FIRE PROTECTION SUBMITTAL SHEETS

PROJECT:

WALMART #0767

2767 W US HWY 90
LAKE CITY, FL 32055

Cuhaci & Peterson
Architects Engineers Planners

- ☑ *Reviewed, no comments*
- ☐ *Rejected*
- ☐ *Submit specific item*
- ☐ *Furnish as corrected*
- ☐ *Revise and resubmit*

This review is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication processes, or to the means, methods, techniques, sequences and procedures of construction; coordination of the Work with that of all trades; and for performing all work in a safe and satisfactory manner.

Date: 9/13/2022 By: vim.abanador

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LISTING AND APPROVAL

THIS IS A GENERAL SUBMITTAL. ITEMS LISTED HEREIN MAY OR MAY NOT BE USED IN THE COMPLETION OF THIS WORKING FIRE PROTECTION SYSTEM.

Series ELO-231FRB – 11.2 K-factor Upright and Pendent Sprinklers Quick Response, Standard Coverage

General Description

TYCO Series ELO-231FRB 11.2K Quick Response, Standard Coverage, Upright and Pendent Sprinklers (Ref. Figure 1) are automatic sprinklers of the frangible bulb type. They are quick response spray sprinklers that produce a hemispherical water distribution pattern below the deflector.

The 11.2K ELO-231FRB Upright and Pendent Sprinklers were subjected to full scale, high-piled storage fire tests to qualify their use in lieu of 5.6 or 8.0 K-factor standard spray sprinklers for the protection of high-piled storage.

Higher flow rates can be achieved at much lower pressures with the 11.2K ELO-231FRB Sprinklers, making their use highly advantageous in high density applications, such as the protection of high-piled storage.

For in-rack applications, an upright intermediate level version of the Series ELO-231FRB Sprinklers can be obtained by utilizing the Series ELO-231FRB Upright Sprinkler with the WSG-2 Guard & Shield, and a pendent intermediate level version of the Series ELO-231FRB Sprinklers can be obtained by utilizing the Series ELO-231FRB Pendent Sprinkler with the WS-2 Shield. If there is a possibility of the pendent intermediate level version being exposed to mechanical damage, a G-2 Guard can be added.

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

The Series ELO-231FRB 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 (NFPA), 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. Contact the installing contractor or product manufacturer with any questions.

Installation of Series ELO-231FRB Pendent Sprinklers in recessed escutcheons will void all sprinkler warranties, as well as possibly void the sprinkler's Approvals and/or Listings.

NFPA 13 prohibits the installation of 1/2 in. NPT sprinklers with a K-factor greater than 5.6K in new installations. They are intended for use in retrofit applications only.

Sprinkler Identification Numbers (SINs)

Refer to Table A for sprinkler identification numbers.

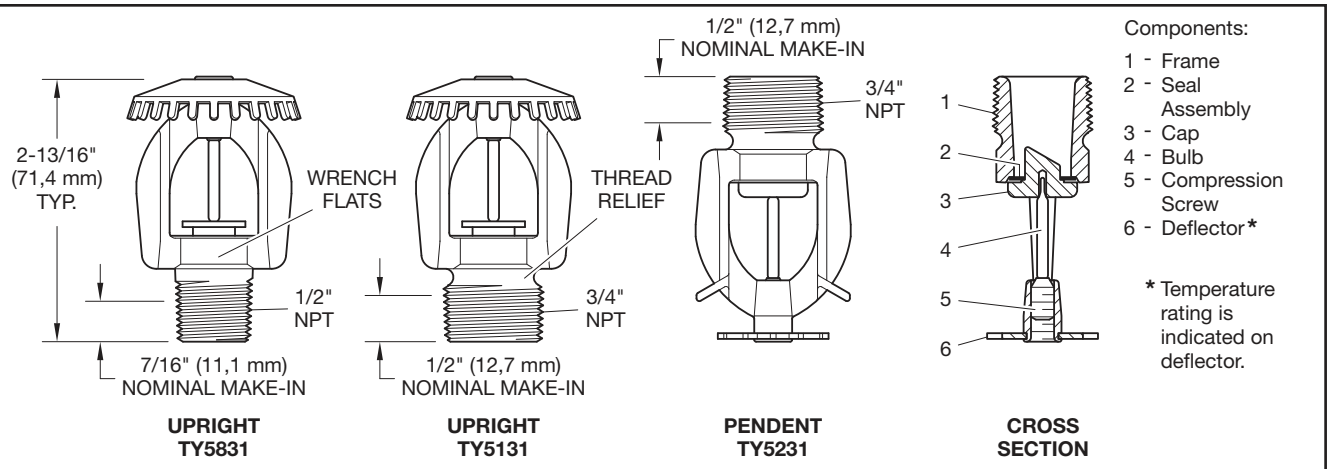


FIGURE 1
SERIES ELO-231FRB 11.2K UPRIGHT - 3/4 IN. NPT (TY5131), UPRIGHT - 1/2 IN. NPT (TY5831), AND PENDENT - 3/4 IN. NPT (TY5231) SPRINKLERS

Technical Data

Approvals
UL and C-UL Listed
FM Approved
NYC Approved
VdS Approved
LPCB Approved

Refer to Table A for complete approval information.

UL and C-UL Listings and FM Approval apply to the service conditions described in the Design Criteria section.

Finishes
Sprinkler: Refer to Table C

Physical Characteristics
Frame . . . . . Bronze
Cap . . . . . Bronze
Sealing Assembly . . Beryllium Nickel w/TEFLON
Bulb (3mm dia.) . . . . . Glass
Compression Screw . . . . . Bronze
Deflector . . . . . Bronze

Additional Technical Data
Refer to Table A for additional technical data.

Item	Description
Sprinkler Identification Number (SIN)	TY5131 – Upright 3/4 in. NPT TY5231 – Pendent 3/4 in. NPT TY5831 - Upright 1/2 in. NPT TY5131 is a re-designation for Central SIN C5131. TY5231 is a re-designation for Central SIN C5231, G1870, and S2551.
K-factor, (gpm/psi) (lpm/bar)	K=11.2 GPM/psi½ (161,4 LPM/bar½)
Temperature Rating °F (°C)[1]	155°F (68°C)[1] 200°F (93°C) 286°F (141°C)
Thread Size	3/4 in. NPT or 1/2 in. NPT
Sprinkler Orientation	Upright/Pendent
Maximum Working Pressure, psi (bar)	175 psi (12,1 bar)

Notes:
1. Refer to Table C for laboratory listings and approvals.

TABLE A
SERIES ELO-231FRB 11.2K UPRIGHT AND PENDENT SPRINKLERS TECHNICAL DATA

Operation

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 water to flow.

Design Criteria

UL and C-UL Listings Requirements
The 11.2K Model ELO-231FRB (TY5131, TY5231, and TY5831) Sprinklers are to be installed in accordance with NFPA 13 standard sprinkler position and area/density flow calculation requirements for light or ordinary occupancies, as well as high-piled storage occupancies (solid-piled, palletized, rack storage, bin box, and shelf storage including but not limited to Class I-IV and Group A plastics) with a minimum residual (flowing) pressure of 7 psi (0,5 bar) for wet pipe systems only. Refer to Table B for additional information

FM Approval Requirements
The 11.2K Model ELO-231FRB (TY5131 & TY5231) Sprinklers are to be installed in accordance with the applicable control mode density/area guidelines provided by FM Approvals for wet systems only.

Note: *FM Approvals guidelines may differ from UL and C-UL Listings criteria.*

Storage Type	NFPA	FM Global
Sprinkler Type	Standard Coverage	Storage
Response Type	QR	QR
System Type	Wet	Wet
Temperature Rating ºF (ºC)[1]	155°F (68°C)[1] 200°F (93°C) 286°F (141°C)	155°F (68°C)[1] 200°F (93°C) 286°F (141°C)
Open Frame (i.e., no solid shelves) Single, Double, Multiple-Row, or Portable Rack Storage of Class I-IV and Group A or B Plastics	Refer to NFPA 13	Refer to FM 2-0 and 8-9
Solid Pile or Palletized Storage of Class I-IV and Group A or B Plastics	Refer to NFPA 13	Refer to FM 2-0 and 8-9
Idle Pallet Storage	Refer to NFPA 13	Refer to FM 2-0, 8-9, and 8-24
Rubber Tire Storage	Refer to NFPA 13	Refer to FM 2-0 and 8-3
Roll Paper Storage (Refer to the Standard)	Refer to NFPA 13	Refer to FM 8-21
Flammable/Ignitable Liquid Storage (Refer to the Standard)	Refer to NFPA 30	Refer to FM 7-29
Aerosol Storage (Refer to the Standard)	Refer to NFPA 30B	Refer to FM 7-31
Automotive Components in Portable Racks (Control mode only; refer to the Standard)	Refer to NFPA 13	N/A

Notes:
1. Refer to Table C for laboratory listings and approvals.

N/A – Not Applicable

TABLE B
SERIES ELO-231FRB 11.2K UPRIGHT AND PENDENT SPRINKLERS
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW

SPRINKLER TYPE	TEMPERATURE RATING	BULB LIQUID COLOR	SPRINKLER FINISH	
			NATURAL BRASS	CHROME PLATED
UPRIGHT (TY5131) & PENDENT (TY5231)	155°F (68°C)	Red	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6
	200°F (93°C)	Green		
	286°F (141°C)	Blue		
UPRIGHT (TY5831)	155°F (68°C)	Red	1	N/A
	200°F (93°C)	Green		

Notes:
1. UL Listed
2. C-UL Listed
3. FM Approved
4. NYC Approved under MEA 291-04-E
5. VdS Approved, TY5131 Ref. No. G410022 and TY5231 Ref. No. G410023
6. LPCB Approved, TY5131 Ref. No. 094c/01 and TY5231 Ref. No. 094c/02

N/A - Not Available

TABLE C
SERIES ELO-231FRB UPRIGHT AND PENDENT 11.2K SPRINKLERS, QUICK RESPONSE
LABORATORY LISTINGS AND APPROVALS
(Refer to the Design Criteria Section)

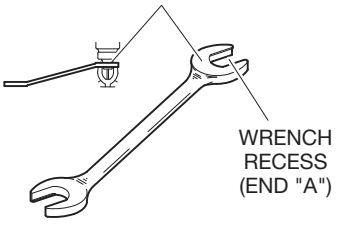


FIGURE 2
W-TYPE 3
SPRINKLER WRENCH

Installation

TYCO Series ELO-231FRB 11.2K Quick Response, Standard Coverage, Upright and Pendent Sprinklers must be installed in accordance with this section.

General 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 in. (1,6 mm) for the 155°F (68°C) to 3/32 in. (2,4 mm) for the 286°F (141°C) temperature ratings.

A leak tight 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). A leak-tight 3/4 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 10 to 20 lb-ft (13,4 to 26,8 N·m). Higher levels of torque can distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to make up for insufficient adjustment in the escutcheon plate by under- or over-tightening the sprinkler. Readjust the position of the sprinkler fitting to suit.

The Series ELO-231FRB Upright and Pendent Sprinklers must be installed in accordance with the following instructions:

Step 1. Upright sprinklers are to be installed in the upright position; pendent sprinklers are to be installed in the pendent position.

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

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 3 Sprinkler Wrench (Ref. Figure 2). With reference to Figure 1, the W-Type 3 Sprinkler Wrench is to be applied to the wrench flats.

Care and Maintenance

TYCO Series ELO-231FRB 11.2K Quick Response, Standard Coverage, Upright and Pendent Sprinklers must be maintained and serviced in accordance with this section.

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

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 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. For additional information, refer to the Installation section.

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 with 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.

P/N 50 — XXX — X — XXX

		SIN
500	11.2K UPRIGHT (3/4 in. NPT)	TY5131
502	11.2K PENDENT (3/4 in. NPT)	TY5231
503	11.2K UPRIGHT (1/2 in. NPT)	TY5831[b]

	SPRINKLER FINISH
1	NATURAL BRASS
9	CHROME PLATED[a]

a. For TY5131 and TY5231 sprinklers only.
b. For retrofit applications only.

	TEMPERATURE RATING
155	155°F (68°C)
200	200°F (93°C)
286	286°F (141°C)[a]

TABLE D
SERIES ELO-231FRB UPRIGHT & PENDENT 11.2K SPRINKLERS, QUICK RESPONSE PART NUMBER SELECTION

Limited Warranty

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

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler
Specify: Series ELO-231FRB 11.2K Quick Response (specify Pendent or Upright) Sprinkler, (specify SIN), (specify) temperature rating, (specify) finish, P/N (specify from Table D)

Sprinkler Wrench
Specify: W-Type 3 Sprinkler Wrench, P/N 56-895-1-001

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

Johnson Controls

Series TY-FRB – 2.8, 4.2, 5.6, and 8.0 K-Factor Upright, Pendent, and Recessed Pendent Sprinklers Quick Response, Standard Coverage

General Description

The TYCO Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent Sprinklers described in herein are quick response, standard coverage, decorative 3 mm glass bulb-type spray sprinklers. They are designed for use in light or ordinary hazard, commercial occupancies such as banks, hotels, and shopping malls.

The TY-FRB Recessed Pendent Sprinkler, where applicable, is intended for use in areas with a finished ceiling. This recessed pendent sprinkler uses one of the following Recessed Escutcheons:

- A two-piece Style 10 (1/2 in. NPT) or Style 40 (3/4 in. NPT) Recessed Escutcheon with 1/2 in. (12,7 mm) of recessed adjustment or up to 3/4 in. (19,1 mm) of total adjustment from the flush pendent position.
- A two-piece Style 20 (1/2 in. NPT) or Style 30 (3/4 in. NPT) Recessed Escutcheon with 1/4 in. (6,4 mm) of recessed adjustment or up to 1/2 in. (12,7 mm) of total adjustment from the flush pendent position.

The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut.

Corrosion-resistant coatings, where applicable, are utilized to extend the life of copper alloy sprinklers beyond what would be obtained when exposed to corrosive atmospheres. Although corrosion-resistant coated sprinklers have passed the standard corrosion tests of the applicable approval agencies, the testing is not representative of all possible corrosive atmospheres. Consequently, it is recommended that the end user be consulted with respect to the suitability of these coatings for any given corrosive environment. The effects of ambient temperature, concentration of chemicals, and gas/chemical velocity, should be considered, as a minimum, along with the corrosive nature of the chemical to which the sprinklers will be exposed.

An intermediate level version of the Series TY-FRB Pendent Sprinklers is detailed in Technical Data Sheet TFP356. Sprinkler Guards are detailed in Technical Data Sheet TFP780.

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

The Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent 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.

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.

NFPA 13 prohibits installation of 1/2 in. NPT sprinklers with K-factors greater than 5.6 in new construction. They are intended for retrofit in existing sprinkler systems only.

Sprinkler Identification Number (SIN)

TY1131 . . . Upright 2.8K, 1/2 in. NPT
TY1231 . . Pendent 2.8K, 1/2 in. NPT
TY2131 . . . Upright 4.2K, 1/2 in. NPT
TY2231 . . Pendent 4.2K, 1/2 in. NPT
TY3131 . . . Upright 5.6K, 1/2 in. NPT
TY3231 . . Pendent 5.6K, 1/2 in. NPT
TY4131 . . . Upright 8.0K, 3/4 in. NPT
TY4231 . . Pendent 8.0K, 3/4 in. NPT
TY4831 . . . Upright 8.0K, 1/2 in. NPT
TY4931 . . Pendent 8.0K, 1/2 in. NPT

Technical Data

Approvals
UL and C-UL Listed
FM, LPCB, and NYC Approved

See Tables A, B, C and D for complete approval information including corrosion-resistant status.

Maximum Working Pressure
See Table E

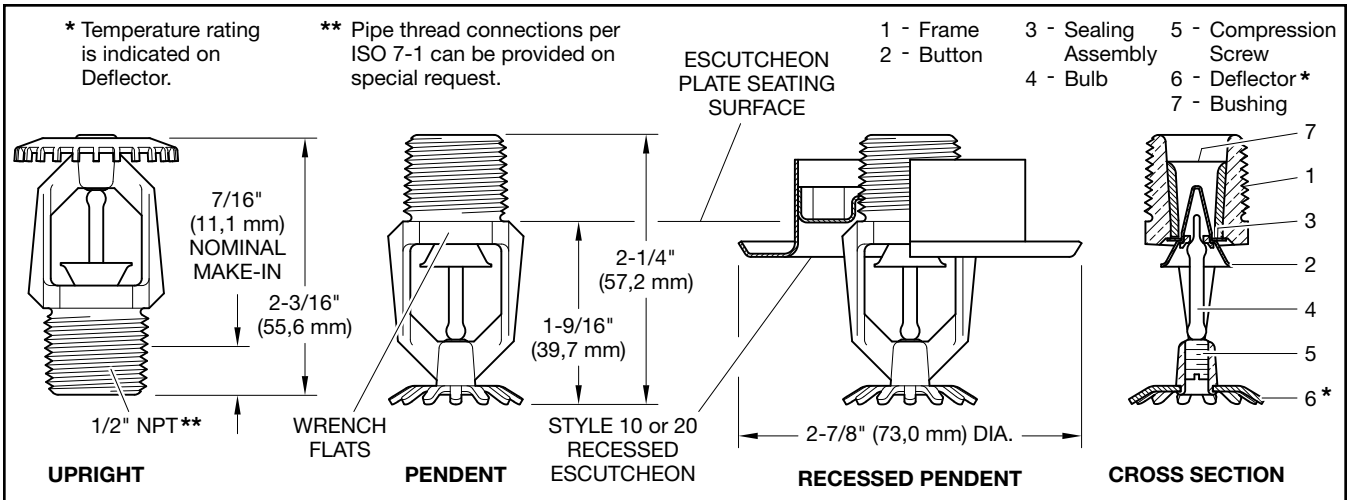


FIGURE 1
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY1131) AND PENDENT (TY1231) SPRINKLERS
2.8 K-FACTOR, 1/2 IN. NPT

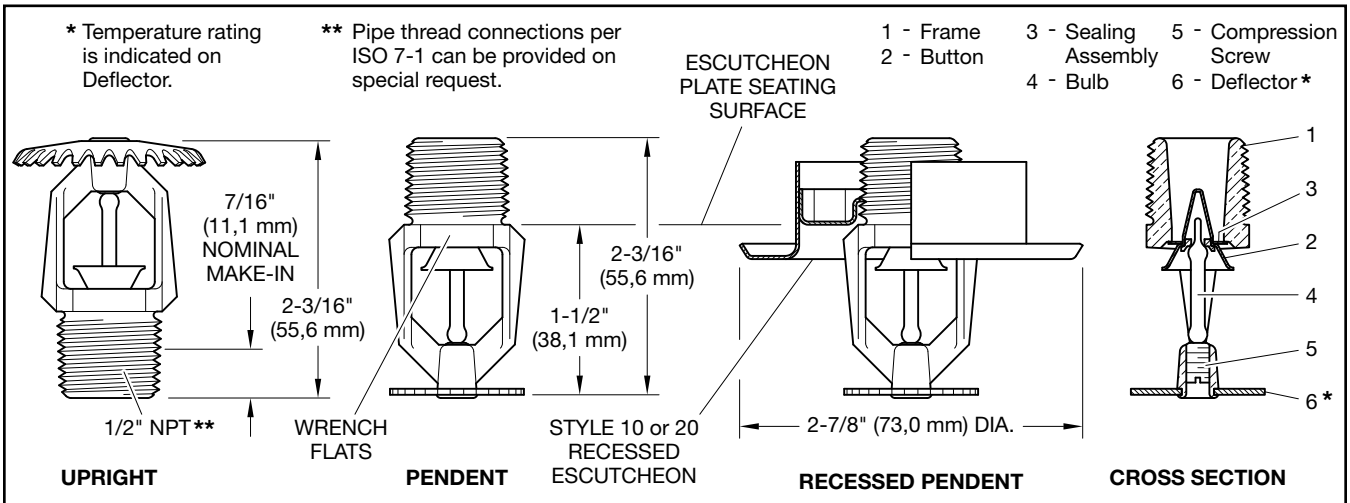


FIGURE 2
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY2131) AND PENDENT (TY2231) SPRINKLERS
4.2 K-FACTOR, 1/2 IN. NPT

Discharge Coefficient
K=2.8 GPM/psi½ (40,3 LPM/bar½)
K=4.2 GPM/psi½ (60,5 LPM/bar½)
K=5.6 GPM/psi½ (80,6 LPM/bar½)
K=8.0 GPM/psi½ (115,2 LPM/bar½)

Temperature Rating
See Tables A and B

Finishes
Sprinkler: See Table D

Recessed Escutcheon: Signal or Pure White, Grey Aluminum, Jet Black, Chrome Plated, or Natural Brass

Physical Characteristics
Frame . . . . . Bronze
Button . . . . . Brass/Copper
Sealing Assembly . . Beryllium Nickel w/TEFLON
Bulb . . . . . Glass
Compression Screw . . . . . Bronze
Deflector . . . . . Copper/Bronze
Bushing (K=2.8) . . . . . Bronze

Poly-Stainless
Physical Characteristics
Frame . . . . . Bronze
Button . . . . . L316 Stainless Steel*
Bulb . . . . . Glass
Compression Screw . . . . . L316 Stainless Steel*
Deflector . . . . . Copper/Bronze
Sealing Assembly . Gold Plated Beryllium Nickel w/TEFLON

*Type L316 stainless steel (UNS 31603) per ASTM A479/479M or BS EN 1008 WN1.4404.

Operation

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 water to flow.

Design Criteria

The TYCO Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency, such as UL Listing based on the requirements of NFPA 13 and FM Approval based on the requirements of the FM Global Loss Prevention Data Sheets. Use only the style 10, 20, 30, or 40 Recessed Escutcheon, as applicable, for recessed pendent installations.

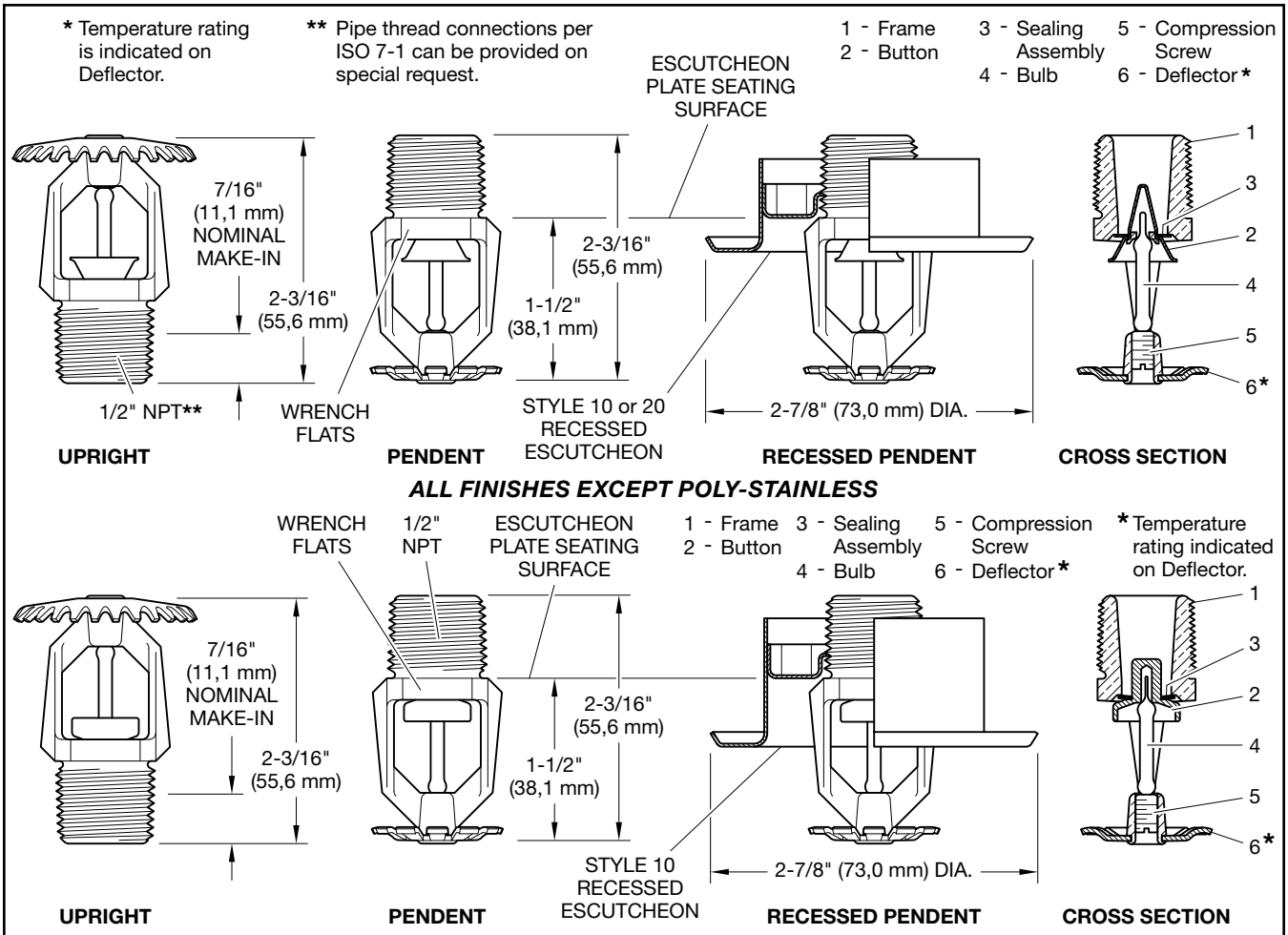


FIGURE 3
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY3131) AND PENDENT (TY3231) SPRINKLERS
5.6 K-FACTOR, 1/2 IN. NPT

Installation

The TYCO Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent Sprinklers must be installed in accordance with this section.

General Instructions
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 in. (1,6 mm) for the 135°F (57°C) and 3/32 in. (2,4 mm) for the 286°F (141°C) temperature ratings. A leak-tight 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). A leak tight 3/4 in. NPT sprinkler joint should be obtained with a torque of 10 to 20 lb-ft (13,4 to 26,8 N·m). Higher levels of torque can distort the sprinkler inlet and cause leakage or impairment of the sprinkler. Do not attempt to compensate for insufficient adjustment in the escutcheon plate by under- or over-tightening the sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Series TY-FRB Upright and Pendent Sprinklers
The Series TY-FRB Upright and Pendent Sprinklers must be installed in accordance with the following instructions:

Step 1. Install pendent sprinklers in the pendent position. Install upright sprinklers in the upright position.

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

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (Ref. Figure 14). With reference to Figure 1 to Figure 5, apply the W-Type 6 Sprinkler Wrench to the sprinkler wrench flats.

Series TY-FRB Recessed Pendent Sprinklers
The Series TY-FRB Recessed Pendent Sprinklers must be installed in accordance with the following instructions:

Step 1. After installing the Style 10, 20, 30, or 40 Mounting Plate, as applicable, over the sprinkler threads and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 2. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench, see Figure 15. With reference to Figure 1 to 4, apply the W-Type 7 Recessed Sprinkler Wrench to the sprinkler wrench flats.

Step 3. After the ceiling is installed or the finish coat is applied, slide on the Style 10, 20, 30, or 40 Closure over the Series TY-FRB Recessed Pendent Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the ceiling.

