. They must be installed and utilized in light hazard occupancies under smooth, flat, horizontal ceilings as outlined in the applicable installation standard recognized by the Listing or Approval agency (for example, UL Listing is based on NFPA 13 requirements).

RAVEN Extended Coverage, Horizontal Sidewall Sprinklers (TY3382) must be installed with a deflector-to-ceiling distance of 4 to 12 inches (100 to 300 mm). To meet this requirement, the centerline of the sprinkler waterway must be located 4-7/16 to 12-7/16 inches (112,7 to 315,9 mm) below the ceiling (Figure 7).

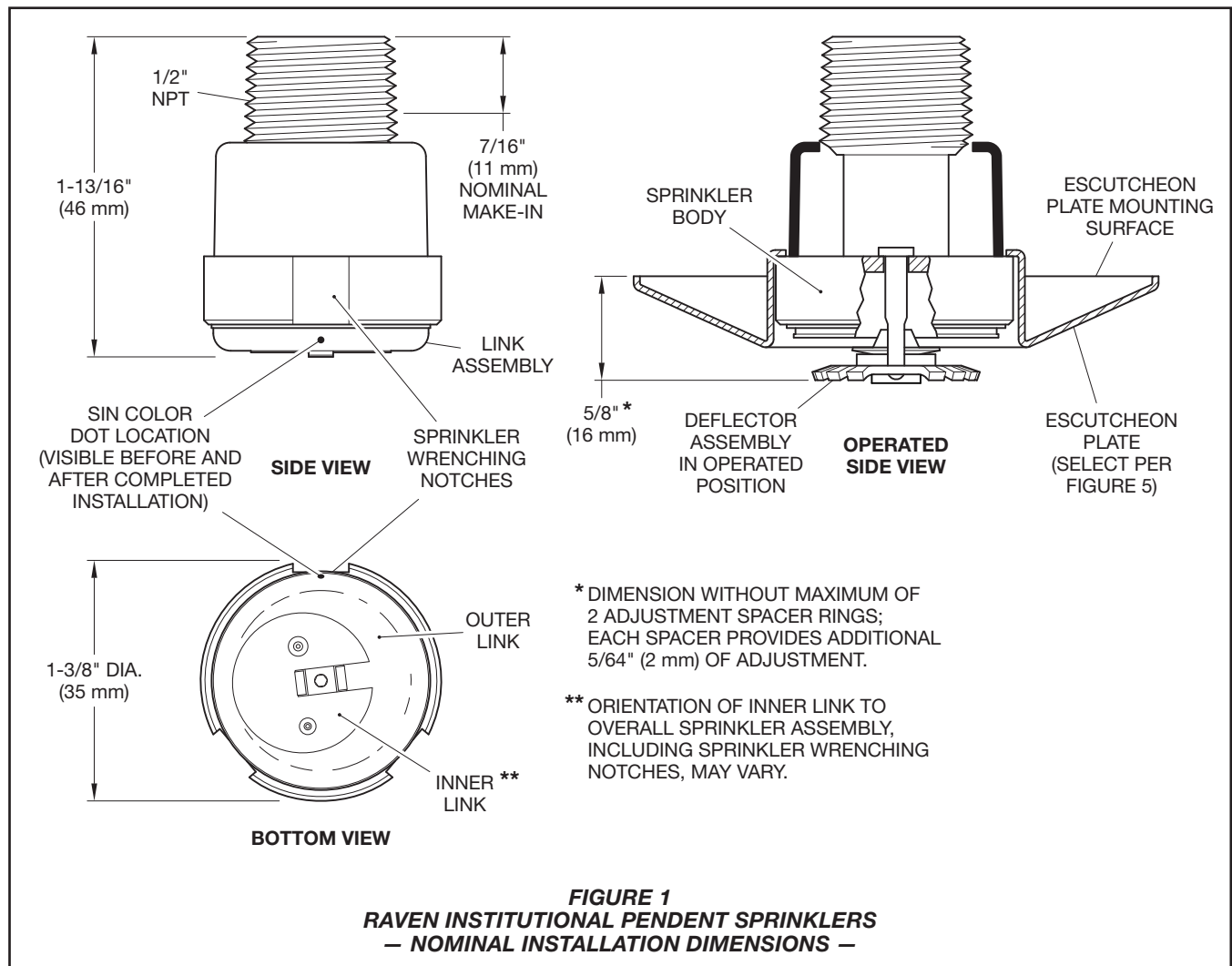
Operation

In standby condition, the unique assembly of RAVEN Institutional Pendent and Horizontal Sidewall Sprinklers is designed with tamper-resistant features to help prohibit a false activation and help reduce the opportunity for individuals to injure themselves or others with components of a fire sprinkler. RAVEN Institutional Sprinklers are specifically designed to minimize components, as well as holes or shapes, that could provide a point for securing an external non-sprinkler associated object. Also, when properly installed, the escutcheon is held fast to the ceiling or wall to deter its removal. The shape of the sprinkler and escutcheon cannot be grasped easily, which further deters tampering.

The sprinkler is designed to operate if the link assembly is manually removed. This feature reduces the possibility of the sprinkler being placed in an inoperable condition as a result of tampering.

For information on the "break-away" load of RAVEN Institutional Sprinklers, contact Technical Services.

A link assembly covers the sealing assembly. The link is soldered with an eutectic solder that melts when exposed to heat. When the link reaches its rated temperature, the link separates and releases the sealing assembly, allowing the deflector assembly to extend from the body and water to flow.



