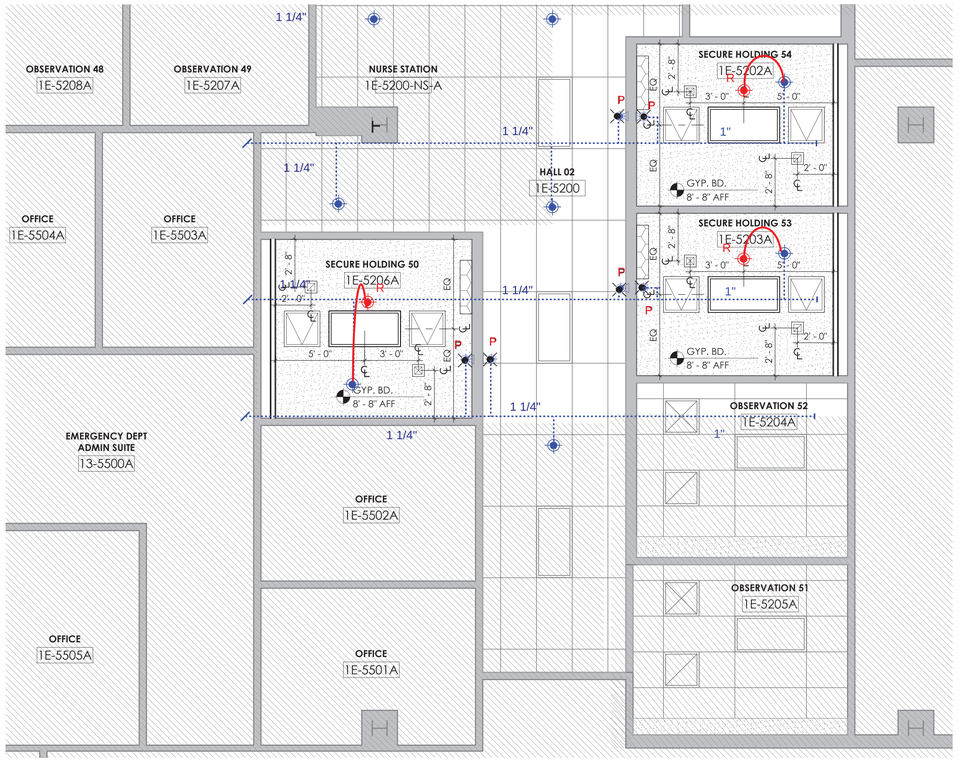
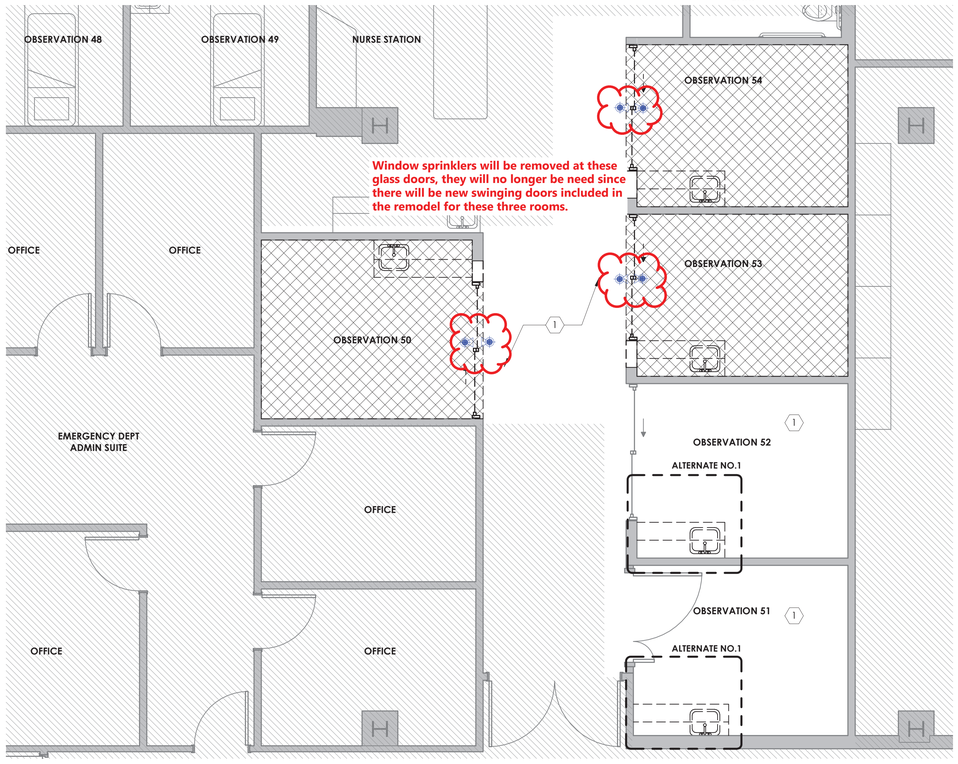


02- LEVEL 01 - REFLECTED CEILING PLAN
1/4" = 1'-0"



01- LEVEL 01 - DEMOLITION FLOOR PLAN
1/4" = 1'-0"

CITY OF AURORA NOTES
THIS PROJECT CONSISTS OF ADDING AND RELOCATING FIRE SPRINKLERS OFF THE EXISTING CORE AND SHELL SPRINKLER SYSTEM FOR THE NEW TENANT LAYOUT.
• THE BUILDING FULLY SPRINKLERED.
• BUILDING OCCUPANCY: B BUSINESS.
• SPRINKLER SYSTEM IS A WET SYSTEM.
• ALL FITTINGS ¾" THROUGH 2" TO BE DUCTILE IRON TYPE FITTINGS.
• ALL FITTINGS 2-1/2" & LARGER TO BE GROOVED TYPE FITTINGS.
• ALL HANGERS TO BE IN ACCORDANCE WITH 2013 NFPA 13 EDITIONS.
• ALL MATERIAL TO MEET 2013 NFPA 13 EDITION.
• MAXIMUM SQUARE FOOTAGE PER HEAD IS 225 SQ. FT.
• SPRINKLER CONTRACTOR TO BEGIN WORK AT THE EXISTING OVERHEAD SYSTEM.
• THE AUTHORITY HAVING JURISDICTION IS THE AURORA BUILDING DIVISION/LIFE SAFETY.
• SCOPE OF WORK IS IN ACCORDANCE WITH THE 2015 IFC AND THE 2013 NFPA 13 EDITION.