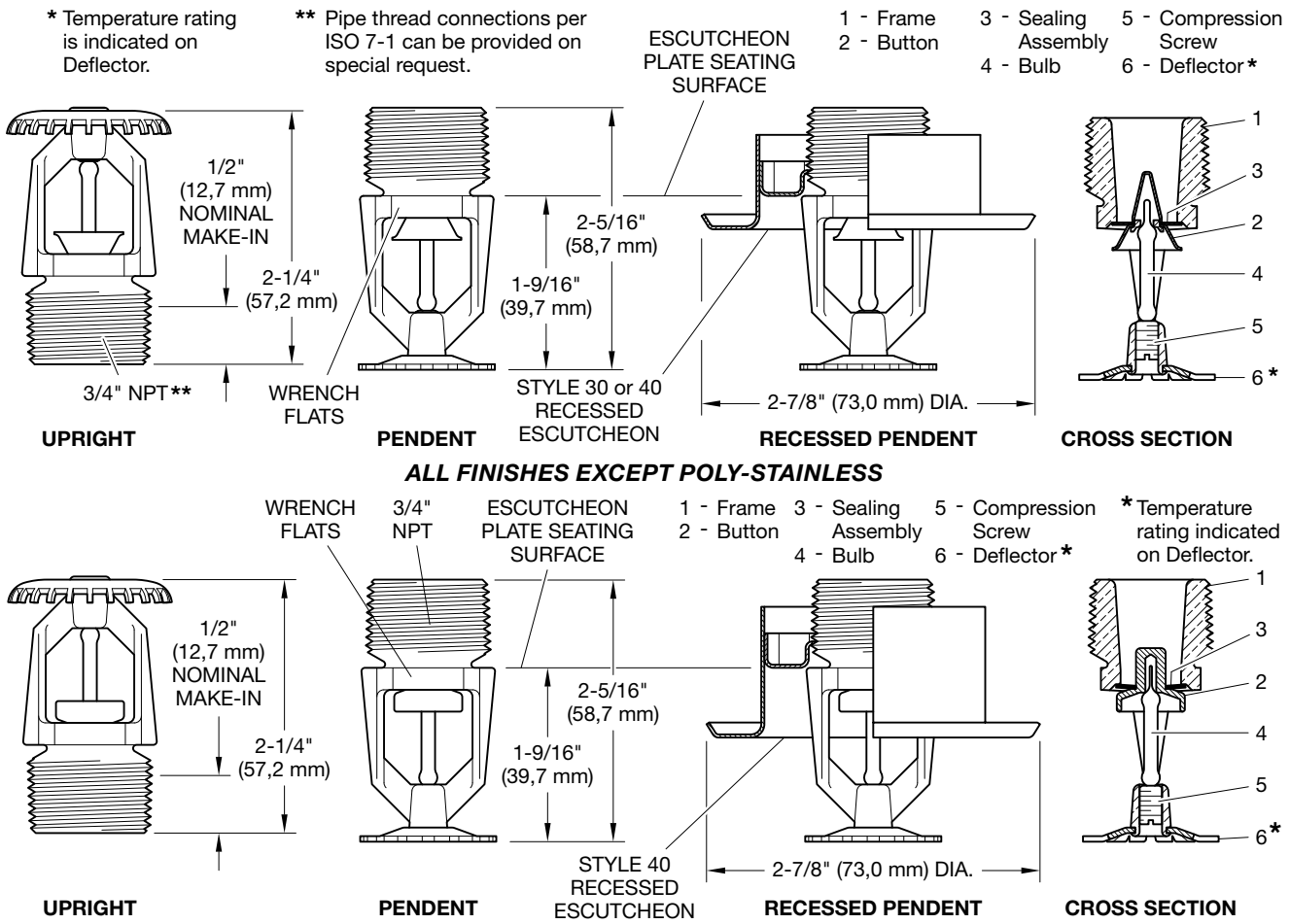


FIGURE 4
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY4131) AND PENDENT (TY4231) SPRINKLERS
8.0 K-FACTOR, 3/4 IN. NPT

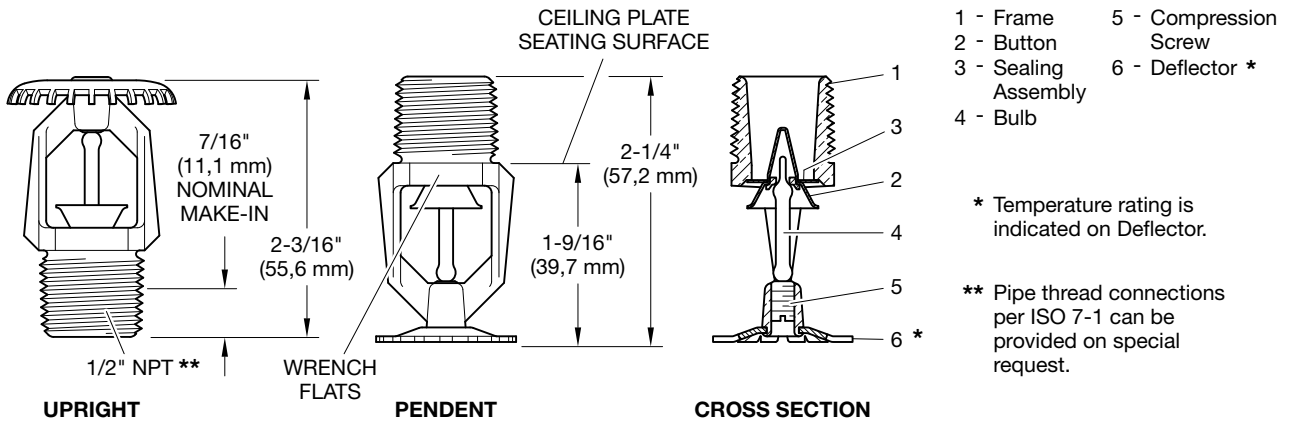


FIGURE 5
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY4831) AND PENDENT (TY4931) SPRINKLERS
8.0 K-FACTOR, 1/2 IN. NPT

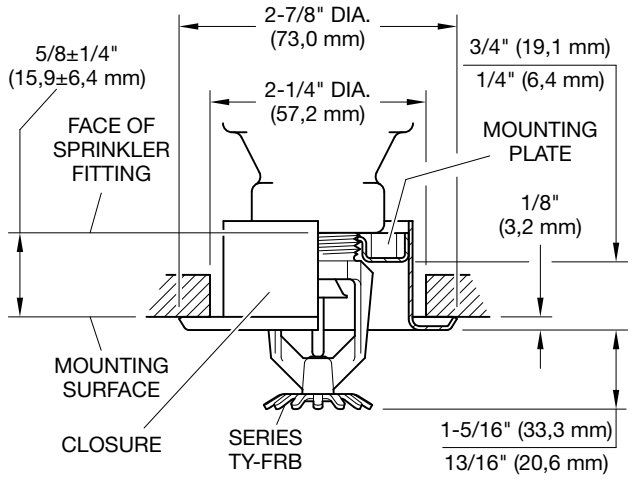


FIGURE 6
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
2.8 K-FACTOR, 1/2 IN. NPT

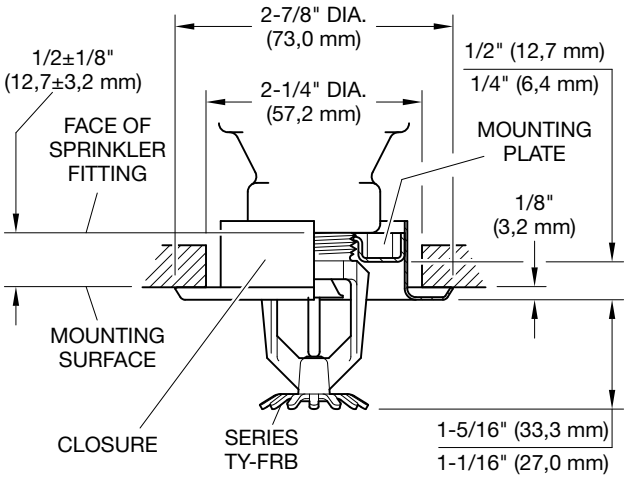


FIGURE 7
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
2.8 K-FACTOR, 1/2 IN. NPT

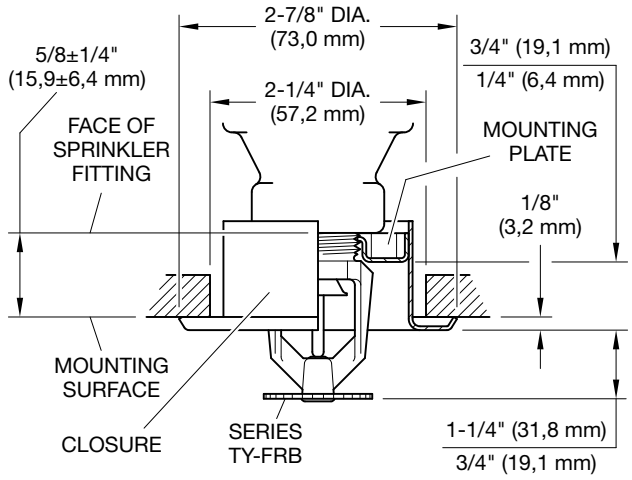


FIGURE 8
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
4.2 K-FACTOR, 1/2 IN. NPT

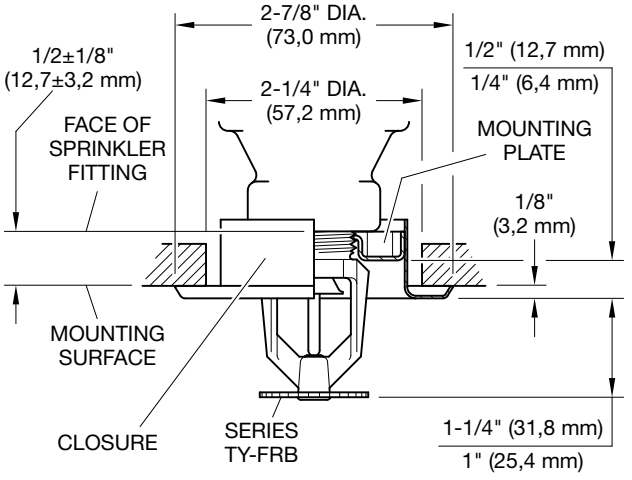


FIGURE 9
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
4.2 K-FACTOR, 1/2 IN. NPT

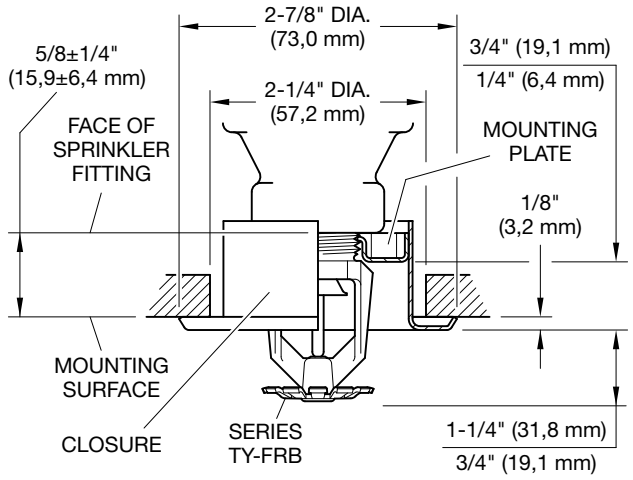


FIGURE 10
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
5.6 K-FACTOR, 1/2 IN. NPT

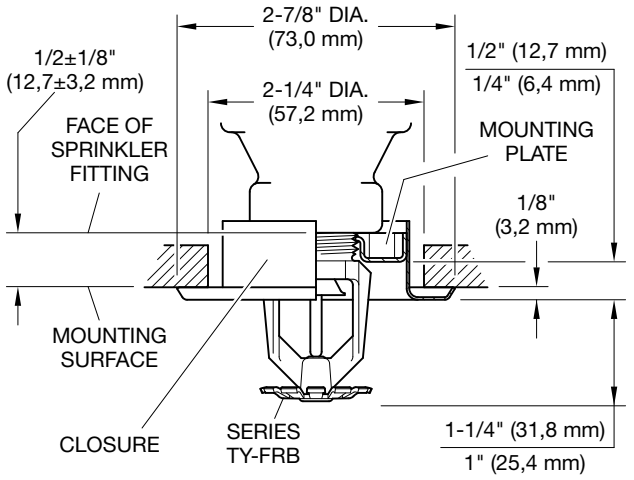


FIGURE 11
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
5.6 K-FACTOR, 1/2 IN. NPT

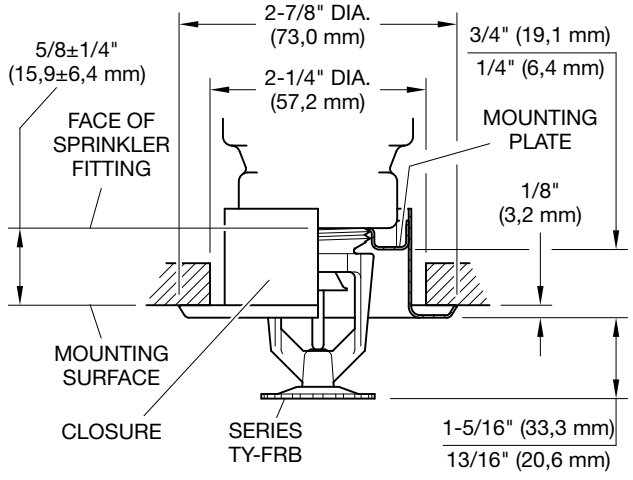


FIGURE 12
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 40 RECESSED ESCUTCHEON
8.0 K-FACTOR, 3/4 IN. NPT

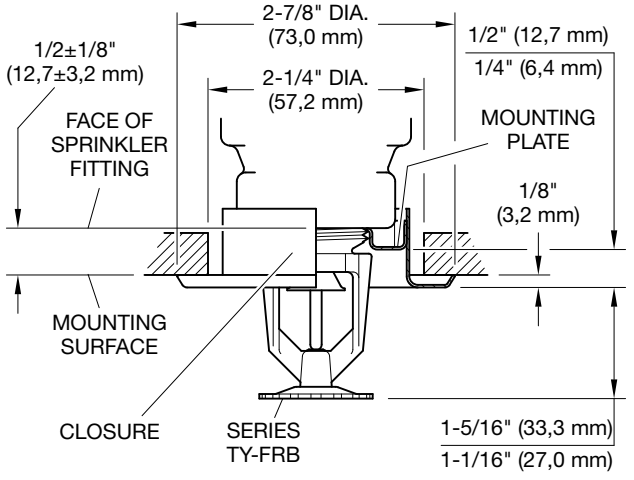


FIGURE 13
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 30 RECESSED ESCUTCHEON
8.0 K-FACTOR, 3/4 IN. NPT

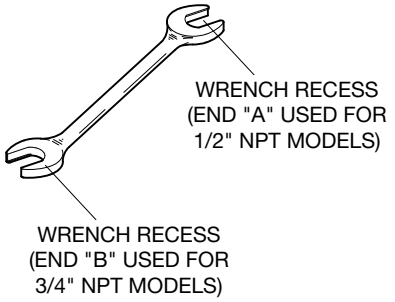


FIGURE 14
W-TYPE 6 SPRINKLER
WRENCH

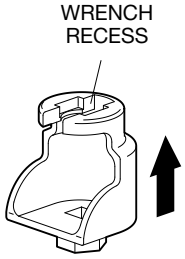


FIGURE 15
W-TYPE 7 RECESSED
SPRINKLER WRENCH

K-Factor	Type	Temperature	Bulb Liquid Color	Sprinkler Finish[5]		
				Natural Brass	Chrome Plated	Polyester[c]
2.8 1/2 in. NPT	Pendent (TY1231)	135°F (57°C)	Orange	1, 2, 3, 4		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	Upright (TY1131)	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	Recessed Pendent (TY1231)[a] Figure 6	135°F (57°C)	Orange	1, 2, 4		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
	Recessed Pendent (TY1231)[b] Figure 7	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			

NOTES
a. Installed with Style 10 (1/2 in. NPT) or Style 40 (3/4 in. NPT) 3/4 in. Total Adjustment Recessed Escutcheon, as applicable.
b. Installed with Style 20 (1/2 in. NPT) or Style 30 (3/4 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon, as applicable.
c. Frame and Deflector only.
1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the City of New York under MEA 354-01-E.
5. Where Polyester Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed, the sprinklers are UL and C-UL Listed as corrosion-resistant sprinklers.

TABLE A
LABORATORY LISTINGS AND APPROVALS FOR
2.8 K-FACTOR SPRINKLERS

K-Factor	Type	Temperature	Bulb Liquid Color	Sprinkler Finish[3]		
				Natural Brass	Chrome Plated	Polyester[c]
4.2 1/2 in. NPT	Pendent (TY2231)	135°F (57°C)	Orange	1, 2		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	Upright (TY2131)	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	Recessed Pendent (TY2231)[a] Figure 8	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
	Recessed Pendent (TY2231)[b] Figure 9	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			

NOTES
a. Installed with Style 10 (1/2 in. NPT) or Style 40 (3/4 in. NPT) 3/4 in. Total Adjustment Recessed Escutcheon, as applicable.
b. Installed with Style 20 (1/2 in. NPT) or Style 30 (3/4 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon, as applicable.
c. Frame and Deflector only.
1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Where Polyester Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed, the sprinklers are UL and C-UL Listed as corrosion-resistant sprinklers.

TABLE B
LABORATORY LISTINGS AND APPROVALS FOR
4.2 K-FACTOR SPRINKLERS

K-Factor	Type	Temperature	Bulb Liquid Color	Sprinkler Finish[8]				
				Natural Brass	Chrome Plated	Polyester[c]	Poly-Stainless[c]	Lead Coated
5.6 1/2 in. NPT	Pendent (TY3231)	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6, 7			1, 2	1, 2, 3, 5
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Upright (TY3131)	135°F (57°C)	Orange	1, 2, 3, 5, 6			1, 2	1, 2, 3, 5
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Recessed Pendent (TY3231)[a] Figure 10	135°F (57°C)	Orange	1, 2, 4, 5			1, 2	N/A[d]
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Recessed Pendent (TY3231)[b] Figure 11	135°F (57°C)	Orange	1, 2, 3, 4, 5			N/A	N/A
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					

NOTES
a. Installed with Style 10 (1/2 in. NPT) or Style 40 (3/4 in. NPT) 3/4 in. Total Adjustment Recessed Escutcheon, as applicable.
b. Installed with Style 20 (1/2 in. NPT) or Style 30 (3/4 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon, as applicable.
c. Frame and Deflector only.
d. Not available (N/A).
1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 007k/04) as Quick Response Sprinklers. However, LPCB does not rate the thermal sensitivity of recessed sprinklers.
5. Approved by the City of New York under MEA 354-01-E.
6. VdS Approved (For details, contact Johnson Controls, Enschede, Netherlands, Tel. 31-53-428-4444/Fax 31-53-428-3377.)
7. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06) as Quick Response Sprinklers.
8. Where Polyester Coated and Lead-Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers. Where Lead-Coated Sprinklers are noted to be FM Approved, the sprinklers are FM Approved as a Corrosion-Resistant Sprinklers.

TABLE C
LABORATORY LISTINGS AND APPROVALS FOR
5.6 K-FACTOR SPRINKLERS

K-Factor	Type	Temperature	Bulb Liquid Color	Sprinkler Finish[8]				
				Natural Brass	Chrome Plated	Polyester[c]	Poly-Stainless[c]	Lead Coated
8.0 3/4 in. NPT	Pendent (TY4231)	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6, 7			1, 2	1, 2, 5
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Upright (TY4131)	135°F (57°C)	Orange					
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Recessed Pendent (TY4231)[a] Figure 12	135°F (57°C)	Orange	1, 2, 5			1, 2	N/A[d]
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Recessed Pendent (TY4231)[b] Figure 13	135°F (57°C)	Orange	1, 2, 3, 5			N/A	N/A
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
8.0 1/2 in. NPT	Pendent (TY4931)	135°F (57°C)	Orange	1, 2, 4, 5, 6			N/A	1, 2, 5
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Upright (TY4831)	135°F (57°C)	Orange					
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					

NOTES
a. Installed with Style 10 (1/2 in. NPT) or Style 40 (3/4 in. NPT) 3/4 in. Total Adjustment Recessed Escutcheon, as applicable.
b. Installed with Style 20 (1/2 in. NPT) or Style 30 (3/4 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon, as applicable.
c. Frame and Deflector only.
d. Not available (N/A).
1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 007k/04) as Quick Response Sprinklers. However, LPCB does not rate the thermal sensitivity of recessed sprinklers.
5. Approved by the City of New York under MEA 354-01-E.
6. VdS Approved (For details, contact Johnson Controls, Enschede, Netherlands, Tel. 31-53-428-4444/Fax 31-53-428-3377.)
7. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06) as Quick Response Sprinklers.
8. Where Polyester Coated and Lead-Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers. Where Lead-Coated Sprinklers are noted to be FM Approved, the sprinklers are FM Approved as a Corrosion-Resistant Sprinklers.

TABLE D
LABORATORY LISTINGS AND APPROVALS FOR
5.6 AND 8.0 K-FACTOR SPRINKLERS

K-Factor	Type	Sprinkler Finish			
		Natural Brass	Chrome Plated	Polyester	Lead Coated
2.8 1/2 in. NPT	Pendent (TY1231) and Upright (TY1131)	175 psi (12,1 bar)			N/A[2]
	Recessed Pendent (TY1231)				
4.2 1/2 in. NPT	Pendent (TY2231) and Upright (TY2131)	175 psi (12,1 bar)			N/A
	Recessed Pendent (TY2231)				
5.6 1/2 in. NPT	Pendent (TY3231) and Upright (TY3131)	250 psi (17,2 bar) or 175 psi (12,1 bar)[1]			
	Recessed Pendent (TY3231)				
8.0 3/4 in. NPT	Pendent (TY4231) and Upright (TY4131)	175 psi (12,1 bar)			175 psi (12,1 bar)
	Recessed Pendent(TY4231)				N/A
8.0 1/2 in. NPT	Pendent (TY4931) and Upright (TY4831)	175 psi (12,1 bar)			175 psi (12,1 bar)

NOTES
1. The maximum working pressure of 250 psi (17,2 bar) only applies to the Listing by Underwriters Laboratories Inc. (UL); the Listing by Underwriters Laboratories, Inc. for use in Canada (C-UL); and, the Approval by the City of New York.
2. Not available (N/A).

TABLE E
MAXIMUM WORKING PRESSURE

Care and Maintenance

The TYCO Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent 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 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.

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 taken 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. For more information, see Installation section.

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 such as NFPA 25, in addition to the standards of any other 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.

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. For more information, see Installation section.

Initial and frequent visual inspections of random samples are recommended for corrosion-resistant sprinklers to verify the integrity of the corrosion-resistant material of construction. Thereafter, annual inspections per NFPA 25 should suffice. Inspections of corrosion-resistant sprinklers are recommended at close range, instead of from the floor level per NFPA. Inspection at close range can better determine the exact sprinkler condition and the long-term integrity of the corrosion-resistant material, which can be affected by the corrosive conditions present.

P/N 57 – XXX – X – XXX

		SIN
330	2.8K UPRIGHT (1/2 in. NPT)	TY1131
331	2.8K PENDENT (1/2 in. NPT)	TY1231
340	4.2K UPRIGHT (1/2 in. NPT)	TY2131
341	4.2K PENDENT (1/2 in. NPT)	TY2231
370	5.6K UPRIGHT (1/2 in. NPT)	TY3131
371	5.6K PENDENT (1/2 in. NPT)	TY3231
390	8.0K UPRIGHT (3/4 in. NPT)	TY4131
391	8.0K PENDENT (3/4 in. NPT)	TY4231
360	8.0K UPRIGHT (1/2 in. NPT)	TY4831
361	8.0K PENDENT (1/2 in. NPT)	TY4931

	SPRINKLER FINISH
1	NATURAL BRASS
2	POLY-STAINLESS GREY ALUMINUM (RAL9007)[1] POLYESTER
3	PURE WHITE POLYESTER (RAL9010)[2]
4	SIGNAL WHITE POLYESTER (RAL9003)
5	JET BLACK POLYESTER (RAL9005)[3]
7	LEAD COATED
9	CHROME PLATED

	TEMPERATURE RATINGS
135	135°F (57°C)
155	155°F (68°C)
175	175°F (79°C)
200	200°F (93°C)
286	286°F (141°C)

NOTES
1. Available only on TY3131, TY3231, TY4131, and TY4231
2. Eastern Hemisphere sales only.
3. Available in only 2.8K, 4.2K, and 8.0K, 155°F (68°C) and 200°F (93°C); requires longer lead time to manufacture.

TABLE F
SERIES TY-FRB PENDENT AND UPRIGHT SPRINKLERS
PART NUMBER SELECTION

Limited Warranty

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

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler Assemblies with NPT Thread Connections
Specify: Series TY-FRB (Specify SIN), (specify K-factor), (specify Pendent or Upright) Sprinkler (specify) temperature rating, (specify) finish or coating, P/N (specify from Table F)

Recessed Escutcheon
Specify: Style (10, 20, 30, or 40) Recessed Escutcheon with (specify*) finish, P/N (specify*)

* Refer to Technical Data Sheet TFP770

Sprinkler Wrench
Specify: W-Type 6 Sprinkler Wrench, P/N 56-000-6-387

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

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

Series DS-2 Dry-Type Sprinklers 11.2K Pendent Standard and Quick Response, Standard Coverage

General Description

TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Standard (5 mm bulb) and Quick Response (3 mm bulb), and Standard Coverage are decorative glass bulb automatic sprinklers typically used where:

- pendent sprinklers are required on dry pipe systems that are exposed to freezing temperatures (e.g., sprinkler drops from unheated portions of buildings)
- sprinklers and/or a portion of the connecting piping may be exposed to freezing temperatures (e.g., sprinkler drops from wet systems into freezers)

NOTICE

Series DS-2 Dry-Type 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 (NFPA), 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. Contact the installing contractor or product manufacturer with any questions.

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.

Series DS-2 Dry-Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section.

Sprinkler Identification Numbers (SINs)

TY5255 – Standard Response
TY5235 – Quick Response

Technical Data

Approvals
UL and C-UL Listed
NYC Approved under MEA 173-02-E

See Table A.

Maximum Working Pressure
175 psi (12,1 bar)

Inlet Thread Connections
1 in. NPT
ISO 7-R 1

Discharge Coefficient
See Table C.

Temperature Ratings
See Table A.

Finishes
Sprinkler: See Table D.
Escutcheon: See Table D.

Physical Characteristics

Inlet	Copper
Plug	Copper
Yoke	Stainless Steel
Casing	Galvanized Carbon Steel
Insert	Bronze
Bulb Seat	Bronze
Bulb	Glass
Compression Screw	Bronze
Deflector	Bronze
Frame	Bronze
Guide Tube	Stainless Steel
Water Tube	Stainless Steel
Spring	Stainless Steel Gasketed Spring
Plate Seal	Beryllium Nickel w/TEFLON
Pin	Stainless Steel
Button Spring	Stainless Steel
Escutcheon	Carbon Steel

Operation

When TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Standard (5 mm bulb) and Quick Response (3 mm bulb), and Standard Coverage are in service, water is prevented from entering the assembly by the Plug with Gasketed Spring Plate Seal (see Figure 1) in the Inlet of the sprinkler.

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 with Gasketed Spring Plate Seal from the Inlet, allowing the sprinkler to activate and flow water.

Temperature Rating	Bulb Color Code	**TY5255** Standard Response **TY5235** Quick Response with Flush Escutcheon (Figure 2) with Recessed Escutcheon (Figure 3) with Extended Escutcheon (Figure 4) without Escutcheon (Figure 5)		
		SPRINKLER FINISH		
		Natural Brass	**Chromed Plated**	**Signal White**
135°F (57°C)	Orange	1, 2, 3		
155°F (68°C)	Red			
175°F (79°C)	Yellow			
200°F (93°C)	Green			
286°F (141°C)	Blue			

Notes:
1. Listed by Underwriters Laboratories, Inc. (UL), maximum order length of 48 inches
2. Listed by Underwriters Laboratories for use in Canada (C-UL), maximum order length of 48 inches
3. Approved by the City of New York under MEA 173-02-E

TABLE A
SERIES DS-2 STANDARD & QUICK RESPONSE, STANDARD COVERAGE DRY-TYPE PENDENT SPRINKLERS LABORATORY LISTINGS AND APPROVALS

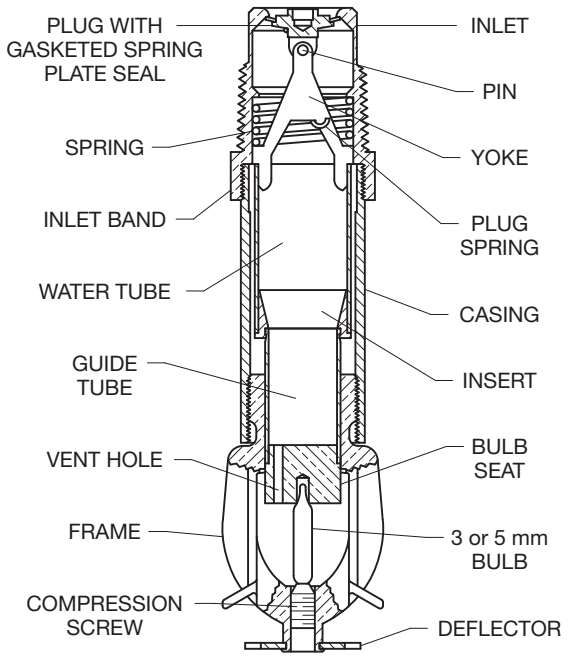


FIGURE 1
SERIES DS-2 STANDARD & QUICK RESPONSE DRY-TYPE PENDENT SPRINKLER ASSEMBLY

Design Criteria

TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Standard (5 mm bulb) and Quick Response (3 mm bulb), and Standard Coverage are intended for use in fire sprinkler systems designed in accordance with the standard coverage installation rules recognized by the applicable listing agency (e.g., UL Listing is based on NFPA 13 requirements).

Sprinkler Fittings
Install 1 in. NPT Series DS-2 Dry-Type Sprinklers in the 1 in. NPT outlet or run of the following fittings:

- malleable or ductile iron threaded tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150)
- cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125)

Do not install Series DS-2 Dry-Type Sprinklers into elbow fittings. The Inlet of the sprinkler can contact the interior of the elbow.

The unused outlet of the threaded tee is plugged as shown in Figure 9.

You can also install Series DS-2 Dry-Type Sprinklers in the 1 in. NPT outlet of a GRINNELL Figure 730 Mechanical Tee. However, the use of the Figure 730 Tee for this arrangement is limited to wet pipe systems.

The configuration shown in Figure 8 is only applicable for wet pipe systems where the sprinkler fitting and water-filled pipe above the sprinkler fitting are not subject to freezing and where the length of the dry-type sprinkler has the minimum exposure length depicted in Figure 10. See the Exposure Length section.

For wet pipe system installations of 1 in. NPT Series DS-2 Dry-Type Sprinklers connected to CPVC piping, use only the following TYCO CPVC fittings:

- 1 in. x 1 in. NPT Female Adapter (P/N 80145)
- 1 in. x 1 in. x 1 in. NPT Sprinkler Head Adapter Tee (P/N 80249)

For dry pipe system installations, use only the side outlet of maximum 2 1/2 in. reducing tee when locating Series DS-2 Dry-Type Sprinklers directly below the branchline. Otherwise, use the configuration shown in Figure 9 to assure complete water drainage from above Series DS-2 Dry-Type Sprinklers and the branchline. Failure to do so may result in pipe freezing and water damage.

Ambient Temperature Exposed to Discharge End of Sprinkler	Temperatures for Heated Area[1]		
	40°F (4°C)	50°F (10°C)	60°F (16°C)
	Minimum Exposed Barrel Length[2], Inches (mm)		
40°F (4°C)	0	0	0
30°F (-1°C)	0	0	0
20°F (-7°C)	4 (100)	0	0
10°F (-12°C)	8 (200)	1 (25)	0
0°F (-18°C)	12 (305)	3 (75)	0
-10°F (-23°C)	14 (355)	4 (100)	1 (25)
-20°F (-29°C)	14 (355)	6 (150)	3 (75)
-30°F (-34°C)	16 (405)	8 (200)	4 (100)
-40°F (-40°C)	18 (455)	8 (200)	4 (100)
-50°F (-46°C)	20 (510)	10 (255)	6 (150)
-60°F (-51°C)	20 (510)	10 (255)	6 (150)

Notes:
1. For protected area temperatures that occur between values listed above, use the next cooler temperature.
2. These lengths are inclusive of wind velocities up to 30 mph (18,6 kph).

TABLE B
EXPOSED SPRINKLER BARRELS IN WET PIPE SYSTEMS
MINIMUM RECOMMENDED LENGTHS

NOTICE

Do not install Series DS-2 Dry-Type Sprinkler into any other type fitting. Failure to use the appropriate fitting may result in one of the following:

- *failure of the sprinkler to operate properly due to formation of ice over the Inlet Plug or binding of the Inlet Plug*
- *insufficient engagement of the Inlet pipe-threads with consequent leakage*

Drainage

In accordance with the minimum requirements of the NATIONAL FIRE PROTECTION ASSOCIATION for dry pipe sprinkler systems, branch, cross, and feed-main piping connected to dry sprinklers and subject to freezing temperatures must be pitched for proper drainage.

Exposure Length

When using dry sprinklers in wet pipe sprinkler systems to protect areas subject to freezing temperatures, use Table B to determine a sprinkler's appropriate exposed barrel length to prevent water from freezing in the connecting pipes due to conduction. The exposed barrel length measurement must be taken from the face of the sprinkler fitting to the surface of the structure or insulation that is exposed to the heated area. See Figure 10 for an example.

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.

Clearance Space

In accordance with Section 8.4.9.2 of the 2010 edition of NFPA 13, when connecting an area subject to freezing and an area containing a wet pipe sprinkler system, the clearance space around the sprinkler barrel of dry-type sprinklers must be sealed. Due to temperature differences between two areas, the potential for the formation of condensation in the sprinkler and subsequent ice build-up is increased. If this condensation is not controlled, ice build-up can occur that might damage the dry-type sprinkler and/or prevent proper operation in a fire situation.

Use of the Model DSB-2 Dry Sprinkler Boot, described in Technical Data Sheet TFP591 and shown in Figure 11, can provide the recommended seal.