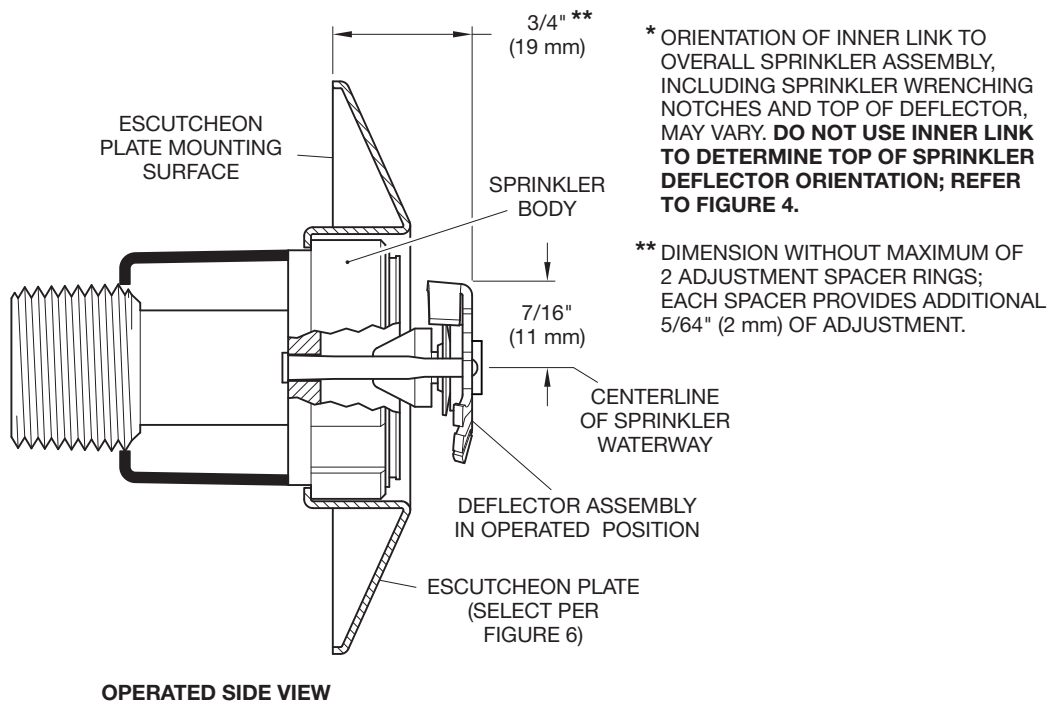
