SUBMITTAL DATA
PREPARED FOR:

HIGHLAND ELEMENTARY SCHOOL
ADDITION AND RENOVATION

1915 BUFFALO LAKE ROAD
SANFORD, NC 27332

PREPARED BY:
J & D SPRINKLER CO, INC.
315 W. MAIN STREET
CLAYTON, NC 27520

PH: (919)-553-2356 FAX: (919)-359-0622

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SPRINKLER HEADS

TECHNICAL DATA

MIRAGE® QUICK RESPONSE EXTENDED COVERAGE CONCEALED PENDENT SPRINKLERS (VK632 AND VK634)

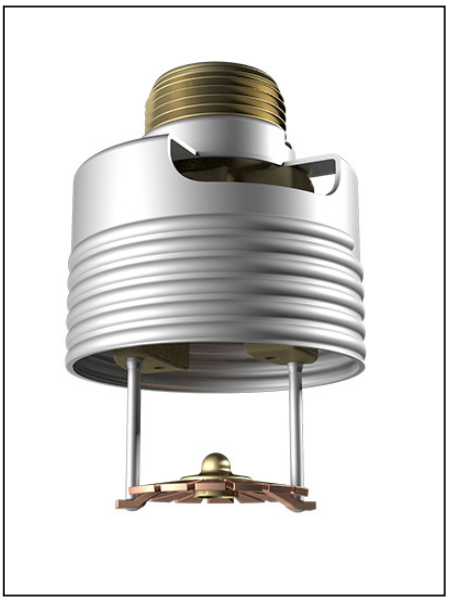
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Viking Mirage® Quick Response Extended Coverage Concealed Pendent Sprinkler VK632 and VK634 are thermosensitive glass-bulb spray sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The glass bulb operating element and special deflector characteristics meet the challenges of quick response extended coverage standards.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile cover assembly that provides up to ½" (12.7 mm) of vertical adjustment. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on", "thread-off" design of the concealed cover plate assembly allows easy installation of the cover plate after the system has been tested and the ceiling finish has been applied. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler.

The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive environments and is listed and approved as indicated in the Approval Charts. The ENT finish is only available for the sprinkler assembly, the cover plate is not plated.



For Light Hazard Occupancies Only

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

2. LISTINGS AND APPROVALS

c UL us **cULus Listed:** Category VNIV

Refer to the Approval Chart and Design Criteria for cULus Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Available since 2007.
Minimum Operating Pressure: 7 psi (0.5 bar)
Maximum Working Pressure: 175 psi (12 Bar).
Factory tested hydrostatically to 500 psi (34.5 bar)
Thread sizes: VK632: 1/2" (15 mm) NPT; VK634: 3/4" (20 mm) NPT
Nominal K-Factors: VK632: 5.6 U.S. (80.6 metric*); VK634: 8.0 U.S. (115.2 metric*)
* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Patents Pending

Material Standards:
Sprinkler Body: Brass UNS-C84400
Deflector: Copper UNS-C19500
Deflector Pins: Stainless Steel Alloy
Bulb: Glass, nominal 3 mm diameter
Pip Cap: Leaded Bronze UNS-C31400 or UNS-C31600, or Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
Button: Brass UNS-C36000
Screws: 18-8 Stainless Steel
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Yoke: Phosphor Bronze UNS-C51000
Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating

Cover Assembly Materials:
Cover: Copper UNS-C11000
Base: Brass UNS-C26000 or UNS-C26800
Springs: Nickel Alloy
Solder: Eutectic

Ordering Information: The sprinkler and cover plate must be ordered separately. Refer to Tables 1 and 2.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

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5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand and the bulb to shatter, releasing the yoke, pip-cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinklers VK632 and VK634 are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: SPRINKLER ORDERING INFORMATION
Instructions: Using the sprinkler base part number,
(1) add the suffix for the desired Finish
(2) add the suffix for the desired Temperature Rating.
(3) Select a cover plate (See Table 2)

SIN	Sprinkler Base Part Number	Size		1: Finishes		2: Temperature Ratings			
		NPT Inch	BSPT mm	Description	Suffix	Sprinkler Temperature Classification	Nominal Rating	Max. Ambient Ceiling Temperature[1]	Suffix
VK632	14613	1/2	--	Brass	A	Oridinary	135 °F (57 °C)	100 °F (38 °C)	A
VK634	14535[7]	3/4	--	ENT [2,3,6]	JN	Oridinary	155 °F (68 °C)	100 °F (38 °C)	B
						Intermediate	175 °F (79 °C)	150 °F (65 °C)	D
						Intermediate	200 °F (93 °C)	150 °F (65 °C)	E

Corrosion Resistant Sprinkler Finish: ENT[2,3,6]

Example: 14613JNE = VK632 1/2" NPT, 200 °F (93 °C) Temperature Rated Sprinkler with an Electroless Nickel PTFE (ENT[2,3,6]) finish.

Accessories

Sprinkler Wrenches and tools:

A. Heavy Duty Part Number: 14047W/B[4]
B. Head Cabinet Wrench Part Number: 14031[5]
C. Optional Small Concealed Cover Plate Installer Tool Part No. 14412
D. Optional Large Concealed Cover Plate Installer Tool Part No. 14867

Sprinkler Cabinet:

Holds up to 6 sprinklers: Part number 01731A.

Footnotes

1. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
2. cULus Listed as corrosion resistant.
3. The corrosion resistant and corrosion proofing coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway.
4. Requires a ½" ratchet (not available from Viking).
5. Also optional for removal of the protective cap. Ideal for sprinkler cabinets.
6. The ENT finish is NOT available and NOT cULus Listed for 135 °F (57 °C) temperature-rated sprinklers.
7. Part number 14535 (VK634) is not available with ENT finish.

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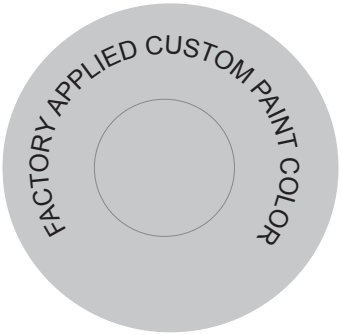
TABLE 2: COVER PLATE ORDERING INFORMATION

Instructions: Using the cover plate base part number,
(1) add the suffix for the desired Finish
(2) add the suffix for the required Cover Plate Nominal Rating.

Cover Plate Base Part Number[4]	Size Inch (mm)	Style	1: Finishes		Temperature Rating Matrix[1,2]			
			Description	Suffix[5]	Cover Plate Nominal Rating (Required)	Sprinkler Nominal Rating / Temperature Classification	Sprinkler Max. Ambient Ceiling Temperature[2,3]	Suffix
23190	2-3/4 (70)	Round	Polished Chrome	F	135 °F (57 °C)	135 °F (57 °C) / ORD	100 °F (38 °C)	A
23174	3-5/16 (84)	Round	Brushed Chrome	F-/B		155 °F (68 °C) / ORD	100 °F (38 °C)	
23179	3-5/16 (84)	Square	Bright Brass	B	165 °F (74 °C)	175 °F (79 °C) / INT	150 °F (65 °C)	C
			Antique Brass	B-/A		200 °F (93 °C) / INT	150 °F (65 °C)	
			Brushed Brass	B-/B	**Example: 23190MC/W = 165 °F (74 °C) Temperature Rated 2-3/4" (70 mm) Diameter Round Cover Plate with a Painted White finish.**			
			Brushed Copper	E-/B				
			Painted White	M-/W				
			Painted Ivory	M-/I				
			Painted Black	M-/B				

Footnotes

1. The sprinkler temperature rating is stamped on the deflector.
2. Based on NFPA-13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. Maximum ambient temperature for cover assembly is 150 °F (65 °C).
4. Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
5. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
6. Square cover plate 23179 cULus Listing is for the 135 °F (57 °C) temperature rated cover plate only. Refer to the Approval Chart.



All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 1: Identification of Custom Paint for Concealed Covers

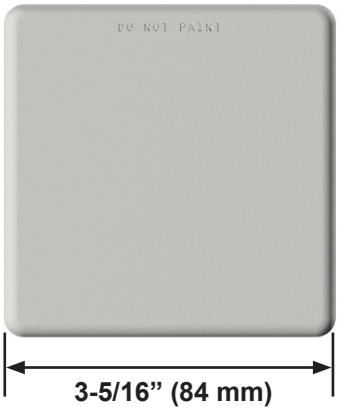


Figure 2: Square Cover Assembly 23179

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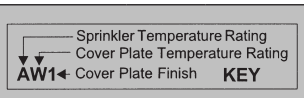
Approval Chart

Mirage® QR Extended Coverage Concealed Pendent Sprinklers
For Light Hazard Occupancies Only.
Maximum 175 PSI (12 Bar) WWP



Sprinkler Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Maximum Areas of Coverage[4]	Minimum Water Supply Requirements[4] Flow/Pressure	Listings and Approvals[3] (Refer also to Design Criteria)		
		NPT Inches	BSPT mm	U.S.	metric[2]			cULus[5]	FM	NYC
Standard Orifice										
14613	VK632	1/2	15	5.6	80.6	16' x 16' (4.9 m x 4.9 m)	26 gpm @ 21.6 psi (98.4 L/min @ 1.49 Bar)	AW1, BX1	--	See Footnote 6.
14613	VK632	1/2	15	5.6	80.6	18' x 18' (5.5 m x 5.5 m)	33 gpm @ 34.7 psi (124.9 L/min @ 2.39 Bar)	AW1, BX1	--	See Footnote 6.
14613	VK632	1/2	15	5.6	80.6	20' x 20' (6.1 m x 6.1 m)	40 gpm @ 51.0 psi (151.4 L/min @ 3.52 Bar)	CW1, DX1	--	See Footnote 6.
Large Orifice										
14535[10]	VK634	3/4	20	8.0	115.2	16' x 16' (4.9 m x 4.9 m)	26 gpm @ 10.6 psi (98.4 L/min @ 0.73 Bar)	AW1, BX1	--	See Footnote 6.
14535[10]	VK634	3/4	20	8.0	115.2	18' x 18' (5.5 m x 5.5 m)	33 gpm @ 17.0 psi (124.9 L/min @ 1.17 Bar)	AW1, BX1	--	See Footnote 6.
14535[10]	VK634	3/4	20	8.0	115.2	20' x 20' (6.1 m x 6.1 m)	40 gpm @ 25.0 psi (151.4 L/min @ 1.72 Bar)	CW1, DX1	--	See Footnote 6.

Sprinkler Temperature Ratings

A - 135 °F (57 °C)[9] and 155 °F (68 °C)
B - 175 °F (79 °C) and 200 °F (93 °C)
C - 135 °F (57 °C)[9]
D - 175 °F (79 °C)

Cover Plate Temperature Ratings[7]

W - 135°F (57°C) cover 23190[1], or 23174[1] (large diameter)
X - 165°F (74°C) cover 23190[1], or 23174[1] (large diameter)

Cover Plate Finishes[8]

1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, and Painted Black

Footnotes

1. Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
2. Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
3. This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.
4. For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" for the next larger area listed. Flows and pressures listed are per sprinkler.
5. Listed by Underwriter's Laboratories, Inc. for use in the U.S. and Canada for Light Hazard occupancies with smooth, flat, horizontal ceilings only.
6. Meets New York City requirements, effective July 1, 2008.
7. The 135 °F (57 °C) cover has an orange label. The 165 °F (74 °C) cover has a white label.
8. Painted finish consists of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.
9. The ENT finish is NOT available and NOT cULus Listed for 135 °F (57 °C) temperature-rated sprinklers.
10. Part number 14535 (VK634) is not available with ENT finish.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

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DESIGN CRITERIA

(Also refer to the Approval Chart)

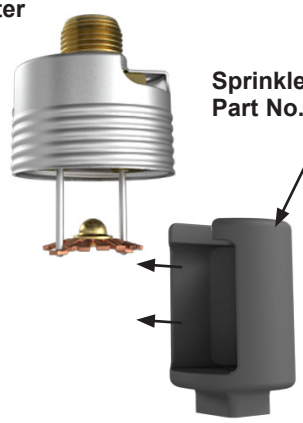
cULus Listing Requirements: Mirage® Quick Response Extended Coverage Concealed Pendent Sprinklers VK632 and VK634 are cULus Listed for installation in accordance with the latest edition of NFPA 13 for extended coverage pendent spray sprinklers:

- Limited to Light Hazard occupancies, with smooth, flat, horizontal ceilings only.
- Minimum spacing allowed is 8 ft. (2.4 m) unless baffles are installed in accordance with NFPA 13.
- Minimum distance from walls is 4 in. (102 mm).
- Maximum distance from walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler installation and obstruction rules contained in NFPA 13 for extended coverage pendent spray sprinklers must be followed.