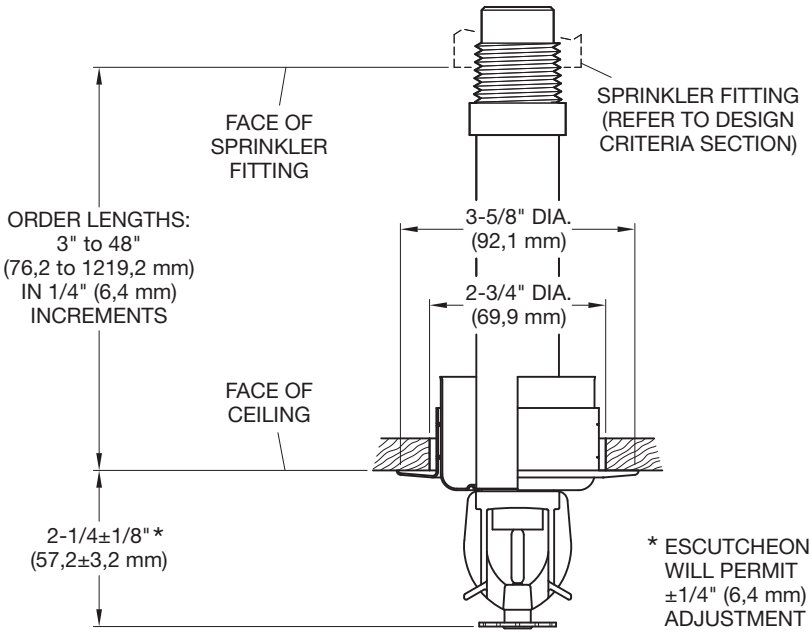


FIGURE 2
SERIES DS-2 DRY-TYPE PENDENT WITH FLUSH ESCUTCHEON
STANDARD RESPONSE (TY5255) OR QUICK RESPONSE (TY5235)

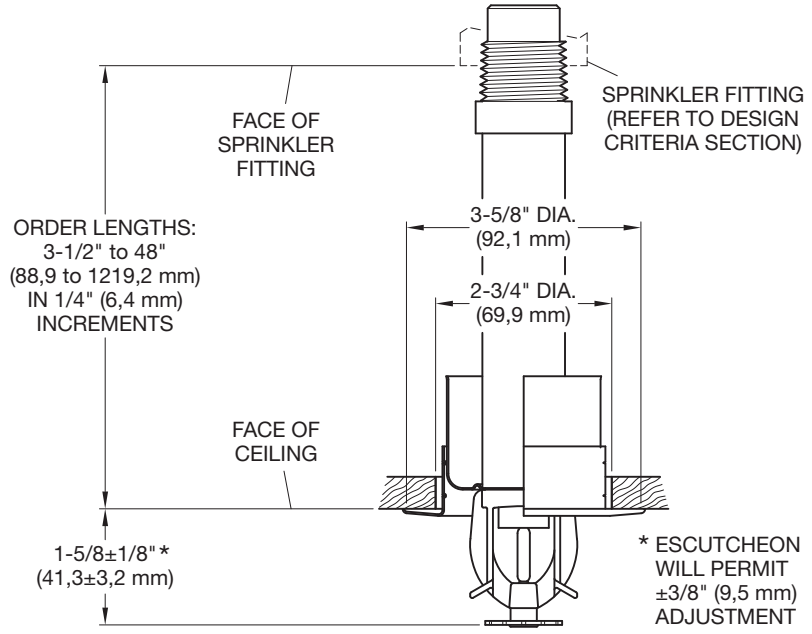


FIGURE 3
SERIES DS-2 DRY-TYPE PENDENT WITH RECESSED ESCUTCHEON
STANDARD RESPONSE (TY5255) OR QUICK RESPONSE (TY5235)

K-factor Length, Inches (mm)	K-factor, GPM/psi½ (LPM/bar½)
2-1/2 to 6-1/4 (63 mm to 159 mm)	11.2 (161,3)
6-1/2 to 10-1/2 (165 mm to 267 mm)	11.1 (159,8)
10-3/4 to 14-3/4 (273 mm to 375 mm)	11.0 (158,4)
15 to 18-3/4 (381 mm to 476 mm)	10.9 (157,0)
19 to 23 (483 mm to 584 mm)	10.8 (155,5)
23-1/4 to 26-3/4 (591 mm to 679 mm)	10.7 (154,1)
27-1/4 to 31-1/4 (692 mm to 794 mm)	10.6 (152,6)
31-1/2 to 35-1/4 (800 mm to 895 mm)	10.5 (151,2)
35-1/2 to 39-1/2 (902 mm to 1003 mm)	10.4 (149,8)
39-3/4 to 43-1/2 (1010 mm to 1105 mm)	10.3 (148,3)
43-3/4 to 48 (1111 mm to 1219 mm)	10.2 (146,9)

Notes:
K-factor Length is determined as follows:
- Flush: Order Length from Figure 2 plus 1/2 in. (12,7 mm)
- Recessed: Order Length from Figure 3 plus 1/4 in. (6,3 mm)
- Extended: Order Length from Figure 4 plus 3-1/4 in. (82,6 mm)
- Without Escutcheon: Order Length from Figure 5 minus 2-1/4 in. (57,2 mm)

TABLE C
DISCHARGE COEFFICIENTS

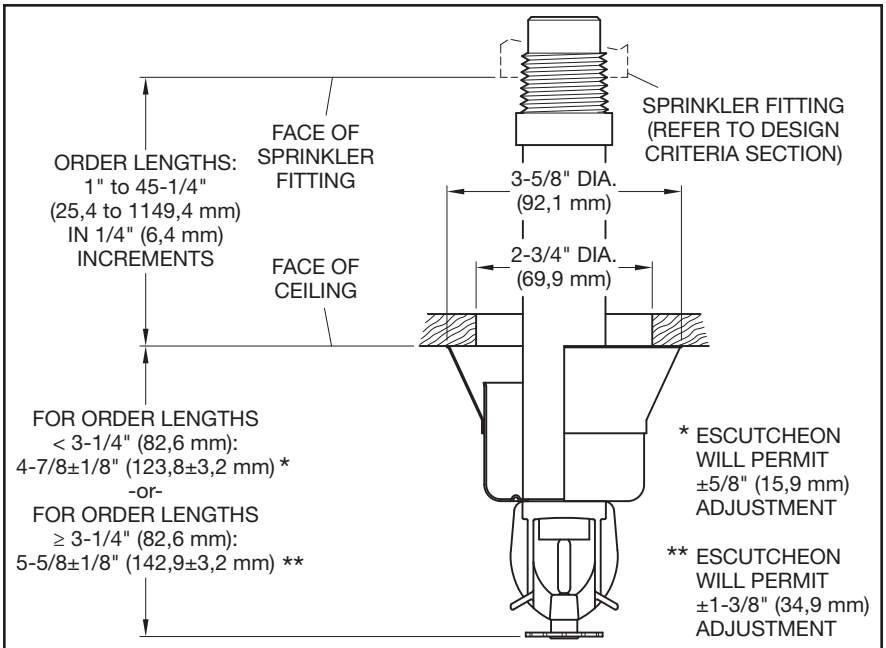


FIGURE 4
SERIES DS-2 DRY-TYPE PENDENT WITH EXTENDED ESCUTCHEON
STANDARD RESPONSE (TY5255) OR QUICK RESPONSE (TY5235)

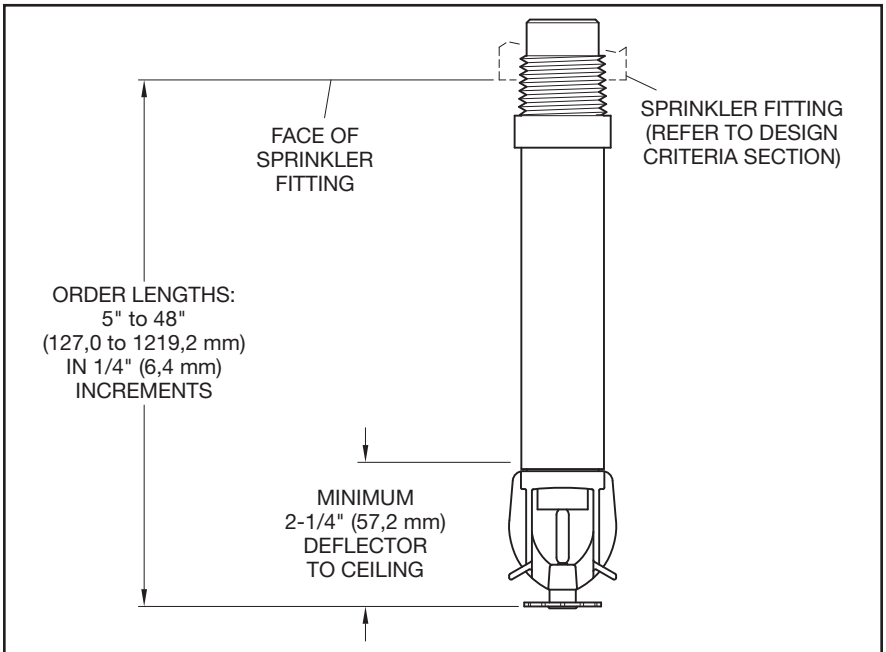


FIGURE 5
SERIES DS-2 DRY-TYPE PENDENT WITHOUT ESCUTCHEON
STANDARD RESPONSE (TY5255) OR QUICK RESPONSE (TY5235)

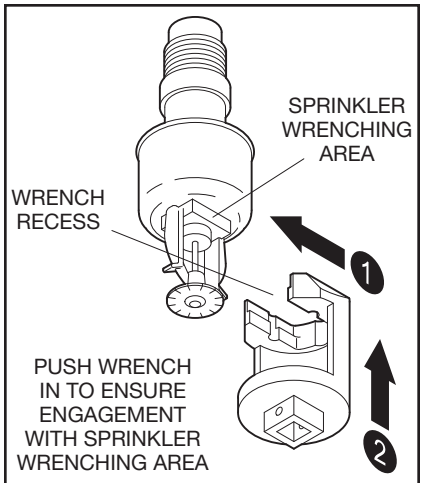


FIGURE 6
W-TYPE 17
SPRINKLER WRENCH

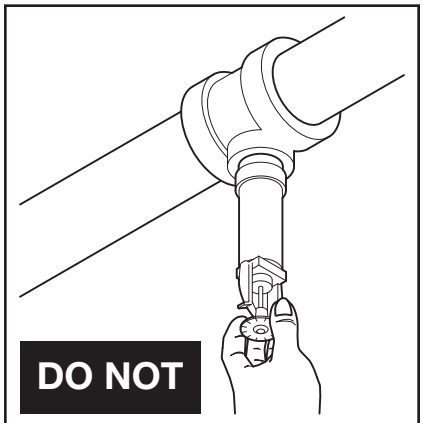


FIGURE 7
DO NOT GRASP DEFLECTOR

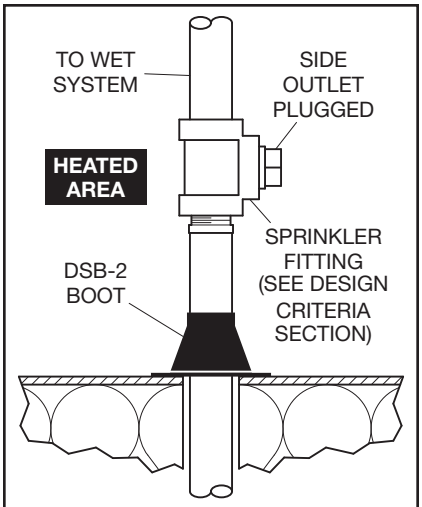


FIGURE 8
SPRINKLER FITTING
HEATED AREA

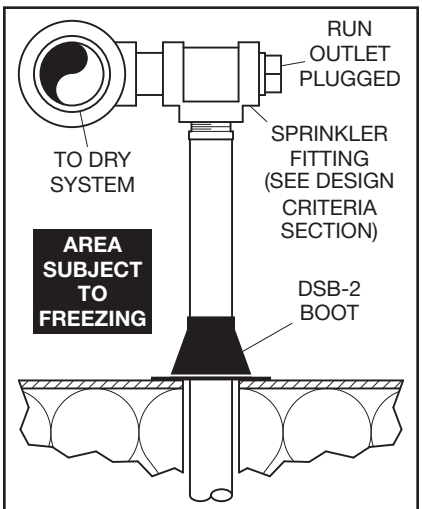


FIGURE 9
SPRINKLER FITTING
UNHEATED AREA

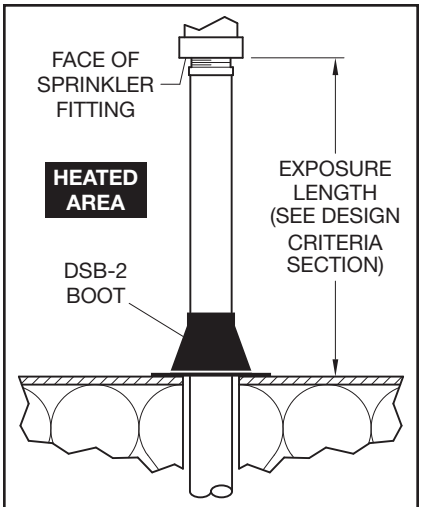


FIGURE 10
EXPOSURE LENGTH

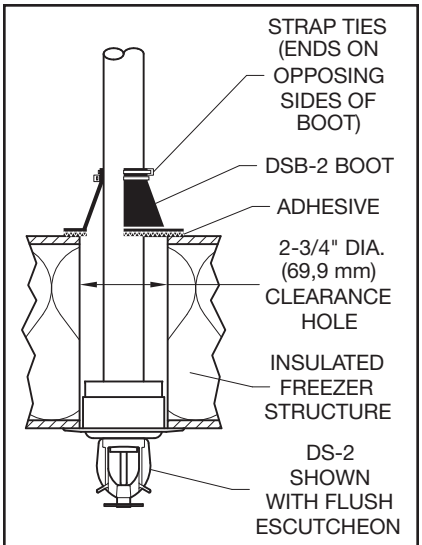


FIGURE 11
MODEL DSB-2 DRY SPRINKLER BOOT WITH SERIES DS-2 DRY-TYPE PENDENT SPRINKLER

Installation

TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Standard (5 mm bulb) and Quick Response (3 mm bulb), and Standard Coverage must be installed in accordance with this section.

General Instructions
Series DS-2 Dry-Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section. See the Design Criteria section for other important requirements regarding piping design and sealing of the clearance space around the sprinkler Casing. With reference to Figure 7, do not grasp the sprinkler by the Deflector. Failure to follow this instruction may impair performance of the device.

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 in. (1,6 mm) for the 135°F (57°C) rating to 1/8 in. (3,2 mm) for the 360°F (182°C) rating.

A leak-tight 1 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 20 to 30 lb-ft (26,8 to 40,2 N·m). 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 an Escutcheon Plate by under or over-tightening the sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Note: *Install pendent sprinklers only in the pendent position. The Deflector of a pendent sprinkler must be parallel to the ceiling.*

Step 1. With a non-hardening pipe-thread sealant such as TEFLON applied to the Inlet threads, hand-tighten the sprinkler into the sprinkler fitting. Do not grasp the sprinkler by the Deflector, see Figure 7.

Step 2. Wrench-tighten the sprinkler using either:

- a pipe wrench on the Inlet Band or the Casing, see Figure 1
- the W-Type 17 Sprinkler Wrench on the Wrench Flat, see Figure 2

Apply the Wrench Recess of the W-Type 17 Sprinkler Wrench to the Wrench Flat.

Note: *If sprinkler removal becomes necessary, remove the sprinkler using the same wrenching method noted above. Sprinkler removal is easier when a non-hardening sealant was used and torque guidelines were followed. After removal, inspect the sprinkler for damage.*

Step 3. After installing the ceiling and applying a ceiling finish, slide on the outer piece of the escutcheon until it comes in contact with the ceiling. Do not lift the ceiling panel out of its normal position.

When using the Deep Escutcheon, hold the outer piece in contact with the mounting surface (ceiling or wall). Then rotate the inner piece approximately 1/4 turn with respect to the outer piece, to hold the Deep Escutcheon firmly together.

Care and Maintenance

TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Standard (5 mm bulb) and Quick Response (3 mm bulb), and Standard Coverage must be maintained and serviced in accordance with this section.

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

Absence of the outer piece of an escutcheon, which is used to cover a

clearance hole, may delay the time to sprinkler operation in a fire situation.

A Vent Hole is provided in the Bulb Seat (Figure 1) to indicate if the Dry Sprinkler is remaining dry. Evidence of leakage from the Vent Hole indicates potential leakage past the Inlet seal and the need to remove the sprinkler to determine the cause of leakage (e.g., an improper installation or an ice plug). Close the fire protection system control valve and drain the system before removing the sprinkler.

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, see Installation Section.

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, such as NFPA 25, in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

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

Limited Warranty

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

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and part number (P/N).

Dry-Type Sprinkler
When ordering Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Standard (5 mm bulb) and Quick Response (3 mm bulb), and Standard Coverage, specify the following information:

- SIN:
  TY5255 – Standard Response
  TY5235 – Quick Response
- Order Length:
  Dry-Type Sprinklers are furnished based upon Order Length as measured from the face of the ceiling to the face of the sprinkler fitting see Figures 2 through 5. After the measurement is taken, round it to the nearest 1/4 in. increment.
- Inlet Connections:
  1 in. NPT
  (Standard)

  ISO 7-R 1
  (For information on ISO Inlet Thread Connections, contact your Johnson Controls Sales Representative.)
- Temperature Rating
- Sprinkler Finish
- Escutcheon Type and Finish, as applicable
- Part Number from Table D

Replacement Escutcheons
Order replacement escutcheons separately.

Specify: (specify type), (specify) finish, P/N (specify):

Flush and Recessed

White Color	854902
Chrome Plated	854912
Brass Plated	854922

Deep

White Color	854802
Chrome Plated	854812
Brass Plated	854822

Sprinkler Wrench
Specify W-Type 17 Sprinkler Wrench, P/N 56-010-4-118

Sprinkler Boot
Specify Model DSB-2 Dry Sprinkler Boot, P/N 63-000-0-002

This Part Number includes one (1) Boot, two (2) Strap Ties, and 1/3 oz of Adhesive (a quantity sufficient for installing one boot).

P/N* 61 – XXX – X – XXX

		SIN
10	Standard Response Pendent with Flush Escutcheon	TY5255 (Figure 2)
11	Standard Response Pendent with Recessed Escutcheon	TY5255 (Figure 3)
12	Standard Response Pendent with Extended Escutcheon	TY5255 (Figure 4)
13	Standard Response Pendent without Escutcheon	TY5255 (Figure 5)
30	Quick Response Pendent with Flush Escutcheon	TY5235 (Figure 2)
31	Quick Response Pendent with Recessed Escutcheon	TY5235 (Figure 3)
32	Quick Response Pendent with Extended Escutcheon	TY5235 (Figure 4)
35	Quick Response Pendent without Escutcheon	TY5235 (Figure 5)

	SPRINKLER FINISH	ESCUTCHEON FINISH[1]
0	CHROME PLATED	SIGNAL WHITE (RAL9003)
1	NATURAL BRASS	SIGNAL WHITE (RAL9003)
4	SIGNAL WHITE (RAL9003)	SIGNAL WHITE (RAL9003)
5	NATURAL BRASS	BRASS PLATED
9	CHROME PLATED	CHROME PLATED

	ORDER LENGTH[2]
055	5.50 in.
082	8.25 in.
180	18.00 in.
187	18.75 in.
372	37.25 in.
480	48.00 in.

	TEMPERATURE RATING
0	135°F (57°C)
1	155°F (68°C)
2	175°F (79°C)
3	200°F (93°C)
4	286°F (141°C)

Notes:
1. Escutcheon Finish applies to sprinklers with escutcheons.
2. Dry-Type Sprinklers are furnished based upon "Order Length" as measured per Figures 2 through 5, as applicable, and for each individual sprinkler where it is to be installed. After the measurement is taken, round it to the nearest 1/4 inch increment.

* Use Prefix "I" for ISO 7-R1 Connection (e.g., I-61-101-1-180).

TABLE D
SERIES DS-2 STANDARD AND QUICK RESPONSE, STANDARD COVERAGE, DRY-TYPE SPRINKLERS
PART NUMBER SELECTION

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

Welded Pipe Nipples

Black & Galvanized, Std. Sch. 40, XH Sch. 80

FIG. 339: Standard Black Schedule 40

FIG. 338: Extra Heavy Black Schedule 80

FIG. 343: Standard Galv. Schedule 40

FIG. 342: Extra Heavy Galv. Schedule 80

Material

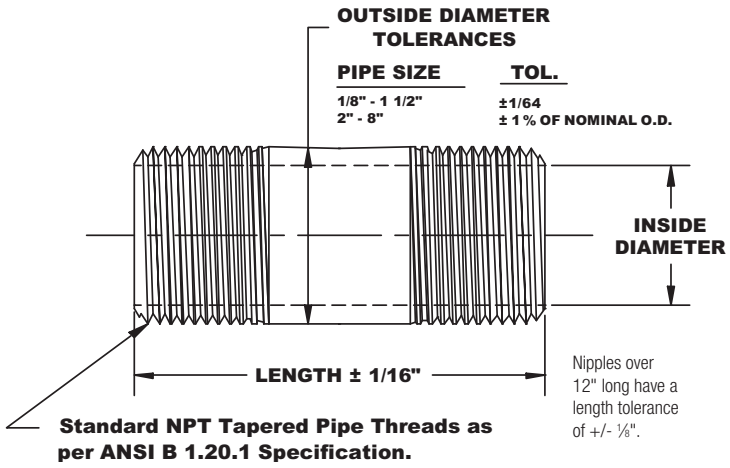
ASTM A53 Standard Specification for Pipe Steel, Black, Galvanized, Hot-Dipped, Zinc Coated, Welded.

Applicable specification

ASTM A733
(Refer to the chart below for specific pipe dimensions.)

Note: Minimum wall thickness at any point to be not more than +/- 10% nominal wall thickness specified for that size pipe.

Standard and Extra Heavy right and left nipples available in 1/8 – 4" diameter and 4" and 6" lengths.



Pipe Size	Pipe O.D.	Length Close	Pipe Nipple Lengths															
in	in	in																
1/8	0.405	3/4	1½	2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
1/4	0.540	7/8	1½	2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
3/8	0.675	1	1½	2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
½	0.840	1⅛	1½	2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
¾	1.050	1⅜	1½	2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
1	1.315	1½		2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
1¼	1.660	1⅝		2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
1½	1.900	1¾		2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
2	2.375	2			2½	3	3½	4	4½	5	5½	6	7	8	9	10	11	12
2½	2.875	2½				3	3½	4	4½	5	5½	6	7	8	9	10	11	12
3	3.500	2⅝				3	3½	4	4½	5	5½	6	7	8	9	10	11	12
4	4.500	2⅞						4	4½	5	5½	6	7	8	9	10	11	12
5	5.563	3							4½	5	5½	6	7	8	9	10	11	12
6	6.625	3⅛							4½	5	5½	6	7	8	9	10	11	12

Note: Other lengths available.
8" Pipe Size available as POA - contact your Anvil Representative for details.

Schedule 10 and Schedule 40

FM Approved and UL Listed Sprinkler Pipe

Bull Moose Tube Company is a recognized producer of quality pipe products. Our Schedule 10 and Schedule 40 are FM Approved and UL Listed (for U.S. and Canada), even though these products do not require separate approvals and listings. Bull Moose Tube made the decision to have them approved and listed for your peace of mind. Our Sch. 10 and Sch. 40 have been through the same rigorous testing as our other fine pipe products.

Bull Moose Tube's Sch. 10 and Sch. 40 pipes are made to ASTM A135 and ASTM A795. These products are typically supplied with our protective coating but can be supplied without the coating so they can be hot-dip galvanized to meet FM requirements for use in dry systems in accordance with the zinc coating specifications of ASTM A795 or ASTM A53. All Schedule 10 and Schedule 40 pipe has a pressure rating of 300 PSI.

Schedule 10 Pipe

Nominal Pipe Size (in)	Nominal O.D. (in)	Nominal I.D. (in)	Weight/Ft	Bundle Size
1	1.315	1.097	1.41 lbs/ft	91
1 1/4	1.660	1.442	1.81 lbs/ft	61
1 1/2	1.900	1.682	2.09 lbs/ft	61
2	2.375	2.157	2.64 lbs/ft	37
2 1/2	2.875	2.635	3.53 lbs/ft	30
3	3.500	3.260	4.34 lbs/ft	19
4	4.500	4.260	5.62 lbs/ft	19

Schedule 40 Pipe

Nominal Pipe Size (in)	Nominal O.D. (in)	Nominal I.D. (in)	Weight/Ft	Bundle Size
1	1.315	1.049	1.68 lbs/ft	70
1 1/4	1.660	1.380	2.27 lbs/ft	51
1 1/2	1.900	1.610	2.72 lbs/ft	44
2	2.375	2.067	3.66 lbs/ft	30
2 1/2	2.875	2.468	5.80 lbs/ft	30
3	3.500	3.068	7.58 lbs/ft	19
4	4.500	4.026	10.80 lbs/ft	19

PIPE PREPARATION

For proper operation, all pipe surfaces should be cleaned prior to installation. In order to provide a leak-tight seat for the gasket, pipe surfaces should be free from indentations and projections from the end of the pipe to the groove. All loose paint, scale, dirt, chips, grease, and rust must be removed prior to installation. Failure to take these important steps may result in improper coupling assembly, causing leakage. Also, check the manufacturer's instructions for the specific fitting used.

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e-mail: sales@bullmoosetube.com

For additional information, contact your salesperson today at (800) 325-4467 or (636) 537-2600 in the USA, or from Canada call (800) 882-4666

c UL us LISTED

FM APPROVED

Fire Sprinkler Pipe

Schedule 10 and Schedule 40

Submittal Data Sheet

FM Approved and Fully Listed Sprinkler Pipe
Wheatland's Schedule 10 and Schedule 40 steel fire sprinkler pipe is FM Approved and UL, C-UL and FM Listed.

Approvals and Specifications
Both products meet or exceed the following standards:

- ASTM A135, Type E, Grade A (Schedule 10)
- ASTM A795, Type E, Grade A (Schedule 40)
- NFPA 13

Manufacturing Protocols
Schedule 10 and Schedule 40 are subjected to the toughest possible testing protocols to ensure the highest quality and long-lasting performance.

Finishes and Coatings
All Wheatland black steel fire sprinkler pipe up to 6" receives a proprietary mill coating to ensure a clean, corrosion-resistant surface that outperforms and outlasts standard lacquer coatings. This coating allows the pipe to be easily painted, without special preparation. Schedule 10 and Schedule 40 can be ordered in black, or with hot-dip galvanizing, to meet FM/UL requirements for dry systems that meet the zinc coating specifications of ASTM A795 or A53. All Wheatland galvanized material is also UL Listed.

Product Marking
Each length of Wheatland fire sprinkler pipe is continuously stenciled to show the manufacturer, type of pipe, grade, size and length. Barcoding is acceptable as a supplementary identification method.

SCHEDULE 10 SPECIFICATIONS

NPS	NOM OD		NOM ID		NOMINAL WALL		NOMINAL WEIGHT		UL	PIECES
	in.	mm	in.	mm	in.	mm	lbs./ft.	kg/m	CRR*	Lift
1¼	1.660	42.2	1.442	36.6	.109	2.77	1.81	2.69	7.3	61
1½	1.900	48.3	1.682	42.7	.109	2.77	2.09	3.11	5.8	61
2	2.375	60.3	2.157	54.8	.109	2.77	2.64	3.93	4.7	37
2½	2.875	73.0	2.635	66.9	.120	3.05	3.53	5.26	3.5	30
3	3.500	88.9	3.260	82.8	.120	3.05	4.34	6.46	2.6	19
4	4.500	114.3	4.260	108.2	.120	3.05	5.62	8.37	1.6	19
5	5.563	141.3	5.295	134.5	.134	3.40	7.78	11.58	1.5	13
6	6.625	168.3	6.357	161.5	.134	3.40	9.30	13.85	1.0	10
8	8.625	219.1	8.249	209.5	.188	4.78	16.96	25.26	2.1	7

** Calculated using Standard UL CRR formula, UL Fire Protection Directory, Category VIZY.*
** The CRR is a ratio value used to measure the ability of a pipe to withstand corrosion. Threaded Schedule 40 steel pipe is used as the benchmark (value of 1.0).*

SCHEDULE 40 SPECIFICATIONS

NPS	NOM OD		NOM ID		NOMINAL WALL		NOMINAL WEIGHT		UL	PIECES
	in.	mm	in.	mm	in.	mm	lbs./ft.	kg/m	CRR*	Lift
1	1.315	33.4	1.049	26.6	.133	3.38	1.68	2.50	1.00	70
1¼	1.660	42.2	1.380	35.1	.140	3.56	2.27	3.39	1.00	51
1½	1.900	48.3	1.610	40.9	.145	3.68	2.72	4.05	1.00	44
2	2.375	60.3	2.067	52.5	.154	3.91	3.66	5.45	1.00	30

** Calculated using Standard UL CRR formula, UL Fire Protection Directory, Category VIZY.*
** The CRR is a ratio value used to measure the ability of a pipe to withstand corrosion. Threaded Schedule 40 steel pipe is used as the benchmark (value of 1.0).*

SUBMITTAL INFORMATION

PROJECT: _____

CONTRACTOR: _____

DATE: _____

ENGINEER: _____

SPECIFICATION REFERENCE: _____

SYSTEM TYPE: _____

LOCATIONS: _____

COMMENTS: _____

☐ BLACK

☐ HOT-DIP GALVANIZED

Wheatland Tube 700 South Dock Street Sharon, PA 16146
P 800.257.8182 | **F** 724.346.7260 | info@wheatland.com | wheatland.com

Wheatland Tube
JMC STEEL GROUP

Malleable Iron Threaded Pipe Unions Pressure - Temperature Ratings							
Temperature		Pressure					
		Class 150		Class 250		Class 300	
(°F)	*(°C)*	psi	*bar*	psi	*bar*	psi	*bar*
-20° to 150°	*-28.9° to 65.6°*	300	*20.7*	500	*34.5*	600	*41.4*
200°	*93.3°*	265	*18.3*	455	*31.4*	550	*37.9*
250°	*121.1°*	225	*15.5*	405	*27.9*	505	*34.8*
300°	*148.9°*	185	*12.8*	360	*24.8*	460	*31.7*
350°	*176.7°*	150	*10.3*	315	*21.7*	415	*28.6*
400°	*204.4°*	110	*7.6*	270	*18.6*	370	*25.5*
450°	*232.2°*	75	*5.2*	225	*15.5*	325	*22.4*
500°	*260.0°*	–	–	180	*12.4*	280	*19.3*
550°	*287.8°*	–	–	130	*9.0*	230	*15.9*

Note: Unions with Copper or Copper Alloy seats are not intended for use where temperature exceeds 450°F

c UL us

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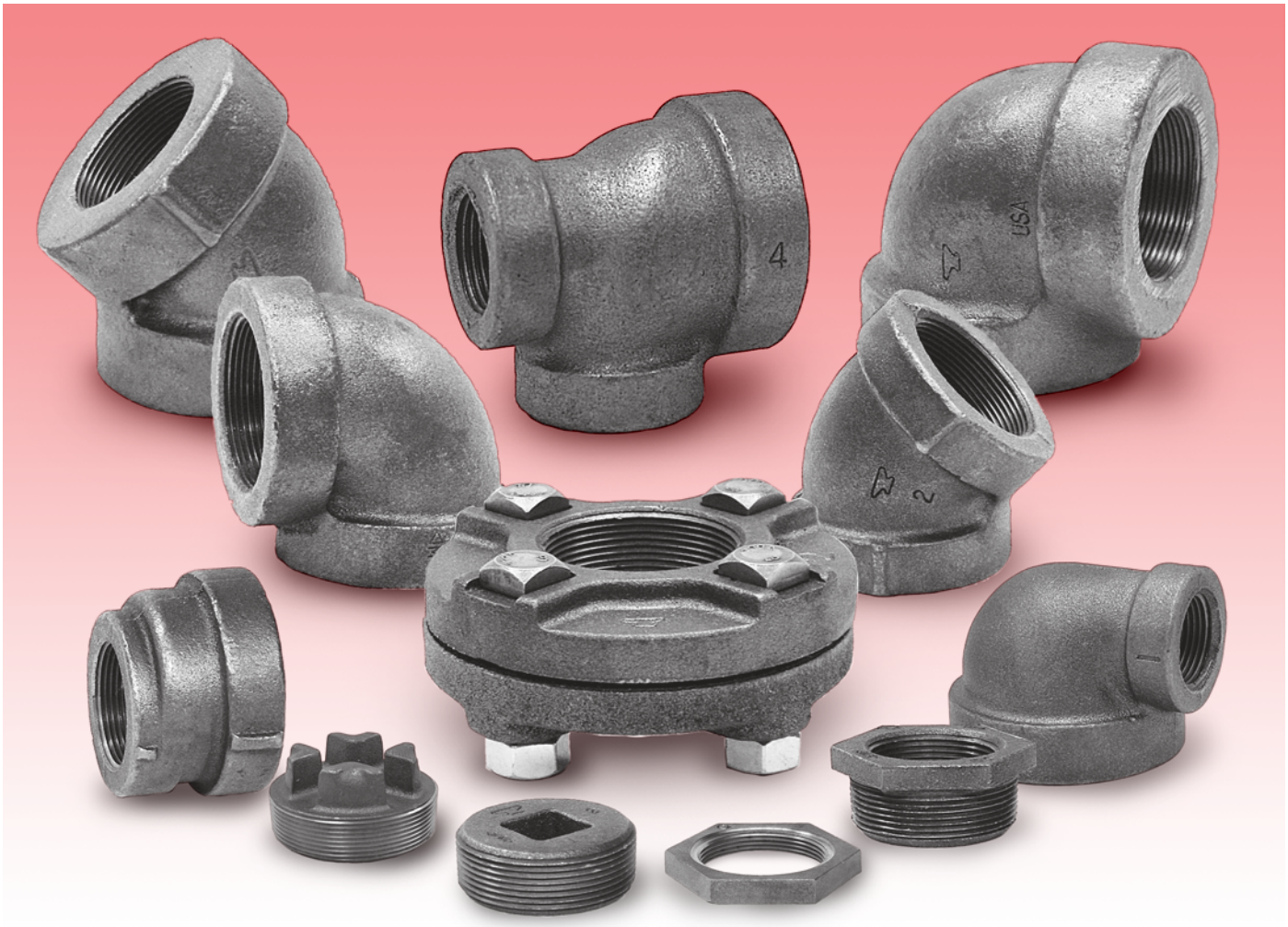
For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.