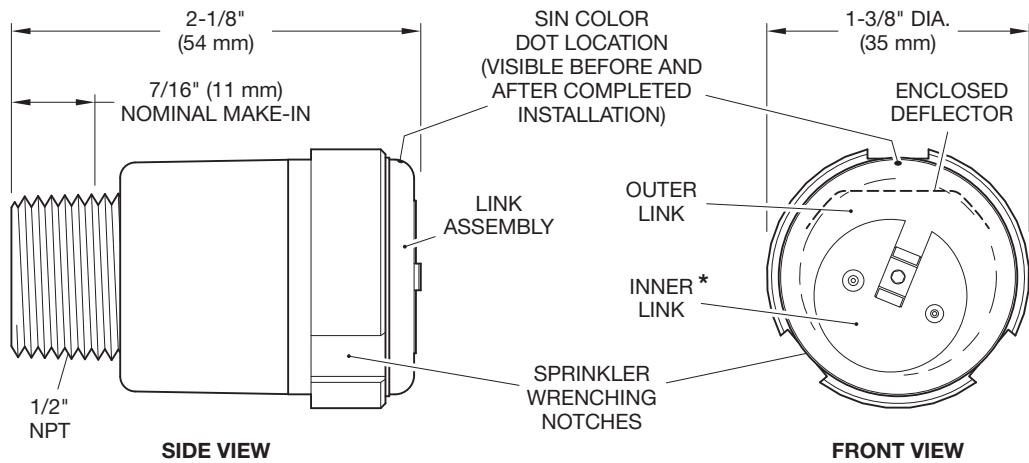
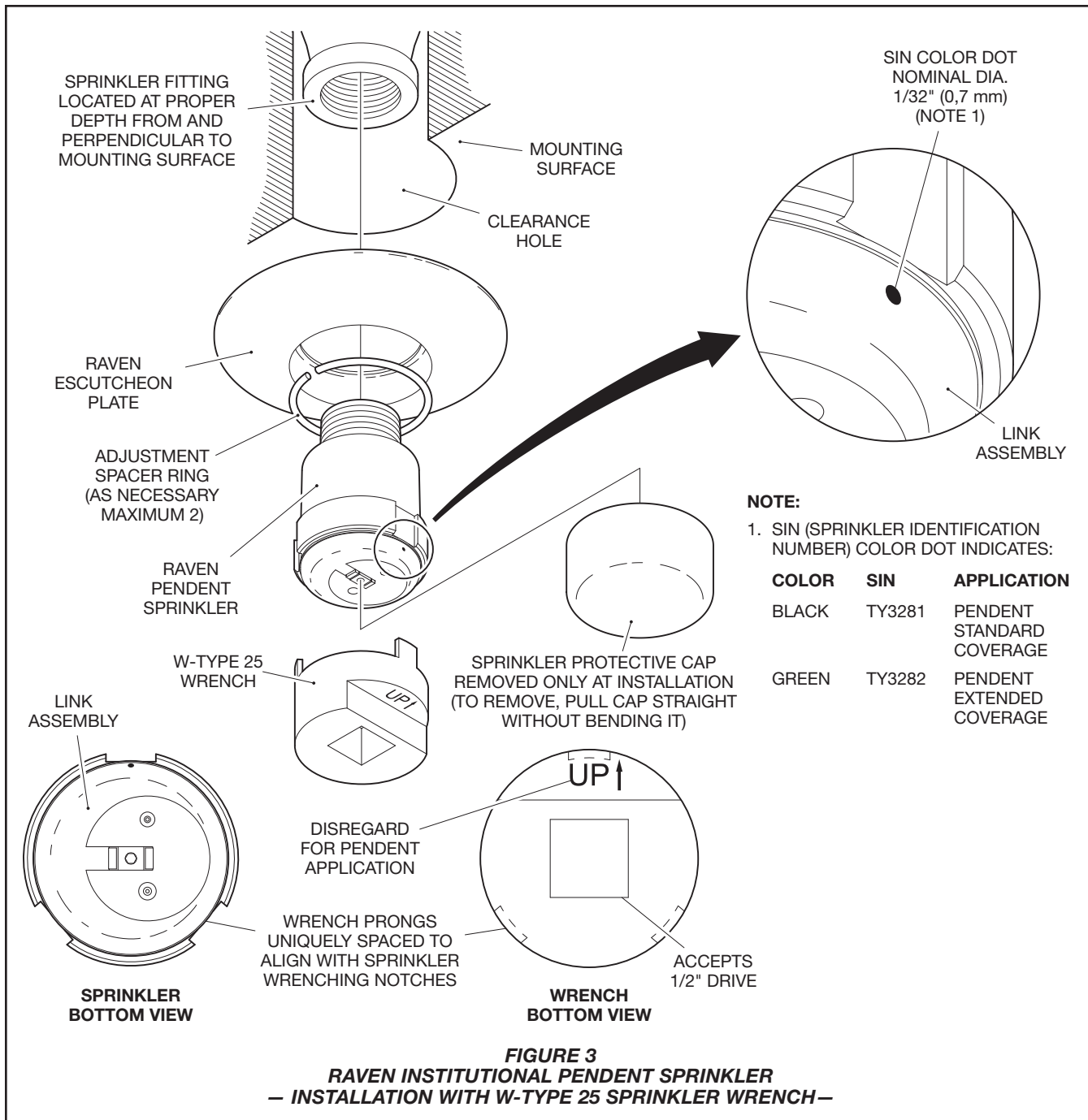