SPECIFIC NOTES REQUIRED BY THE AURORA:
• OWNER IS RESPONSIBLE FOR PROVIDING HEAT, ABOVE 40 DEGREES FAHRENHEIT, ADEQUATE
ENOUGH TO PREVENT FREEZING OF THE SPRINKLER PIPING.
• ALL VALVES CONTROLLING THE WATER SUPPLY TO 20 OR MORE SPRINKLER HEADS MUST BE SUPERVISED. AT THE TIME OF FINAL INSPECTION, FIRE SAFETY SYSTEMS MUST BE SUPERVISED BY AN APPROVED UL-LISTED MONITORING AGENCY.
• THE CONTRACTOR (OR DESIGNEE) MUST PROVIDE ALL NECESSARY TESTING EQUIPMENT AND PERFORM ALL TESTING REQUIRED BY THE LIFE SAFETY INSPECTOR.
• ALL NEW OR EXISTING FIRE ALARM SYSTEMS MUST BE INTERCONNECTED WITH THE FLOW SWITCH OF THE FIRE SPRINKLER SYSTEMS OUTSIDE HORN AND STROBE.
• INSTALLATION OF INTERIOR ALARMS ACTIVATED BY THE FIRE SPRINKLER WATER FLOW WILL BE REQUIRED PER 2015 IFC, 903.4.2. APPROVED AUDIBLE DEVICES SHALL BE CONNECTED TO EVERY AUTOMATIC FIRE SPRINKLER SYSTEM.
• IMPORTANT: IN THE EVENT THAT A CONCEALED SPACE IS NOT SHOWN ON THE PLAN SUBMITTAL AND IS DISCOVERED IN THE FIELD, THE INSTALLING CONTRACTOR MUST COMPLY WITH 2013 NFPA 13,
SECTION 8.15.1.
• ALL WATER SUPPLY VALVES AND WATER FLOW SWITCHES SHALL BE ELECTRICALLY SUPERVISED,
IFC 2015, 903.4.

FIRE SPRINKLER LEGEND:

	EXISTING 1/2" 155 QR SEMI RECESSED SPRINKLER	
	RELOCATED 1/2" 155 QR SEMI RECESSED SPRINKLER	3
	EXISITNG 1/2" WINDOW SPRINKLER TO BE REMOVED	6
TOTAL SPRINKLERS TO BE WORKED ON		9

FIRE SPRINKLER NOTES
¼" = 1'-0"
General Scope:
Relocate three sprinklers one in each of the newly remodeled patient room. The existing glass slider doors will be replaced with new swinging doors for security thus eliminating the need of the window protection into the hallway. Widow protection sprinkler will be removed, and the outlets plugged above the ceiling.

Notes:
1.All relocated fire sprinklers will be replaced with new sprinklers per NFPA 13.
2.Piping is black steel pipe with ductile iron fittings.
3.Sprinklers will be piped from existing 1" outlets.
4.All work regarding sprinkler and hanger spacing per NFPA 13 2013 edition.

PROJECT DATA

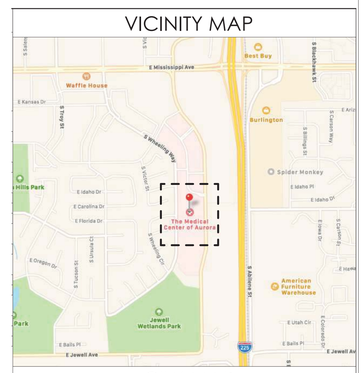
- **CODES/ LAWS:**
  CITY OF AURORA:
  2015 INTERNATIONAL BUILDING CODE (IBC)
  2015 INTERNATIONAL EXISTING BUILDING CODE (EIBC)
  ~~2017~~ NATIONAL ELECTRICAL CODE (NEC)
  2015 INTERNATIONAL MECHANICAL CODE
  2015 INTERNATIONAL PLUMBING CODE
  2015 INTERNATIONAL FUEL GAS CODE
  2015 INTERNATIONAL FIRE CODE
  2015 INTERNATIONAL ENERGY CONSERVATION CODE

  STATE OF COLORADO:
  2006 COLORADO DEPARTMENT OF HEALTH AND ENVIRONMENT - HOSPITAL LICENSING RULES
  2012 NFPA 101 - LIFE SAFETY CODE
  2018 FGI - GUIDELINES FOR DESIGN AND CONSTRUCTION OF HOSPITALS
  FEDERAL:
  2010 AMERICANS WITH DISABILITIES ACT GUIDELINES
  2009 ICC / ANSI 117.1 ACCESSIBILITY CODE
- **OCCUPANCY CLASSIFICATION:**
  2015 IBC - GROUP I-2 (SECTION 308.4)
  2012 NFPA 101 - EXISTING HEALTHCARE OCCUPANCY (CHAPTER 19)
- **PRINCIPAL OCCUPANCY TYPE:** I-2
- **CONSTRUCTION TYPE:**

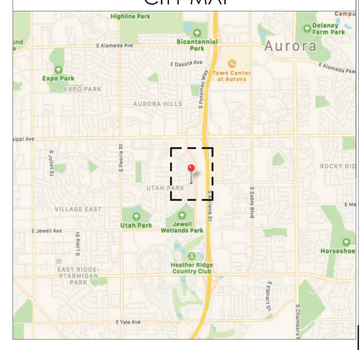
  EXISTING: SBC - TYPE 1-A, UNRESTRAINED, FULLY SPRINKLERED

  NEW: 2015 IBC - TYPE 1-A, FULLY SPRINKLERED
  2012 NFPA 220 - TYPE 1 (332)

VICINITY MAP



CITY MAP



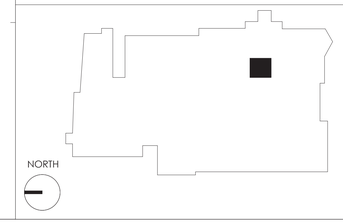
COA Adopted Codes for this project:
ICC-2015 - NEC-2020
NFPA 13-2013 - NFPA 72-2013
COA Amendments 22 & 66

City of Aurora Building Division
Counter Permit intake by: MLA
Date: Feb 03, 2021
RSN: 1516211
Permit: 2021-1924447-CT
2015 INTERNATIONAL CODES (I-CODES) Scope of permit to be field verified

THIS SET OF FIRE SPRINKLER SHOP DRAWINGS HAVE BEEN REVIEW AND FOUND TO BE ACCEPTABLE – NICET IV # 125946
SENIOR ENGINEERING TECHNICIAN – FIRE PROTECTION
Bryan A. Echelberger
BRYAN A. ECHELBERGER; SET
1/27/2021
DATE

PERFORMANCE FIRE PROTECTION INC.