Malleable Iron Threaded Fittings Pressure - Temperature Ratings									
Temperature		Pressure							
		Class 150		Class 300					
				Sizes ¼"–1" *(6–25 mm)*		Sizes 1¼"–2" *(32–51 mm)*		Sizes 2½"–3" *(64–76 mm)*	
(°F)	*(°C)*	psi	*bar*	psi	*bar*	psi	*bar*	psi	*bar*
-20° to 150°	*-28.9° to 65.6°*	300	*20.7*	2,000	*137.9*	1,500	*103.4*	1,000	*68.9*
200°	*93.3*	265	*18.3*	1,785	*123.1*	1,350	*93.1*	910	*62.7*
250°	*121.1*	225	*15.5*	1,575	*108.6*	1,200	*82.7*	825	*56.9*
300°	*148.9*	185	*12.8*	1,360	*93.8*	1,050	*72.4*	735	*50.7*
350°	*176.7*	150	*10.3*	1,150	*79.3*	900	*62.1*	650	*44.8*
400°	*204.4*	–	–	935	*64.5*	750	*51.7*	560	*38.6*
450°	*232.2*	–	–	725	*50.0*	600	*41.4*	475	*32.8*
500°	*260.0*	–	–	510	*35.2*	450	*31.0*	385	*26.5*
550°	*287.8*	–	–	300	*20.7*	300	*20.7*	300	*20.7*

Anvil Class 150/300 Malleable Iron Fittings conform to ASME B16.3 and Unions conform to ASME B16.39.

ALL ELBOWS & TEES ⅜" *(10 DN)* and LARGER ARE 100% GAS TESTED AT A MINIMUM OF 100 PSI. *(6.9 bar)*



Anvil standard and extra heavy cast iron threaded fittings are manufactured in accordance with ASME-B16.4 (except plugs and bushings, ASME B16.14). Dimensions also conform to Federal Specifications, WW-P-501 (except plugs and bushings WW-P-471).

c UL us

FM APPROVED

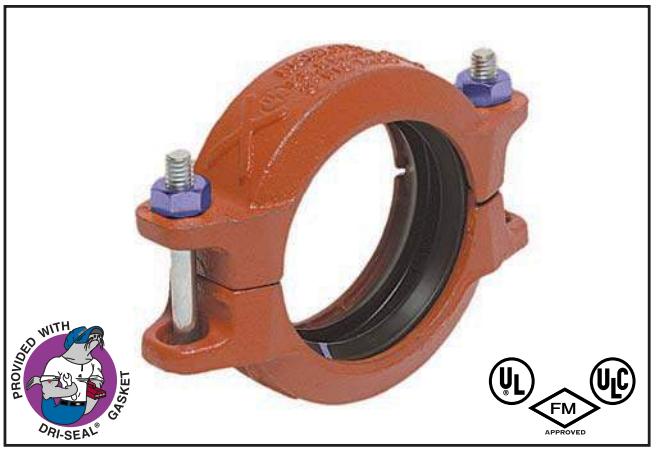
For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.

Cast Iron Threaded Fittings Pressure - Temperature Ratings					
Temperature		Pressure			
		Class 125		Class 250	
(°F)	*(°C)*	psi	*bar*	psi	*bar*
-20° to 150°	*-28.9 to 65.6*	175	*12.1*	400	*27.6*
200°	*93.3*	165	*11.4*	370	*25.5*
250°	*121.1*	150	*10.3*	340	*23.4*
300°	*148.9*	140	*9.7*	310	*21.4*
350°	*176.7*	125	*8.6*	300	*20.7*
400°	*204.4*	–	–	250	*17.2*

Figure 7400* Rigidlite® Coupling

The Figure 7400 Rigidlite Coupling from Gruvlok is specially designed to provide a rigid, locked-in pipe connection to meet the specific demands of rigid design steel pipe. Fast and easy swing-over installation of the rugged lightweight housing produces a secure, rigid pipe joint. The Figure 7400 Rigidlite Coupling is UL/ULC Listed and FM Approved for fire protection service in both wet and dry systems, with roll grooved or cut grooved steel pipe prepared in accordance with Gruvlok grooving specifications. Working pressure ratings shown are for reference only and are based on schedule 40 pipe. For the latest UL/ULC Listed and FM approved pressure ratings versus pipe schedule, see www.anvilstar.com or contact your local AnvilStar Representative.

The Figure 7400 Rigidlite Coupling with a DRI-SEAL®, "C" Style, Grade E Type "A" gasket (coupling is easily identified by purple nuts) is intended for use in fire protection systems installed in accordance with NFPA Standard 13 "Sprinkler Systems".



❑ – Available galvanized.

* When ordering, refer to product as FP7400.

Material Specifications:

Housing:
Ductile Iron conforming to ASTM A-536, Grade 65-45-12.

ANSI Bolts and Heavy Hex Nuts:
Heat treated, oval neck track head bolts conforming to ASTM A-183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A-563. Bolts and nuts are provided zinc electroplated as standard.

Metric Bolts and Heavy Hex Nuts:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

Stainless Steel Bolts and Nuts
Stainless steel bolts and nuts are also available. Contact a AnvilStar Representative for more information.

Coatings:
❑ Rust inhibiting lead-free paint Color: ORANGE (standard)

❑ Hot Dipped Zinc Galvanized (optional)

❑ Other (Specify): _____ (IE: RAL3000 or RAL9000)

For other Coating requirements contact a AnvilStar Representative.

Lubrication: (Specify)
❑ Standard Gruvlok

❑ Gruvlok Xtreme™
Recommended for dry pipe systems and freezer applications

❑ Other (Specify): _____

Gaskets: Materials (Specify when ordering)
Flush gap gasket available
Properties as designated in accordance with ASTM D-2000

❑ **DRI-SEAL® "C" Style Grade "E", Type "A" Gasket** (Violet color code)
-40°F to 150°F (Service Temperature Range)(-40°C to 66°C)
Recommended for wet and dry(oil free air) pipe fire protectio sprinkler systems. For dry pipe systems and freezer applications, Gruvlok Xtreme™ Lubricant is required.

❑ **Grade "E" EPDM** (Green color code) NSF-61 Certified
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

❑ **Grade "T" Nitrile** (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petrolium applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

❑ Other_____

Gasket Type: (Specify)
❑ Standard C Style

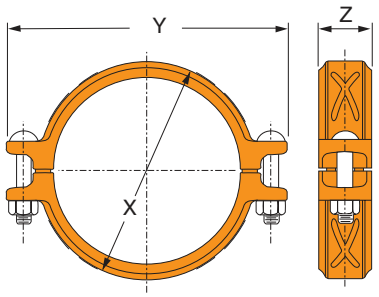
❑ Flush Gap (1¼" - 8")

Project Information:

Project: undefined	
Date: undefined	**Phone:** undefined
Architect / Engineer: undefined	
Contractor: undefined	
Address: undefined	
Notes 1: undefined	
Notes 2: undefined	

Approval Stamp:

Figure 7400* Rigidlite® Coupling



⚠ WARNING

For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok® Xtreme™ Lubricant is recommended.

Figure 7400 Rigidlite® Coupling

Nominal Size	Pipe O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	COUPLING DIMENSIONS			COUPLING BOLTS		SPECIFIED TORQUE §		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs./N-M*		*Lbs./kg*
1¼	1.660	300	649	0 - ⅛	2⅝	4¾	1¾	2	⅜ x 2¼	30	45	1.3
32	*42.2*	*20.7*	*2.89*	*0 - 3.2*	*67*	*121*	*44*		*M10 x 57*	*40*	*60*	*0.6*
1½	1.900	300	851	0 - ⅛	2⅞	4⅞	1¾	2	⅜ x 2¼	30	45	1.4
40	*48.3*	*20.7*	*3.78*	*0 - 3.2*	*73*	*124*	*44*		*M10 x 57*	*40*	*60*	*0.6*
2	2.375	300	1,329	0 - ⅛	3¼	5½	1¾	2	⅜ x 2¼	30	45	1.6
50	*60.3*	*20.7*	*5.91*	*0 - 3.2*	*83*	*140*	*44*		*M10 x 57*	*40*	*60*	*0.7*
2½	2.875	300	1,948	0 - ⅛	3⅞	6	1¾	2	⅜ x 2¼	30	45	1.9
65	*73.0*	*20.7*	*8.66*	*0 - 3.2*	*98*	*152*	*44*		*M10 x 57*	*40*	*60*	*0.9*
3 O.D,	*2.996*	*300*	*2,115*	*0 - ⅛*	*4*	*5⅞*	*1¾*	*2*	*⅜ x 2¼*	*30*	*45*	*1.9*
76.1	76.1	20.7	9.41	*0 - 3.2*	102	149	44		*M10 x 57*	40	60	*0.9*
3	3.500	300	2,886	0 - ⅛	4½	6¾	1¾	2	⅜ x 2¾	30	45	2.1
80	*88.9*	*20.7*	*12.84*	*0 - 3.2*	*114*	*171*	*44*		*M10 x 70*	*40*	*60*	*1.0*
4	4.500	300	4,771	0 - ¼	5⅝	7¾	1⅞	2	⅜ x 2¾	30	45	3.1
100	*114.3*	*20.7*	*21.22*	*0 - 6.4*	*143*	*197*	*48*		*M10 x 70*	*40*	*60*	*1.4*
5½ O.D.	*5.500*	*300*	*7,127*	*0 - ¼*	*6¾*	*9¼*	*2*	*2*	*½ x 3*	*80*	*100*	*4.6*
139.7	139.7	20.7	31.70	0 - 6.4	171	235	*51*		*M12 x 76*	110	150	*2.1*
5	5.563	300	7,292	0 - ¼	6⅞	9¼	2	2	½ x 3	80	100	4.6
125	*141.3*	*20.7*	*32.44*	*0 - 6.4*	*175*	*235*	*51*		*M12 x 76*	*110*	*150*	*2.1*
6½ O.D.	*6.500*	*300*	*9,995*	*0 - ¼*	*7¾*	*10⅜*	*2*	*2*	*½ x 3*	*80*	*100*	*5.5*
165.1	165.1	20.7	44.28	0 - 6.4	200	*264*	*51*		*M12 x 76*	110	150	*2.5*
6	6.625	300	10,341	0 - ¼	7⅞	10⅜	2	2	½ x 3	80	100	5.5
150	*168.3*	*20.7*	*46.00*	*0 - 6.4*	*200*	*264*	*51*		*M12 x 76*	*110*	*150*	*2.5*
8	8.625	300	17,528	0 - ⅛	10¼	12¾	2⅜	2	½ x 3	80	100	8.4
200	*219.1*	*20.7*	*77.97*	*0 - 3.2*	*260*	*324*	*60*		*M12 x 76*	*110*	*150*	*3.8*

Note: 7400 Grade "E" EPDM gasket is required for use in copper system

§ – For additional Bolt Torque information see Technical Data Section.

Additional sizes available, see Gruvlok Catalog or contact an AnvilStar Representative.

Figure 7050S* Standard 90˚ Elbow for Fire Protection

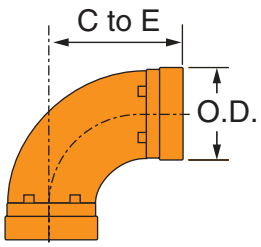


Figure 7050S* Standard 90° Elbow

Nominal Size	O.D.	Max. Rated Pressure	Center to End	Approx Wt. Ea.
In./DN(mm)	*In./mm*	*psi/bar*	*In./mm*	*Lbs./Kg*
1¼ 32	1.660 42.2	300 20.7	2¾ 70	1.0 0.5
1½ 40	1.900 48.3	300 20.7	2¾ 70	1.2 0.5
2 50	2.375 60.3	300 20.7	3¼ 83	1.7 0.8
2½ 65	2.875 73.0	300 20.7	3¾ 95	2.6 1.2
3 80	3.500 88.9	300 20.7	4¼ 108	4.0 1.8
4 100	4.500 114.3	300 20.7	5 127	7.7 3.5
5 125	5.563 141.3	300 20.7	5½ 140	11.1 5.0
6 150	6.625 168.3	300 20.7	6½ 165	16.5 7.5
8 200	8.625 219.1	300 20.7	7¾ 197	30.6 13.9

For additional sizes, see Fig. 7050 in the Gruvlok Catalog or contact an AnvilStar Representative

☐ – Available galvanized.

*When ordering, refer to product as FP7050S.

These fittings are designed to provide minimal pressure drop and uniform strength.

Material Specifications:

Cast Fittings:

Ductile iron conforming to ASTM A-536
Malleable iron conforming to ASTM A-47

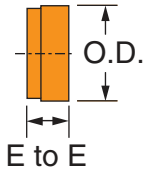
Coatings:

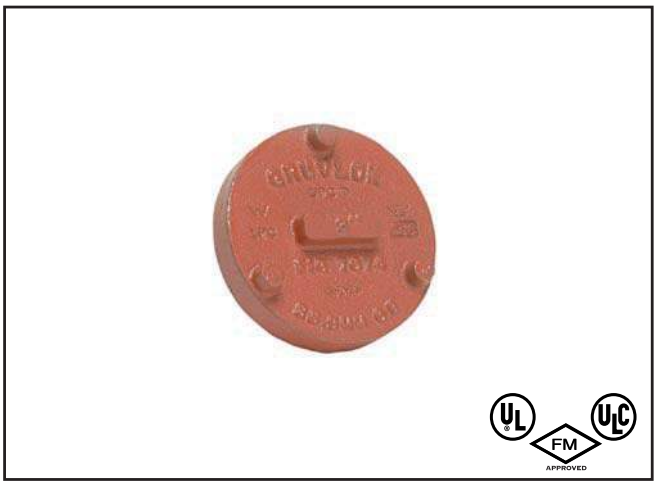
❑ Rust inhibiting lead-free paint: Color: ORANGE (standard) or
❑ Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
❑ Other (Specify): _____ (IE: RAL3000 or RAL9000)

Project Information:		Approval Stamp:
Project: undefined		
Date: undefined	**Phone:** undefined	
Architect / Engineer: undefined		
Contractor: undefined		
Address: undefined		
Notes 1: undefined		
Notes 2: undefined		

 For the latest UL/ULC Listed and FM Approved pressure ratings, versus pipe schedule, go to www.anvilstar.com or contact your local AnvilStar representative

Figure 7074* Cap





☐ – Available galvanized.

*When ordering, refer to product as FP7074

Figure 7074 Cap			
Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1¼	1.660	1¼	0.4
32	*42.2*	*32*	*0.2*
1½	1.900	1¼	0.5
40	*48.3*	*32*	*0.2*
2	2.375	1	0.5
50	*60.3*	*25*	*0.2*
2½	2.875	1	0.7
65	*73.0*	*25*	*0.3*
3	3.500	1	1.1
80	*88.9*	*25*	*0.5*
4	4.500	1⅛	2.8
100	*114.3*	*29*	*1.3*
5	5.563	1⅛	4.0
125	*141.3*	*29*	*1.8*
6	6.625	1 5/16	6.0
150	*168.3*	*33*	*2.7*
8	8.625	1½	12.5
200	*219.1*	*38*	*5.7*
10	10.750	1½	21.9
250	*273.1*	*38*	*9.9*
12	12.750	1½	33.8
300	*323.9*	*38*	*15.3*

Additional sizes available, see Gruvlok Catalog or contact an AnvilStar Representative

Material Specifications:

Cast Fittings:

Cast iron conforming to ASTM A 536
Ductile iron conforming to ASTM A 536
Malleable iron conforming to ASTM A 47

Coatings:

❑ Rust inhibiting lead-free paint Color: ORANGE (standard) or
❑ Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
❑ Other (Specify): _____ (IE: RAL3000 or RAL9000)

Project Information:		Approval Stamp:
Project: undefined		
Date: undefined	**Phone:** undefined	
Architect / Engineer: undefined		
Contractor: undefined		
Address: undefined		
Notes 1: undefined		
Notes 2: undefined		

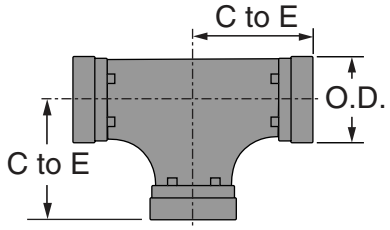
 For the latest UL/ULC Listed and FM Approved pressure ratings, versus pipe schedule, go to www.anvilstar.com or contact your local AnvilStar representative

FIG. 7060S* Standard Tee for Fire Protection

ANVILSTAR™ Fire Products Division of Anvil® International

ANVIL INTERNATIONAL, INC.

Submittal Sheet



UL FM ULC
APPROVED
For Listing / Approval details contact your AnvilStar™ Representative.

– Available galvanized.

*When ordering, refer to product as FP7060S.

These fittings are designed to provide minimal pressure drop and uniform strength.

FIGURE 7060S* TEE

Nominal Size	O.D.	Max. Rated Pressure	Center to End	Approx Wt. Ea.
In./DN(mm)	*In./mm*	*psi/bar*	*In./mm*	*Lbs./Kg*
1¼	1.660	300	2¾	1.5
32	*42.2*	*20.7*	*70*	*0.7*
1½	1.900	300	2¾	1.8
40	*48.3*	*20.7*	*70*	*0.8*
2	2.375	300	3¼	2.4
50	*60.3*	*20.7*	*83*	*1.1*
2½	2.875	300	3¾	4.0
65	*73.0*	*20.7*	*95*	*1.8*
3	3.500	300	4¼	5.8
80	*88.9*	*20.7*	*108*	*2.6*
4	4.500	300	5	10.3
100	*114.3*	*20.7*	*127*	*4.7*
5	5.563	300	5½	16.2
125	*141.3*	*20.7*	*140*	*7.3*
6	6.625	300	6½	25.7
150	*168.3*	*20.7*	*165*	*11.7*
8	8.625	300	7¾	41.1
200	*219.1*	*20.7*	*197*	*18.6*

Additional sizes available, see Gruvlok Catalog or contact an AnvilStar Representative.

MATERIAL SPECIFICATIONS:

CAST FITTINGS:

Ductile iron conforming to ASTM A-536
Malleable iron conforming to ASTM A-47

COATINGS:

- ❑ Rust inhibiting lead-free paint: Color: ORANGE (standard) or
- ❑ Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- ❑ Other (Specify): _____ Example: RAL3000 or RAL9000 Series.

For other Coating requirements contact an AnvilStar Representative.

Project Information:		Approval Stamp:
Project:		
Date:	**Phone:**	
Architect / Engineer:		
Contractor:		
Address:		
Notes 1:		
Notes 2:		

For the latest UL/ULC Listed and FM Approved pressure ratings, versus pipe schedule, go to **www.anvilstar.com** or contact your local AnvilStar representative

ANVIL INTERNATIONAL, INC.

Model L399 OS&Y Gate Valves

cULus Listed, FM Approved

Product Description

The Reliable Model L399 OS&Y Gate valves are UL Listed and FM Approved indicating control valves for fire protection systems. Reliable OS&Y Valves valves have AWWA C 606 grooved end connections or ANSI B 16.1 Class 150 flanged end connections. They are available in 2" (50mm), 2-1/2" (65mm), 3" (80mm), 4" (100mm), 6" (150mm), 8" (200mm), 10" (250mm), and 12" (300mm) nominal sizes. The valves are listed for 300 psi (20.7 bar) working pressure. Verify that appropriate end connections and fittings are used for the system pressure prior to installation.

Maintenance

The owner is responsible for maintaining the fire protection system in proper operating condition. Any system maintenance or testing that involves placing a control valve out of service will eliminate the fire protection that is provided by the fire protection system.

The Reliable OS&Y Gate valves and associated equipment shall periodically be given a thorough inspection and test. NFPA 25, "Inspection, Testing and Maintenance of Water Based Fire Protection Systems," provides minimum maintenance requirements.

Ordering Information

Specify the following when ordering:

Reliable Model L399 OS&Y Gate Valve
End Connection
- Flange x Flange
- Flange x Groove
- Groove x Groove

Valve Size
- 2" (50mm)
- 2-1/2" (65mm)
- 3" (80mm)
- 4" (100mm)
- 6" (150mm)
- 8" (200mm)
- 10" (250mm)
- 12" (300mm)

Flange x Flange

Flange x Groove

Groove x Groove

Guarantee

For Reliable Automatic Sprinkler Co., Inc. guarantee, terms, and conditions, visit www.reliablesprinkler.com.

End Configuration Options **Table A**

Model	End Connections	Sizes in (mm)	Approvals
REL-OSY-L399F	Flange x Flange	2" (50), 2-1/2" (65), 3" (80), 4" (100), 6" (150), 8" (200), 10" (250), 12" (300)	cULus Listed, FM Approved
REL-OSY-L399FG	Flange x Groove		
REL-OSY-L399GG	Groove x Groove		

OS&Y Gate Valves

Technical Specifications
Pressure Rating:
300 psi (20.7 bar)

Material Specifications
Body: Ductile Iron A536 65-45-12
Wedge: Ductile Iron EPDM Coated
Wedge Nut: Stainless Steel AISI 304
Stem: Stainless Steel AISI 304
Bonnet: Ductile Iron A536 65-45-12
Gasket: EPDM Commercial
Packing: Graphite
Stem Nut: Bronze ASTM B62
Handwheel: Ductile Iron A536 65-45-12

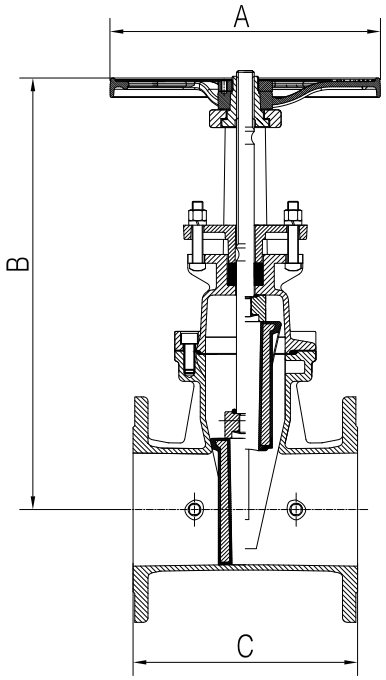
End Connections
Groove x Groove (REL-OSY-L399GG)
Flange x Groove (REL-OSY-L399FG)
Flange x Flange (REL-OSY-L399F)

Specifications
Groove: AWWA C 606
Flange: ANSI B 16.1 Class 150

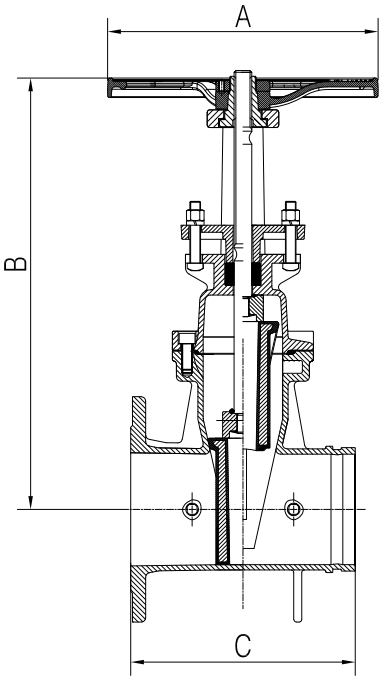
Listings and Approvals
cULus Listed
FM Approved

Reliable OS&Y Gate Valve Dimensions — **Figure 1**

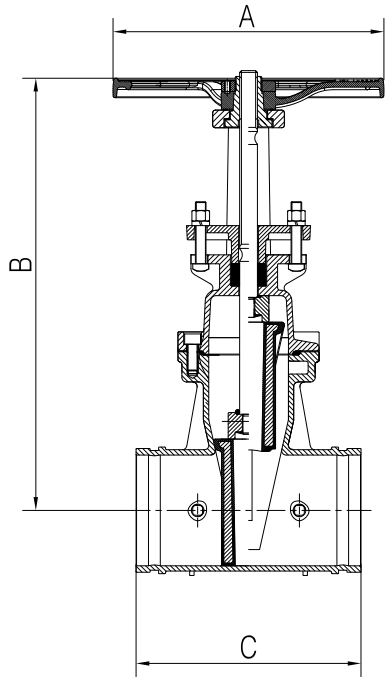
Flange x Flange



Flange x Groove



Groove x Groove



Reliable OS&Y Gate Valve Dimensions - in. (mm) — **Table B**

Valve Size	A	B	C
2” (50)	7-3/16” (183)	16-3/16” (411)	7” (178)
2-1/2” (65)	7-3/16” (183)	16-3/16” (411)	7-1/2” (191)
3” (80)	9-15/16” (253)	18-3/16” (462)	8” (203)
4” (100)	9-15/16” (253)	20-1/4” (514)	9” (229)
6” (150)	12-1/16” (306)	27-15/16” (709)	10-1/2” (267)
8” (200)	14” (355)	36-1/3” (922)	11-1/2” (292)
10” (250)	17-1/2” (445)	43-15/16” (1116)	13” (330)
12” (300)	17-1/2” (445)	51-3/16” (1300)	14” (356)

TrimFit® Globe Valve with PTFE

INSIST ON FPPI®

UL/ULC Listed 300 psi

Description

FPPI® TrimFit® Bronze* Globe Valves are precision cast then machined using state of the art facilities. Each valve features a full floating seat holder for reduced seat wear when closing the valve. Seat is made of pure virgin PTFE for longer seat life and reduced maintenance as compared to rubber seat valves. TrimFit trim valves are suitable for use in regular (175psi) and high pressure (300psi) sprinkler systems. Standard configuration is FNPT x FNPT and is available in ¼" IPS through 2" IPS sizes. Each valve carries the UL Listing UL/ ULC Listed 2R97

Installation

Install in accordance with usual and customary installation techniques for fire sprinkler systems. Use a suitable thread sealant on the male threads of the pipe being threaded into the valve body. We recommend either FPPI PTFE Thread Sealing Tape or PipeFit® Thread Sealing Paste with PTFE. **NEVER USE BOTH. DO NOT OVERTIGHTEN. OVERTIGHTENING MAY CAUSE CRACKS OR LEAKS.**

Specifications

Material:
Brass* or Bronze*
Seat-PTFE
Hand wheel-JIS FC 20 painted red.

Sizes:
06-798-00 ¼" IPS FNPT
06-800-00 ½"
06-802-00 ¾"
06-804-00 1"
06-806-00 1¼"
06-808-00 1½"
06-810-00 2"

*Contains lead. Not for use in water systems intended for human consumption.

3198 LIONSHEAD AVE
CARLSBAD, CA 92010
TEL + 1 760 599-1168
+ 1 800 344-1822
FAX + 1 800 344-3775

UL LISTED c UL LISTED

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

VSR
VANE TYPE WATERFLOW ALARM SWITCH WITH RETARD

UL, CUL and CSFM Listed, FM Approved, LPCB Approved, For CE Marked (EN12259-5) / VdS Approved model use VSR-EU

Service Pressure: 450 PSI (31 BAR) - UL

Flow Sensitivity Range for Signal:
4-10 GPM (15-38 LPM) - UL

Maximum Surge: 18 FPS (5.5 m/s)

Contact Ratings: Two sets of SPDT (Form C)
10.0 Amps at 125/250VAC
2.0 Amps at 30VDC Resistive
10 mAmps min. at 24VDC

Conduit Entrances: Two knockouts provided for 1/2" conduit. Individual switch compartments suitable for dissimilar voltages.

Environmental Specifications:

- NEMA 4/IP54 Rated Enclosure suitable for indoor or outdoor use with factory installed gasket and die-cast housing when used with appropriate conduit fitting.
- Temperature Range: 40°F - 120°F, (4.5°C - 49°C) - UL
- Non-corrosive sleeve factory installed in saddle.

Service Use:

Automatic Sprinkler	NFPA-13
One or two family dwelling	NFPA-13D
Residential occupancy up to four stories	NFPA-13R
National Fire Alarm Code	NFPA-72

Specifications subject to change without notice.

Ordering Information			
Nominal Pipe Size		Model	Part Number
2"	DN50	VSR-2	1144402
2 1/2"	DN65	VSR-2 1/2	1144425
3"	DN80	VSR-3	1144403
3 1/2"	-	VSR-3 1/2	1144435
4"	DN100	VSR-4	1144404
5"	-	VSR-5	1144405
6"	DN150	VSR-6	1144406
8"	DN200	VSR-8	1144408

Optional: Cover Tamper Switch Kit, stock no. 0090148
Replaceable Components: Retard/Switch Assembly, stock no. 1029030

⚠ WARNING

- Installation must be performed by qualified personnel and in accordance with all national and local codes and ordinances.
- Shock hazard. Disconnect power source before servicing. Serious injury or death could result.
- Risk of explosion. Not for use in hazardous locations. Serious injury or death could result.

CAUTION

Waterflow switches that are monitoring wet pipe sprinkler systems shall not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems. Waterflow switches used for this application may result in unintended discharges caused by surges, trapped air, or short retard times.

General Information

The Model VSR is a vane type waterflow switch for use on wet sprinkler systems. It is UL Listed and FM Approved for use on steel pipe; schedules 10 through 40, sizes 2" thru 8" (50 mm thru 200 mm). LPC approved sizes are 2" thru 8" (50 mm thru 200 mm). See Ordering Information chart.