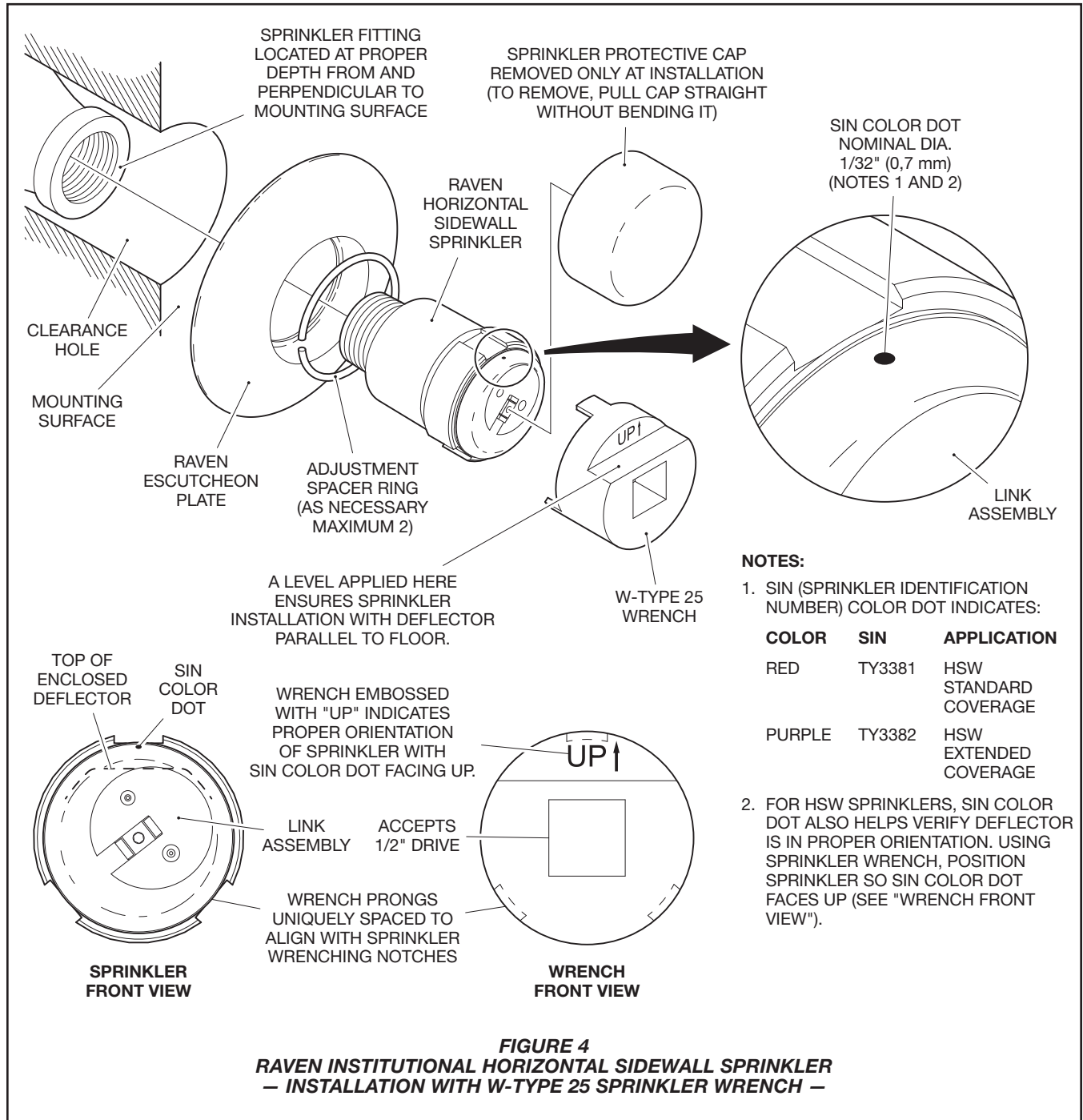