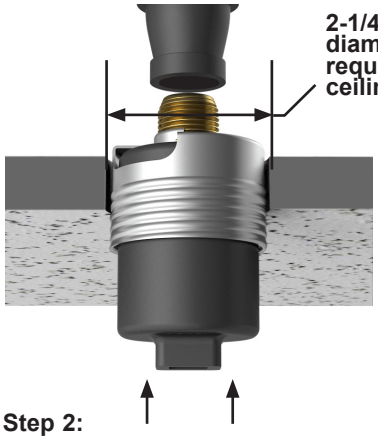
NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer Bulletin Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

Sprinkler and Adapter Assembly
- **Protective cap removed**
- **Use wrench 14031****



Step 1:
Carefully slide the wrench sideways around the deflector and pins



Step 2:
Carefully press the wrench upward and turn slightly to ensure engagement with the sprinkler wrench flats.

NEVER install the sprinkler by applying the installation wrench across the frame arms. DO NOT overtighten. Use only the designated sprinkler wrenches, Part Numbers 14047WB or 14031**. A leak-tight seal should be achieved by turning the sprinkler clockwise 1 to 1-1/2 turns beyond finger tight.**

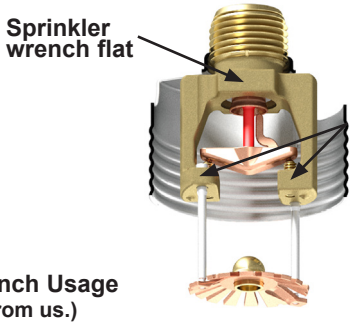


Figure 3: Sprinkler Installation and Proper Wrench Usage
**** A 1/2" ratchet is required (Not available from us.)**

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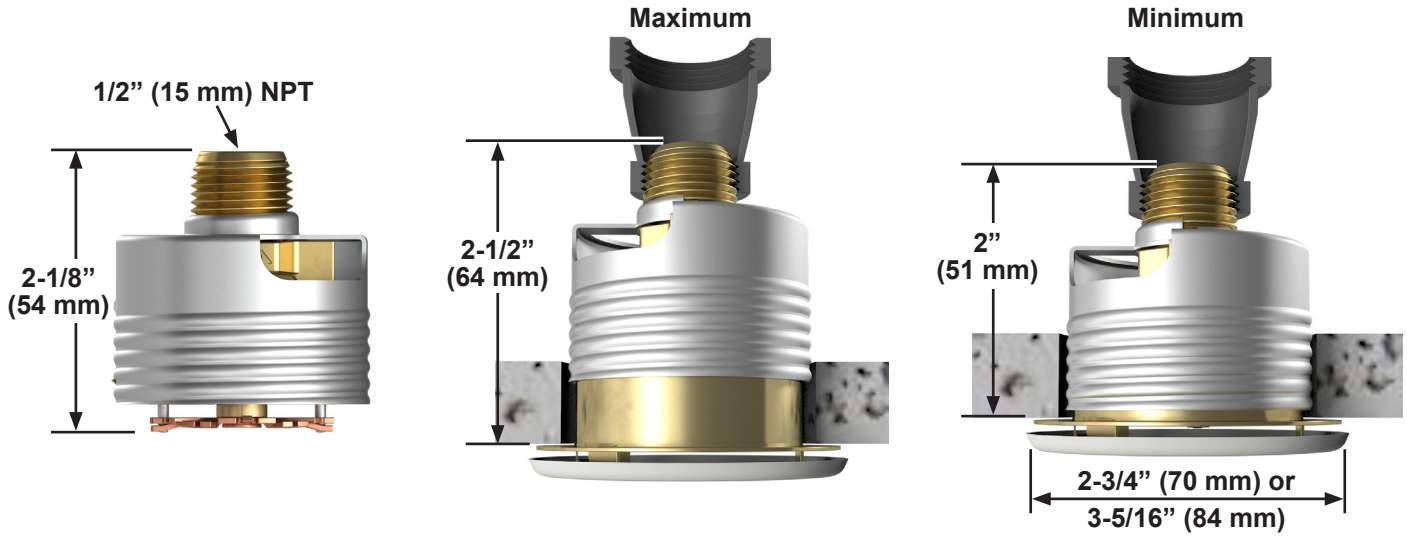
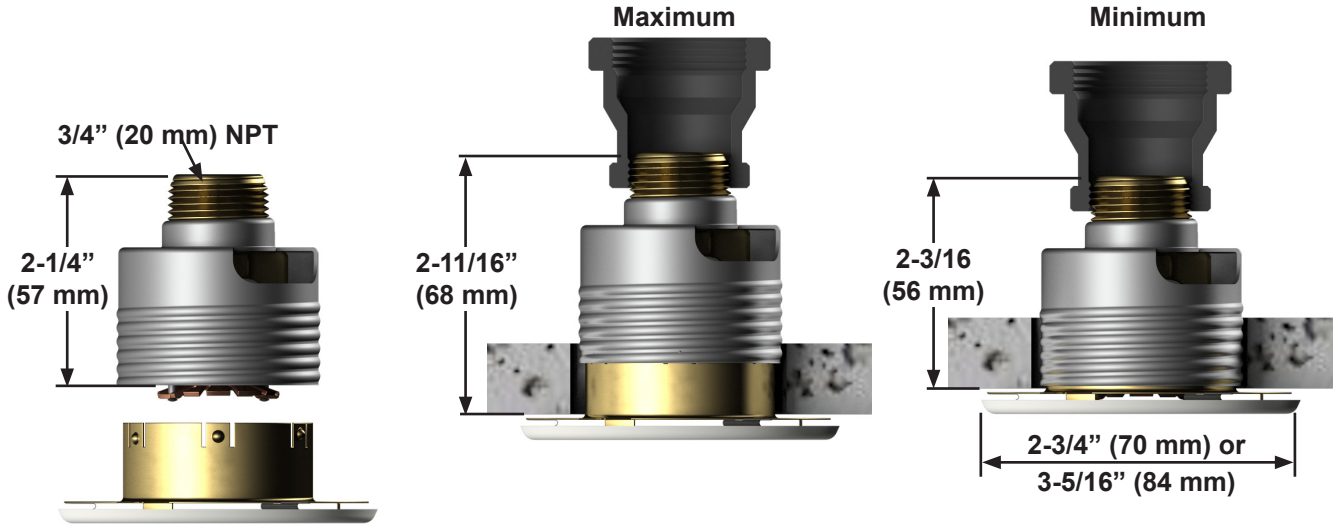


NOTE: ***Upon sprinkler activation, the deflector descends to approximately 13/16” (21 mm) below the sprinkler body.***

Figure 4: Sprinkler Dimensions and Cover Installation-VK632



NOTE: ***Upon sprinkler activation, the deflector descends to approximately 13/16” (21 mm) below the sprinkler body.***

Figure 5: Sprinkler Dimensions and Cover Installation-VK634

Bulletin 157 November 2022

Reliable®

Model F3QR56 Dry K5.6 (80 metric) Quick-Response, Standard Spray Sprinklers

Features

1. Available in the following configurations:
   - Pendent with standard escutcheon
   - Pendent with Model HB extended escutcheon
   - Pendent with Model FP recessed escutcheon
   - Pendent with Model F1 recessed escutcheon
   - Concealed Pendent with Model CCP cover plate
   - Horizontal Sidewall with Standard escutcheon
   - Horizontal Sidewall with Model HB extended escutcheon
   - Horizontal Sidewall with Model FP recessed escutcheon (FM Standard Response)
   - Horizontal Sidewall with Model F1 recessed escutcheon (FM Standard Response)
   - Upright
2. Available with 1" NPT, ISO7-1R1, 3/4" NPT, or ISO7-1R3/4 inlet fitting.
3. 3/4" NPT inlet fittings permit replacement of older 3/4" inlet dry sprinklers without changing to a larger sprinkler fitting.
4. Sprinklers, escutcheons, and cover plates are available in a wide variety of standard and special application finishes.
5. White polyester, black polyester, and Electroless Nickel PTFE (ENT) finish sprinklers are cULus Listed as Corrosion Resistant.
6. Available with cULus Listed 250 psi (17.2 bar) pressure rating for Dry Pendent and select HSW configurations. FM Approved for 175 psi (12 bar).

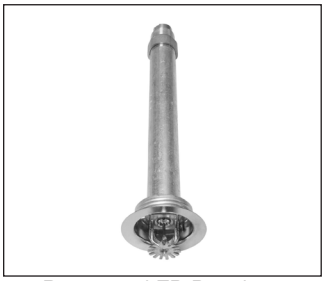
Product Description

Model F3QR56 Dry sprinklers are quick-response, standard coverage sprinklers with a nominal K-Factor of 5.6 (80 metric). Available in Dry Pendent, Dry Horizontal Sidewall, and Dry Upright configurations, Model F3QR56 Dry sprinklers all use a 3 mm glass bulb operating element. See the Temperature Ratings table in this Bulletin for available temperature ratings. Model F3QR56 Dry sprinklers are intended for installation on wet-pipe, dry-pipe, or preaction sprinkler systems in accordance with NFPA 13, FM Property Loss Prevention Data Sheets, and other applicable installation standards.

Model F3QR56 Dry Pendent and Sidewall sprinklers are available with a variety of escutcheon options as illustrated in Figs. 1 through 3 and Figs. 5 through 9. In addition, Model F3QR56 Dry Pendent sprinklers are also available with the Model CCP conical concealed cover plate as illustrated in Fig. 4. Available sprinkler, escutcheon, and cover plate finishes are identified in the Finishes table in this Bulletin. The Model F1 escutcheon, Model FP escutcheon, and Model CCP cover plate are the only recessed escutcheons and cover plate listed for use with Model F3QR56 Dry sprinklers; the use of any other recessed escutcheon or cover plate with Model F3QR56 Dry sprinklers will void all guarantees, warranties, listings and approvals.

Pendent
(See Fig. 1)

Pendent / HB
(See Fig. 2)

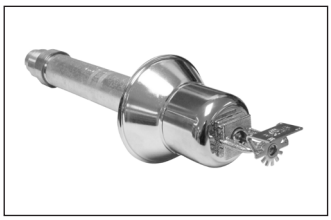


Recessed FP Pendent
(See Fig. 3)

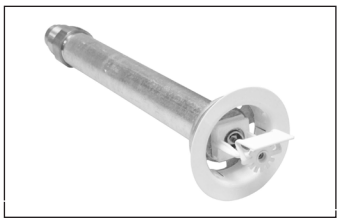
Concealed
(See Fig. 4)

Recessed F1 Pendent
(See Fig. 5)

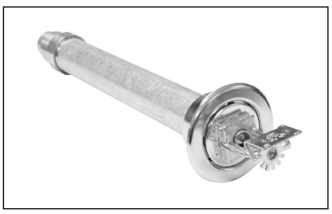
Horizontal Sidewall
(See Fig. 6)



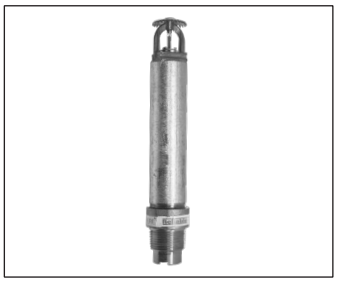
Horizontal Sidewall / HB
(See Fig. 7)



Recessed FP
Horizontal Sidewall
(See Fig. 8)



Recessed F1
Horizontal Sidewall
(See Fig. 9)



Upright
(See Fig. 10)

Inlet fittings are available with 1" NPT, ISO 7-1R1, 3/4" NPT, or ISO7-1R3/4 threads. Sprinklers with 3/4" NPT and ISO7-1R3/4 inlet fittings are intended primarily for replacement of existing 3/4" or ISO7-1R3/4 inlet dry sprinklers, but may also be used in new installations.