KEY PLAN



19-009D TMCA MEDICAL DECISION UNIT

1501 S POTOMAC ST
AURORA, CO 80012

Issue	ISSUE FOR CONSTRUCTION
Date	**1/26/2021**
Project Number	19-009D
Drawn by	
Checked by	
Sheet Title	**FIRE SPRINKLER PLAN**
Sheet Number	**FP-1**

tyco®

Worldwide Contacts | www.tyco-fire.com

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 (HSW) 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 Coverage (light and ordinary hazard) or Extended Coverage (light hazard) applications.

- The assembly is designed with tamper-resistant features to help prohibit a false activation.
- This sprinkler is designed to operate when the Inner Link (Ref. Figure 1) is removed manually. While the design of this sprinkler makes manual removal of the Inner Link less likely, this feature negates the possibility of a tampered sprinkler placed in a condition where it would not operate in the event of a fire due to prior part removal.
- This protected, unobtrusive design helps reduce the opportunity for individuals to injure themselves or others with piecemeal components of the sprinkler.
- The flush design is aesthetically appealing by concealing all operating parts.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

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.

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 (NFPA), in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

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

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 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.

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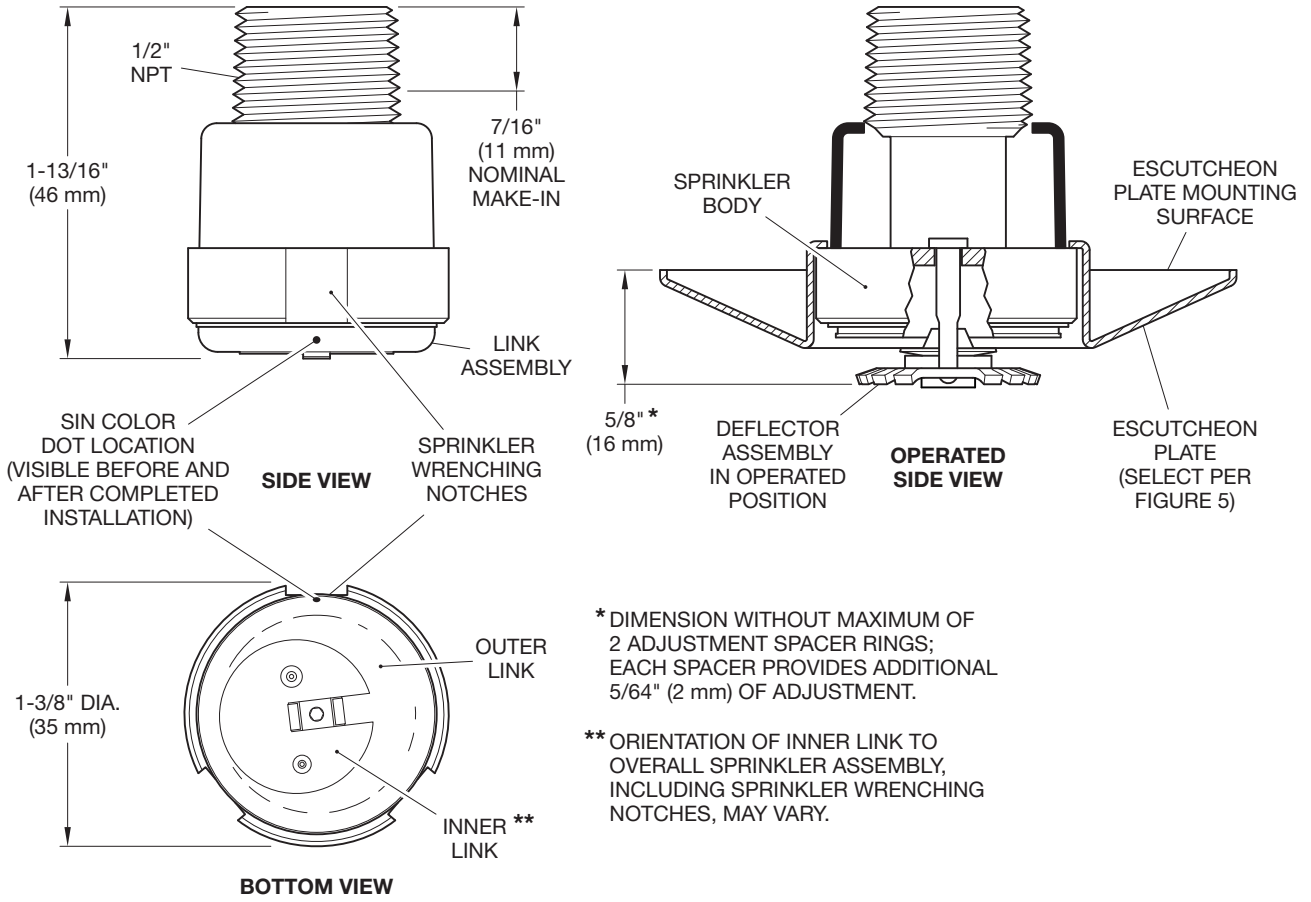


FIGURE 1
RAVEN INSTITUTIONAL PENDENT SPRINKLER
NOMINAL INSTALLATION DIMENSIONS

Technical Data

Approvals
UL and C-UL Listed

Maximum Working Pressure
175 psi (12,1 bar)

Inlet Thread Connection
1/2 in. NPT

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

Temperature Rating
165°F (74°C)

Finish
Sprinkler: White or Grey

Escutcheon: White, Grey, Chrome Coated (Carbon Steel only), or Electropolished* (Stainless Steel only)

Physical Characteristics

Body	Brass
Deflector Assembly	Bronze
Sealing Assembly	Beryllium Nickel w/TEFLON
Link Assembly	Copper
Escutcheon	Carbon Steel or Stainless Steel