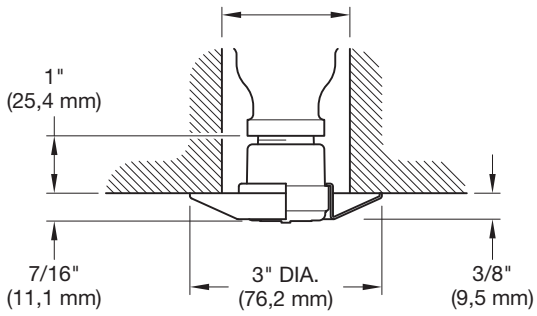
FIGURE 2
RAVEN INSTITUTIONAL HORIZONTAL SIDEWALL SPRINKLERS
— NOMINAL INSTALLATION DIMENSIONS —





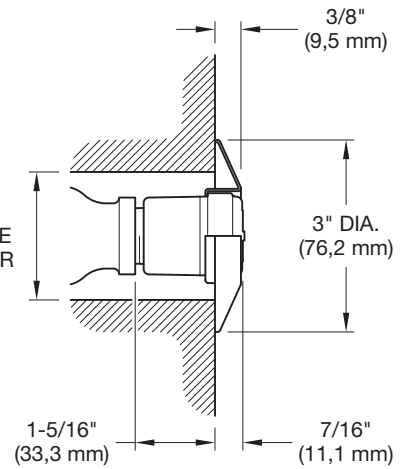
STYLE F

DIAMETER DETERMINED BY CLEARANCE FOR SPRINKLER FITTING



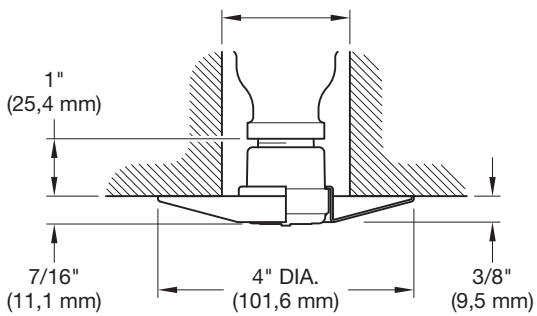
STYLE F

DIAMETER DETERMINED BY CLEARANCE FOR SPRINKLER FITTING



STYLE G

DIAMETER DETERMINED BY CLEARANCE FOR SPRINKLER FITTING



STYLE G

DIAMETER DETERMINED BY CLEARANCE FOR SPRINKLER FITTING

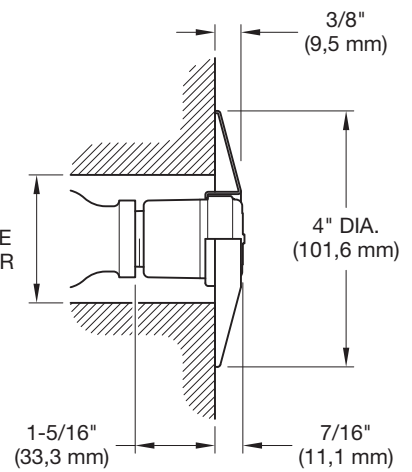


FIGURE 5
RAVEN INSTITUTIONAL PENDENT SPRINKLERS
– ESCUTCHEON OPTIONS –

FIGURE 6
RAVEN INSTITUTIONAL HSW SPRINKLERS
– ESCUTCHEON OPTIONS –

Installation

TYCO RAVEN Institutional Sprinklers must be installed in accordance with the following instructions.

NOTICE

Refer to Design Criteria for important information regarding the piping installation design and its effect on maintaining the integrity of the tamper-resistant design of the Institutional Escutcheons.