The VSR may also be used as a sectional waterflow detector on large systems. The VSR contains two single pole, double throw, snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 GPM (38 LPM) or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

Enclosure

The VSR switches and retard device are enclosed in a general purpose, die-cast housing. The cover is held in place with two tamper resistant screws which require a special key for removal. A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover. See bulletin number 5401103 for installation instructions of this switch.

VSR
VANE TYPE WATERFLOW ALARM SWITCH WITH RETARD

Installation (see Fig. 1)

These devices may be mounted on horizontal or vertical pipe. On horizontal pipe they shall be installed on the top side of the pipe where they will be accessible. The device should not be installed within 6" (15 cm) of a fitting which changes the direction of the waterflow or within 24" (60 cm) of a valve or drain.

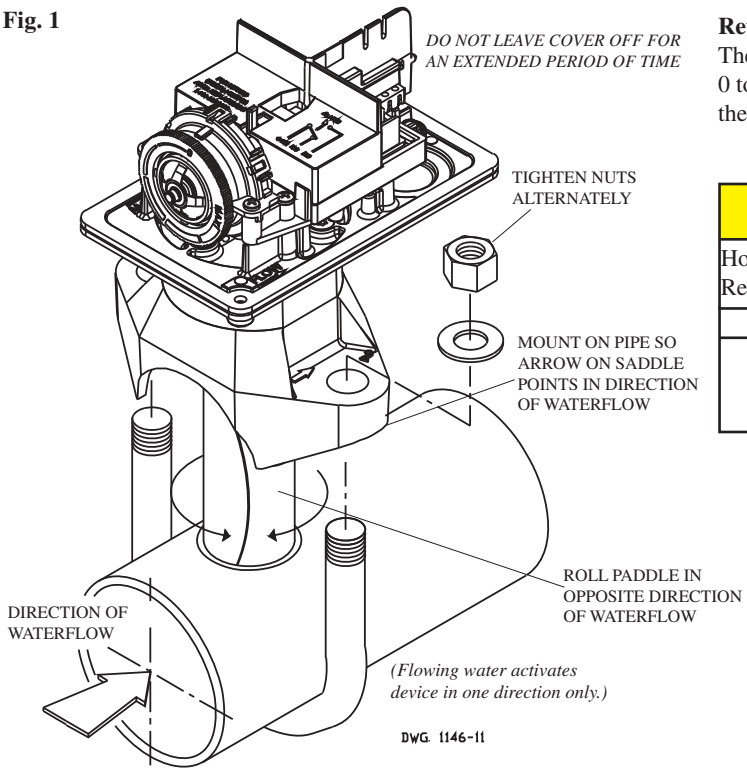
NOTE: Do not leave cover off for an extended period of time.

Drain the system and drill a hole in the pipe using a hole saw in a slow speed drill (see Fig. 1). Clean the inside pipe of all growth or other material for a distance equal to the pipe diameter on either side of the hole. Roll the vane so that it may be inserted into the hole; do not bend or crease it. Insert the vane so that the arrow on the saddle points in the direction of the waterflow. Take care not to damage the non-corrosive bushing in the saddle. The bushing should fit inside the hole in the pipe. Install the saddle strap and tighten nuts alternately to required torque (see the chart in Fig. 1). The vane must not rub the inside of the pipe or bind in any way.

⚠ CAUTION

Do not trim the paddle. Failure to follow these instructions may prevent the device from operating and will void the warranty.

Fig. 1

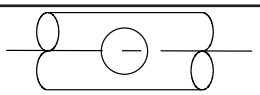
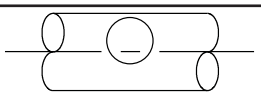


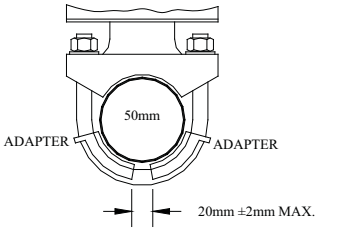
Retard Adjustment

The delay can be adjusted by rotating the retard adjustment knob from 0 to the max setting (60-90 seconds). The time delay should be set at the minimum required to prevent false alarms

CAUTION

Hole must be drilled perpendicular to the pipe and vertically centered. Refer to the Compatible Pipe/Installation Requirements chart for size.

Correct	Incorrect
	



DN50 ONLY

USE (2) 5180162 ADAPTERS AS SHOWN ABOVE

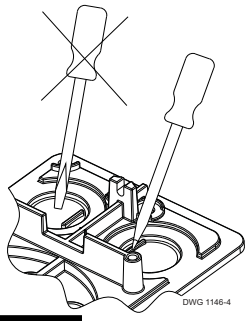
DWG# 1146-1F

Compatible Pipe/ Installation Requirements

Model	Nominal Pipe Size		Nominal Pipe O.D.		Pipe Wall Thickness								Hole Size		U-Bolt Nuts Torque	
					Schedule 10 (UL)		Schedule 40 (UL)		BS-1387 (LPC)		DN (VDS)					
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	ft-lb	n-m
VSR-2	2	DN50	2.375	60.3	0.109	2.77	0.154	3.91	0.142	3.6	0.091	2.3	1.25 + .125/-.062	33.0 ± 2.0	20	27
VSR-2 1/2	2.5	-	2.875	73.0	0.120	3.05	0.203	5.16	-	-	-	-				
VSR-2 1/2	-	DN65	3.000	76.1	-	-	-	-	0.142	3.6	0.102	2.6				
VSR-3	3	DN80	3.500	88.9	0.120	3.05	0.216	5.49	0.157	4.0	0.114	2.9	2.00 ± .125	50.8 ± 2.0		
VSR-3 1/2	3.5	-	4.000	101.6	0.120	3.05	0.226	5.74	-	-	-	-				
VSR-4	4	DN100	4.500	114.3	0.120	3.05	0.237	6.02	0.177	4.5	0.126	3.2				
VSR-5	5	-	5.563	141.3	0.134	3.40	0.258	6.55	-	-	-	-				
VSR-6	6	DN150	6.625	168.3	0.134	3.40	0.280	7.11	0.197	5.0	0.157	4.0				
VSR-8	8	DN200	8.625	219.1	0.148	3.76	0.322	8.18	0.248	6.3	0.177	4.5				

NOTE: For copper or plastic pipe use Model VSR-CF.

Fig. 2
To remove knockouts: Place screwdriver at inside edge of knockouts, not in the center.



NOTICE
Do not drill into the base as this creates metal shavings which can create electrical hazards and damage the device. Drilling voids the warranty.

Fig. 3
Break out thin section of cover when wiring both switches from one conduit entrance.

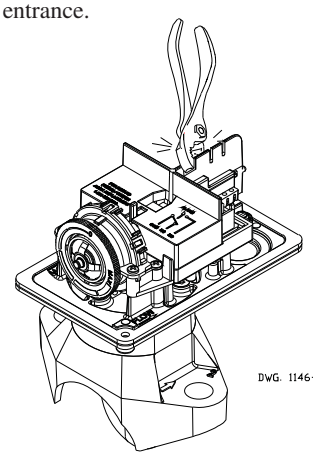
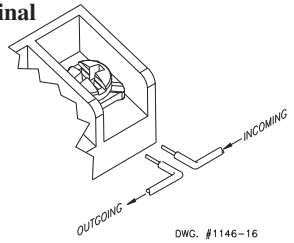


Fig. 4 Switch Terminal Connections Clamping Plate Terminal

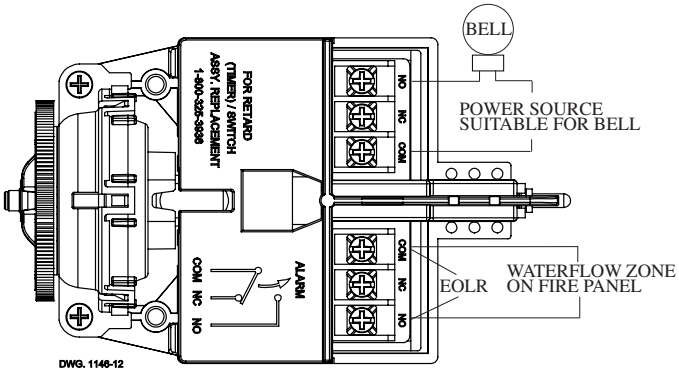


⚠ WARNING
An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire become dislodged from under the terminal. Failure to sever the wire may render the device inoperable risking severe property damage and loss of life.

Do not strip wire beyond 3/8" of length or expose an uninsulated conductor beyond the edge of the terminal block. When using stranded wire, capture all strands under the clamping plate.

Fig. 5 Typical Electrical Connections

Notes:
1. The Model VSR has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other contact is used to operate a local audible or visual annunciator.
2. A condition of LPC Approval of this product is that the electrical entry must be sealed to exclude moisture.
3. For supervised circuits, see "Switch Terminal Connections" drawing and warning note (Fig. 4).

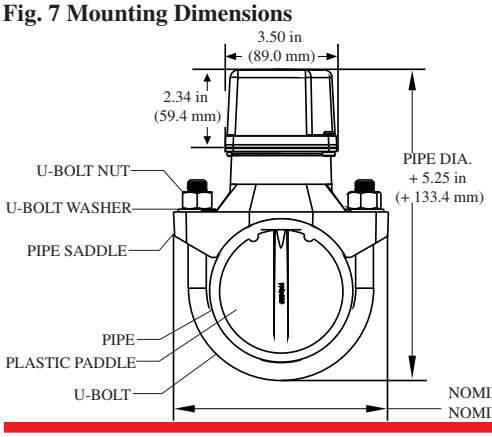


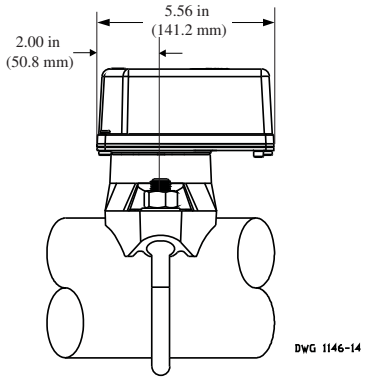
Testing
The frequency of inspection and testing for the Model VSR and its associated protective monitoring system shall be in accordance with applicable NFPA Codes and Standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).

If provided, the inspector's test valve shall always be used for test purposes. If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR is not recommended or advisable.
A minimum flow of 10 GPM (38 LPM) is required to activate this device.

NOTICE Advise the person responsible for testing of the fire protection system that this system must be tested in accordance with the testing instructions.

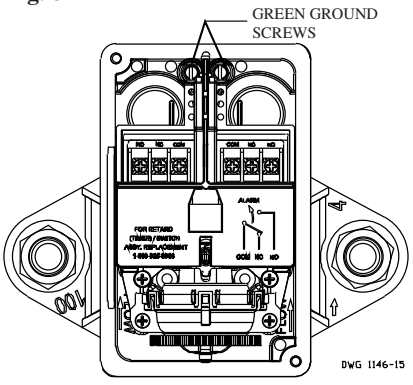
Fig. 7 Mounting Dimensions





NOMINAL PIPE DIA. +1.75 in (+44.5 MM) FOR DN 50 – DN 65 2–2.5 in
NOMINAL PIPE DIA. +2.125 in (+54.0 MM) FOR DN 80 – DN 200 3–8 in

Fig. 8



Maintenance

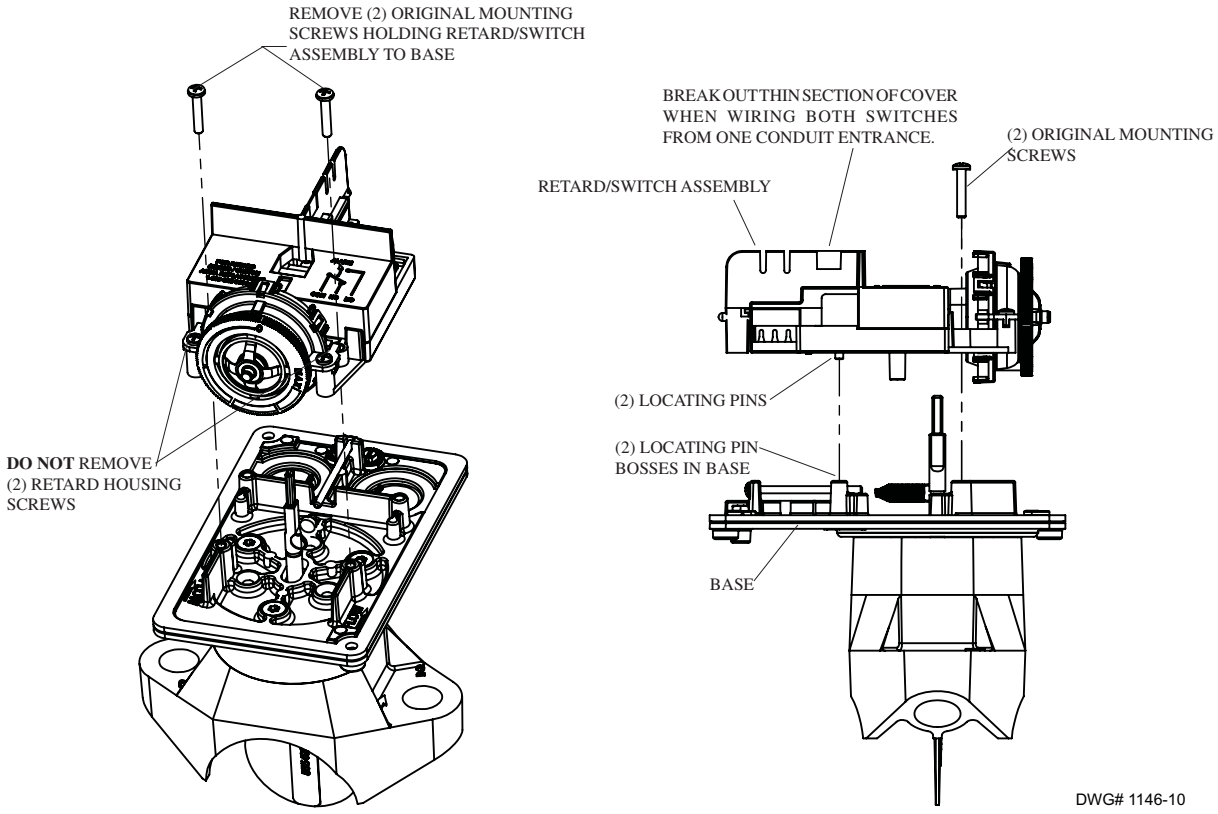
Inspect detectors monthly. If leaks are found, replace the detector. The VSR waterflow switch should provide years of trouble-free service. The retard and switch assembly are easily field replaceable. In the unlikely event that either component does not perform properly, please order replacement retard switch assembly stock #1029030 (see Fig. 6). There is no maintenance required, only periodic testing and inspection.

Retard/Switch Assembly Replacement (See Fig. 6)

NOTICE The Retard/Switch Assembly is field-replaceable without draining the system or removing the waterflow switch from the pipe

1. Make sure the fire alarm zone or circuit connected to the waterflow switch is bypassed or otherwise taken out of service.
2. Disconnect the power source for local bell (if applicable).
3. Identify and remove all wires from the waterflow switch.
4. Remove the (2) mounting screws holding retard/switch assembly to the base. **Do not** remove the (2) retard housing screws.
5. Remove the retard assembly by lifting it straight up over the tripstem.
6. Install the new retard assembly. Make sure the locating pins on the retard/switch assembly fit into the locating pin bosses on the base.
7. Re-install the (2) original mounting screws.
8. Reconnect all wires. Perform a flow test and place the system back in service.

Fig. 6



Removal of Waterflow Switch

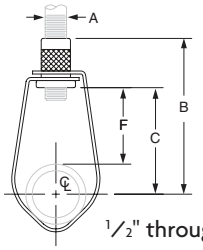
- To prevent accidental water damage, all control valves should be shut tight and the system completely drained before waterflow detectors are removed or replaced.
- Turn off electrical power to the detector, then disconnect wiring.
- Loosen nuts and remove U-bolts.
- Gently lift the saddle far enough to get your fingers under it. With your fingers, roll the vane so it will fit through the hole while continuing to lift the waterflow detector saddle.
- Lift detector clear of pipe.

Fig. 69 Adjustable Swivel Ring, Tapped Per NFPA Standards

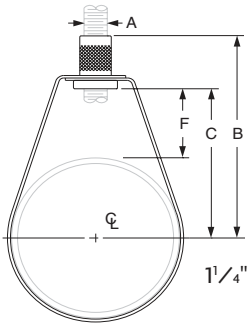
Size Range: 1/2" through 8"
Material: Carbon steel
Finish: ❑ Galvanized
Service: Recommended for suspension of non-insulated **stationary** pipe line.
Maximum Temperature: 650° F
Approvals: Complies with Federal Specification A-A-1192A (Type 10) *WW-H-171-E (Type 10)*, ANSI/MSS SP-69 and MSS SP-58 (Type 10). UL Listed and FM Approved (Sizes 3/4" - 8").
Features:

- Threads are countersunk so that they cannot become burred or damaged.
- Knurled swivel nut provides vertical adjustment after piping is in place.
- Captured swivel nut in the 1/2" through 6" sizes. The capture is permanent in the bottom portion of the band, allowing the hanger to be opened during installation if desired, but not allowing the nut to fall completely out.

Ordering: Specify size, figure number and name.
Note: The acceptability of galvanized coatings at temperatures above 450°F is at the discretion of the end user.
Metric nut available upon request. Non-captured nut also available upon request.



1/2" through 1" pipe



1 1/4" through 8" pipe

FIG. 69: LOADS (LBS) • WEIGHT (LBS) • DIMENSIONS (IN)						
Pipe Size	Max Load	Weight	Rod Size A	B	C	F
1/2	300	0.10	3/8	2 7/8	2	1 9/16
3/4		0.10		2 3/4	1 7/8	1 5/16
1		0.10		2 9/16	1 11/16	1
1 1/4		0.10		2 5/8	1 3/4	7/8
1 1/2		0.10		2 3/4	1 7/8	
2		0.11		3 1/4	2 3/8	1 1/8
2 1/2	525	0.20		4	2 3/4	1 5/16
3		0.20		3 13/16	2 15/16	1 3/16
4	650	0.30		4 11/16	3 13/16	1 9/16
5	1,000	0.54	1/2	5 5/16	4 3/8	
6		0.65		6 11/16	5 9/16	2 1/4
8		1.00		8	7	2 11/16

Note: Reflects changes in rod diameter from previously published data per recent revisions in MSS-SP-58 & 69

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

Fig. 146

Continuous Threaded Rod

Size Range: 1/4" through 1 1/2" Stocked in six, ten, and twelve foot lengths. Other even foot lengths can be furnished to order.
Material: Carbon steel; rod threaded complete length.
Finish: ❑ Plain or ❑ galvanized.
Maximum Temperature: 650° F.
Ordering: Specify rod diameter and length, figure number, name and finish.
Note: The acceptability of galvanized coatings at temperatures above 450°F is at the discretion of the end user.

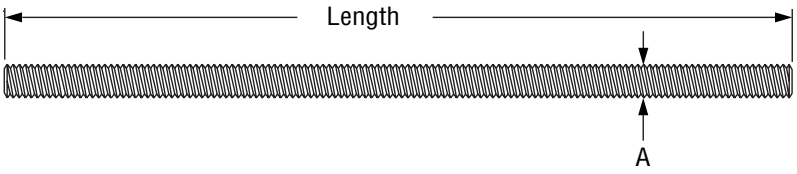


FIG. 146: LOADS (LBS) • WEIGHTS (LBS) DIMENSIONS (IN)

Rod Size A	Threads per Inch	Max Load 650° F	Weight per Ft.
1/4	20	240	0.12
3/8	16	730	0.30
1/2	13	1,350	0.53
5/8	11	2,160	0.84
3/4	10	3,230	1.20
7/8	9	4,480	1.70
1	8	5,900	2.30
1 1/4	7	9,500	3.60
1 1/2	6	13,800	5.10

Note: Other rod sizes available upon request. Class 2 fit is available upon request.

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

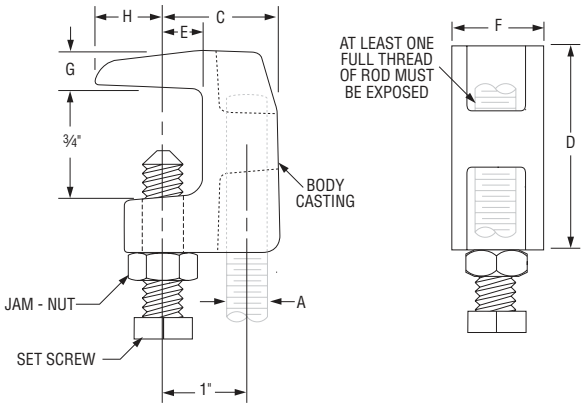
Fig. 92

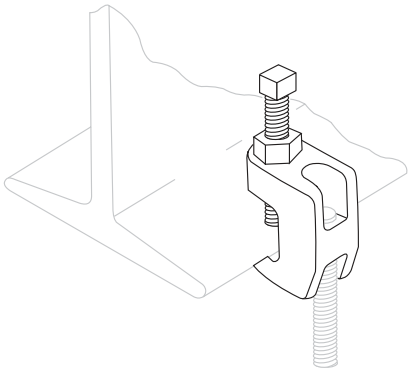
Universal C-type Clamp (Standard Throat)

Size Range: 3/8" and 1/2"
Material: Ductile iron, hardened steel cup point set screw and locknut.
Finish: ❑ Plain or ❑ Galvanized
Service: Recommended for use under roof installations with bar joist type construction, or for attachment to the top or bottom flange of structural shapes where the vertical hanger rod is required to be offset from the edge of the flange and where the thickness of joist or flange does not exceed 3/4".
Approvals: Complies with Federal Specification A-A-1192A (Type 19 & 23) *WW-H-171-E (Type 23)*, ANSI/MSS SP-69 and MSS SP-58 (Type 19 & 23). UL, ULC Listed and FM Approved.
How to size: Size of clamp is determined by size of rod to be used.
Installation: Follow recommended set screw torque values per MSS-SP-69 (See table on page 208)
Features:

- They may be attached to horizontal flanges of structural members in either the top beam or bottom beam positions.
- Secured in place by a cup-pointed Set Screw tightened against the flange. A Jam Nut is provided for tightening the Set Screw against the Body Casting.
- Thru tapping of the body casting permits extended adjustment of the threaded rod.
- Can be used with Fig 89X retaining clip for seismic applications.

Ordering: Specify rod size, figure number, name of clamp and finish.





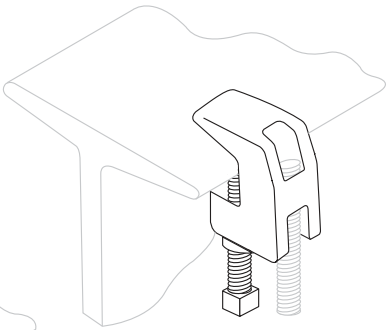


FIG. 92: LOAD (LBS) • WEIGHT (LBS) • DIMENSIONS (IN) • TORQUE (IN-LBS)											
Rod Size A	Set Screw Size	Torque Value	Max Loads ■		Weight	C	D	E	F	G	H
			Top	Bottom							
3/8	3/8	60	500	250	0.34	1 5/16	1 9/16	9/16	13/16	3/8	1/2
1/2	1/2	125	950	760	0.63	1 3/8	1 13/16	1/2	1 1/16	7/16	23/32

■ Maximum temperature of 450° F

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

FIRE PROTECTION HYDRAULIC CALCULATIONS

PROJECT:

WALMART #0767

2767 W US HWY 90
LAKE CITY, FL. 32055

Cuhaci & Peterson
Architects Engineers Planners

- ☑ *Reviewed, no comments*
- ☐ *Rejected*
- ☐ *Submit specific item*
- ☐ *Furnish as corrected*
- ☐ *Revise and resubmit*

This review is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication processes, or to the means, methods, techniques, sequences and procedures of construction; coordination of the Work with that of all trades; and for performing all work in a safe and satisfactory manner.

Date: 9/13/2022 By: vim.abanador

CONTACT:

FAHAD ALAJMI
(203)804-6299
falajmi@skywaysprinkler.com

CALCULATION SUMMARY

Project Name : Walmart #0767

Project Location: 2767 W US HWY 90

Contract No. : SSC-027

City: LAKE CITY, FL 32055

Design Areas

Design Area Name	Calc. Mode (Model)	Occupancy	Area of Application	Total Water	Pressure @ Source	Min. Density	Min. Pressure	Min. Flow	Calculated Heads	Hose Streams	Margin To Source
			(ft²)	(gpm)	(psi)	(gpm/ft²)	(psi)	(gpm)	#	(gpm)	(psi)
1	Demand (HW)	ORDINARY GROUP II	12	777.9	Required 39.4	0.434	15	43.4	12	250	19.6

HYDRAULIC CALCULATIONS
for

Job Information

Project Name : Walmart #0767

Contract No. : SSC-027 | City: LAKE CITY, FL 32055

Project Location: 2767 W US HWY 90 | Date: 6/1/2022

Contractor Information

Name of Contractor: Skyway Sprinkler, LLC

Address: 360 Central Avenue - Suite 800 | City: St. Petersburg, FL 33701

Phone Number: 727-914-2374 | E-mail: falajmi@skywaysprinkler.com

Name of Designer: FA

Authority Having Jurisdiction:

Design

Remote Area Name	1
Remote Area Location	OGP 12S
Occupancy Classification	ORDINARY GROUP II
Density (gpm/ft^2)	0.434
Area of Application (ft^2)	12
Coverage per Sprinkler (ft^2)	100
Number of Calculated Sprinklers	12
In-Rack Demand (gpm)	0
Special Heads	
Hose Streams (gpm)	250
Total Water Required (incl. Hose Streams) (gpm)	777.9
Required Pressure at Source (psi)	39.4
Type of System	Wet
Volume - Entire System (gal)	1642.6 gal

Water Supply Information

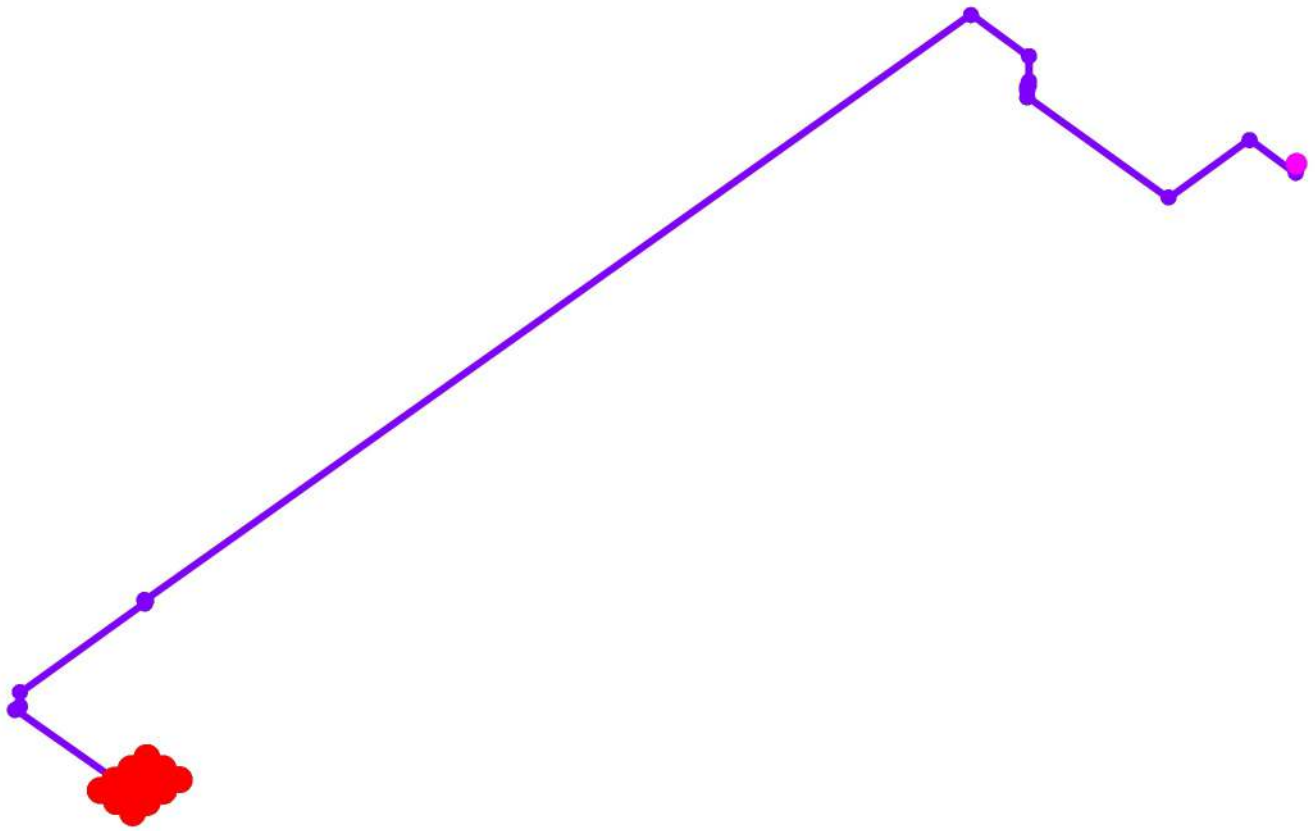
Date	10/12/2021
Location	EXISTING HYDRANT INFRONT OF WALMART
Source	W1

Notes

FLOWING 12 SPRINKLERS AT 15 PSI

Node Labels: Off
Pipe Labels: Off

Diagram for Design Area : 1
(Optimized Hydraulic Simplified)



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Hydraulic Analysis for : 1

Calculation Info

Calculation Mode	Demand
Hydraulic Model	Hazen-Williams
Fluid Name	Water @ 60F (15.6C)
Fluid Weight, (lb/ftE)	N/A for Hazen-Williams calculation.
Fluid Dynamic Viscosity, (lbXs/ftД)	N/A for Hazen-Williams calculation.