See the Available Configurations, Listings, and Approvals table in this Bulletin for further information on Model F3QR56 Dry sprinklers.

Available Configurations, Listings, and Approvals

Sprinkler Model	Escutcheon or Cover Plate	Available Length (See Figs. 1-9)	Listings and Approvals[1]	Inlet Threads	Sprinkler Identification Number (SIN)
F3QR56 Dry Pendent	Standard Escutcheon	2" to 36" (50 to 900 mm)	cULus, NYC	3/4" NPT or ISO7-1R3/4	R5714
	HB Extended Escutcheon	3-1/2" to 36" (90 to 900 mm)			
	F1 Recessed Escutcheon				
	FP Recessed Escutcheon				
	CCP Cover Plate				
	Standard Escutcheon	2" to 48" (50 to 1200 mm)	cULus, FM, NYC	1" NPT or ISO7-1R1	
	HB Extended Escutcheon	3-1/2" to 48" (90 to 1200 mm)			
	F1 Recessed Escutcheon				
	FP Recessed Escutcheon				
	CCP Cover Plate				
F3QR56 Dry Horizontal Sidewall	Standard Escutcheon	2" to 48" (50 to 1200 mm)	cULus[2], NYC[2]	3/4" NPT or ISO7-1R3/4	R5734
	HB Extended Escutcheon	3-1/2" to 48" (90 to 1200 mm)			
	F1 Recessed Escutcheon				
	FP Recessed Escutcheon				
	Standard Escutcheon	2" to 48" (50 to 1200 mm)	cULus[2], FM[3], NYC[2]	1" NPT or ISO7-1R1	
	HB Extended Escutcheon	3-1/2" to 48" (90 to 1200 mm)			
	F1 Recessed Escutcheon	3-1/2" to 48" (90 to 1200 mm)	cULus[2], FM[3][4], NYC[2]		
	FP Recessed Escutcheon				
F3QR56 Dry Upright	N/A	5" to 48" (127 to 1200 mm)	cULus[2]	1" NPT or ISO7-1R1	R5724

[1] For available temperature ratings and finishes see the Temperature Ratings and Finishes tables, respectively, in this Bulletin.
[2] cULus Listing and NYC for Light Hazard and Ordinary Hazard only.
[3] FM Approved for Light Hazard only.
[4] Model F3QR56 Dry Horizontal Sidewall with Model F1 or Model FP recessed escutcheon are FM Approved as Standard Response.

Listing and Approval Agencies

See the Available Configurations, Listings, and Approvals table in this Bulletin for listings and approvals applicable to each available configuration.

1. Listed by Underwriters Laboratories, Inc. and UL Certified for Canada (cULus)
2. Certified by FM Approvals (FM)
3. Permitted in New York City based on UL Listing per Local Law 33/2007 (NYC)

Technical Data

Nominal K-Factor: 5.6 gpm/psi$^{1/2}$ (80 L/min/bar$^{1/2}$)

Sprinkler	Listing or Approval	Deflector to Ceiling Distance	Maximum Working Pressure
F3QR56 Dry Pendent	cULus, NYC	See note below	250 psi (17.2 bar)
	FM	See note below	175 psi (12 bar)
F3QR56 Dry Horizontal Sidewall	cULus, NYC	4" to 6 "	250 psi (17.2 bar)
		4" to 12"	175 psi (12 bar)
	FM	See note below	175 psi (12 bar)
F3QR56 Dry Upright	cULus	See note below	175 psi (12 bar)

Note: Deflector distance to be in accordance with applicable NFPA, FM, or other agency requirements. Information is provided only when additional clarification is necessary.

Temperature Classification	Glass Bulb Color	Sprinkler Temperature Rating	Cover Plate Temperature Rating	Maximum Ceiling Temperature	Listings and Approvals[1]
Ordinary	Orange	135°F (57°C)	135°F (57°C)	100°F (38°C)	cULus, FM, NYC
	Red	155°F (68°C)			
Intermediate	Yellow	175°F (79°C)	165°F (74°C)	150°F (66°C)	cULus, NYC
Intermediate	Green	200°F (93°C)	165°F (74°C)	150°F (66°C)	cULus, FM, NYC
High	Blue	286°F (141°C)	None	225°F (107°C)	cULus, FM[2], NYC
			165°F (74°C)	150°F (66°C)	cULus, NYC

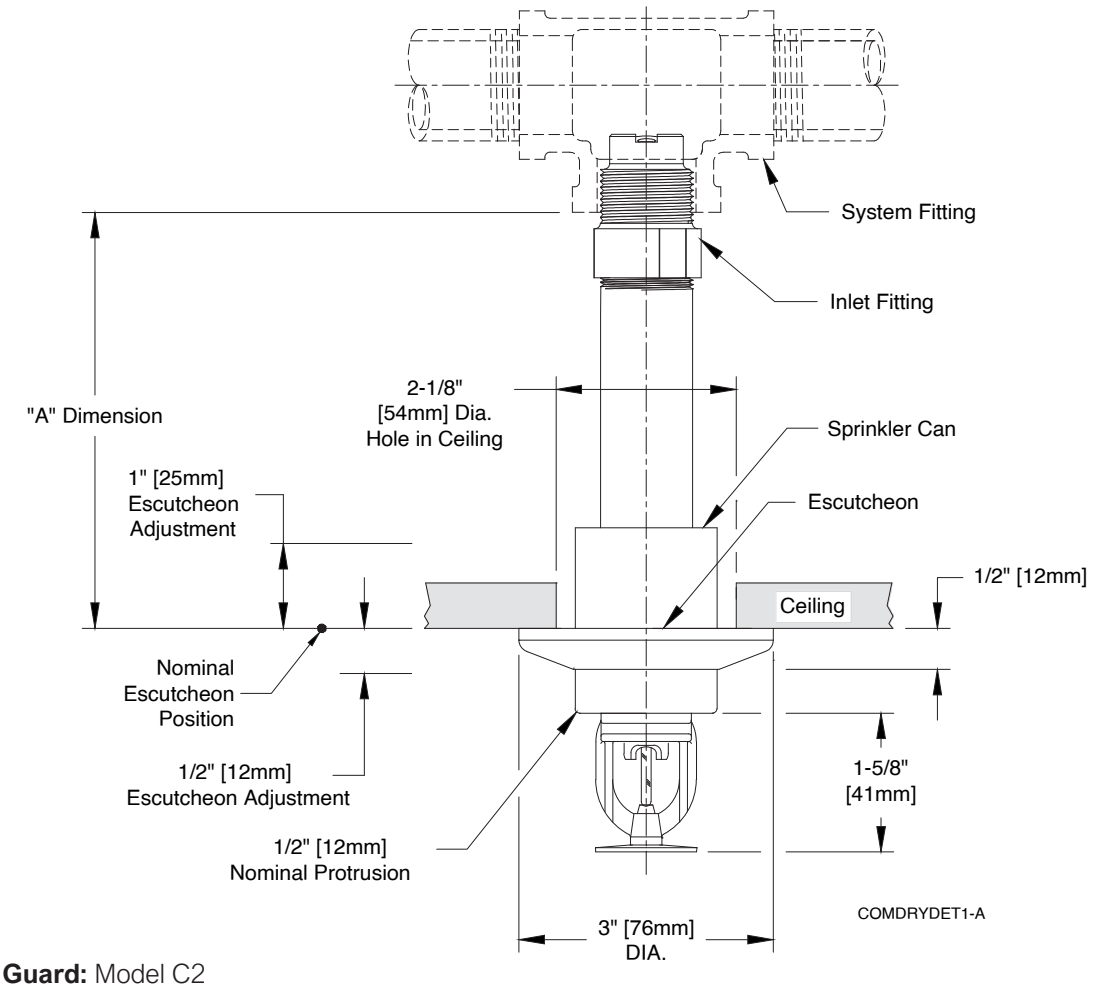
[1] For listed and approved sprinkler, escutcheon, and inlet configurations see the Available Configurations, Listings, and Approvals table in this Bulletin.
[2] High temperature classification is FM Approved with Standard and Model HB escutcheons only.

Finish Notes

1. Finishes vary with type of trim selected. See table provided with each sprinkler detail for finish combinations.
2. Paint or any other coating applied over the factory finish will void all approvals and warranties.
3. Other finishes and colors may be available on special order. Consult your Reliable sales representative for details.
4. For Standard, Model HB, and Model F1 trims, both components of escutcheon are finished.
5. For Model FP and CCP trims, only the trim ring and cover plate are finished. The threaded sprinkler cup is unfinished.

Model F3QR56 Dry Pendent Sprinkler with Standard Escutcheon (SIN R5714)

"A" Dim.	2" to 48" (51mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 2" to 36" (51mm to 914mm) in 1/4" (6mm) increments for 3/4" connections



Sprinkler Guard: Model C2

Fig. 1

Note: The sprinkler can protrudes 1/2" (12mm) when escutcheon is in nominal position. Escutcheon adjustment provides -1/2" (12mm) to +1" (25mm) "A" dimension adjustment range.

Finish Combinations: Standard Escutcheon	
Sprinkler	**Escutcheon[2][3]**
Bronze	Polished Stainless
Bronze	Laquered Brass
Chrome	Polished Stainless
White Polyester[1]	White Polyester
Black Polyester[1]	Black Polyester
Custom Color Polyester[1]	Custom Color Polyester
Electroless Nickel PTFE[4]	Polished Stainless

Notes:
1. UL Listed as Corrosion Resistant.
2. Escutcheons do not carry corrosion resistant listings.
3. Base material is 316 stainless steel unless noted.
4. FM Approved as Corrosion Resistant.