* Chrome-coated appearance

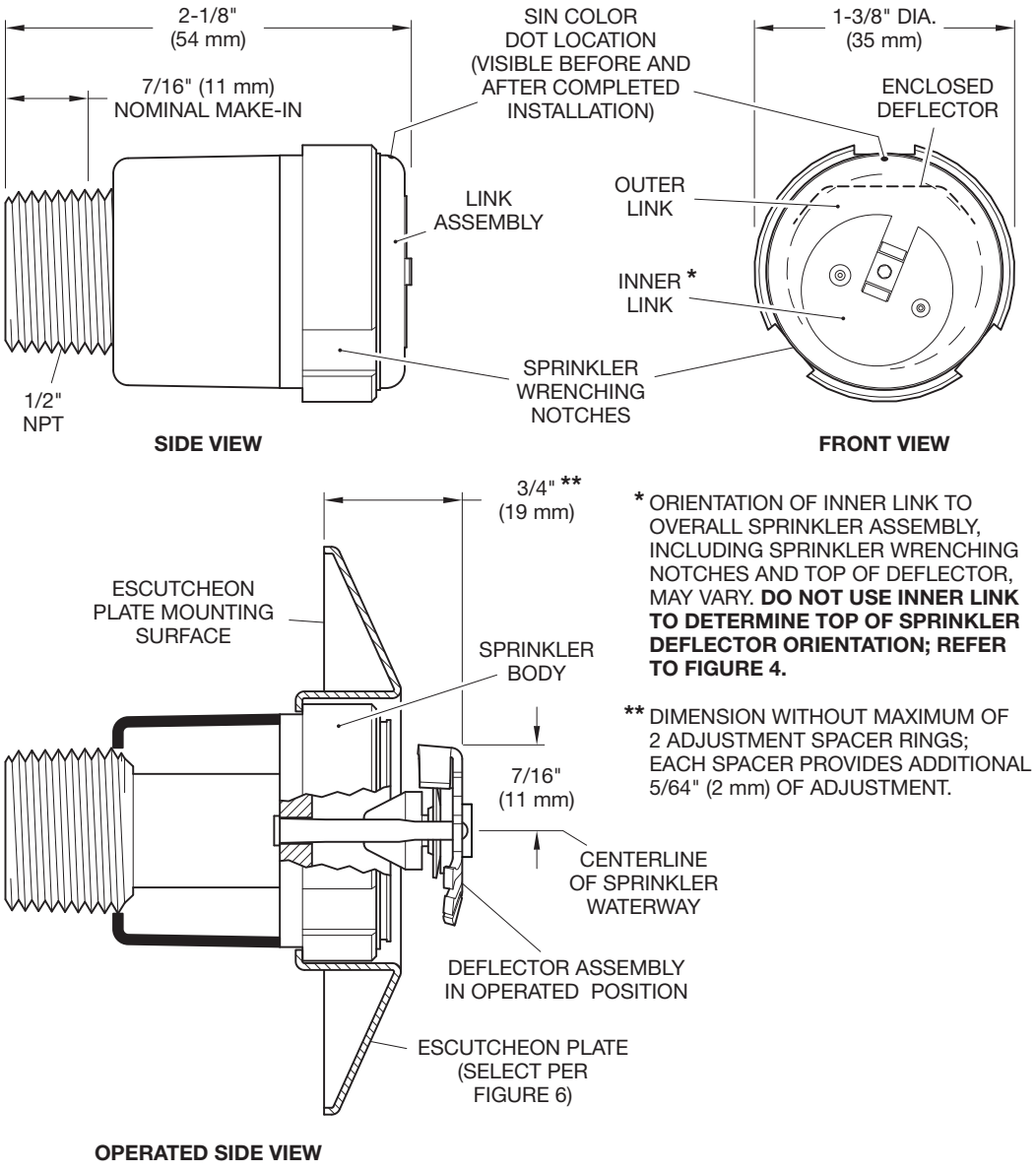
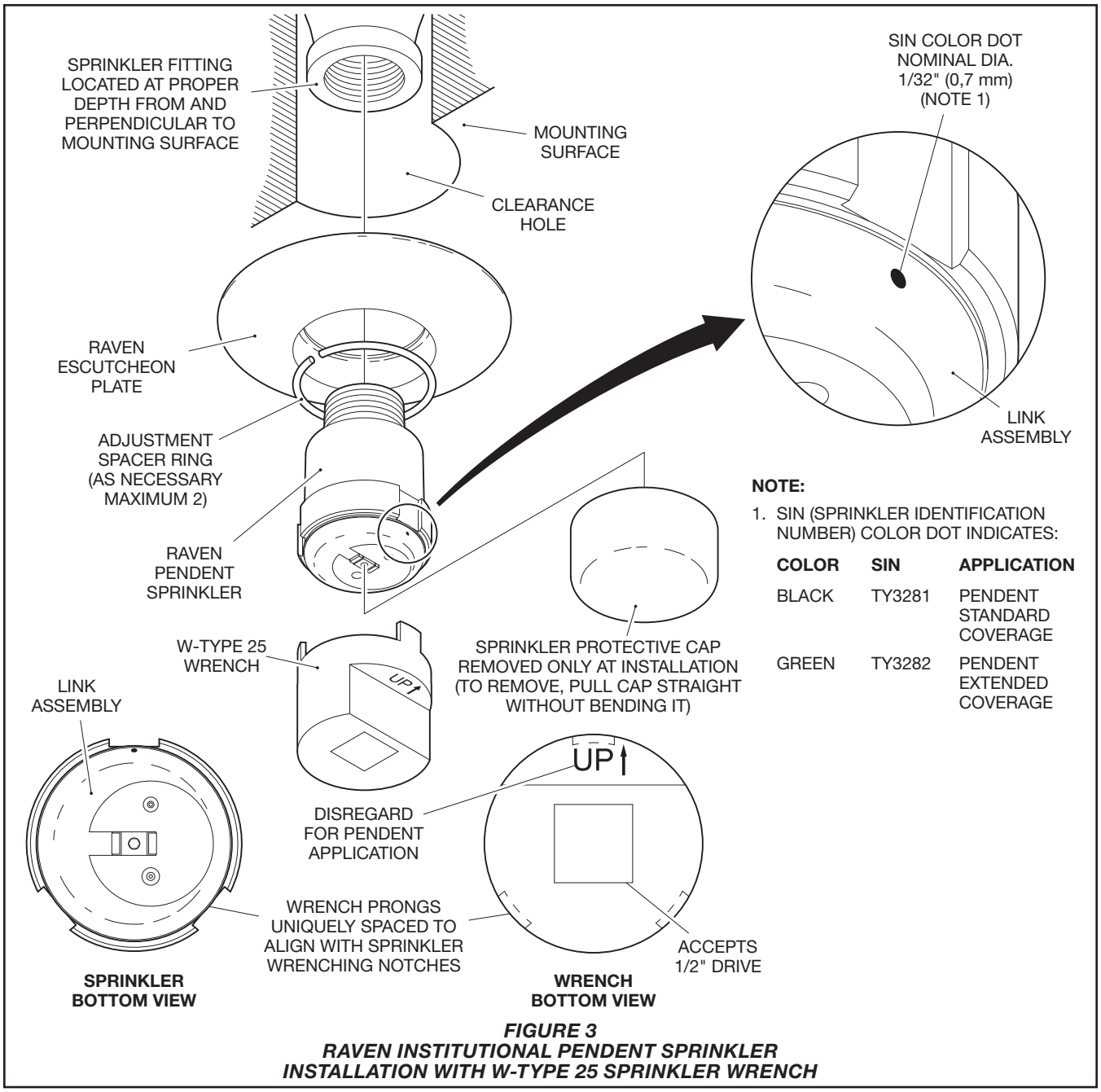