Obtain a 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 may damage the sprinkler with consequent leakage or impairment of the sprinkler. Rather than over-torquing to meet proper orientation for the horizontal sidewall sprinkler, stop tightening earlier.

Do not attempt to compensate for improper location of the sprinkler fitting by under or over-tightening the sprinkler.

After installation is complete, ensure the RAVEN Escutcheon is held fast (that is, tight with no movement or gap) to the mounting surface and that the Escutcheon sits squarely against the mounting surface around the entire perimeter of the Escutcheon.

The following tools are recommended for proper installation of RAVEN Institutional Sprinklers:

- TEFLON tape
- TYCO W-Type 25 Installation Wrench
- 1/2-inch drive ratchet wrench
- Torque wrenches
- 3-inch maximum length ratchet extension (optional)
- Level

Step 1. Install RAVEN Pendent Sprinklers with the centerline of the waterway perpendicular to the ceiling. Install RAVEN Horizontal Sidewall sprinklers with the centerline of their waterway parallel with the ceiling and perpendicular to the back wall.

Step 2. Inspect the sprinkler for any visible signs of damage that could have occurred during shipping or handling.

Apply a non-hardening pipe-thread sealant such as TEFLON tape to the NPT thread of the sprinkler. Applying between 2 and 4 full wraps of tape is recommended.

Carefully remove the orange protective cap from the sprinkler by pulling it straight out without bending it.

Verify that the sprinkler identification number (SIN) and temperature rating located on the side of the sprinkler match installation requirements.



Step 3. Align the TYCO W-Type 25 Installation Wrench with the sprinkler. The flat surface should be in line with the small colored dot on the sprinkler.

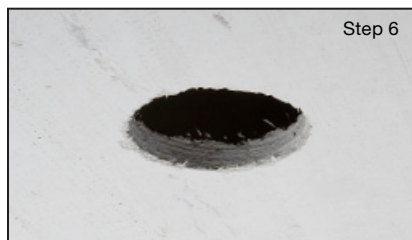
Step 4. Ensure that the TYCO W-Type 25 Installation Wrench is fully engaged onto the sprinkler. Fully insert all three Wrench Prongs into the slots on the sprinkler body.



Step 5. With the Wrench on the sprinkler, place the escutcheon over the threaded end of the sprinkler.



Step 6. Ensure that the ceiling/wall is smooth for the escutcheon to sit against and that the distance from the ceiling/wall surface to the sprinkler fitting is appropriate. As shown in Figures 5 and 6, the "face of sprinkler fitting" to "face of mounting surface" dimensions are 1 inch for pendent sprinklers and 1-5/16 inches for horizontal sidewall sprinklers.



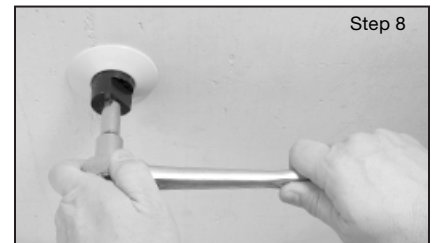
Note: The sprinkler has intentionally been designed to be difficult to grasp by hand. Therefore, the use of the W-Type 25 Installation Wrench for hand-tightening assists in threading the sprinkler. Also use of the W-Type 25 Installation Wrench helps avoid damage to the Sprinkler during installation.

Step 7. With the Escutcheon in place and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting using the TYCO W-Type 25 Installation Wrench with the Wrench Prongs fully engaged with the Sprinkler Wrenching Notches. The Wrench Prongs are designed to engage the wrenching notches in the sprinkler body. The Wrench Prongs are also uniquely spaced to align with the sprinkler wrenching notches in one position.



Step 8. Wrench-tighten the Sprinkler using only the TYCO W-Type 25 Installation Wrench (Figure 3).

Insert a 1/2 inch drive ratchet wrench (with or without the extension) into the TYCO W-Type 25 Installation Wrench. Ensure the ratchet wrench remains parallel to the ceiling/wall. A ratchet extension can help to keep the wrench in line with the sprinkler. Torque for the RAVEN Institutional Sprinkler is 7 to 14 ft.-lbs.



Note: To help prevent slippage of the wrench and while using a 1/2-inch drive ratchet wrench, place one hand over the TYCO W-Type 25 Installation Wrench while tightening with the other hand.