Model F3QR56 Dry Pendent Sprinkler with Model HB Extended Escutcheon (SIN R5714)

"A" Dim.	3½" to 48" (89mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 3½" to 36" (89mm to 914mm) in 1/4" (6mm) increments for 3/4" connections

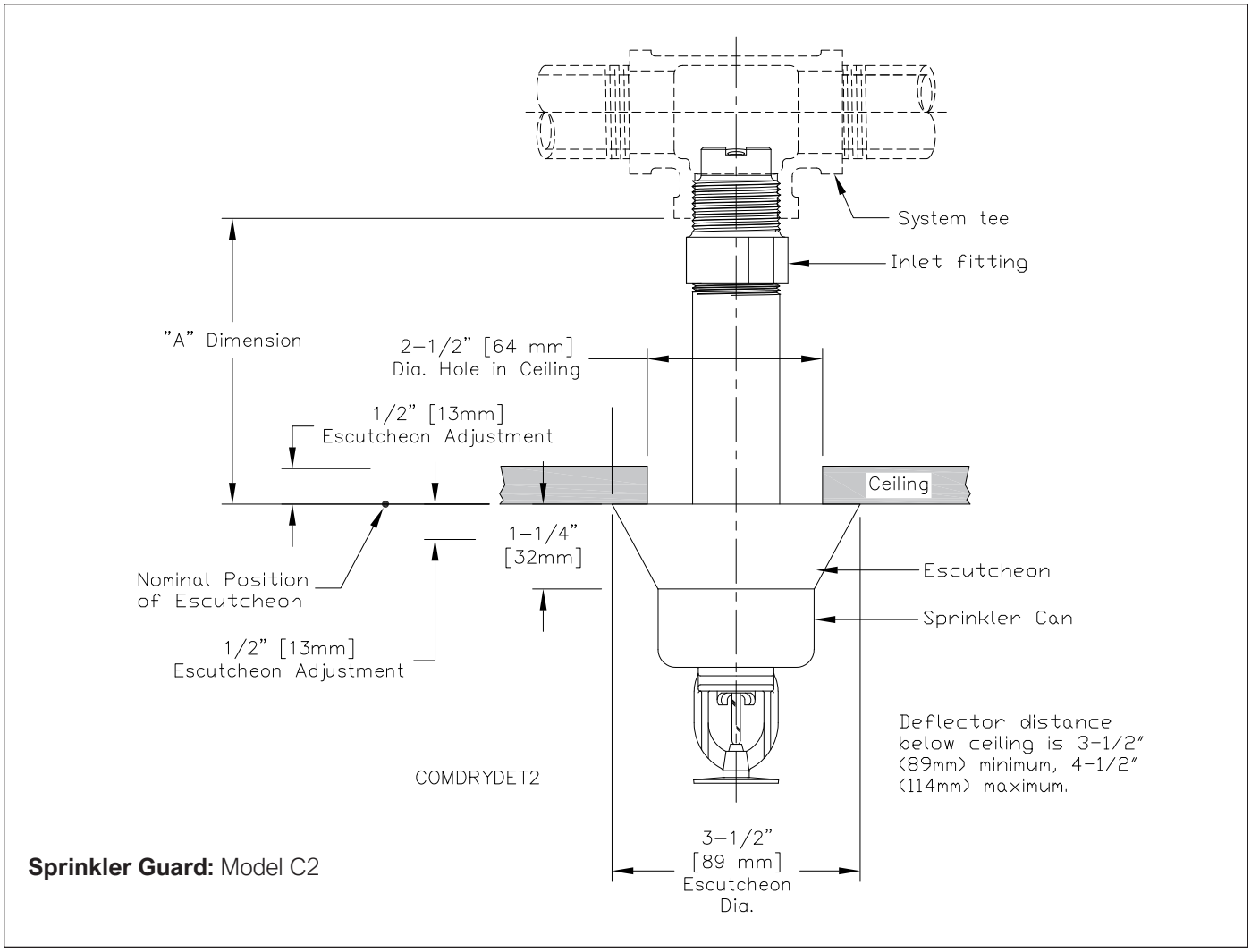


Fig. 2

Note: The sprinkler can protrudes 1¼" when escutcheon is in nominal position. Escutcheon adjustment provides -½" (-12.7mm) to +½" (+12.7mm) "A" dimension adjustment range.

Finish Combinations: HB Escutcheon	
Sprinkler	**Escutcheon[2][3]**
Bronze	Chrome
Chrome	Chrome
White Polyester[1]	White Polyester
Black Polyester[1]	Black Polyester
Custom Color Polyester[1]	Custom Color Polyester
Electroless Nickel PTFE[1][4]	Stainless Steel

Notes:
1. UL Listed as Corrosion Resistant.
2. Escutcheons do not carry corrosion resistant listings.
3. Base material is cold rolled steel unless noted.
4. FM Approved as Corrosion Resistant.

Model F3QR56 Dry Pendent Sprinkler with Model FP Recessed Escutcheon (SIN R5714)

"A" Dim.	3½" to 48" (89mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 3½" to 36" (89mm to 914mm) in 1/4" (6mm) increments for 3/4" connections

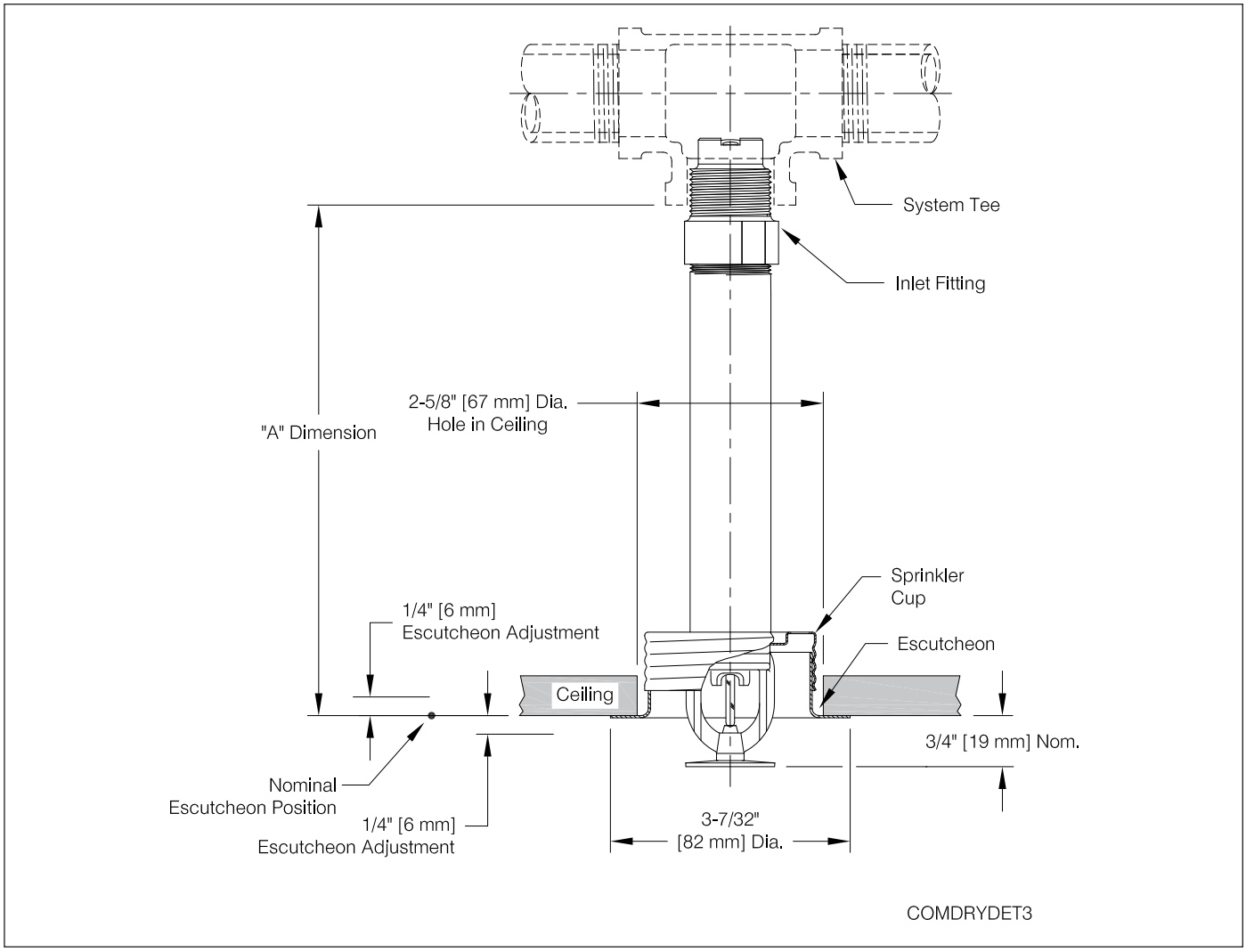


Fig. 3

Note: Do not install the Model F3QR56 Dry Pendent sprinkler with the Model FP escutcheon in ceilings which have positive pressure in the space above.

Finish Combinations: FP Recessed Escutcheon	
Sprinkler[1]	**Escutcheon[3][4]**
Bronze	Chrome
Bronze	Brass
Chrome	Chrome
White Polyester[2]	White Polyester
Black Polyester[2]	Black Polyester
Custom Color Polyester[2]	Custom Color Polyester
Electroless Nickel PTFE[2][5]	Stainless Steel

Notes:
1. Cup for FP Recessed is unfinished galvanized steel except electroless nickel PTFE sprinkler uses a stainless steel cup.
2. UL Listed as Corrosion Resistant.
3. Escutcheons do not carry corrosion resistant listings.
4. Base material is cold rolled steel unless noted.
5. FM Approved as Corrosion Resistant.

Model F3QR56 Dry Pendent Sprinkler with Model CCP Cover Plate (SIN R5714)

"A" Dim.	3½" to 48" (89mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 3½" to 36" (89mm to 914mm) in 1/4" (6mm) increments for 3/4" connections

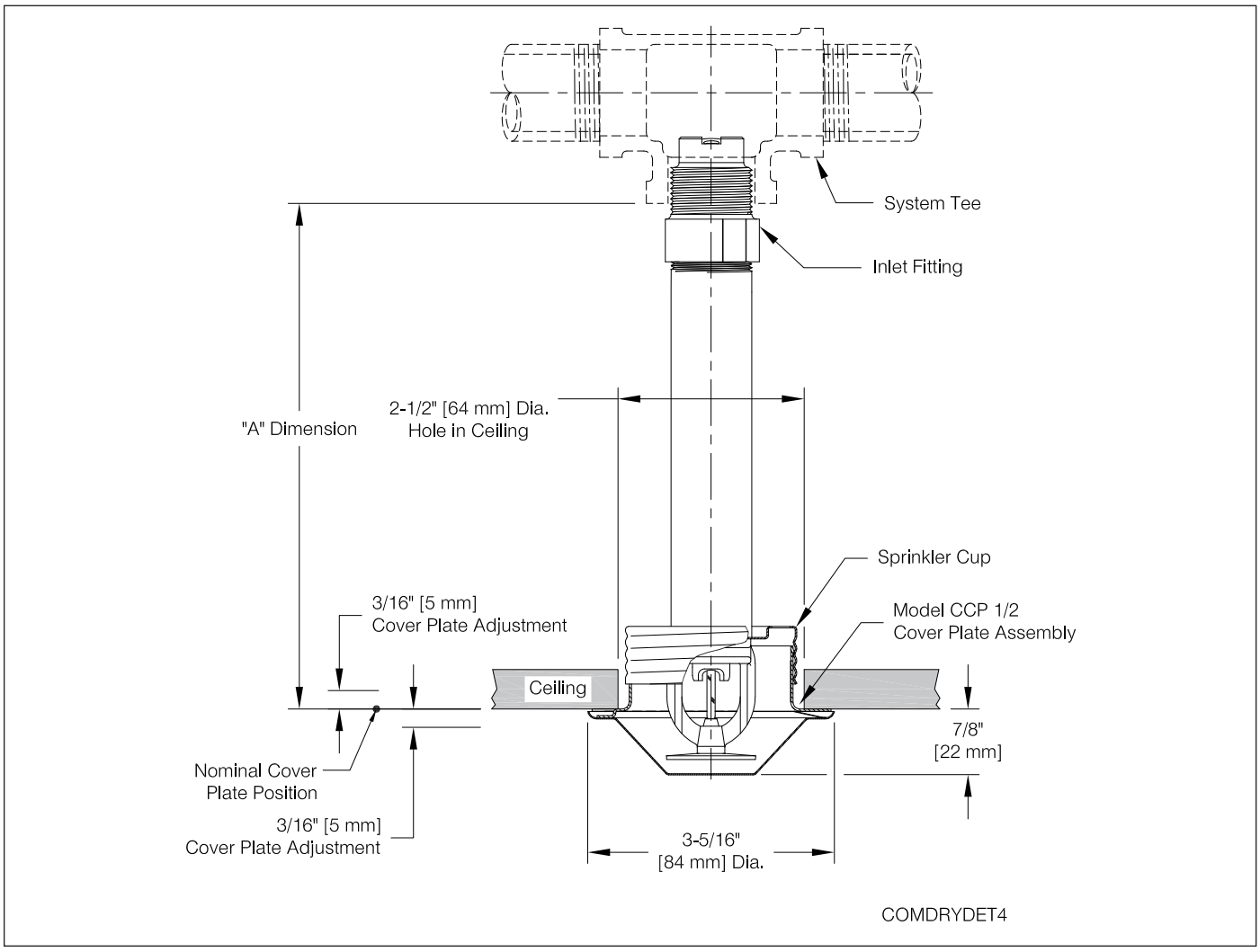


Fig. 4

Note: Do not install the Model F3QR56 Dry Pendent sprinkler with the Model CCP cover plate in ceilings which have positive pressure in the space above.