Water Supply Parameters

Supply 1 : W1

Flow (gpm)	Pressure (psi)
0	65
1130	53

Supply Analysis

Node at Source	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)	Available Pressure (psi)	Total Demand (gpm)	Required Pressure (psi)
W1	65	53	1130	59	777.9	39.4

Hoses

Inside Hose Flow / Standpipe Demand (gpm)	
Outside Hose Flow (gpm)	
Additional Outside Hose Flow (gpm)	250
Other (custom defined) Hose Flow (gpm)	
Total Hose Flow (gpm)	250

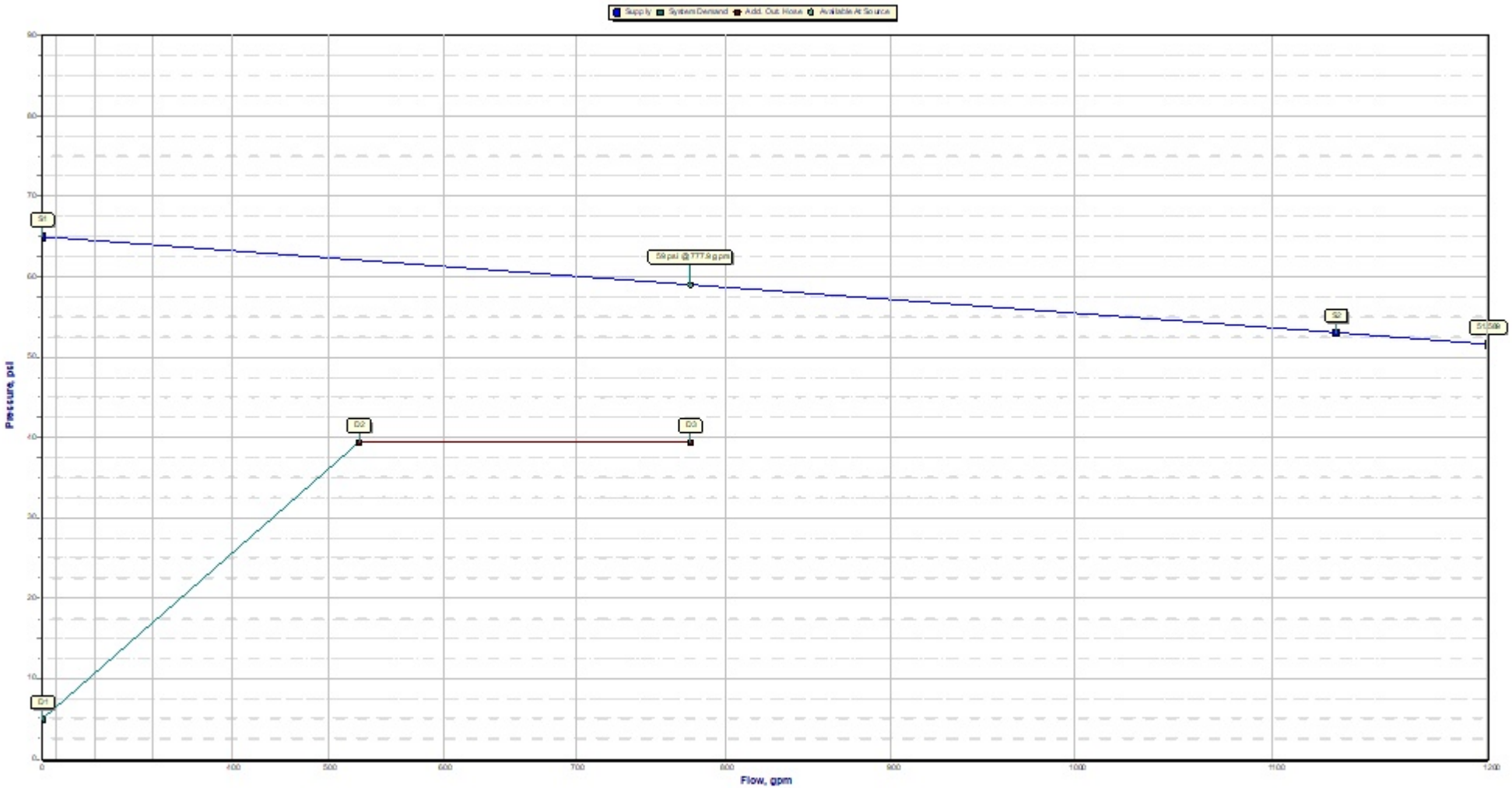
Sprinklers

Ovehead Sprinkler Flow (gpm)	527.9
InRack Sprinkler Flow (gpm)	0
Other (custom defined) Sprinkler Flow (gpm)	0
Total Sprinkler Flow (gpm)	527.9

Other

Required Margin of Safety (psi)	0
W1 - Pressure (psi)	39.4
W1 - Flow (gpm)	527.9
Demand w/o System Pump(s)	N/A

Hydraulic Analysis for : 1



Hydraulic Analysis for : 1

Graph Labels

Label	Description	Values	
		Flow (gpm)	Pressure (psi)
S1	Supply point #1 - Static	0	65
S2	Supply point #2 - Residual	1130	53
D1	Elevation Pressure	0	5
D2	System Demand	527.9	39.4
D3	System Demand + Add.Out.Hose	777.9	39.4

Curve Intersections & Safety Margins

Curve Name	Intersection		Safety Margin	
	Pressure (psi)	Flow (gpm)	Pressure (psi)	@ Flow (gpm)
Supply	60.3	682.3	19.6	777.9

Open Heads

Head Ref.	Head Type	Coverage	K-Factor	Required			Calculated		
				Density	Flow	Pressure	Density	Flow	Pressure
		(ftД)	(gpm/psiЖ)	(gpm/ftД)	(gpm)	(psi)	(gpm/ftД)	(gpm)	(psi)
H01	Overhead Sprinkler	100	11.2	0	0	15	0.436	43.6	15.1
H02	Overhead Sprinkler	100	11.2	0	0	15	0.434	43.4	15
H03	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.439	43.9	15.3
H04	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.441	44.1	15.5
H05	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.445	44.5	15.8
H06	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.441	44.1	15.5
H07	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.442	44.2	15.6
H08	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.447	44.7	15.9
H09	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.438	43.8	15.3
H10	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.442	44.2	15.6
H11	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.436	43.6	15.1
H12	Overhead Sprinkler	100	11.2	0.000	0.0	15	0.44	44	15.5

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psiЖ	gpm gpm	ftД gpm/ftД	psi psi	psi gpm
H02 14.46	Overhead Sprinkler HEAD	11.2 Open	43.4	100 0.434	15 -5	15 0
H01 14.46	Overhead Sprinkler HEAD	11.2 Open	43.6	100 0.436	15.1 -5	15 0
H11 14.24	Overhead Sprinkler HEAD	11.2 Open	43.6	100 0.436	15.1 -4.9	15 0.0
H09 14.25	Overhead Sprinkler HEAD	11.2 Open	43.8	100 0.438	15.3 -4.9	15 0.0
H03 14.46	Overhead Sprinkler HEAD	11.2 Open	43.9	100 0.439	15.3 -5	15 0.0
H12 13.99	Overhead Sprinkler HEAD	11.2 Open	44	100 0.44	15.5 -4.8	15 0.0
H06 14.46	Overhead Sprinkler HEAD	11.2 Open	44.1	100 0.441	15.5 -5	15 0.0
H04 14.25	Overhead Sprinkler HEAD	11.2 Open	44.1	100 0.441	15.5 -4.9	15 0.0
H10 14.04	Overhead Sprinkler HEAD	11.2 Open	44.2	100 0.442	15.6 -4.8	15 0.0
H07 14.25	Overhead Sprinkler HEAD	11.2 Open	44.2	100 0.442	15.6 -4.9	15 0.0
H05 14.04	Overhead Sprinkler HEAD	11.2 Open	44.5	100 0.445	15.8 -4.8	15 0.0
H08 14.04	Overhead Sprinkler HEAD	11.2 Open	44.7	100 0.447	15.9 -4.8	15 0.0
138 13.54	Node NODE				18.6 -4.6	
128 13.33	Node NODE				18.8 -4.5	
001 13.54	Node NODE				18.8 -4.6	
127 13.33	Node NODE				18.9 -4.5	
002 13.54	Node NODE				19 -4.6	
113 13.12	Node NODE				19.1 -4.4	
010 13.54	Node NODE				19.2 -4.6	
118 13.33	Node NODE				19.2 -4.5	
112 13.12	Node NODE				19.3 -4.4	
115 13.33	Node NODE				19.3 -4.5	
109 13.12	Node NODE				19.5 -4.4	
108 13.12	Node NODE				19.7 -4.4	
003 13.54	Node NODE				20 -4.6	

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psiЖ	gpm gpm	ftД gpm/ftД	psi psi	psi gpm
012 13.33	Node NODE				20.2 -4.5	
013 13.12	Node NODE				20.5 -4.4	
014 11.82	Node NODE				26.5 -3.8	
047-O 6.25	Node NODE				35.8 -1.4	
047-I 5.38	Node NODE				36.2 -1	
051-O 3.4	Node NODE				37.7 -0.2	
051-I 2.44	Node NODE				38.6 0.2	
052 1	Node NODE				39.3 0.9	
W1 3	Supply SUPPLY		-527.9		39.4 0	
056 -3	Node NODE				41.4 2.6	
058 -3	Node NODE				41.8 2.6	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
H02	14.46	11.2	43.4	1	1x(us.Tee-Br)= 5	0.92	120	15	
138	13.54		43.4	1.049		5	0.5439	0.4	
						5.92		3.2	
138	13.54		0	2		9.83	120	18.6	
001	13.54		43.4	2.157		0	0.0163	0	
						9.83		0.2	
001	13.54		43.6	2	1x(us.Tee-Br)= 12.31	8.61	120	18.8	
003	13.54		86.9	2.157		12.31	0.0589	0	
						20.92		1.2	
003	13.54		87.9	4		10	120	20	
012	13.33		174.9	4.26		0	0.0078	0.1	
						10		0.1	
012	13.33		175.7	4		10	120	20.2	
013	13.12		350.5	4.26		0	0.0283	0.1	
						10		0.3	
013	13.12		177.4	4	1x(us.Tee-Br)= 26.33	63.01	120	20.5	
014	11.82		527.9	4.26		26.33	0.0605	0.6	
						89.34		5.4	
014	11.82		0	6	8x(us.90)= 140.82	653.4	120	26.5	
047-O	6.25		527.9	6.357		140.82	0.0086	2.4	
						794.22		6.8	
047-O	6.25		0	6		0.88		35.8	Gate A2360
047-I	5.38		527.9	0		0	0.0108	0.4	***
						0.88		0	
047-I	5.38		0	6	2x(us.Tee-Br)= 75.44	3.06	120	36.2	
051-O	3.4		527.9	6.357		75.44	0.0086	0.9	
						78.5		0.7	
051-O	3.4		0	6		0.96		37.7	CV-1F Check
051-I	2.44		527.9	0		0	0.5404	0.4	***
						0.96		0.5	
051-I	2.44		0	6		1.44	120	38.6	
052	1		527.9	6.357		0	0.0086	0.6	
						1.44		0.0	
052	1		0	8	2x(us.Tee-Br)= 123.28	141.2	140	39.3	
056	-3		527.9	8.55	1x(us.90)= 31.7	154.98	0.0015	1.7	
						296.18		0.5	
056	-3		0	6	1x(us.90)= 24.19	28.48	140	41.4	
058	-3		527.9	6.4		24.19	0.0063	0	
						52.68		0.3	
058	-3		0	6	1x(us.90)= 17.6	6.5	120	41.8	
W1	3		527.9	6.357		17.6	0.0086	-2.6	
						24.1		0.2	
W1								39.4	
Path No: 2									
H01	14.46	11.2	43.6	1	1x(us.Tee-Br)= 5	0.92	120	15.1	
001	13.54		43.6	1.049		5	0.5484	0.4	
						5.92		3.2	
001								18.8	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 3									
H11	14.24	11.2	43.6	1	1x(us.Tee-Br)=5	0.91	120	15.1	
128	13.33		43.6	1.049		5	0.5485	0.4	
						5.91		3.2	
128	13.33		0	2		9.83	120	18.8	
127	13.33		43.6	2.157		0	0.0164	0	
						9.83		0.2	
127	13.33		43.8	2	1x(us.Tee-Br)=12.31	8.61	120	18.9	
012	13.33		87.3	2.157		12.31	0.0594	0	
						20.92		1.2	
012								20.2	
Path No: 4									
H09	14.25	11.2	43.8	1	1x(us.Tee-Br)=5	0.92	120	15.3	
127	13.33		43.8	1.049		5	0.5528	0.4	
						5.92		3.3	
127								18.9	
Path No: 5									
H03	14.46	11.2	43.9	1	1x(us.Tee-Br)=5	0.92	120	15.3	
002	13.54		43.9	1.049		5	0.5556	0.4	
						5.92		3.3	
002	13.54		0	2		9	120	19	
010	13.54		43.9	2.157		0	0.0166	0	
						9		0.1	
010	13.54		44.1	2	1x(us.Tee-Br)=12.31	1.39	120	19.2	
003	13.54		87.9	2.157		12.31	0.0602	0	
						13.69		0.8	
003								20	
Path No: 6									
H12	13.99	11.2	44	1	1x(us.Tee-Br)=5	0.87	120	15.5	
113	13.12		44	1.049		5	0.5594	0.4	
						5.87		3.3	
113	13.12		0	2		9.83	120	19.1	
112	13.12		44	2.157		0	0.0167	0	
						9.83		0.2	
112	13.12		44.2	2	1x(us.Tee-Br)=12.31	8.61	120	19.3	
013	13.12		88.2	2.157		12.31	0.0605	0	
						20.92		1.3	
013								20.5	
Path No: 7									
H06	14.46	11.2	44.1	1	1x(us.Tee-Br)=5	0.92	120	15.5	
010	13.54		44.1	1.049		5	0.5598	0.4	
						5.92		3.3	
010								19.2	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 8									
H04	14.25	11.2	44.1	1	1x(us.Tee-Br)=5	0.92	120	15.5	
118	13.33		44.1	1.049		5	0.5601	0.4	
						5.92		3.3	
118	13.33		0	2		9	120	19.2	
115	13.33		44.1	2.157		0	0.0167	0	
						9		0.2	
115	13.33		44.2	2	1x(us.Tee-Br)=12.31	1.39	120	19.3	
012	13.33		88.3	2.157		12.31	0.0606	0	
						13.69		0.8	
012								20.2	
Path No: 9									
H10	14.04	11.2	44.2	1	1x(us.Tee-Br)=5	0.92	120	15.6	
112	13.12		44.2	1.049		5	0.5626	0.4	
						5.92		3.3	
112								19.3	
Path No: 10									
H07	14.25	11.2	44.2	1	1x(us.Tee-Br)=5	0.92	120	15.6	
115	13.33		44.2	1.049		5	0.5643	0.4	
						5.92		3.3	
115								19.3	
Path No: 11									
H05	14.04	11.2	44.5	1	1x(us.Tee-Br)=5	0.92	120	15.8	
109	13.12		44.5	1.049		5	0.5701	0.4	
						5.92		3.4	
109	13.12		0	2		9	120	19.5	
108	13.12		44.5	2.157		0	0.017	0	
						9		0.2	
108	13.12		44.7	2	1x(us.Tee-Br)=12.31	1.39	120	19.7	
013	13.12		89.2	2.157		12.31	0.0617	0	
						13.69		0.8	
013								20.5	
Path No: 12									
H08	14.04	11.2	44.7	1	1x(us.Tee-Br)=5	0.92	120	15.9	
108	13.12		44.7	1.049		5	0.5744	0.4	
						5.92		3.4	
108								19.7	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	

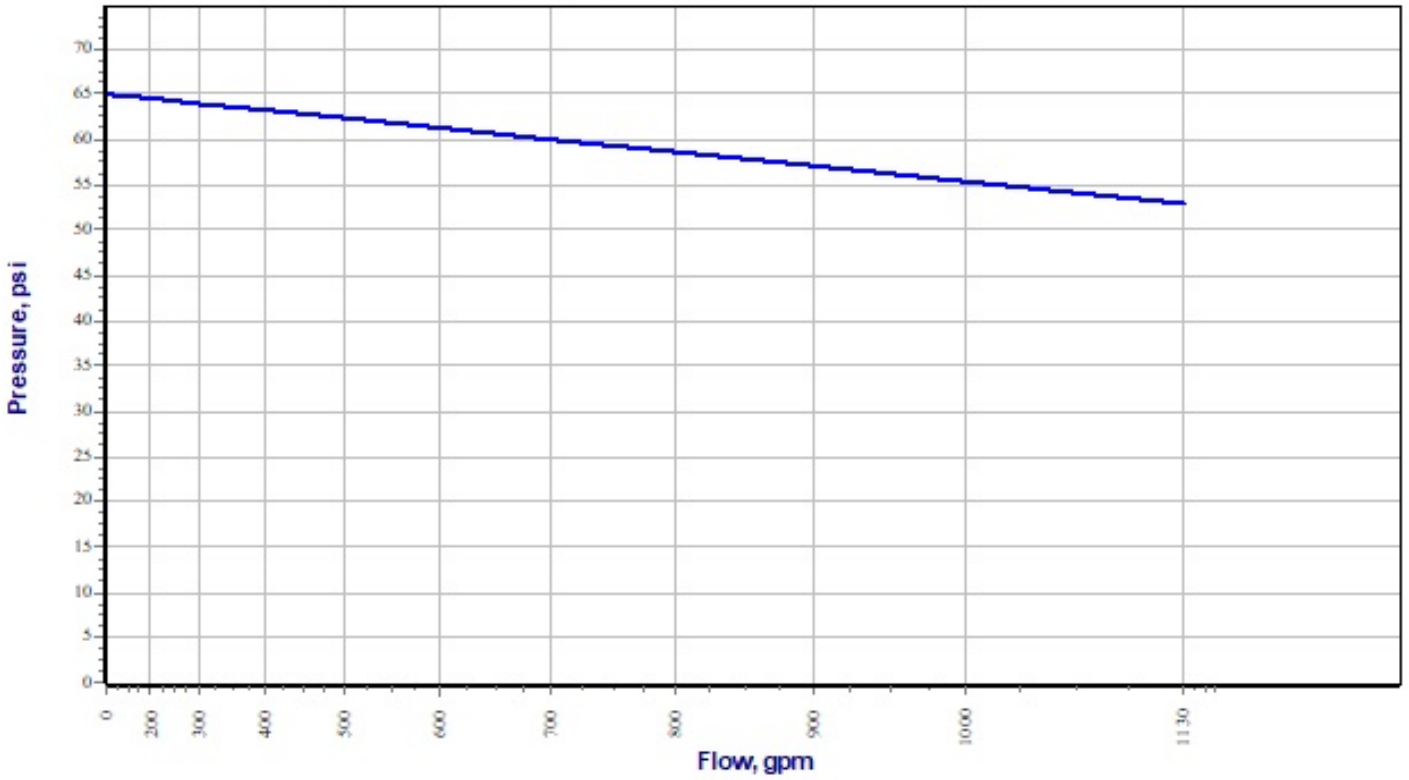
* Pressures are balanced to a high degree of accuracy. Values may vary by 0.1 psi due to display rounding.

* Maximum Velocity of 16.58 ft/s occurs in the following pipe(s): (108-H08)

*** Device pressure loss (gain in the case of pumps) is calculated from the device's curve. If the device curve is printed with this report, it will appear below. The length of the device as shown in the table above comes from the CAD drawing. The friction loss per unit of length is calculated based upon the length and the curve-based loss/gain value. Internal ID and C Factor values are irrelevant as the device is not represented as an addition to any pipe, but is an individual item whose loss/gain is based solely on the curve data.

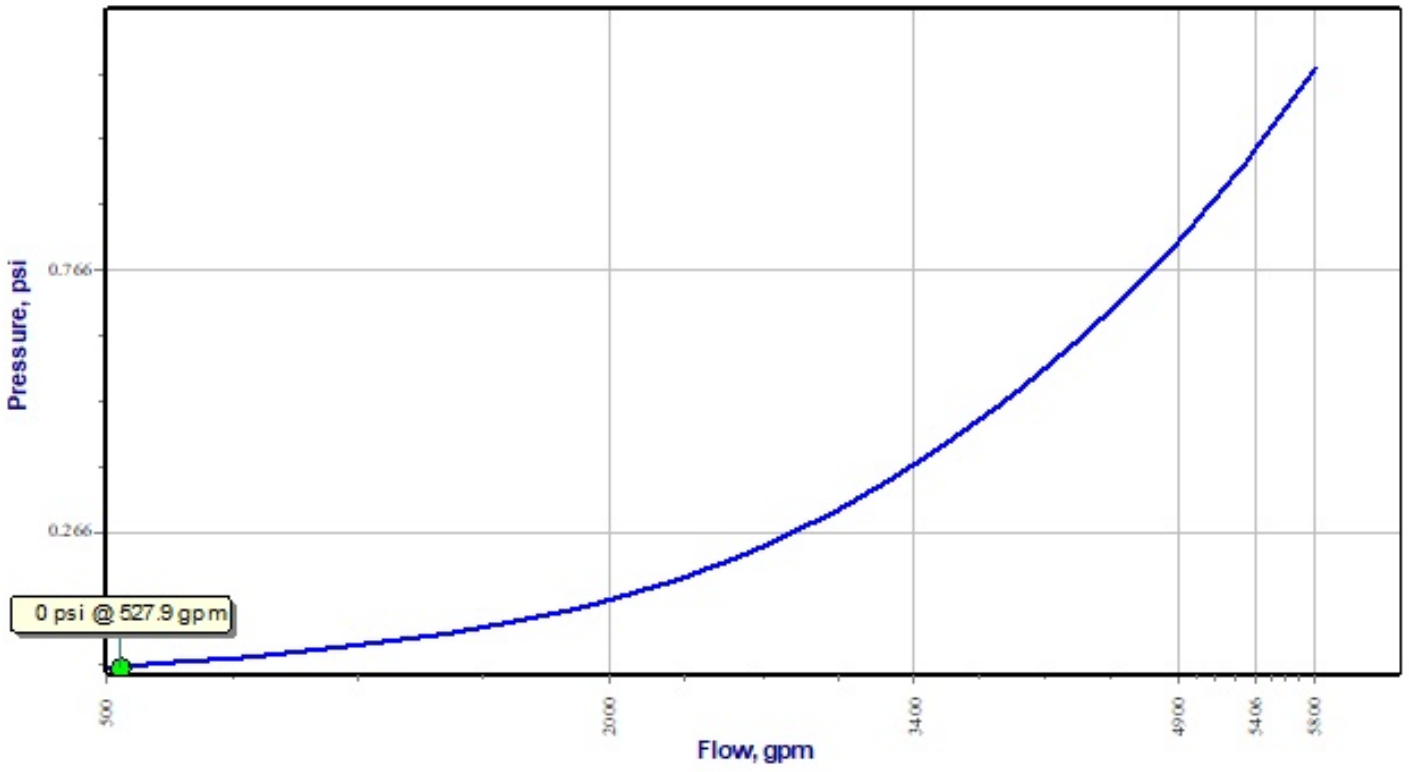
Pressure vs. Flow Function

Design Area: 1; Supply Ref.: W1; Supply Name:W1



Pressure Loss Function

Design Area: 1; Valve Ref.: 206 (Gate A2360, Size = 6); Inlet Node: 047-I; Outlet Node: 047-O



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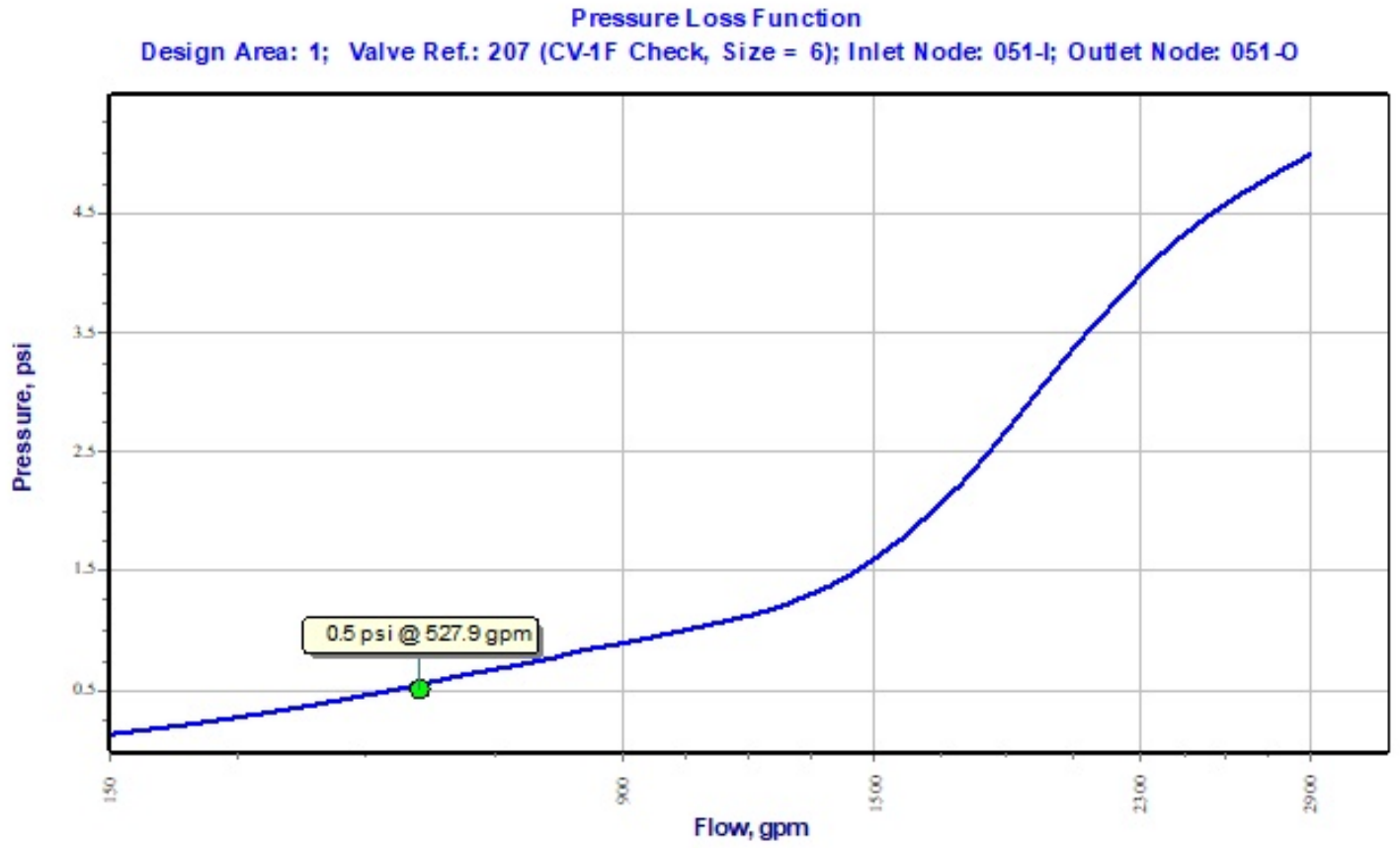

CALCULATION SUMMARY

Project Name : Walmart #0767

Project Location: 2767 W US HWY 90

Contract No. : SSC-027

City: LAKE CITY, FL 32055

Design Areas

Design Area Name	Calc. Mode (Model)	Occupancy	Area of Application	Total Water	Pressure @ Source	Min. Density	Min. Pressure	Min. Flow	Calculated Heads	Hose Streams	Margin To Source
			(ft²)	(gpm)	(psi)	(gpm/ft²)	(psi)	(gpm)	#	(gpm)	(psi)
2	Demand (HW)	ORDINARY GROUP II	2	373	Required 44.8	0.613	30	61.3	2	250	18.6

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HYDRAULIC CALCULATIONS
for

Job Information

Project Name : Walmart #0767

Contract No. : SSC-027 | City: LAKE CITY, FL 32055

Project Location: 2767 W US HWY 90 | Date: 6/1/2022

Contractor Information

Name of Contractor: Skyway Sprinkler, LLC

Address: 360 Central Avenue - Suite 800 | City: St. Petersburg, FL 33701

Phone Number: 727-914-2374 | E-mail: falajmi@skywaysprinkler.com

Name of Designer: FA

Authority Having Jurisdiction:

Design

Remote Area Name	2
Remote Area Location	OGP 2S
Occupancy Classification	ORDINARY GROUP II
Density (gpm/ft^2)	0.613
Area of Application (ft^2)	2
Coverage per Sprinkler (ft^2)	100
Number of Calculated Sprinklers	2
In-Rack Demand (gpm)	0
Special Heads	
Hose Streams (gpm)	250
Total Water Required (incl. Hose Streams) (gpm)	373
Required Pressure at Source (psi)	44.8
Type of System	Wet
Volume - Entire System (gal)	1629.2 gal

Water Supply Information

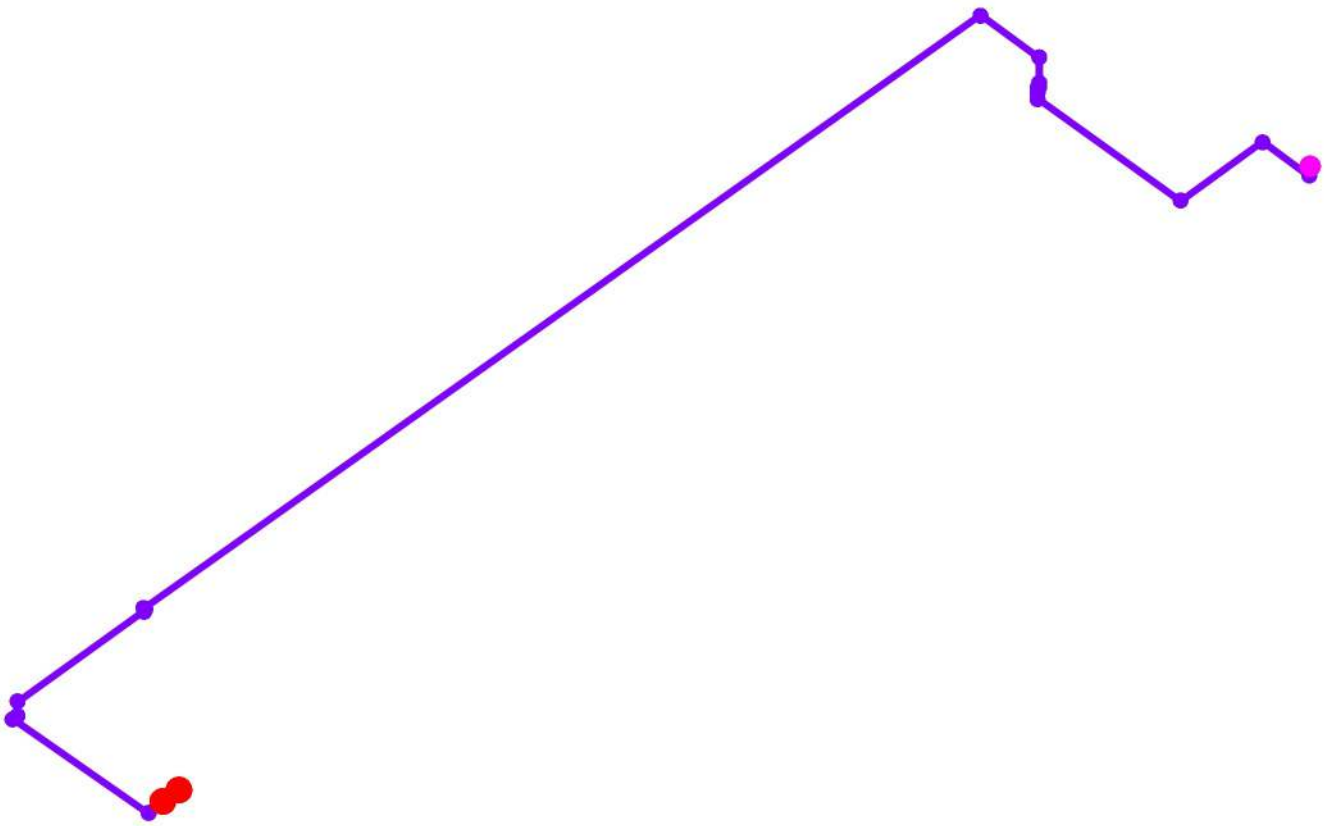
Date	10/12/2021
Location	EXISTING HYDRANT INFRONT OF WALMART
Source	W1

Notes

FLOWING 2 SPRINKLERS AT 30 PSI

Node Labels: Off
Pipe Labels: Off

Diagram for Design Area : 2
(Optimized Hydraulic Simplified)



Hydraulic Analysis for : 2

Calculation Info

Calculation Mode	Demand
Hydraulic Model	Hazen-Williams
Fluid Name	Water @ 60F (15.6C)
Fluid Weight, (lb/ftE)	N/A for Hazen-Williams calculation.
Fluid Dynamic Viscosity, (lbXs/ftД)	N/A for Hazen-Williams calculation.