A recommended technique to determine if the torque range is achieved involves the use of two different torque settings. Install first with a 7 ft.-lbs. torque value, followed by adjusting with a maximum 14 ft.-lbs. value.

Step 9. For horizontal sidewall sprinklers, a Level should be placed on top of the flat surface of the TYCO W-Type 25 Installation Wrench to orient the sprinkler correctly.



Step 10. After installation is complete, ensure that the RAVEN Escutcheon is held fast against the mounting surface and sits squarely against the ceiling around its entire perimeter.



When using the technique in Figure 7, the Escutcheon can be pulled flat against the mounting surface by pulling up on the sprinkler/supply pipe from behind the wall or above the ceiling and then tightening the Wall Set Screws and Pipe Set Screws of the Retaining Flange. Do not over-tighten the Wall Set Screws as over-tightening these screws may damage the sprinkler.

To verify correct sprinkler application, refer to the Notes in Figures 3 and 4 on SIN color dot indicators.

For horizontal sidewall sprinklers, the SIN Color Dot also helps verify deflector orientation. In proper installations of RAVEN Horizontal Sidewall Sprinklers, SIN Color Dots face up.

NOTICE

If the Escutcheon is NOT held fast (tight with no movement or gap) to the mounting surface and as an option to relocating the sprinkler fitting (increasing the "face of sprinkler fitting" to "face of mounting surface" distance), up to two Adjustment Spacer Rings as shown in Figure 3 may be utilized. Each Adjustment Spacer Ring can account for 0.075 inches of gap between the Escutcheon and mounting surface. Therefore, if the gap is greater than 0.150 inches, the sprinkler fitting will need to be relocated to assure proper installation of both the sprinkler and escutcheon.

Care and Maintenance

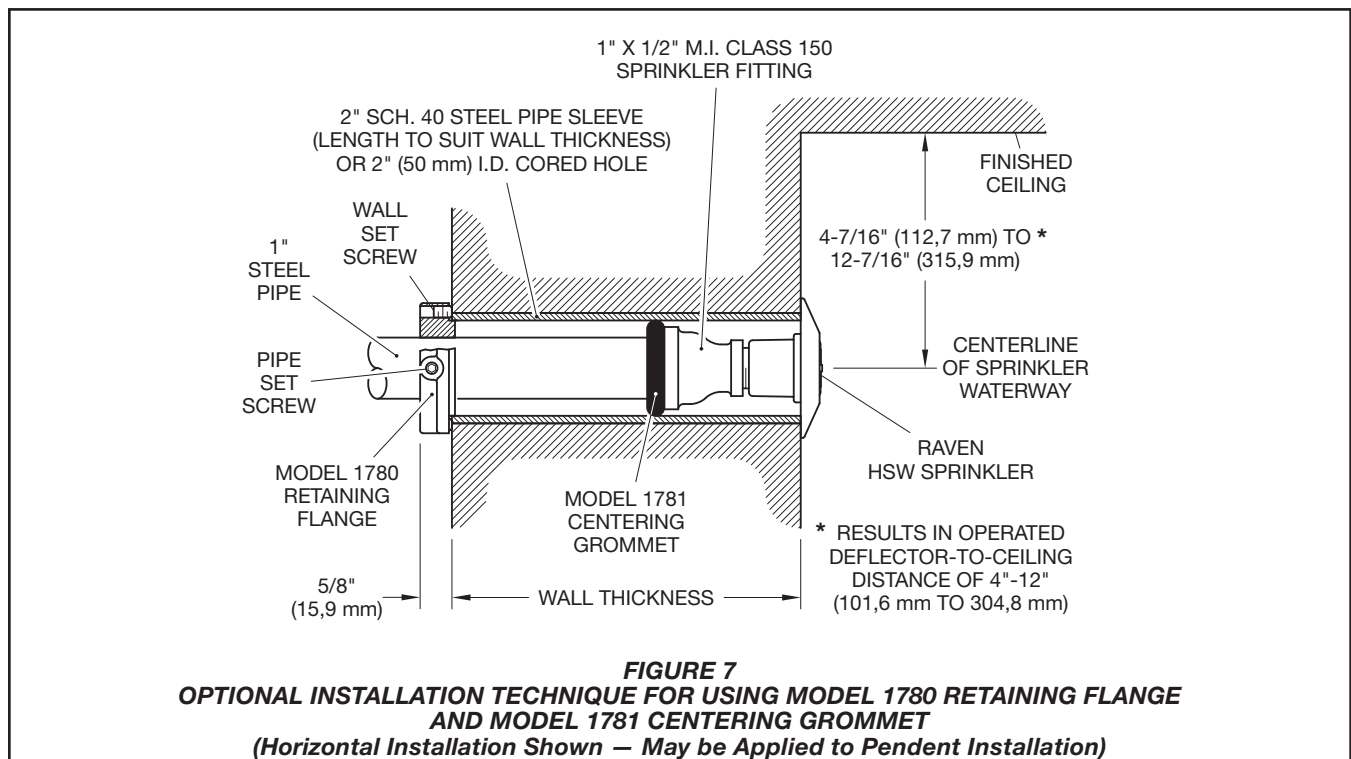
TYCO RAVEN Institutional Sprinklers must be maintained and serviced in accordance with the following instructions.