Finish Combinations: CCP Conical Cover Plate	
Sprinkler	**Cover Plate(2)**
Bronze	White Polyester
	Chrome Bright
	Chrome Dull
	Bright Brass
	Unfinished Bronze
	Custom Color

Notes:
1. Cup for CCP Concealed in unfinished galvanized steel.
2. Cover plates do not carry corrosion resistant listings.

Model F3QR56 Dry Pendent Sprinkler with Model F1 Recessed Escutcheon (SIN R5714)

"A" Dim.	3½" to 48" (89mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 3½" to 36" (89mm to 914mm) in 1/4" (6mm) increments for 3/4" connections.

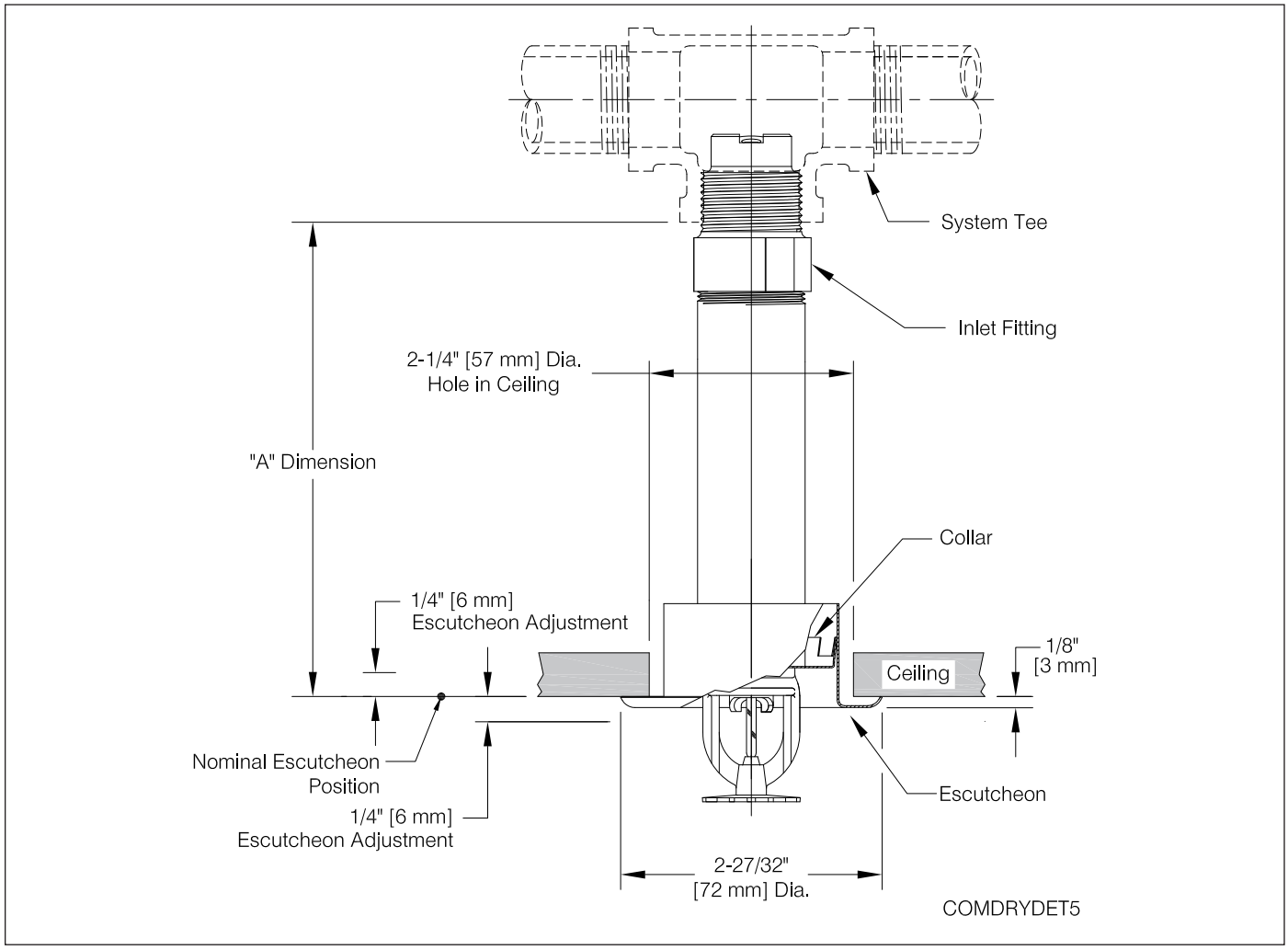


Fig. 5

Finish Combinations: F1 Recessed Escutcheon	
Sprinkler	**Escutcheon[2][3]**
Bronze	Chrome
Bronze	Brass
Chrome	Chrome
White Polyester[1]	White Polyester
Black Polyester[1]	Black Polyester
Custom Color Polyester[1]	Custom Color Polyester
Electroless Nickel PTFE[1][4]	Stainless Steel

Notes:
1. UL Listed as Corrosion Resistant.
2. Escutcheons do not carry corrosion resistant listings.
3. Base material is cold rolled steel unless noted.
4. FM Approved as Corrosion Resistant.

Model F3QR56 Dry Horizontal Sidewall Sprinkler with Standard Escutcheon (SIN R5734)

"A" Dim.	2" to 48" (51mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 2" to 36" (51mm to 914mm) in 1/4" (6mm) increments for 3/4" connections

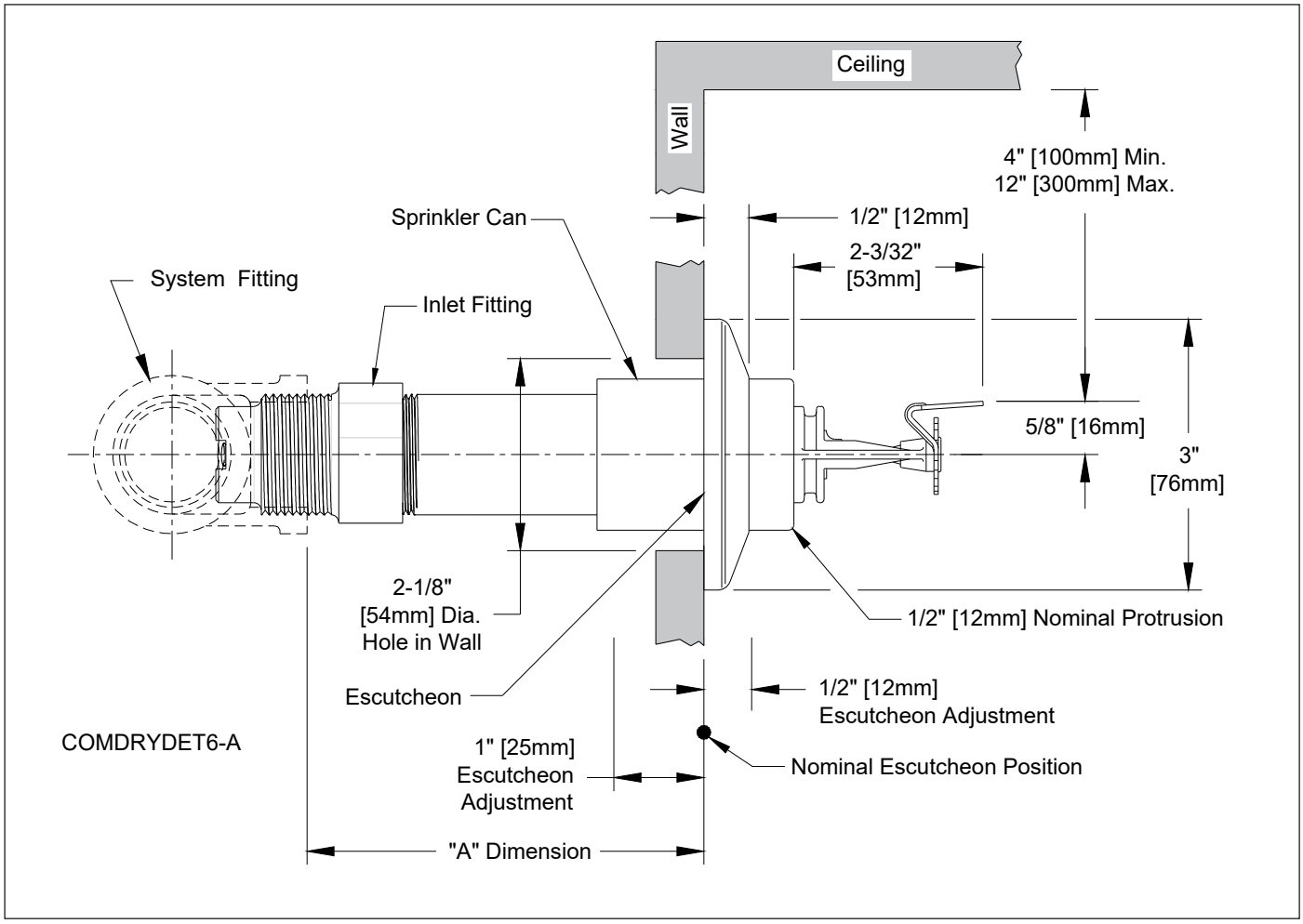


Fig. 6

Note: The sprinkler can protrudes 1/2" when escutcheon is in nominal position. Escutcheon adjustment provides -1/2" (-12mm) to +1" (25mm) "A" dimension adjustment range.

Finish Combinations: Standard Escutcheon	
Sprinkler	**Escutcheon[2][3]**
Bronze	Polished Stainless
Bronze	Laquered Brass
Chrome	Polished Stainless
White Polyester[1]	White Polyester
Black Polyester[1]	Black Polyester
Custom Color Polyester[1]	Custom Color Polyester
Electroless Nickel PTFE[1][4]	Polished Stainless

Notes:
1. UL Listed as Corrosion Resistant.
2. Escutcheons do not carry corrosion resistant listings.
3. Base material is 316 stainless steel unless noted.
4. FM Approved as Corrosion Resistant.