FIGURE 2
RAVEN INSTITUTIONAL HORIZONTAL SIDEWALL SPRINKLER
NOMINAL INSTALLATION DIMENSIONS

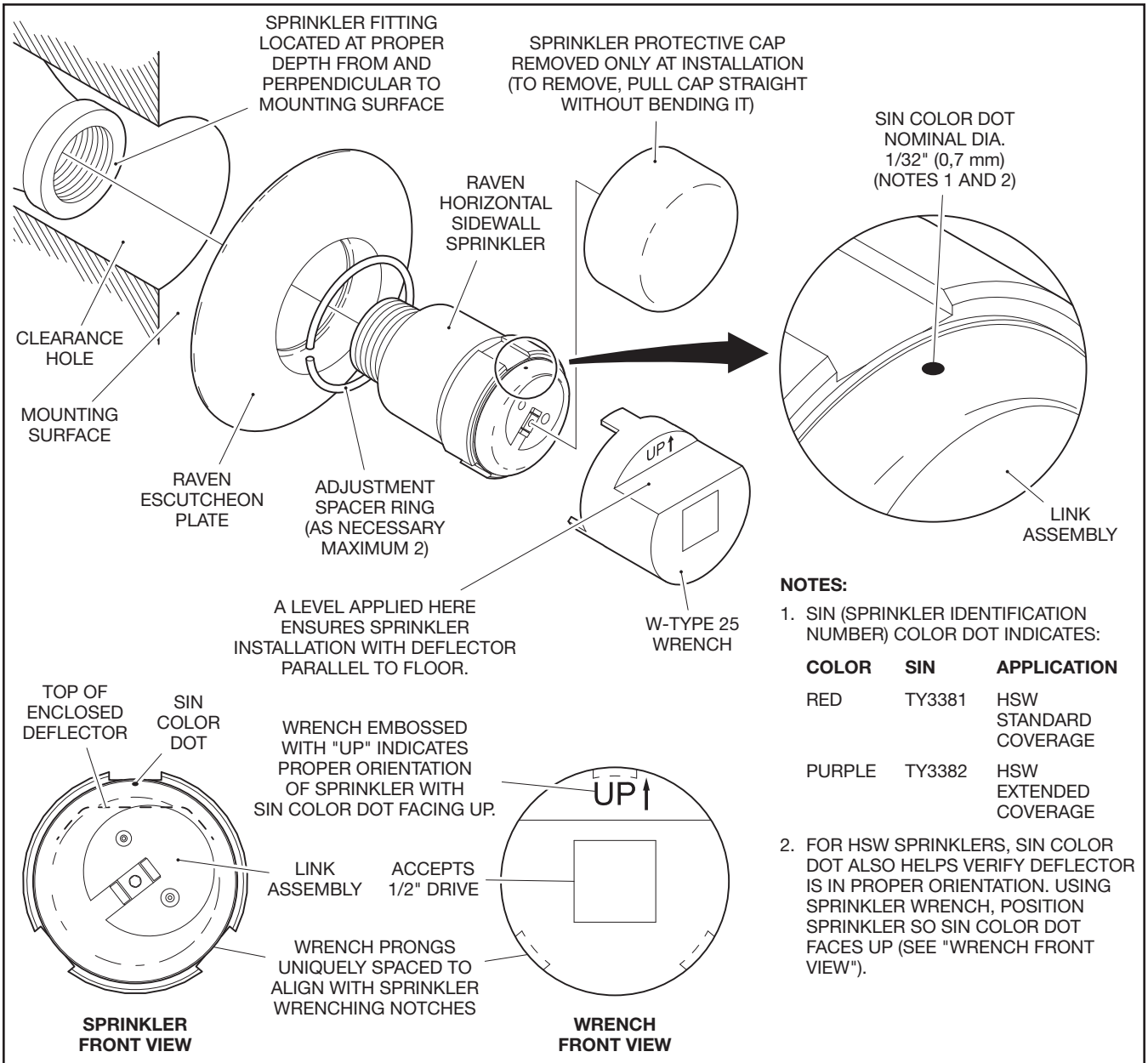


NOTE:

1. SIN (SPRINKLER IDENTIFICATION NUMBER) COLOR DOT INDICATES:

COLOR	SIN	APPLICATION
BLACK	TY3281	PENDENT STANDARD COVERAGE
GREEN	TY3282	PENDENT EXTENDED COVERAGE

FIGURE 3
RAVEN INSTITUTIONAL PENDENT SPRINKLER INSTALLATION WITH W-TYPE 25 SPRINKLER WRENCH



NOTES:

1. SIN (SPRINKLER IDENTIFICATION NUMBER) COLOR DOT INDICATES:

COLOR	SIN	APPLICATION
RED	TY3381	HSW STANDARD COVERAGE
PURPLE	TY3382	HSW EXTENDED COVERAGE

2. FOR HSW SPRINKLERS, SIN COLOR DOT ALSO HELPS VERIFY DEFLECTOR IS IN PROPER ORIENTATION. USING SPRINKLER WRENCH, POSITION SPRINKLER SO SIN COLOR DOT FACES UP (SEE "WRENCH FRONT VIEW").