Water Supply Parameters

Supply 1 : W1

Flow (gpm)	Pressure (psi)
0	65
1130	53

Supply Analysis

Node at Source	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)	Available Pressure (psi)	Total Demand (gpm)	Required Pressure (psi)
W1	65	53	1130	63.5	373	44.8

Hoses

Inside Hose Flow / Standpipe Demand (gpm)	
Outside Hose Flow (gpm)	
Additional Outside Hose Flow (gpm)	250
Other (custom defined) Hose Flow (gpm)	
Total Hose Flow (gpm)	250

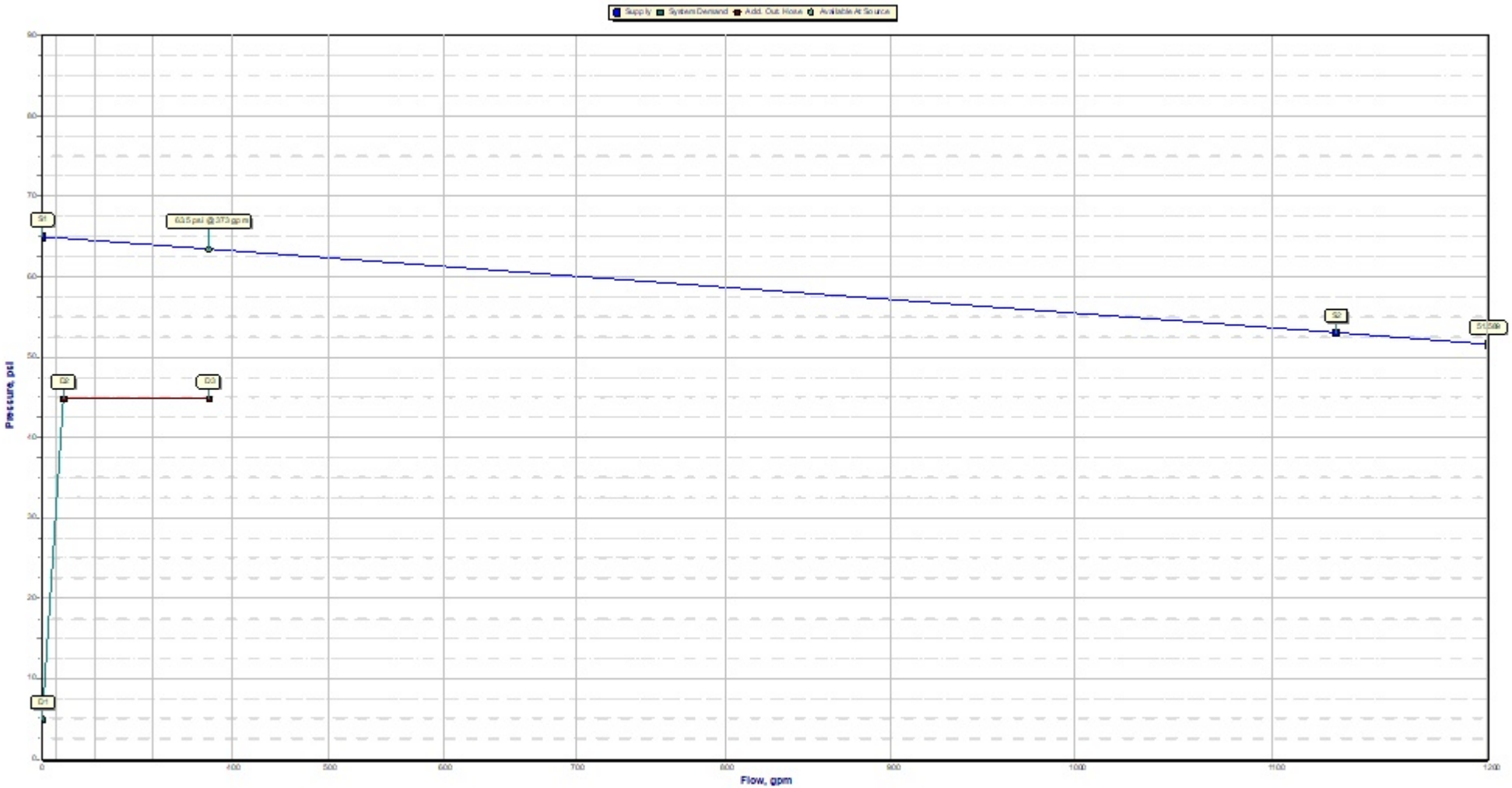
Sprinklers

Ovehead Sprinkler Flow (gpm)	123
InRack Sprinkler Flow (gpm)	0
Other (custom defined) Sprinkler Flow (gpm)	0
Total Sprinkler Flow (gpm)	123

Other

Required Margin of Safety (psi)	0
W1 - Pressure (psi)	44.8
W1 - Flow (gpm)	123
Demand w/o System Pump(s)	N/A

Hydraulic Analysis for : 2



Hydraulic Analysis for : 2

Graph Labels

Label	Description	Values	
		Flow (gpm)	Pressure (psi)
S1	Supply point #1 - Static	0	65
S2	Supply point #2 - Residual	1130	53
D1	Elevation Pressure	0	5
D2	System Demand	123	44.8
D3	System Demand + Add.Out.Hose	373	44.8

Curve Intersections & Safety Margins

Curve Name	Intersection		Safety Margin	
	Pressure (psi)	Flow (gpm)	Pressure (psi)	@ Flow (gpm)
Supply	64.7	153	18.6	373

Open Heads

Head Ref.	Head Type	Coverage	K-Factor	Required			Calculated		
				Density	Flow	Pressure	Density	Flow	Pressure
		(ftД)	(gpm/psiЖ)	(gpm/ftД)	(gpm)	(psi)	(gpm/ftД)	(gpm)	(psi)
H01	Overhead Sprinkler	100	11.2	0	0	30	0.616	61.6	30.3
H02	Overhead Sprinkler	100	11.2	0	0	30	0.613	61.3	30

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psiЖ	gpm gpm	ftД gpm/ftД	psi psi	psi gpm
H02 14.46	Overhead Sprinkler HEAD	11.2 Open	61.3	100 0.613	30 -5	30 0
H01 14.46	Overhead Sprinkler HEAD	11.2 Open	61.6	100 0.616	30.3 -5	30 0
138 13.54	Node NODE				36.5 -4.6	
001 13.54	Node NODE				36.8 -4.6	
003 13.54	Node NODE				39.2 -4.6	
014 11.82	Node NODE				40.3 -3.8	
047-O 6.25	Node NODE				43.2 -1.4	
047-I 5.38	Node NODE				43.6 -1	
051-O 3.4	Node NODE				44.5 -0.2	
W1 3	Supply SUPPLY		-123		44.8 0	
051-I 2.44	Node NODE				45 0.2	
052 1	Node NODE				45.6 0.9	
056 -3	Node NODE				47.4 2.6	
058 -3	Node NODE				47.4 2.6	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
H02	14.46	11.2	61.3	1	1x(us.Tee-Br)= 5	0.92	120	30	
138	13.54		61.3	1.049		5	1.0334	0.4	
						5.92		6.1	
138	13.54		0	2		9.83	120	36.5	
001	13.54		61.3	2.157		0	0.0309	0	
						9.83		0.3	
001	13.54		61.6	2	1x(us.Tee-Br)= 12.31	8.61	120	36.8	
003	13.54		123	2.157		12.31	0.1119	0	
						20.92		2.3	
003	13.54		0	4	1x(us.Tee-Br)= 26.33	83.01	120	39.2	
014	11.82		123	4.26		26.33	0.0041	0.7	
						109.34		0.4	
014	11.82		0	6	8x(us.90)= 140.82	653.4	120	40.3	
047-O	6.25		123	6.357		140.82	0.0006	2.4	
						794.22		0.5	
047-O	6.25		0	6		0.88		43.2	Gate A2360
047-I	5.38		123	0		0	0.0015	0.4	***
						0.88		0	
047-I	5.38		0	6	2x(us.Tee-Br)= 75.44	3.06	120	43.6	
051-O	3.4		123	6.357		75.44	0.0006	0.9	
						78.5		0.0	
051-O	3.4		0	6		0.96		44.5	CV-1F Check
051-I	2.44		123	0		0	0.1057	0.4	***
						0.96		0.1	
051-I	2.44		0	6		1.44	120	45	
052	1		123	6.357		0	0.0006	0.6	
						1.44		0	
052	1		0	8	2x(us.Tee-Br)= 123.28	141.2	140	45.6	
056	-3		123	8.55	1x(us.90)= 31.7	154.98	0.0001	1.7	
						296.18		0.0	
056	-3		0	6	1x(us.90)= 24.19	28.48	140	47.4	
058	-3		123	6.4		24.19	0.0004	0	
						52.68		0.0	
058	-3		0	6	1x(us.90)= 17.6	6.5	120	47.4	
W1	3		123	6.357		17.6	0.0006	-2.6	
						24.1		0.0	
W1								44.8	
Path No: 2									
H01	14.46	11.2	61.6	1	1x(us.Tee-Br)= 5	0.92	120	30.3	
001	13.54		61.6	1.049		5	1.0416	0.4	
						5.92		6.2	
001								36.8	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	

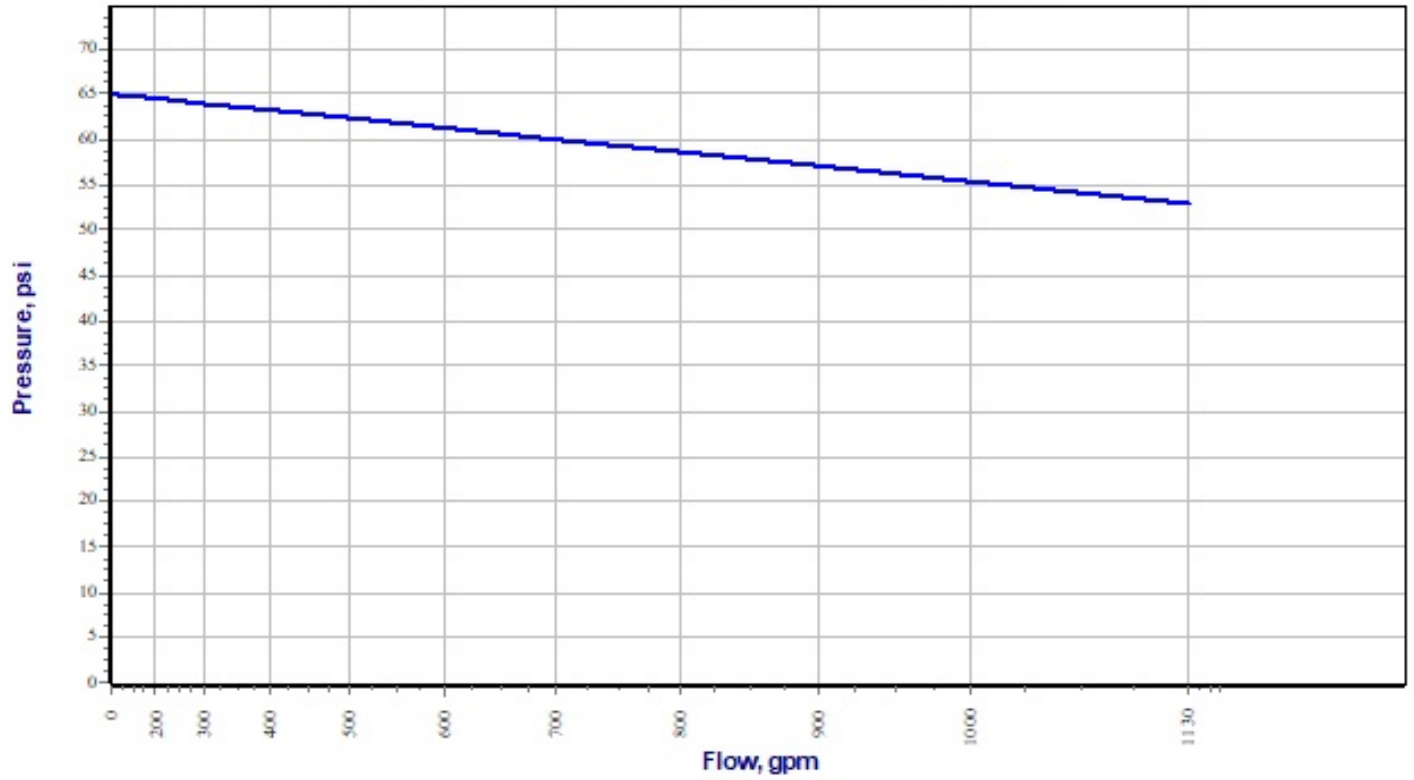
* Pressures are balanced to a high degree of accuracy. Values may vary by 0.1 psi due to display rounding.

* Maximum Velocity of 22.87 ft/s occurs in the following pipe(s): (001-H01)

*** Device pressure loss (gain in the case of pumps) is calculated from the device's curve. If the device curve is printed with this report, it will appear below. The length of the device as shown in the table above comes from the CAD drawing. The friction loss per unit of length is calculated based upon the length and the curve-based loss/gain value. Internal ID and C Factor values are irrelevant as the device is not represented as an addition to any pipe, but is an individual item whose loss/gain is based solely on the curve data.

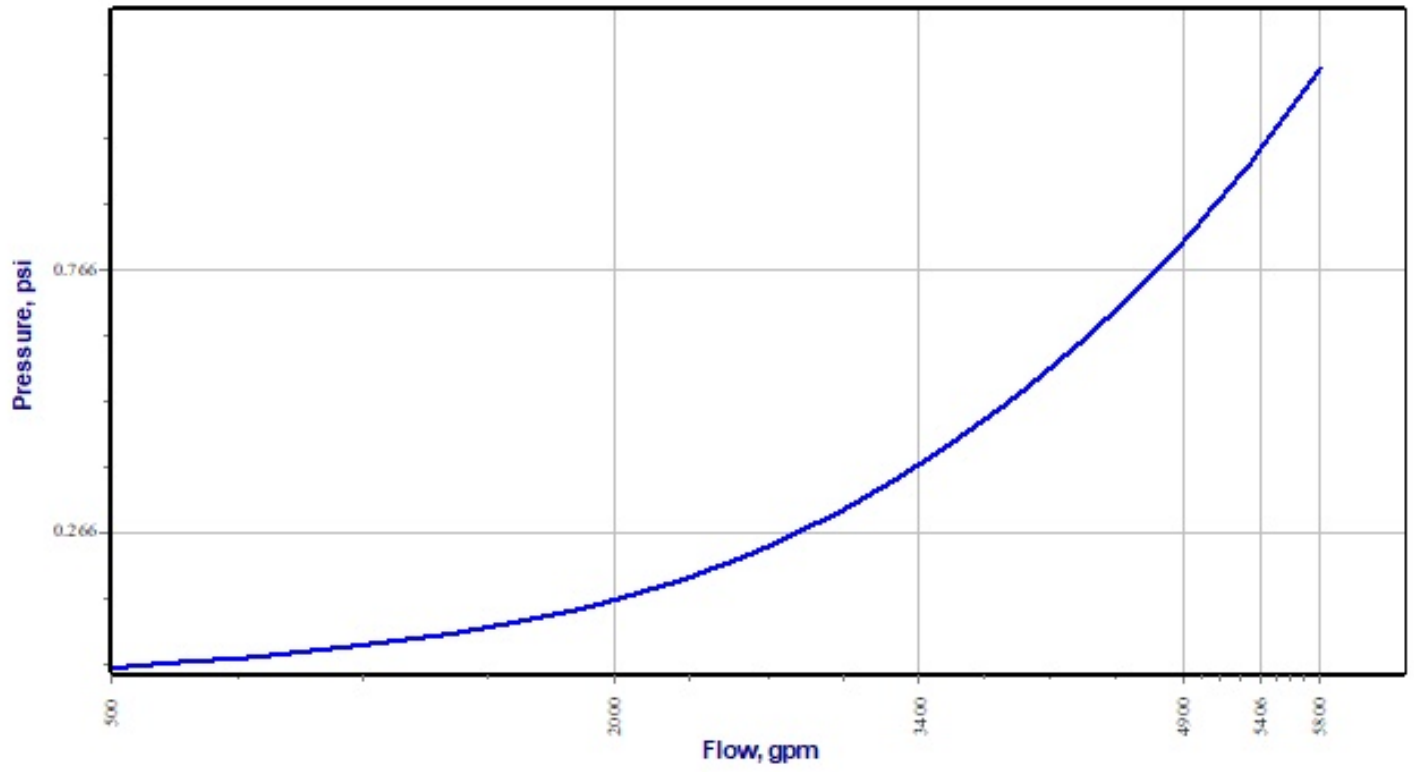
Pressure vs. Flow Function

Design Area: 2; Supply Ref.: W1; Supply Name:W1



Pressure Loss Function

Design Area: 2; Valve Ref.: 206 (Gate A2360, Size = 6); Inlet Node: 047-I; Outlet Node: 047-O



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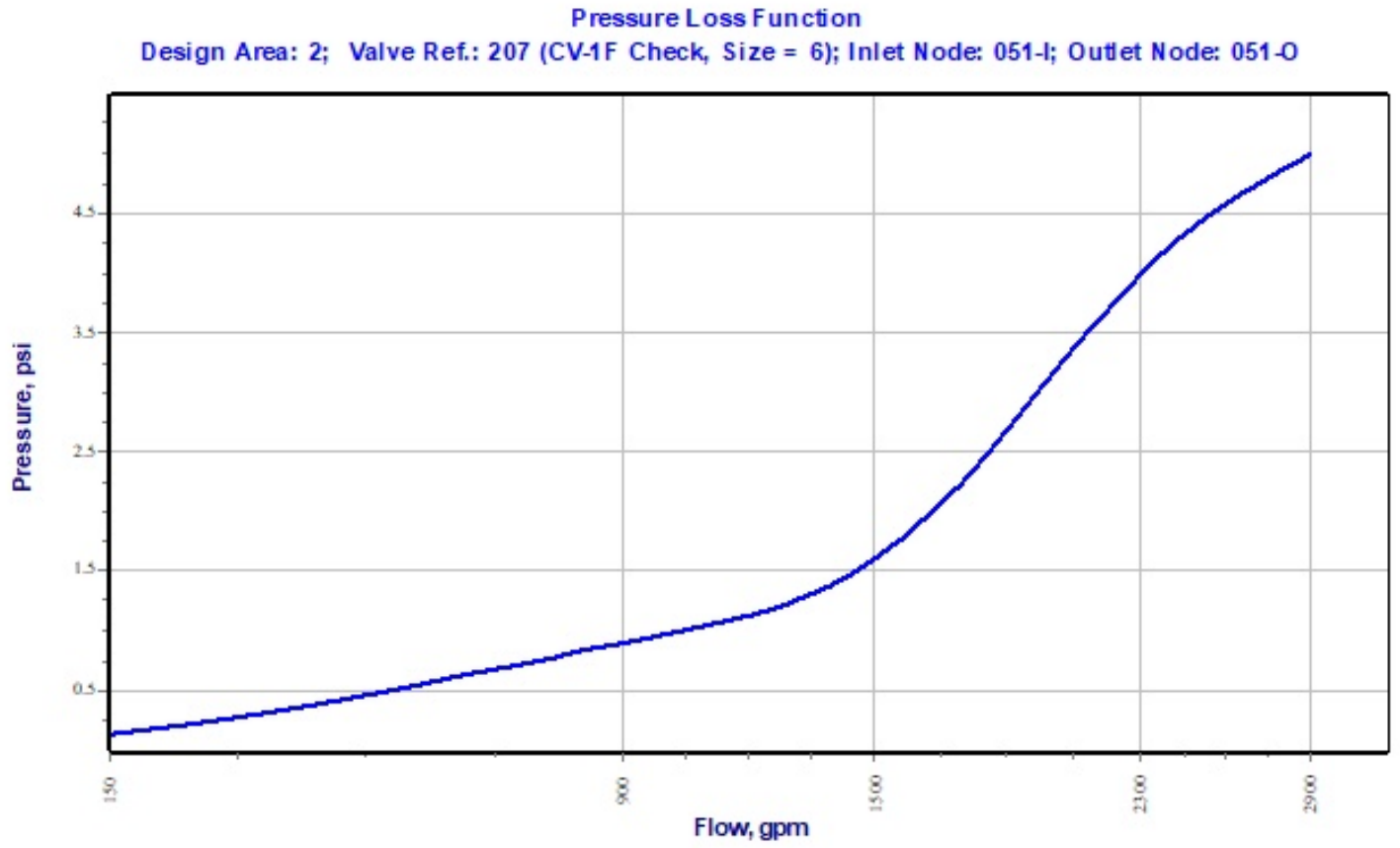


SCOPE OF WORK:

1. THE DEMOLITION OF EXISTING SPRINKLER PIPING ABOVE ENTRY CANOPY.

2. THE INSTALLATION OF OGP SYSTEM AND NEW 6" FIRE SPRINKLER RISER TO SUPPLY THE NEW ONLINE GROCERY PICKUP SYSTEM.

3. THE INSTALLATION OF NEW DRY PENDENT SPRINKLERS FOR NEW OGP COOLER/ FREEZERS

ALL WORK IS TO BE IN ACCORDANCE WITH FFPC 7TH EDITION (2020), NFPA 13, 2016 EDITION, AND LOCAL CODES.

- SCOPE OF WORK SQUARE FOOTAGE: 11,405 SQ FT.

GENERAL NOTES:

1. A HYDROSTATIC TEST FOR 2-HOURS AT 200 PSI SHALL BE PERFORMED PRIOR TO START OF WORK. A SECOND HYDROSTATIC TEST SHALL BE PERFORMED AFTER COMPLETION OF WORK.

2. THE EXISTING SPRINKLER SYSTEM IS HYDRAULICALLY CALCULATED AND CALCULATIONS ARE PROVIDED WITH THIS PLAN.

3. ALL LENGTHS ARE CENTER TO CENTER PIPE LENGTH UNLESS NOTED OTHERWISE.

4. DESIGN PARAMETERS:

   A. ALL HANGERS TO BE ACCORDANCE WITH NFPA-13 AND DETAILS LOCATED ON THIS SHEET.

   B. ALL SPRINKLERS TO BE SPACED IN ACCORDANCE WITH NFPA 13, 2016, MANUFACTURER'S LISTING & AS PER DIMENSIONED ON PLANS. MAXIMUM SPACING SHALL NOT EXCEED 225 SQ FT FOR LIGHT HAZARD AND 130 SQ FT FOR ORDINARY HAZARD.

   C. MINIMUM SPACING PER NFPA 13 AND MANUFACTURER'S LISTING IS 6'-0" BETWEEN SPRINKLER HEADS FOR STANDARD COVERAGE HEADS AND 8'-0" FOR EXTENDED COVERAGE HEADS.

5. MATERIALS:

   A. ALL FIRE PROTECTION EQUIPMENT AND MATERIALS SHALL BE U.L. LISTED.

   B. ALL THREADED FITTINGS ARE TO BE CLASS 125 CAST IRON OR CLASS 150 MALLEABLE IRON.

   C. ALL THREADED PIPE IS TO BE SCHEDULE 40 BLACK STEEL IN ACCORDANCE WITH NFPA-13.

6. SKYWAY SPRINKLER LLC WILL MAINTAIN A SET OF AS-BUILTS FOR PROJECT CLOSE-OUTS.

SPRINKLER LEGEND:

- EXISTING UNDERGROUND PIPING
- NEW FIRE SPRINKLER PIPING
- EXISTING 8K UPRIGHT SPRINKLER TO BE REMOVED
- NEW 8K UPRIGHT SPRINKLER TO BE INSTALLED
- NEW 11.2K UPRIGHT SPRINKLER TO BE INSTALLED
- NEW 11.2K DRY PENDENT SPRINKLER TO BE INSTALLED
- PIPE HANGER SYMBOL
- TRAPEZE HANGER
- DENOTES NEW 6" FIRE SPRINKLER SYSTEM RISER TO BE INSTALLED
- 10'-0"AFF CEILING / DECK ELEVATION ABOVE FINISHED FLOOR
- [10'-0"] PIPE ELEVATION ABOVE FINISHED FLOOR
- [-44] PIPE ELEVATION DOWN FROM DECK
- CONNECT TO EXISTING W/ MECHANICAL TEE AND THRD OUTLET AT THIS POINT
- XX HYDRAULIC REFERENCE NODE
- EXISTING INSPECTOR'S TEST / AUXILIARY DRAIN
- EXISTING FIRE DEPARTMENT CONNECTION

OWNER FURNISHED SPRINKLERS AND ACCESSORIES

SYMBOL	SIZE	K-FACTOR	FINISH	MFR	MAKE	S.I.N.	TEMP	STYLE	QTY	SPARE QTY	ESCH STYLE	ESCH FINISH	ESCH QTY
◎	3/4"	11.2	BRASS	TYCO	ELO-231	TY5131	155	UPRIGHT	53	6	---	---	---

SUBSTITUTIONS WILL NOT BE PERMITTED. REFERENCE SPECIFICATIONS APPENDIX B FOR ADDITIONAL INFORMATION.

WHERE SPRINKLERS ARE INSTALLED BELOW OBSTRUCTIONS (REFRIGERATION PIPING, RTUs, CABLE TRAYS, ETC.) THESE SPRINKLERS SHALL BE REPLACED WITH SPRINKLERS MATCHING THE NEW SPRINKLERS BEING INSTALLED AT THE ROOF DECK LEVEL.

* INTERMEDIATE TEMPERATURE SPRINKLERS TO BE FURNISHED BY OWNER FOR INSTALLATION BELOW SKYLIGHTS AND ON AIR FLOW SIDE (INTERMEDIATE-TEMERATURE ZONE) OF UNIT HEATERS PER NFPA 13.

**HIGH TEMPERATURE SPRINKLERS TO BE FURNISHED BY OWNER FOR INSTALLATION AROUND UNIT HEATERS.

THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO OWNER FURNISHED SPRINKLERS DURING INSTALLATION. TO REPLACE DAMAGED SPRINKLERS CONTACT HAINES, JONES, CADBURY 1-800-459-7099.

THE OWNER WILL FURNISH ADDITIONAL SPRINKLERS FOR THE SPARES CABINET. INSTALL SPARE SPRINKLER QUANTITY INDICATED ON CONTRACT DOCUMENTS PRIOR TO FIRE PROTECTION CONSULTANT SITE OBSERVATION.

WATER SUPPLY INFORMATION

TEST STATIC AT SRC: 65 PSI
TEST RESIDUAL AT SRC: 53 PSI AT 1130 GPM

INFORMATION DERIVED FROM A WATER REPORT BY (CUHACI & PETERSON) FROM A FLOW TEST CONDUCTED ON 10/12/21. THE TEST WAS CONDUCTED AT 09:00 AM EST.

FLOW TEST ELEVATION: 100.0 FT AMSL
BUILDING PAD ELEVATION: 100.0 FT AMSL

THE WATER SUPPLY IS MODIFIED BY THE FOLLOWING:

+ 0.0 PSI DUE TO ELEVATION DIFFERENCE BETWEEN TEST AND BUILDING
- 5.0 PSI WALMART SAFETY FACTOR

DESIGN STATIC AT SRC: 70 PSI
DESIGN RESIDUAL AT SRC: 58 PSI AT 1130 GPM

PLACARD INFORMATION

THE FOLLOWING INFORMATION MUST BE SHOWN ON THE PLACARDS FOR EACH UL PERFORMANCE BASE DESIGNS. USE A PLACARD FOR EACH CALCULATED DESIGN. PLACARDS SHALL BE ENGRAVED METAL SIGNS. REFERENCE SPECIFICATIONS FOR ADDITIONAL INFORMATION. PLACARDS THAT ARE INSTALLED WITH INFORMATION WRITTEN PERMANENT MARKER WILL NOT BE ACCEPTED.

SYSTEM #: X AREA: X
SPRINKLERS CALCULATED: X
SPRK END HEAD PRESSURE: X
HOSE DEMAND: X
SYSTEM FLOW DEMAND: X
SYSTEM PRESSURE DEMAND: X
SYSTEM SAFETY FACTOR: X
INSTALLING CONTRACTOR: X

UL PERFORMANCE BASE DESIGN
PROJECT 4788122552, NC27954

GENERAL UNDERGROUND NOTES

1. ALL UNDERGROUND IS SHOWN FOR HYDRAULIC REFERENCE ONLY.
2. SEE CIVIL DRAWINGS FOR EXACT LOCATIONS IF AVAILABLE.
3. NO NEW WORK UNLESS OTHERWISE NOTED.