Model F3QR56 Dry Horizontal Sidewall Sprinkler with Model HB Escutcheon (SIN R5734)

"A" Dim.	3½" to 48" (89mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 3½" to 36" (89mm to 914mm) in 1/4" (6mm) increments for 3/4" connections

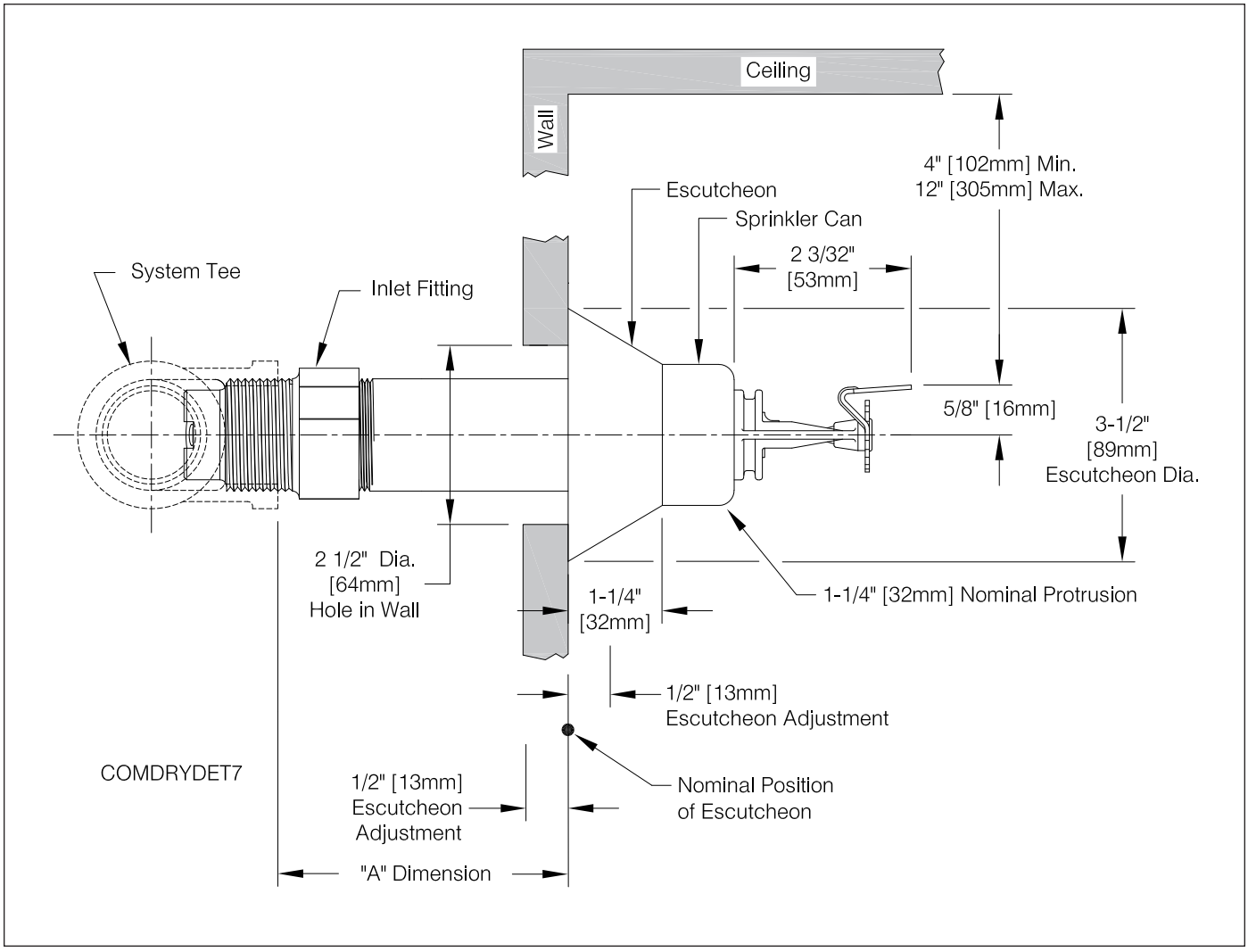


Fig. 7

Note: The sprinkler can protrudes 1¼" when escutcheon is in nominal position. Escutcheon adjustment provides -½" (-12.7mm) to +½" (+12.7mm) "A" dimension adjustment range.

Finish Combinations: HB Escutcheon	
Sprinkler	**Escutcheon[2][3]**
Bronze	Chrome
Chrome	Chrome
White Polyester[1]	White Polyester
Black Polyester[1]	Black Polyester
Custom Color Polyester[1]	Custom Color Polyester
Electroless Nickel PTFE[1][4]	Stainless Steel

Notes:
1. UL Listed as Corrosion Resistant.
2. Escutcheons do not carry corrosion resistant listings.
3. Base material is cold rolled steel unless noted.
4. FM Approved as Corrosion Resistant.

Model F3QR56 Dry Horizontal Sidewall Sprinkler with Model FP Recessed Escutcheon (SIN R5734)

"A" Dim.	3½" to 48" (89mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 3½" to 36" (89mm to 914mm) in 1/4" (6mm) increments for 3/4" connections

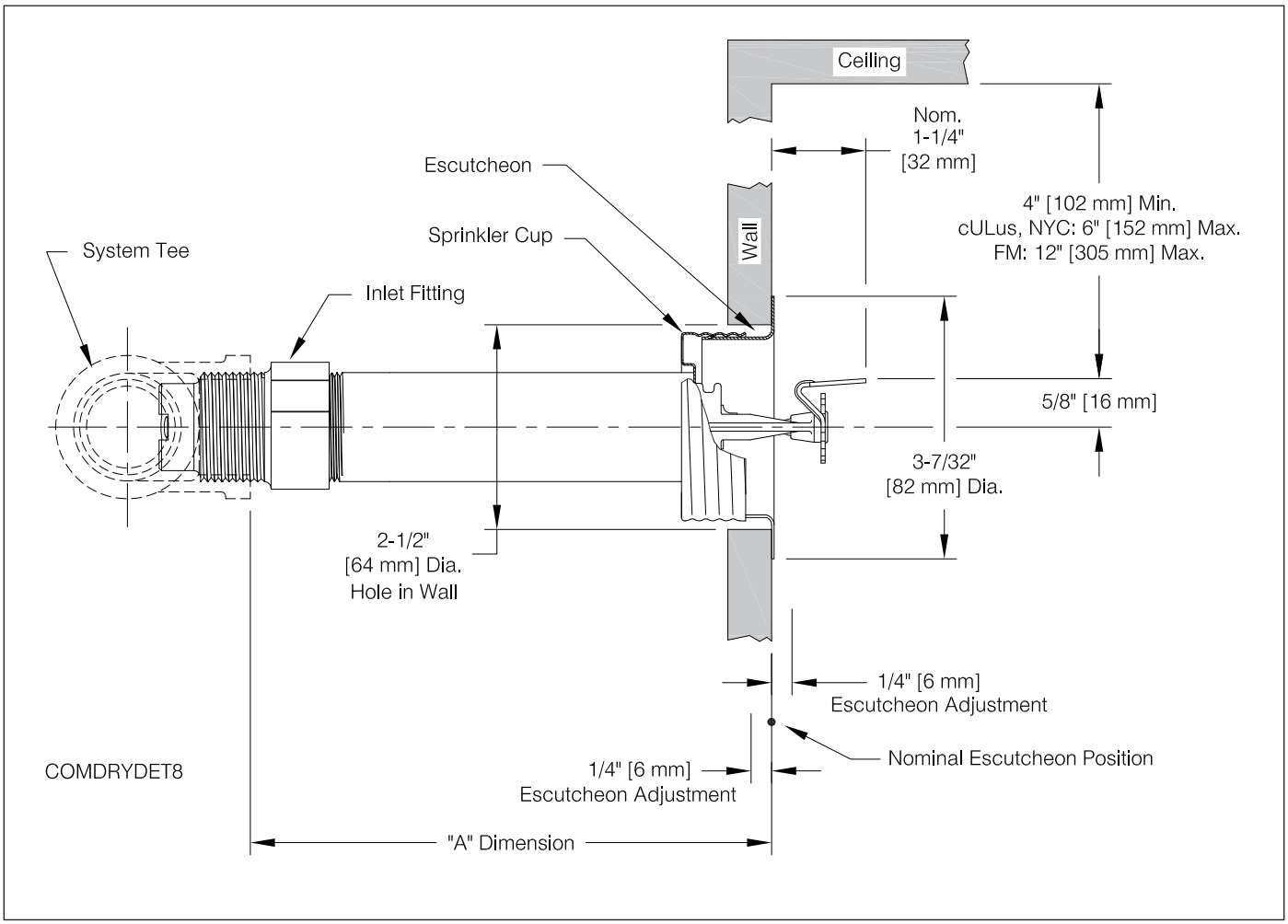


Fig. 8

Note: Do not install the Model F3QR56 Dry Horizontal Sidewall sprinkler with the Model FP escutcheon in walls which are positively pressurized with respect to the protected space.

Finish Combinations: FP Recessed Escutcheon	
Sprinkler[1]	**Escutcheon[3][4]**
Bronze	Chrome
Bronze	Brass
Chrome	Chrome
White Polyester[2]	White Polyester
Black Polyester[2]	Black Polyester
Custom Color Polyester[2]	Custom Color Polyester
Electroless Nickel PTFE[2][5]	Stainless Steel

Notes:
1. Cup for FP Recessed is unfinished galvanized steel except electroless nickel PTFE sprinkler uses a stainless steel cup.
2. UL Listed as Corrosion Resistant.
3. Escutcheons do not carry corrosion resistant listings.
4. Base material is cold rolled steel unless noted.
5. FM Approved as Corrosion Resistant.

Model F3QR56 Dry Horizontal Sidewall Sprinkler with Model F1 Recessed Escutcheon (SIN R5734)

"A" Dim.	3½" to 48" (89mm to 1219mm) in 1/4" (6mm) increments for 1" connections or 3½" to 36" (89mm to 914mm) in 1/4" (6mm) increments for 3/4" connections

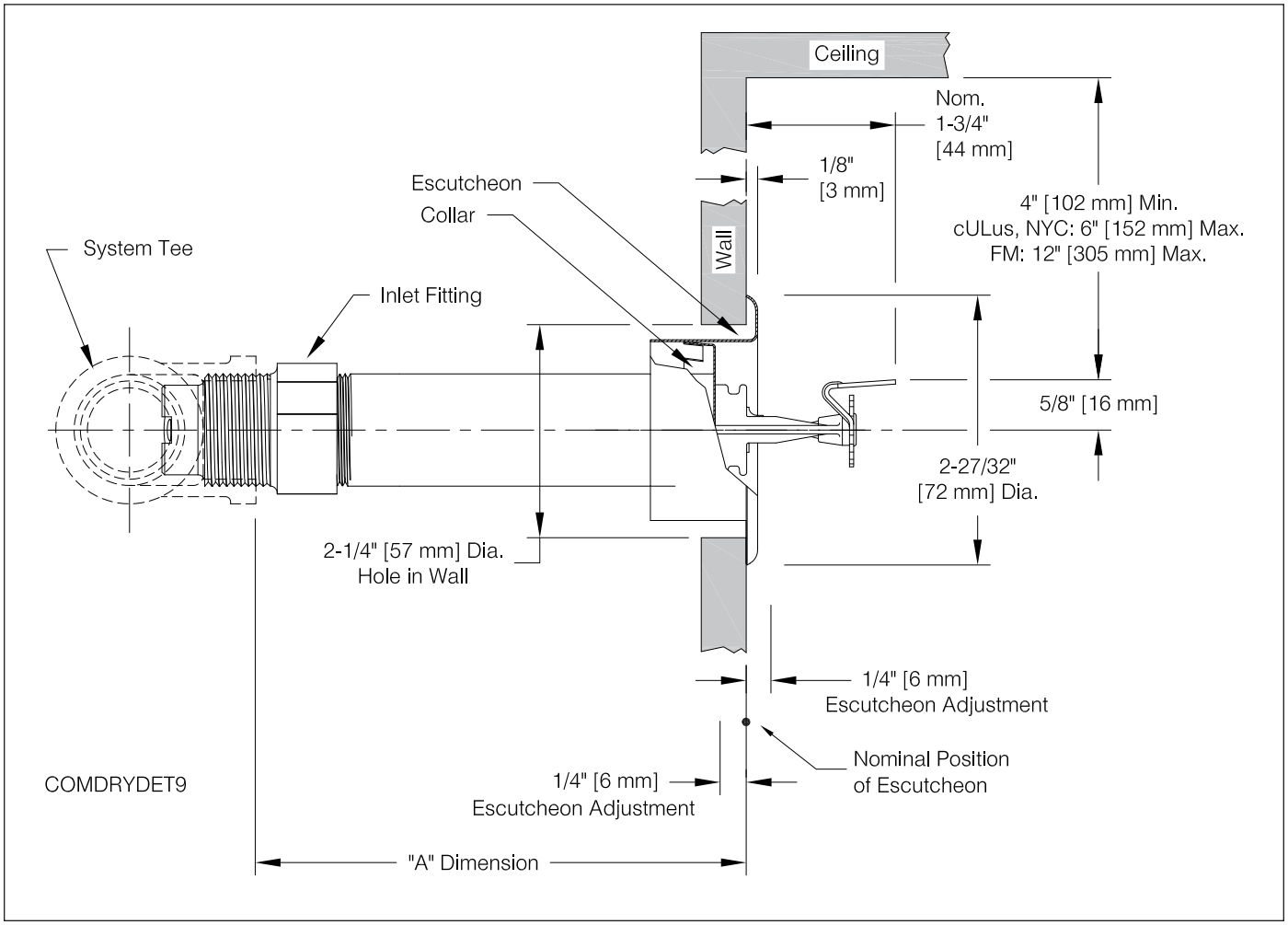


Fig. 9

Finish Combinations: F1 Recessed Escutcheon	
Sprinkler	**Escutcheon[2][3]**
Bronze	Chrome
Bronze	Brass
Chrome	Chrome
White Polyester[1]	White Polyester
Black Polyester[1]	Black Polyester
Custom Color Polyester[1]	Custom Color Polyester
Electroless Nickel PTFE[1][4]	Stainless Steel

Notes:
1. UL Listed as Corrosion Resistant.
2. Escutcheons do not carry corrosion resistant listings.
3. Base material is cold rolled steel unless noted.
4. FM Approved as Corrosion Resistant.