FIGURE 4
RAVEN INSTITUTIONAL HORIZONTAL SIDEWALL SPRINKLER INSTALLATION WITH W-TYPE 25 SPRINKLER WRENCH

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 Inches (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] Inches (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 in. (11,1 mm) below the deflector (Ref. Figure 7).
4. Minimum spacing is for lateral distance between sprinklers located along a single wall. Otherwise adjacent sprinklers (i.e., 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

Design Criteria

General Criteria
Only escutcheons shown in Figures 5 and 6 can be utilized with TYCO RAVEN 5.6K Institutional Pendent and Horizontal Sidewall 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, thereby, also disable its principle functions of helping to avoid false sprinkler operations and avoid the opportunity for individuals to injure themselves or others with components of the sprinkler.

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 (e.g., UL Listing is based on NFPA 13 requirements).

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

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 (e.g., 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 in. to 12 in. (100 mm to 300 mm). To meet this requirement, the centerline of the sprinkler waterway must be located 4-7/16 in. to 12-7/16 in. (112,7 mm to 315,9 mm) below the ceiling (Ref. 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.

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.

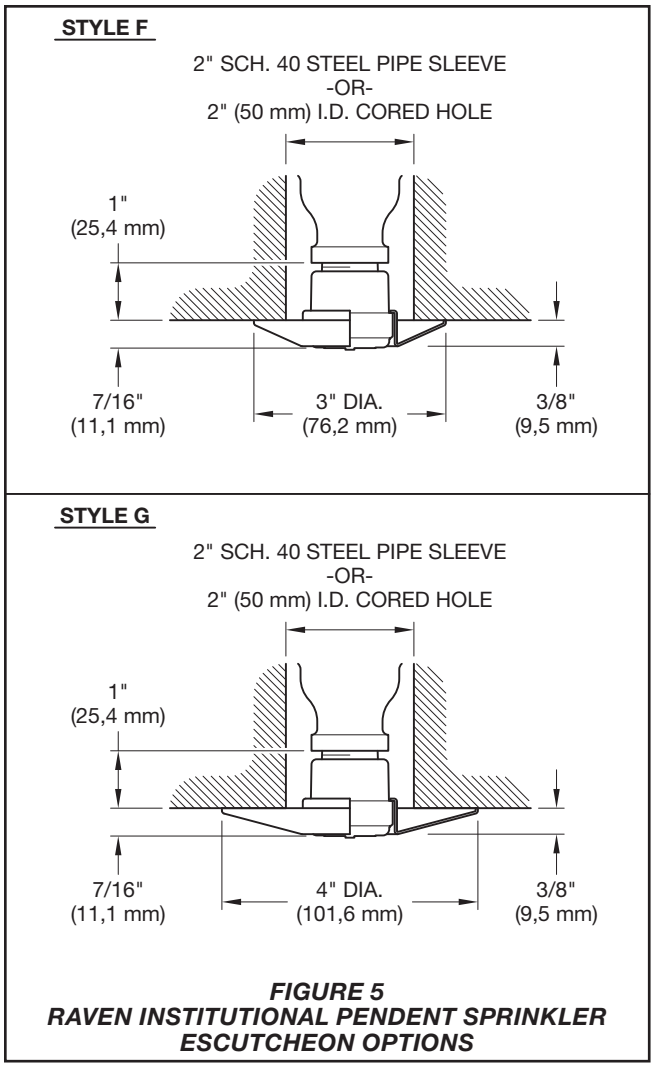


FIGURE 5
RAVEN INSTITUTIONAL PENDENT SPRINKLER ESCUTCHEON OPTIONS

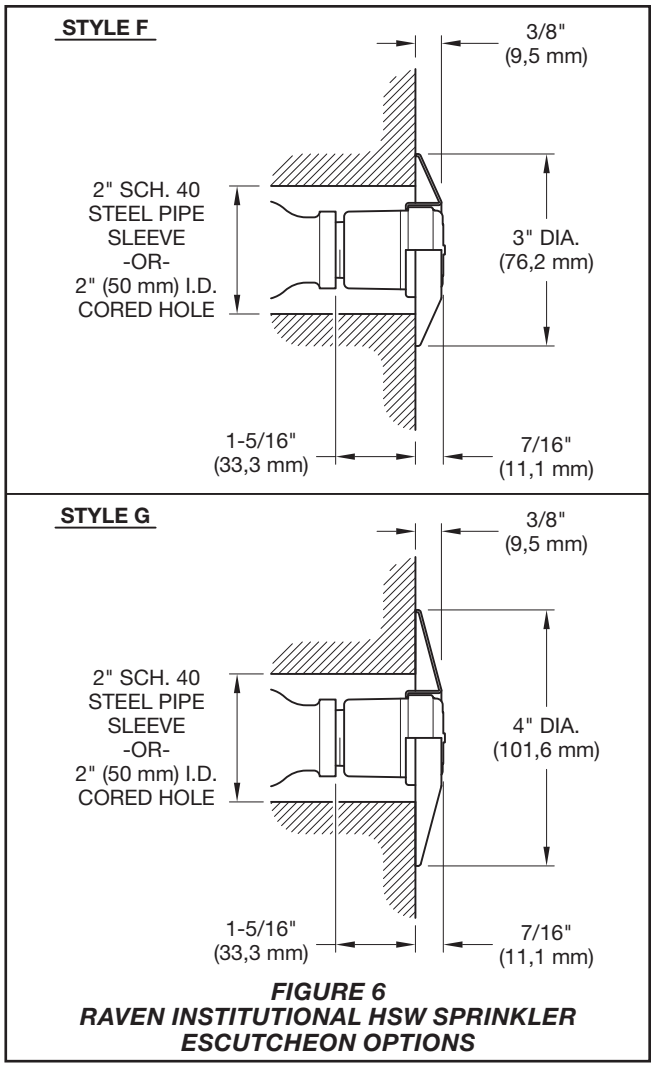


FIGURE 6
RAVEN INSTITUTIONAL HSW SPRINKLER ESCUTCHEON OPTIONS

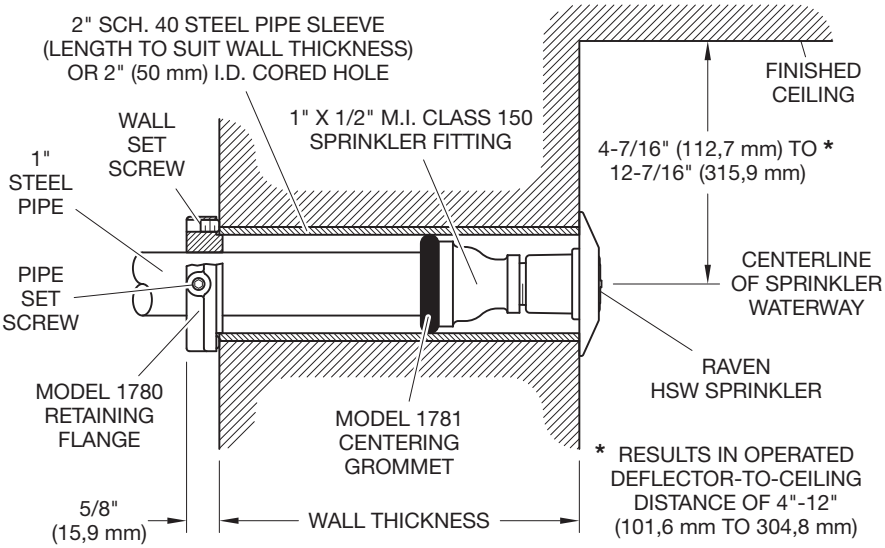


FIGURE 7
MODEL 1780 RETAINING FLANGE AND MODEL 1781 CENTERING GROMMET HORIZONTAL INSTALLATION FOR PENDENT

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Installation

TYCO RAVEN 5.6K Institutional Pendent and Horizontal Sidewall Sprinklers must be installed in accordance with this section.

General Instructions

Integrity of the tamper-resistant design of RAVEN Escutcheons is dependent on the piping installation design. When installed properly, the escutcheon is held fast (i.e., tight with no movement or gap) to the mounting surface (ceiling or wall, as applicable) by tightening the sprinkler assembly into the sprinkler fitting. Be careful not to create too much force between the escutcheon and wall, as extensive force may cause issues with the pulling of the sprinkler body from the stem, possibly causing warping, cracks, and leaks.

A tamper-resistant 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 (Ref. Figures 5 & 6).
- The sprinkler fitting must be rigidly secured and immobile through the use of the retaining flange, installed flush to the back of the wall or above the ceiling and secured with the pipe set screws.
- The centerline of the sprinkler fitting must be perpendicular to the mounting surface to assure that the Institutional Escutcheon sits squarely against the mounting surface around its entire perimeter.