APPLICABLE CODES

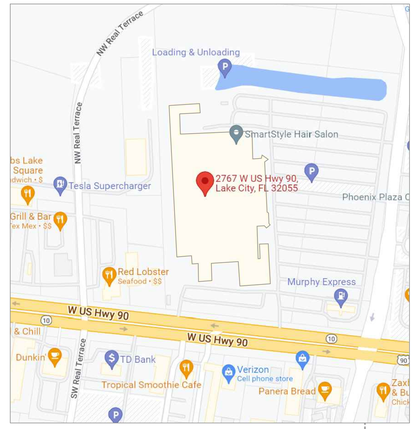
CODE STANDARD	EDITION
NFPA 13	2016
NFPA 25	2017
FFPC	7TH

PROTECTION CRITERIA LEGEND

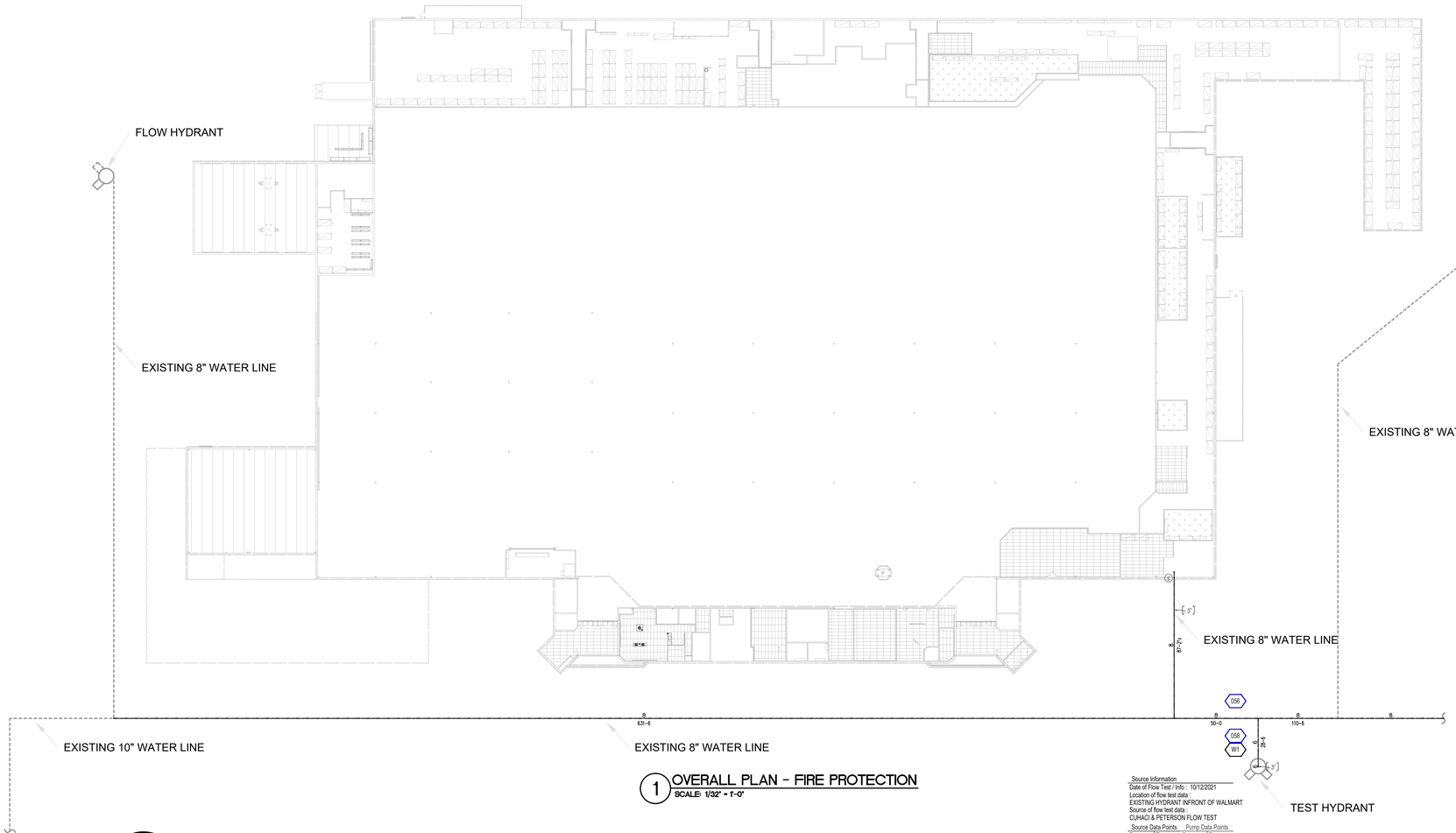
OCCUPANCY CLASSIFICATION	DISCHARGE PRESSURE (# OPERATING SPRINKLERS - DESIGN AREA)		MAXIMUM SPRINKLER SPACING (SQ FT)	DESIGN BASIS
OGP - STOCKROOM -GM/GR (SL - OPTION 1)	30 PSI (2 AS-2S/1L) 15 PSI (12 AS-4S/2L)	250	140	CLASS I-IV RACK STORAGE TO 10'-0" (25'-0" CEILING HEIGHT), 6'-0" AISLES; UL LLC TECHNICAL REPORT PROJECT 4788122552, NC27954 - TABLE 2 SUMMARY OF TESTS, 12022002 AND 120323002
PICKUP COOLER/FREEZER (EXTRA HAZARD GROUP II)	0.40/2000 SQ FT	500	100	CLASS I-IV TO 12'-0", NFPA 13, TABLE 13.2.1, 13.2.3

RC = RETAIL CEILING/RNC = RETAIL NO CEILING
SL = STORAGE LOW/SH = STORAGE HIGH
REFERENCE SPRINKLER PLANS AND SPRINKLER SYMBOL LEGEND FOR SPRINKLERS NECESSARY TO MEET THE DESIGN REQUIREMENTS
* = EXISTING DESIGN CRITERIA TO REMAIN

SRR = SINGLE ROW RACK
DRR = DOUBLE ROW RACK
MRR = MULTIPLE ROW RACK



2 SITE MAP - FIRE PROTECTION
SCALE: N.T.S



1 OVERALL PLAN - FIRE PROTECTION
SCALE: 1/32" = 1'-0"

PROJECT NORTH

Cuhaci review stamp: no comments / specific item / corrected / resubmit
This review is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not indicate approval of an assembly of which the item is a part. Contractor is responsible for dimensions to be confirmed and correlated at the job site. Information that pertains solely to the fabrication processes, or to the means, methods, techniques, sequences and procedures of construction. Coordination of the Work with that of all trades and for performing all work in a safe and satisfactory manner.
Date 9/13/2022 By vim.abanador

NOTES:
- PIPE PAINTING IS BY OTHERS
- SEISMIC BRACING IS NOT REQUIRED
- PIPE IDENTIFICATION IS NOT REQUIRED
- PIPE SLEEVES ARE NOT REQUIRED

PIPE INSULATION NOTE:
ALL PIPE INSULATION IS TO BE BY OTHERS, ANY DETAILS PROVIDED ARE FOR SUGGESTIONS ONLY, ALL INSULATION MUST BE INSTALLED BY A QUALIFIED INSTALLER
SKYWAY SPRINKLER ACCEPTS NO RESPONSIBILITY

FOREMAN NOTE:
SPRINKLER HEAD LOCATIONS IN AREAS WITH SUSPENDED ACCOUSTICAL CEILING TILES ARE SHOWN IN CENTER OF TILE FOR DESIGN PURPOSES. THESE HEADS ARE NOT REQUIRED TO BE CENTERED IN CEILING TILES PER CONTRACT SPECIFICATIONS.

"IMPORTANT"
THE OWNER HAS THE RESPONSIBILITY OF PROVIDING FREEZE PROTECTION IN AREAS THAT HAVE A WET PIPE SPRINKLER SYSTEM AS WELL AS A SUITABLE HEATED ENCLOSURE FOR DRY PIPE, DELUGE OR ANY OTHER TYPE VALVE CONTROLLING WATER SUPPLIES TO AUTOMATIC SPRINKLER SYSTEMS.

PIPE & FITTING NOTES

- ☑ ALL LINE PIPING TO BE SCH.40 W/ STANDARD 125# THREADED FITTINGS
- ☐ ALL LINE PIPING TO BE W/ OUTLETS & ENDS
- ☑ ALL MAIN PIPING TO BE SCH.10 W/ WELDED OUTLETS & GROOVED ENDS
- ☐ ALL MAIN PIPING TO BE W/ STANDARD 125# THREADED FITTINGS

HANGER NOTES

- DENOTES HANGER LOCATION
- DENOTES TRAPEZE HANGER LOCATION
- ☑ 3/8" ATR 1"-4" PIPE ☑ 1/2" ATR 5"-8" PIPE
- ☑ STEEL BEAM CLAMP, PIPE RING, & ATR
- ☐ CONCRETE ANCHOR, PIPE RING, & ATR
- ☐ WOOD HANGER ASSEMBLY, SEE DETAIL
- ☐ STAINLESS STEEL HANGER ASSEMBLY

DESIGN CRITERIA

TYPE SYSTEM: ☑ WET ☐ DRY ☐ PRE-ACTION | NFPA STANDARD: ☑ 13-2016 ☐ 14-2016 ☐ 20-2016 ☐ 24-2016
OCCUPANCY: MERCANTILE / STORAGE | APPROVING AUTHORITY: COLUMBIA COUNTY
HAZARD: SEE PROTECTION CRITERIA LEGEND | APPLICABLE CODE: FFPC 7TH EDITION (2020)
DENSITY: SEE LEGEND GPM/SQ.FT.
REMOTE AREA: VARIES, SEE PLAN SQ. FT.
MAX. S.F./HD.: VARIES, SEE PROT. CRIT. LEGEND
TOTAL HOSE STREAM: ☐ 100 GPM ☑ 250 GPM ☑ 500 GPM ☐ 750 GPM ☐ 1000 GPM
LOCAL HOSE THREAD:

SPRINKLER SUMMARY

TOTAL SPRINKLERS THIS PROJECT ▶ 74

SYM	TYPE	FINISH	TEMP	ORIF.	"K"	NPT	MFG / MODEL #	S.I.N.	ESCUTCH. / TEMP	QTY.
◎	Upright	Brass	155°	17/32"	11.2	3/4"	Tyco - ELO-231FRB	TY5131	N/A	56
○	Upright	Brass	200°	17/32"	8.0	3/4"	Tyco - FRB	TY4131	N/A	8
✠	Dry Pendent	White	286°	17/32"	11.2	1"	Tyco - DS-2	TY5255	FLUSH	10

Plot Date: 9/1/2022 10:38 AM Plotted By: Fahad Alajmi

REVISIONS

BY	DESCRIPTION	DATE	#

SUBMITTAL

Florida Contractors License Number: FPC22-000018
Christopher Taylor

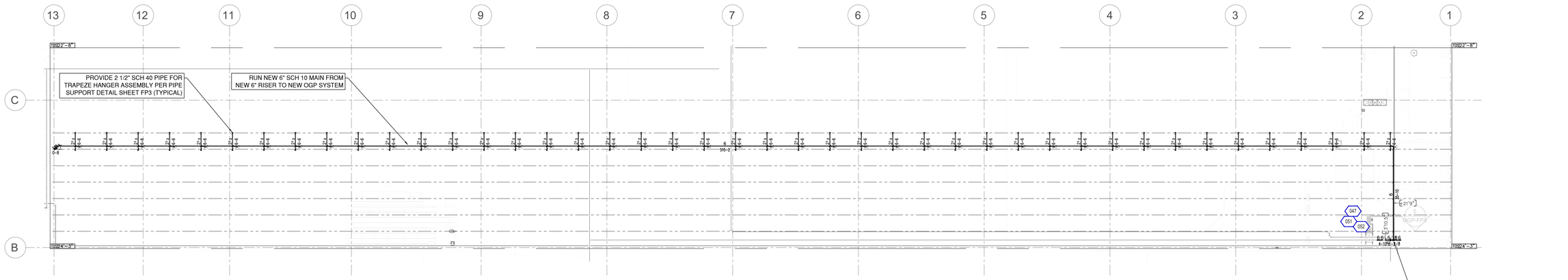
SKYWAY SPRINKLER

OFFICE
360 CENTRAL AVE (SUITE 800) ST. PETERSBURG FL 33701
727-914-2374 OFFICE

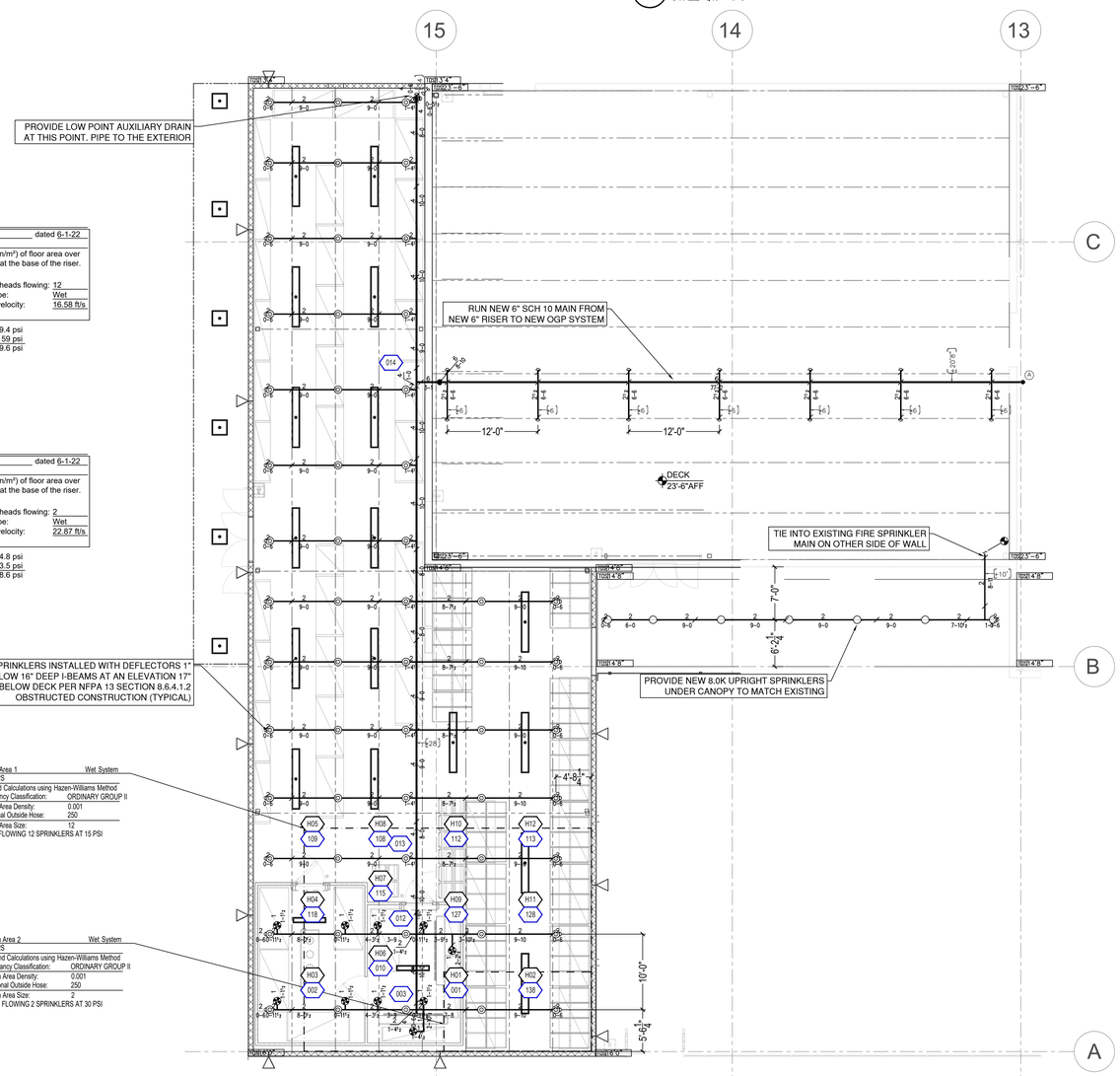
JOB No.	SSC-027
DATE	8-1-22
DESIGNER	FA
SCALE	NOTED ON PLAN

Sprinkler Plan
WALMART #0767
2767 W US HWY 90
LAKE CITY, FL 32055
Contract with FMGI

FILE: SSC-027 WALMART #0767 LAKE CITY.dwg
SHEET No. FP 1



2 SYSTEM 5 PLAN - FIRE PROTECTION
SCALE: 1/16" = 1'-0"



Calculation results for Design Area 1 – OGP 12S

This system as shown on Skyway Sprinkler, LLC company print no ____ dated 6-1-22
for Walmart #0767 at 2767 W US HWY 90
contract no SSC-027 is designed to discharge at a rate of 0.001 gpm/ft² (L/min/m²) of floor area over a maximum area of 0 ft² when supplied with water at a rate of 527.9 gpm at 39.4 psi at the base of the riser.
Hose stream allowance of ____ is included in the above.

Occupancy classification: ORDINARY GROUP II
Commodity classification: ____
Maximum storage height: ____
Storage arrangement: ____

Number of heads flowing: 12
System Type: Wet
Maximum velocity: 16.58 ft/s

Flow from In-Rack sprinklers:	0 gpm
Flow from Overhead sprinklers:	527.9 gpm
Flow from Inside Hoses:	0 gpm
Flow from Outside Hoses:	0 gpm
Other fixed flows:	0 gpm
Total flow in system piping:	527.9 gpm
Additional flow at/beyond source:	250 gpm
Total of all flows:	777.9 gpm

Pressure Required at Source:	39.4 psi
Pressure Available at Source:	59 psi
Surplus Pressure at Source:	19.6 psi

Calculation results for Design Area 2 – OGP 2S

This system as shown on Skyway Sprinkler, LLC company print no ____ dated 6-1-22
for Walmart #0767 at 2767 W US HWY 90
contract no SSC-027 is designed to discharge at a rate of 0.001 gpm/ft² (L/min/m²) of floor area over a maximum area of 0 ft² when supplied with water at a rate of 123 gpm at 44.8 psi at the base of the riser.
Hose stream allowance of ____ is included in the above.

Occupancy classification: ORDINARY GROUP II
Commodity classification: ____
Maximum storage height: ____
Storage arrangement: ____

Number of heads flowing: 2
System Type: Wet
Maximum velocity: 22.87 ft/s

Flow from In-Rack sprinklers:	0 gpm
Flow from Overhead sprinklers:	123 gpm
Flow from Inside Hoses:	0 gpm
Flow from Outside Hoses:	0 gpm
Other fixed flows:	0 gpm
Total flow in system piping:	123 gpm
Additional flow at/beyond source:	250 gpm
Total of all flows:	373 gpm

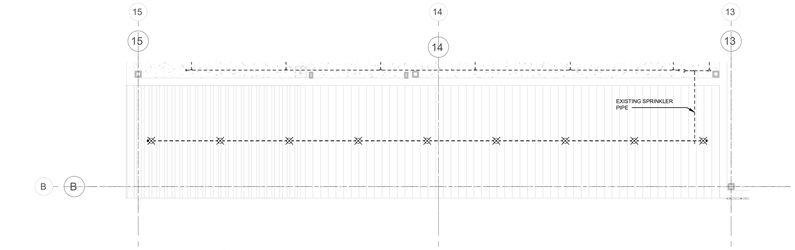
Pressure Required at Source:	44.8 psi
Pressure Available at Source:	63.5 psi
Surplus Pressure at Source:	18.6 psi

Design Area 1 — Wet System
OGP 12S
Demand Calculations using Hazen-Williams Method
Occupancy Classification: ORDINARY GROUP II
Design Area Density: 0.001
Additional Outside Hose: 250
Design Area Size: 12
Notes: FLOWING 12 SPRINKLERS AT 15 PSI

Design Area 2 — Wet System
OGP 2S
Demand Calculations using Hazen-Williams Method
Occupancy Classification: ORDINARY GROUP II
Design Area Density: 0.001
Additional Outside Hose: 250
Design Area Size: 2
Notes: FLOWING 2 SPRINKLERS AT 30 PSI

PROJECT NORTH

1 OGP EXPANSION - FIRE PROTECTION
SCALE: 1/8" = 1'-0"



3 ENTRY CANOPY DEMOLITION PLAN - FIRE PROTECTION
SCALE: 1/8" = 1'-0"

0 4 8 16 32
GRAPHIC SCALE: 1/8" = 1'- 0"

NOTES:
- PIPE PAINTING IS BY OTHERS
- SEISMIC BRACING IS NOT REQUIRED
- PIPE IDENTIFICATION IS NOT REQUIRED
- PIPE SLEEVES ARE NOT REQUIRED

PIPE INSULATION NOTE:
ALL PIPE INSULATION IS TO BE BY OTHERS, ANY DETAILS PROVIDED ARE FOR SUGGESTIONS ONLY, ALL INSULATION MUST BE INSTALLED BY A QUALIFIED INSTALLER
SKYWAY SPRINKLER ACCEPTS NO RESPONSIBILITY

FOREMAN NOTE:
SPRINKLER HEAD LOCATIONS IN AREAS WITH SUSPENDED ACCOUSTICAL CEILING TILES ARE SHOWN IN CENTER OF TILE FOR DESIGN PURPOSES. THESE HEADS ARE NOT REQUIRED TO BE CENTERED IN CEILING TILES PER CONTRACT SPECIFICATIONS.

IMPORTANT
THE OWNER HAS THE RESPONSIBILITY OF PROVIDING FREEZE PROTECTION IN AREAS THAT HAVE A WET PIPE SPRINKLER SYSTEM AS WELL AS A SUITABLE HEATED ENCLOSURE FOR DRY PIPE, DELUGE OR ANY OTHER TYPE VALVE CONTROLLING WATER SUPPLIES TO AUTOMATIC SPRINKLER SYSTEMS.

PIPE & FITTING NOTES

- ☑ ALL LINE PIPING TO BE SCH.40 W/ STANDARD 125# THREADED FITTINGS
- ☐ ALL LINE PIPING TO BE W/ OUTLETS & ENDS
- ☑ ALL MAIN PIPING TO BE SCH.10 W/ WELDED OUTLETS & GROOVED ENDS
- ☐ ALL MAIN PIPING TO BE W/ STANDARD 125# THREADED FITTINGS

HANGER NOTES

- DENOTES HANGER LOCATION
- DENOTES TRAPEZE HANGER LOCATION
- ☑ 3/8" ATR 1"-4" PIPE
- ☑ 1/2" ATR 5"-8" PIPE
- ☑ STEEL BEAM CLAMP, PIPE RING, & ATR
- ☐ CONCRETE ANCHOR, PIPE RING, & ATR
- ☐ WOOD HANGER ASSEMBLY, SEE DETAIL
- ☐ STAINLESS STEEL HANGER ASSEMBLY

DESIGN CRITERIA

TYPE SYSTEM: ☑ WET ☐ DRY ☐ PRE-ACTION NFPA STANDARD: ☑ 13-2016 ☐ 14-2016 ☐ 20-2016 ☐ 24-2016
OCCUPANCY: MERCANTILE / STORAGE
APPROVING AUTHORITY: COLUMBIA COUNTY
HAZARD: SEE PROTECTION CRITERIA LEGEND
APPLICABLE CODE: FFPC 7TH EDITION (2020)
DENSITY: SEE LEGEND GPM/SQ.FT.
REMOTE AREA: VARIES, SEE PLAN SQ. FT.
MAX. S.F./HD.: VARIES, SEE PROT. CRIT. LEGEND
TOTAL HOSE STREAM: ☐ 100 GPM ☑ 250 GPM ☑ 500 GPM ☐ 750 GPM ☐ 1000 GPM
LOCAL HOSE THREAD: ____

SPRINKLER SUMMARY

TOTAL SPRINKLERS THIS PROJECT ▶ 74

SYM	TYPE	FINISH	TEMP	ORIF.	"K"	NPT	MFG / MODEL #	S.I.N.	ESCUTCH. / TEMP	QTY.
◎	*Upright*	*Brass*	*155°*	*17/32"*	*11.2*	*3/4"*	*Tyco - ELO-231FRB*	*TY5131*	*N/A*	*56*
○	*Upright*	*Brass*	*200°*	*17/32"*	*8.0*	*3/4"*	*Tyco - FRB*	*TY4131*	*N/A*	*8*
✿	*Dry Pendent*	*White*	*286°*	*17/32"*	*11.2*	*1"*	*Tyco - DS-2*	*TY5255*	*FLUSH*	*10*

Plot Date: 9/1/2022 10:39 AM Plotted By: Fahad Alajmi

REVISIONS

BY	DESCRIPTION	DATE	#

SUBMITTAL

Florida Contractors License Number: FPC22-000018
Christopher Taylor

SKYWAY SPRINKLER

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360 CENTRAL AVE (SUITE 800) ST. PETERSBURG FL 33701
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JOB No.	SSC-027
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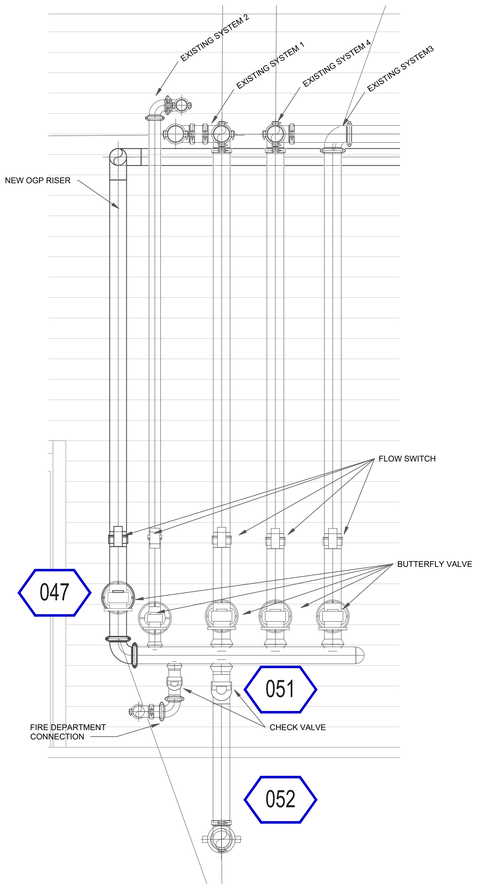
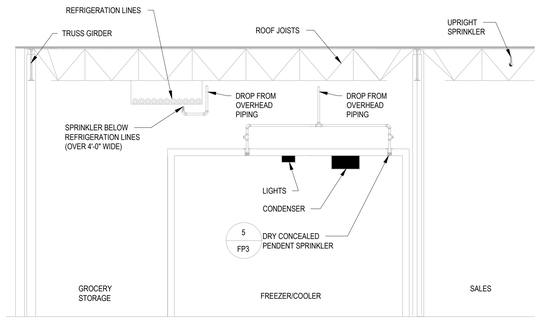
SHEET No. FP 2



4 NEW OGP FIRE SPRINKLER RISER DIAGRAM
SCALE: N.T.S.



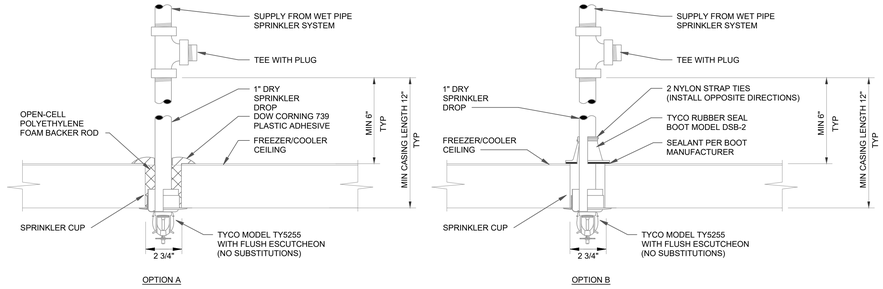
3 FREEZER SECTION
SCALE: N.T.S.

OPTION "A" INSTALLATION PROCEDURE

1. CORE DRILL 2 1/2" DIAMETER HOLE IN THE FREEZER/COOLER INSULATED CEILING PANEL. LOCATE HOLE AND REQUIRED SPRINKLER PROTECTION IN ACCORDANCE WITH NFPA 13 OBSTRUCTION CRITERIA (SSP TYPE SPRINKLERS). MAINTAIN 6" CLEARANCE FROM COOLER SEAMS.
2. INSTALL DRY PENDENT SPRINKLER PER MANUFACTURER'S INSTALLATION REQUIREMENTS.
3. COMPLETELY FILL ANNULAR CEILING OPENING BETWEEN THE ESCUTCHEON AND TOP OF CEILING PANEL WITH OPEN-CELL POLYETHYLENE FOAM BACKER ROD. EXPANDED FOAM IS NOT PERMITTED.
4. INJECT DOW CORNING 739 PLASTIC ADHESIVE SEALANT INTO AND AROUND THE TOP OF THE FREEZER/COOLER CEILING CORE OPENING IN ACCORDANCE WITH SEALANT MANUFACTURER'S INSTRUCTIONS.

OPTION "B" INSTALLATION PROCEDURE

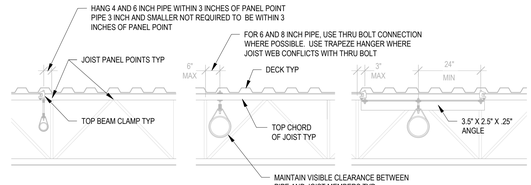
1. CORE DRILL 2 1/2" DIAMETER HOLE IN THE FREEZER/COOLER INSULATED CEILING PANEL. LOCATE HOLE AND REQUIRED SPRINKLER PROTECTION IN ACCORDANCE WITH NFPA 13 OBSTRUCTION CRITERIA (SSP TYPE SPRINKLERS). MAINTAIN 6" CLEARANCE FROM COOLER SEAMS
2. INSTALL TYCO DRY PENDENT SPRINKLER PER MANUFACTURER'S INSTALLATION REQUIREMENTS. INSERT BOOT PRIOR TO MAKE-UP WITH PIPING.
3. COMPLETELY SEAL INTERFACE BETWEEN BOOT FLANGE AND TOP OF FREEZER/COOLER PANEL WITH ADHESIVE PROVIDED WITH BOOT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
4. APPLY STRAP TIES ON BOOT AROUND DRY SPRINKLER BARREL PER MANUFACTURER'S INSTRUCTIONS.



NOTE: CONTRACTOR TO SEAL DRY PENDENT SPRINKLERS AT FREEZER/COOLER USING ONE OF THE OPTIONS ABOVE. NO OTHER SEALANTS ARE PERMITTED

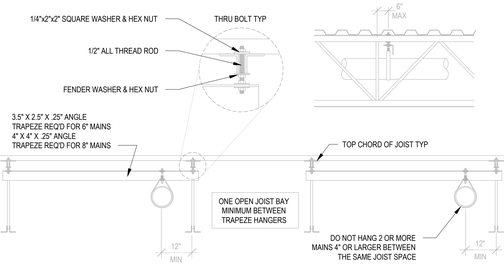
*NOTE TO DESIGNER:
THIS IS FOR PICKUP COOLERS/FREEZERS ONLY. INCLUDE f_FREEZER DETAIL. USE KEYNOTE 13.978

2 FREEZER COOLER DRY PENDENT
SCALE: N.T.S.



MAXIMUM HANGER SPACING FOR PIPING PERPENDICULAR TO JOISTS		
BEAM CLAMP NOT TRAPEZED	THRU-BOLT NOT TRAPEZED	BEAM CLAMP TRAPEZED
4" PIPE EVERY 12'-0" EVERY OTHER JOIST	4" PIPE EVERY 12'-0" EVERY OTHER JOIST	4" PIPE NOT NECESSARY
6" PIPE EVERY 6'-0" EVERY JOIST	6" PIPE EVERY 12'-0" EVERY OTHER JOIST	6" PIPE NOT NECESSARY
8" PIPE NOT ALLOWED	8" PIPE EVERY 6'-0" EVERY JOIST	8" PIPE EVERY 6'-0" EVERY JOIST

PIPE RUNNING PERPENDICULAR TO JOISTS



MAXIMUM HANGER SPACING FOR PIPES PARALLEL TO JOISTS		
4" PIPE EVERY 12'-0" NOT TRAPEZED BEAM CLAMP	6" PIPE EVERY 12'-0" TRAPEZED THRU BOLT	8" PIPE EVERY 12'-0" TRAPEZED THRU BOLT

PIPE RUNNING PARALLEL TO JOIST

CONTRACTOR MAY SUBSTITUTE ANGLE IRON TRAPEZE MEMBER WITH PIPE MEMBER. SIZE PIPE MEMBER IN ACCORDANCE WITH NFPA-13 AND MAINTAIN 12 INCH MAXIMUM DEFLECTOR DISTANCE

UTILIZE THESE HANGING METHODS FOR ALL SPRINKLER PIPING. SPACE TRAPEZE HANGERS IN ACCORDANCE WITH SCHEDULE. LOCATE HANGERS WITHIN 3 INCHES OF JOIST PANEL POINTS U.N.O.

NOTE: DO NOT SUPPORT SPRINKLER PIPING FROM BOTTOM CHORD OF BAR JOISTS

1 PIPE SUPPORT
SCALE: N.T.S.

PROJECT NORTH

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HANGER NOTES

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- [x] STEEL BEAM CLAMP, PIPE RING, & ATR
- [ ] DENOTES TRAPEZE HANGER LOCATION
- [ ] CONCRETE ANCHOR, PIPE RING, & ATR
- [x] 3/8" ATR 1"-4" PIPE
- [x] 1/2" ATR 5"-8" PIPE
- [ ] WOOD HANGER ASSEMBLY, SEE DETAIL
- [ ] STAINLESS STEEL HANGER ASSEMBLY

DESIGN CRITERIA

TYPE SYSTEM: [x] WET [ ] DRY [ ] PRE-ACTION | NFPA STANDARD: [x] 13-2016 [ ] 14-2016 [ ] 20-2016 [ ] 24-2016

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LOCAL HOSE THREAD:

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Plot Date: 9/1/2022 10:42 AM — Plotted By: Fahad Alajmi

REVISIONS

BY	DESCRIPTION	DATE	#

SUBMITTAL

Florida Contractors License Number: FPC22-000018
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