Model F3QR56 Dry Upright (SIN 5724)

Order Dimensions 5” to 48” (127 mm to 1219 mm)

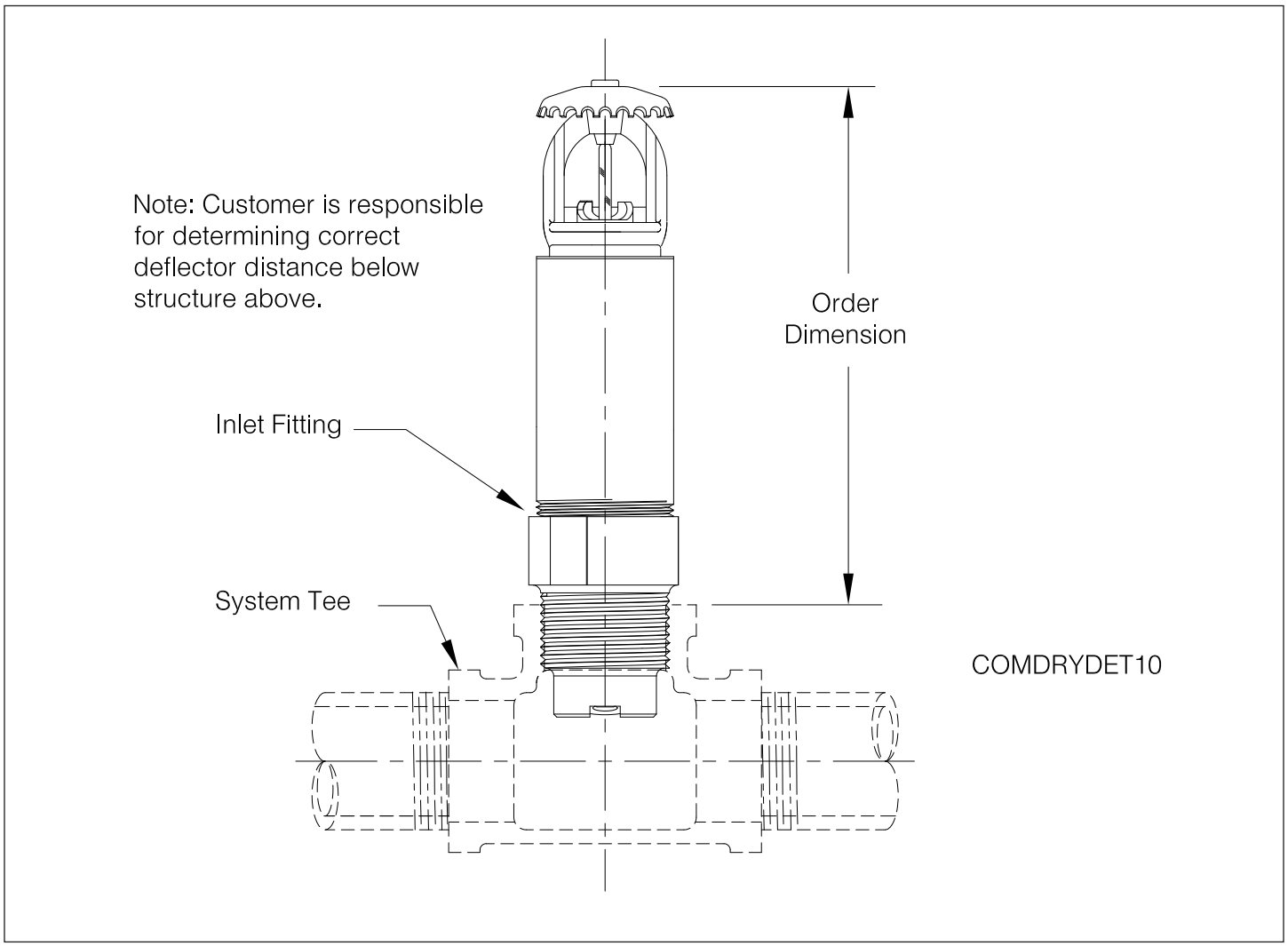


Fig. 10

Finish Combinations: Upright	
Sprinkler	**Escutcheon**
Bronze	NA
Electroless Nickel PTFE(1)	NA

Notes:

1. UL Listed as Corrosion Resistant.
2. Escutcheons do not carry corrosion resistant listings.
3. Base material is cold rolled steel unless noted.

MINIMUM EXPOSED BARREL LENGTH WHEN CONNECTED TO WET PIPE SPRINKLER SYSTEM

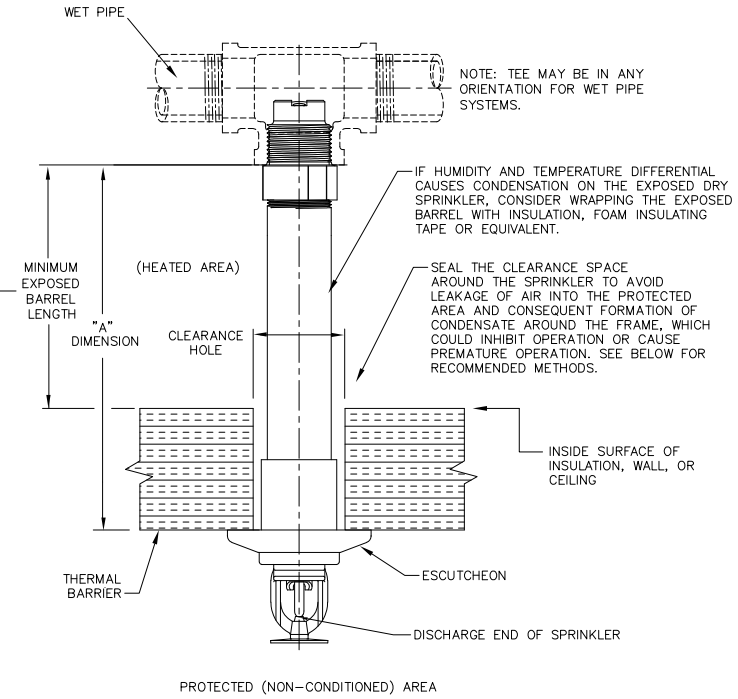
NOTE: STANDARD DRY PENDENT IS SHOWN, HOWEVER, MINIMUM EXPOSED BARREL LENGTH APPLIES TO ALL STYLES OF DRY SPRINKLERS CONNECTED TO A WET PIPE SYSTEM.

AMBIENT TEMPERATURE EXPOSED TO DISCHARGE END OF SPRINKLER*	EXPOSED BARREL AMBIENT TEMPERATURE		
	40°F/4°C	50°F/10°C	60°F/16°C
	EXPOSED MINIMUM BARREL LENGTH** (FACE OF FITTING TO TOP OF CEILING)***		
	IN. (MM)	IN. (MM)	IN. (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 (300)	3 (75)	0
−10°F (−23°C)	14 (350)	4 (100)	1 (25)
−20°F (−29°C)	14 (350)	6 (150)	3 (75)
−30°F (−34°C)	16 (400)	8 (200)	4 (100)
−40°F (−40°C)	18 (450)	8 (200)	4 (100)
−50°F (−46°C)	20 (500)	10 (250)	6 (150)
−60°F (−51°C)	20 (500)	10 (250)	6 (150)

* FOR AMBIENT TEMPERATURES EXPOSED TO THE DISCHARGE END OF THE SPRINKLER THAT OCCUR BETWEEN THE VALUES LISTED, USE THE NEXT COOLER TEMPERATURE.

** THE MINIMUM EXPOSED BARREL LENGTH IS NOT THE SAME AS THE "A" DIMENSION. THE MINIMUM EXPOSED BARREL LENGTH IS BASED ON A PROPERLY SEALED PENETRATION WITH A MAXIMUM WIND VELOCITY ON THE EXPOSED SPRINKLER OF 30 MPH (48 KM/H). LONGER EXPOSED BARREL LENGTHS WILL HELP AVOID FREEZING OF THE WET PIPING WHERE HIGHER WIND VELOCITY IS EXPECTED.

*** THE MINIMUM EXPOSED BARREL LENGTH IS MEASURED FROM THE FACE OF THE FITTING TO THE INSIDE FACE OF THE INSULATION, WALL, OR CEILING LEADING TO THE COLD SPACE, WHICHEVER IS CLOSEST TO THE FITTING.



RECOMMENDED DRY SPRINKLER SEAL ARRANGEMENTS
(DRY SPRINKLER WITH STANDARD ESCUTCHEON SHOWN)