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, and the retaining flange set flush to the back of the wall or above the ceiling and secured with the retaining flange pipe set screws. This technique will help overcome problems with assuring that the escutcheon is held fast to the mounting surface (i.e., tight with no movement or gap).

It is recommended that flexible sprinkler piping is used to connect the sprinkler pipe to the supply piping to maximize installation flexibility and to ensure that the sprinkler and the escutcheon are installed properly, as shown in Figure 7.

A 1/2 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). 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 (i.e., tight with no movement or gap) to the mounting surface and that the escutcheon sits squarely against the mounting surface around its entire perimeter.

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

- TEFLON tape
- TYCO W-Type 25 Installation Wrench
- 1/2 in. drive ratchet wrench
- Torque wrenches
- Ratchet extension (optional)
- Level

NOTICE

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 1. 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 two (2) and four (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 2. 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 3. 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 4. With the Wrench on the sprinkler, place the escutcheon over the sprinkler.

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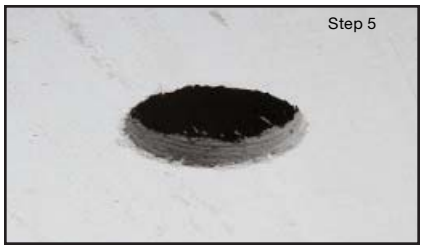
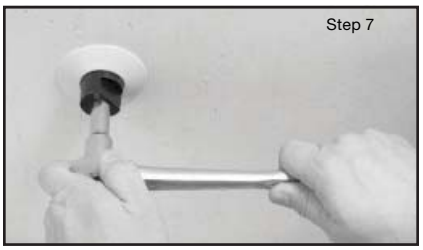


Step 5. Ensure that the ceiling/wall is smooth for the escutcheon to sit against and that the distance from the ceiling/wall surface to the sprinkler fitting is appropriate. As shown in Figures 5 and 6, the take-out dimensions are 1 inch for pendent sprinklers and 1-5/16 inches for horizontal sidewall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

NOTICE

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 6. 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, and are also uniquely spaced to align with the sprinkler wrenching notches in one position.



Step 7. Wrench-tighten the sprinkler using only the TYCO W-Type 25 Installation Wrench (Ref. Figure 3).

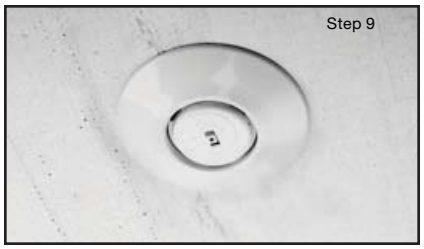
Insert a 1/2 in. drive ratchet wrench (with or without the extension) into the TYCO W-Type 25 Installation Wrench. Ensure the ratchet wrench remains parallel to the ceiling/wall. A ratchet extension can help to keep the wrench in line with the sprinkler. Torque for the RAVEN Institutional Sprinkler is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

NOTICE

To help prevent slippage of the wrench and while using a 1/2 in. 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 wrenches. Adjust first with a 7 lb-ft torque wrench, followed by adjusting with a 14 lb-ft wrench.

Step 8. For horizontal sidewall sprinklers, a Level can be placed on top of the flat surface of the TYCO W-Type 25 Installation Wrench to orient the sprinkler correctly.