NOTICE

Service inspections should be made on a regular basis to detect possible damage or alterations to the sprinkler and escutcheon. Inspections should include making certain that the Institutional Escutcheon is held fast to the mounting surface. Damaged or altered sprinklers are to be replaced immediately to avoid personal injury and to prevent use for causing personal injury, as well as to maintain the sprinkler system in an operative condition.

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 system from the proper authorities and notify all personnel who may be affected by this action.

Exercise care to avoid damage to the sprinklers before, during, and after installation. Never paint, plate, coat, or otherwise alter sprinklers after they leave the factory; otherwise, the performance may be impaired.



Replace sprinklers that:

- were damaged by dropping, striking, wrench twisting, wrench slippage, or the like.
- were modified or over-heated.
- are leaking or exhibiting visible signs of corrosion.

Frequent visual inspections are recommended to be initially performed for sprinklers installed in potentially corrosive atmospheres to verify the integrity of the materials of construction as they may be affected by the corrosive conditions present for a given installation. Thereafter, annual inspections per NFPA 25 are required.

Owners are 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 other Authorities Having Jurisdiction. Contact the installing contractor or sprinkler manufacturer regarding any questions.

Sprinklers are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Disclaimer for RAVEN Institutional Sprinklers

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Limited Warranty

Products manufactured by Tyco Fire Protection Products (TFPP) 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 TFPP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFPP 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 TFPP to be defective shall be either repaired or replaced, at TFPP's sole option. TFPP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFPP 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 TFPP 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 TFPP was informed about the possibility of such damages, and in no event shall TFPP'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 description and Part Number (P/N).

Sprinkler Assemblies

Specify: RAVEN (standard or extended coverage), 165°F (74°C), Institutional (pendent or horizontal sidewall) Sprinkler with (finish) and P/N (below).

Standard Coverage Pendent (TY3281)

Chrome P/N 50-314-9-165

White Color P/N 50-314-4-165

Standard Coverage HSW (TY3381)

Chrome P/N 50-316-9-165

White Color P/N 50-316-4-165

Extended Coverage Pendent (TY3282)

Chrome P/N 50-315-9-165

White Color P/N 50-315-4-165

Extended Coverage HSW (TY3382)

Chrome P/N 50-317-9-165

White Color P/N 50-317-4-165

Separately Ordered Escutcheons Style F (3" Diameter)

Chrome P/N 56-314-9-010

White Color P/N 56-314-4-010

Separately Ordered Escutcheons Style G (4" Diameter)

Chrome P/N 56-312-9-010

White Color P/N 56-312-4-010

Separately Ordered Sprinkler Wrench

Specify W-Type 25 Installation Wrench, P/N 56-314-1-001.

Separately Ordered Adjustment Spacer Ring

Specify Adjustment Spacer Ring for use with RAVEN Institutional Sprinklers, P/N 56-000-1-755.

Separately Ordered Parts for Installation in Concrete

Specify Model 1781 Centering Grommet for installation in concrete, P/N 56-000-1-781.

Specify Model 1780 Retaining Flange with Set Screws for installation in concrete, P/N 56-000-1-780.