Step 9. 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 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, and the retaining flange set flush to the back of the wall or above the ceiling and secured with the retaining flange pipe set screws. 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 (i.e., tight with no movement or gap) to the mounting surface and as an option to relocating the sprinkler fitting (increasing the face-of-fitting to face-of-mounting surface distance), up to two (2) 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.

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Care and Maintenance

TYCO RAVEN 5.6K Institutional Pendent and Horizontal Sidewall Sprinklers 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 system from the proper authorities and notify all personnel who may be affected by this action.

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 RAVEN 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.

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. Refer to the Installation section for additional information.

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.

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. Contact the installing contractor or product 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.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Disclaimer for RAVEN Institutional Sprinklers

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

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 (specify) Finish, and P/N (specify):

Standard Coverage Pendent (TY3281)
White 50-314-4-165
Grey 50-314-9-165
Standard Coverage HSW (TY3381)
White 50-316-4-165
Grey 50-316-9-165
Extended Coverage Pendent (TY3282)
White 50-315-4-165
Grey 50-315-9-165
Extended Coverage HSW (TY3382)
White 50-317-4-165
Grey 50-317-9-165

Separately Ordered Escutcheons Style F (3 in. Diameter)
Carbon Steel
White 56-314-4-010
Grey 56-314-7-010
Chrome Coated 56-314-9-010
Stainless Steel
White 56-318-4-010
Grey 56-318-7-010
Electropolished* 56-318-9-010

Separately Ordered Escutcheons Style G (4 in. Diameter)
Carbon Steel
White 56-312-4-010
Grey 56-312-7-010
Chrome Coated 56-312-9-010
Stainless Steel
White 56-319-4-010
Grey 56-319-7-010
Electropolished* 56-319-9-010

* Chrome-coated appearance

Separately Ordered Sprinkler Wrench
Specify: W-Type 25 Installation Wrench, P/N 56-314-1-001

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

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

1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700

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Johnson Controls

Eddythread 40

A Lightweight Schedule 40 Replacement Pipe That Has a Corrosion Resistance Ratio of 1.0

Bull Moose Tube Company has been making pipe for a long time and is recognized as a producer of quality pipe products. Eddythread 40 is designed with the same thoroughness as our other fine pipe products and now our customers have an option to buy a carefully designed replacement for Schedule 40 that:

- Has a Corrosion Resistance Ratio of 1.0
- Has a Pressure Rating of 300 psi
- Is Lighter Weight Than Schedule 40
- Is Approved by Factory Mutual and Listed by Underwriters Laboratories
- Is Produced in Accordance to ASTM A-135 and A-795
- Can be Used With Standard Schedule 40 Threaded Fittings, Couplings and Valves
- Is Produced From Steel With Excellent Properties of Strength and Threadability
- Can be Used in Wet, Dry, Preaction, and Deluge Type Sprinkler Systems*
- Offers Lower Freight Costs

EDDYTHREAD 40 SPECIFICATIONS

NOMINAL PIPE SIZE (in)	WEIGHT (lbs/ft)	I.D. (in)	BUNDLE SIZE
1	1.461	1.083	70
1 1/4	2.070	1.418	51
1 1/2	2.547	1.654	44
2	3.308	2.123	30

CORROSION RESISTANCE RATIOS

NOMINAL PIPE SIZE (in)	SCHEDULE 40	EDDYTHREAD 40
1	1.00	1.00
1 1/4	1.00	1.00
1 1/2	1.00	1.00
2	1.00	1.00

** Eddythread 40 can be hot dipped galvanized to meet FM's requirement for dry systems*

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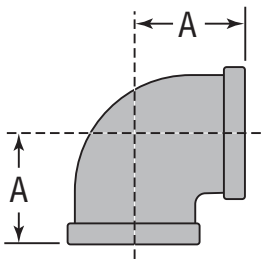
FIG. 3201

90° Elbow



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For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3201 - 90° ELBOW

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
In. (mm)	*PSI (kPa)*	*In. (mm)*	*Lbs. (kg)*
1 *20*	500 *3450*	1.50 *38.10*	0.62 *0.28*
1¼ *32*	500 *3450*	1.75 *44.45*	0.90 *0.41*
1½ *40*	500 *3450*	1.94 *49.276*	1.20 *0.54*
2 *50*	500 *3450*	2.25 *57.15*	1.85 *0.84*

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ **Approved**
Address:	☐ **Approved as noted**
Contractor:	☐ **Not approved**
Engineer:	**Remarks:**
Submittal Date:	
Notes 1:	
Notes 2:	

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FIG. 3205

Straight Tee

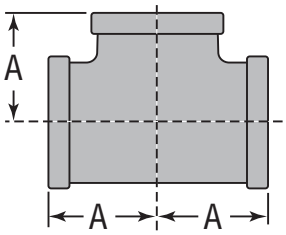

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FIGURE 3205 - STRAIGHT TEE

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
In. (mm)	*PSI (kPa)*	*In. (mm)*	*Lbs. (kg)*
1 *25*	500 *3450*	1.50 *38.10*	0.85 *0.39*
1¼ *32*	500 *3450*	1.75 *44.45*	1.22 *0.55*
1½ *40*	500 *3450*	1.94 *49.27*	1.55 *0.70*
2 *50*	500 *3450*	2.25 *57.15*	2.45 *1.11*

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ **Approved**
Address:	☐ **Approved as noted**
Contractor:	☐ **Not approved**
Engineer:	**Remarks:**
Submittal Date:	
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Notes 2:	

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FIG. 3221R

Reducing Coupling

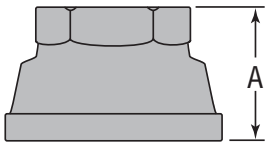

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FIGURE 3221R - REDUCING COUPLING

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
In. (mm)	*PSI (kPa)*	*In. (mm)*	*Lbs. (kg)*
1 x ½ *25 x 15*	500 *3450*	1.69 *42.92*	0.39 *0.18*
1 x ¾ *25 x 20*	500 *3450*	1.69 *42.92*	0.53 *0.24*

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ **Approved**
Address:	☐ **Approved as noted**
Contractor:	☐ **Not approved**
Engineer:	**Remarks:**
Submittal Date:	
Notes 1:	
Notes 2:	