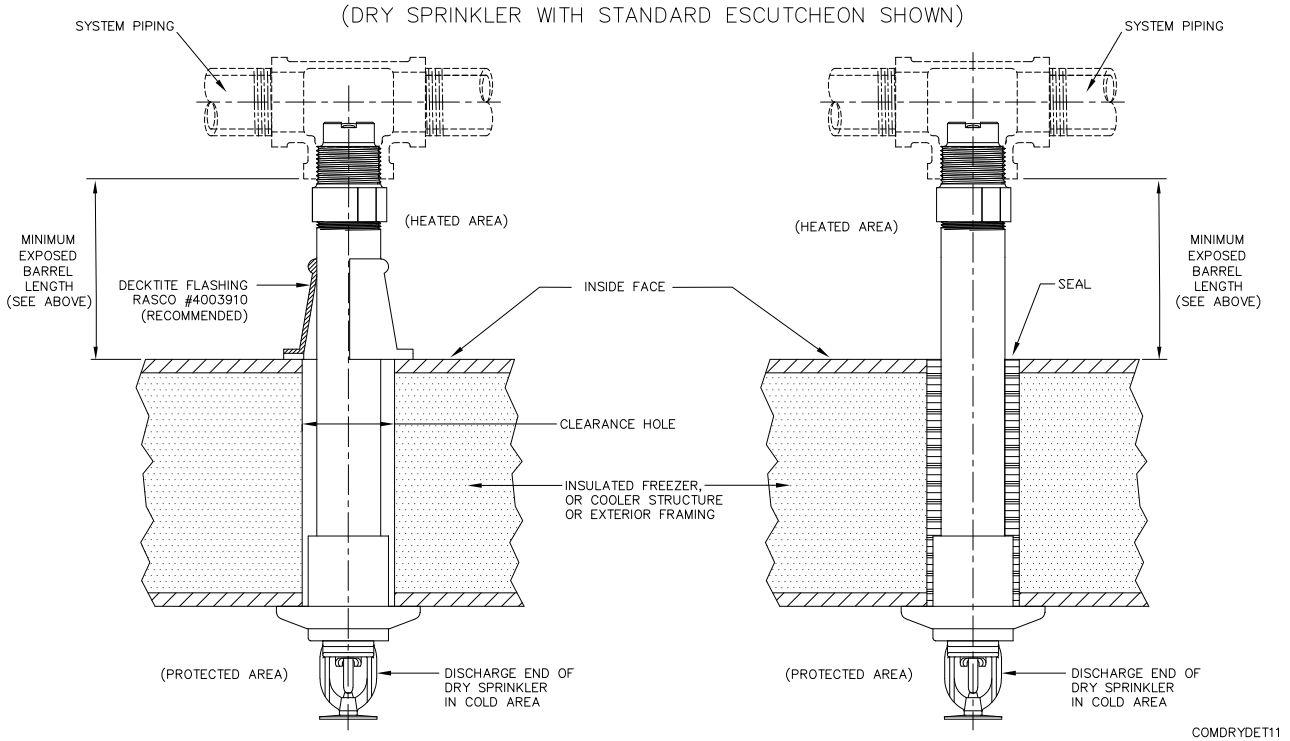


Fig. 11

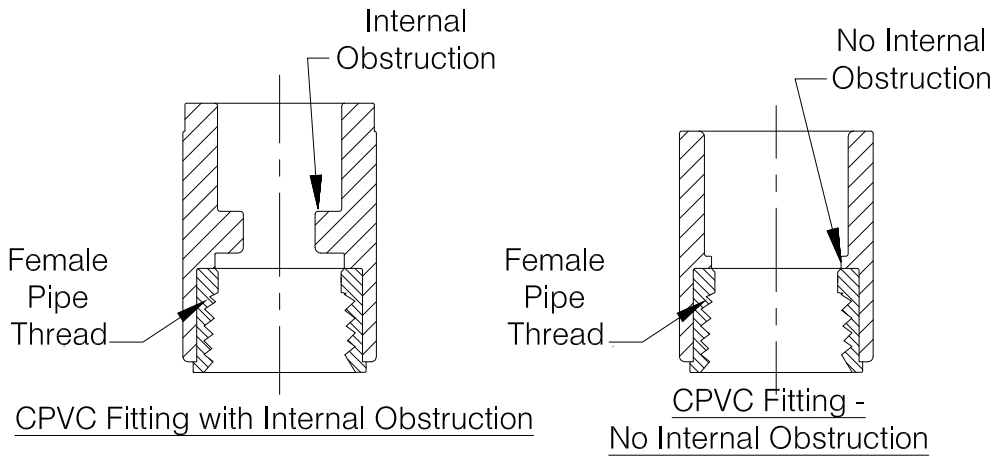
CAUTION

RELIABLE DRY SPRINKLERS MAY BE INSTALLED IN A LISTED CPVC SPRINKLER FITTING, ONLY UPON VERIFICATION THAT THE FITTING DOES NOT INTERFERE WITH THE SPRINKLER'S INLET.

Do not install dry sprinklers with standard inlets into CPVC fittings that have an internal obstruction; this will damage the sprinkler, the fitting, or both.

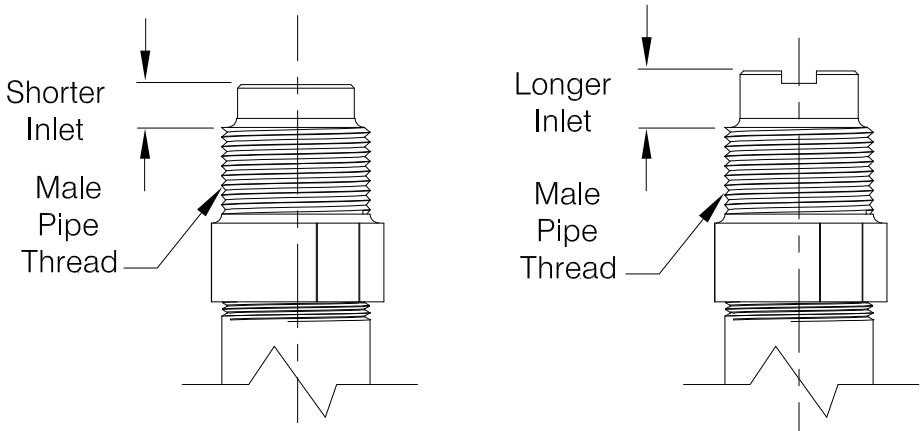
Short inlet ("PL") versions of Reliable dry sprinklers are available that may or may not be compatible with fittings having internal obstructions in existing installations. Sprinklers with the short inlet ("PL") should only be installed in CPVC fittings of wet-pipe systems.

In all cases, verify sprinkler and fitting dimensions prior to installation to avoid interference.



CPVC Fitting with Internal Obstruction

CPVC Fitting -
No Internal Obstruction



Dry Sprinkler
Short Inlet ("PL")

Dry Sprinkler
Standard Inlet

BE SURE TO ORDER THE CORRECT SPRINKLERS FOR YOUR APPLICATION

COMDRYDET2

Fig. 12

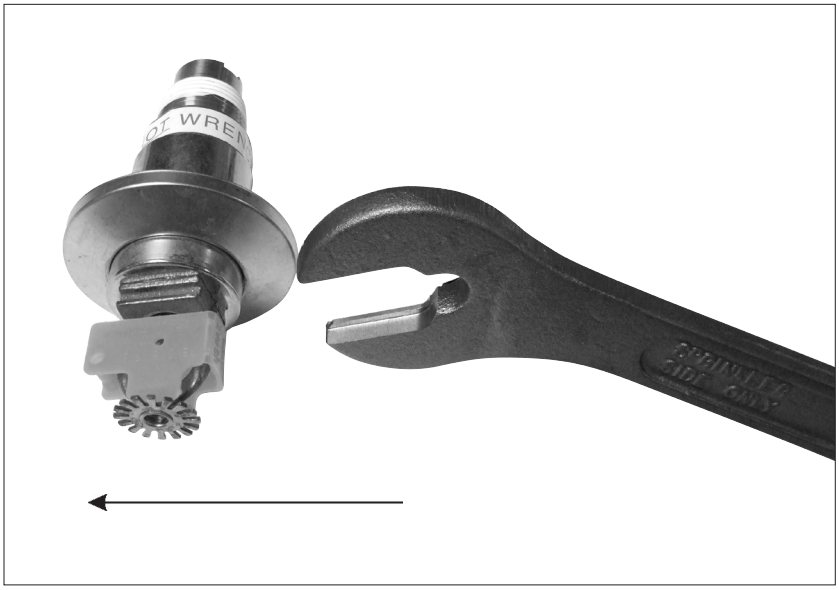


Fig. 13 - Model F3R Wrench

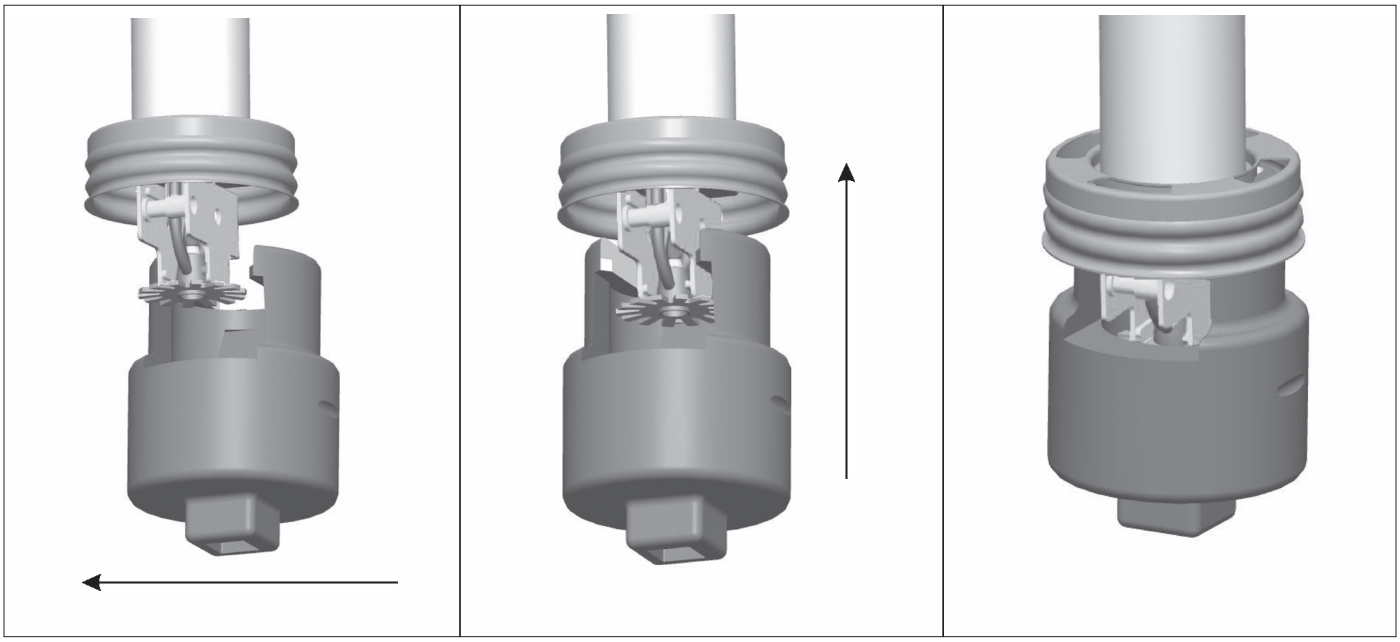
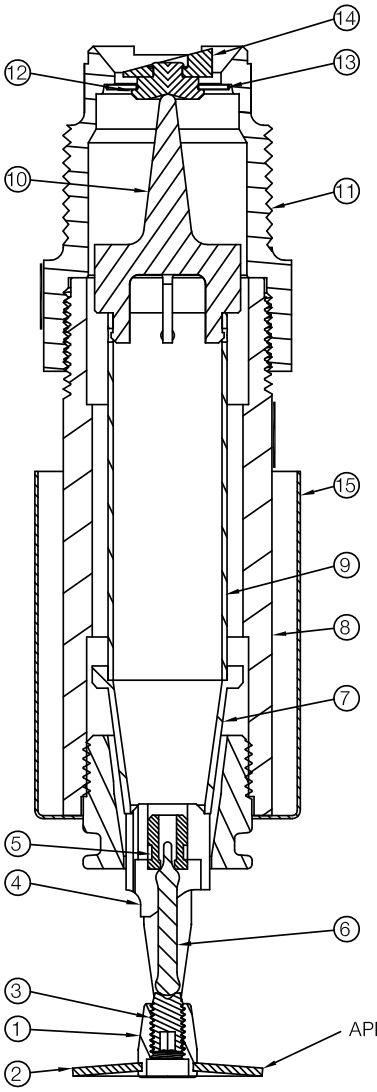


Fig. 14 - Model XLO2 Wrench

MATERIAL SPECIFICATIONS



ITEM #	DESCRIPTION	MATERIAL SPECIFICATION
1	FRAME	BRASS PER UNS C83600
2	DEFLECTOR	BRONZE PER UNS C51000
3	LOAD SCREW	BRASS PER UNS C22000
4	SEAT ADAPTOR	BRASS ALLOY PER UNS C36000
5	BULB INSERT	COPPER ALLOY PER UNS C31400
6	GLASS BULB	GLASS W/GLYCERIN SOLUTION
7	ORIFICE ADAPTOR	BRASS ALLOY PER UNS C36000
8	OUTER TUBE	GALVANIZED STEEL
9	INNER TUBE	BRASS ALLOY PER UNS C23000
10	YOKE	BRASS ALLOY PER UNS C38000
11	INLET	BRASS ALLOY PER UNS C35330
12	CAP	BRASS ALLOY PER UNS C54400
13	SPRING WASHER/SEAL	PTFE COATED BERYLLIUM NICKEL
14	FLIP DISK	BRASS ALLOY PER UNS C54400
15	CAN/ESCUTCHEON	PAINTED OR PLATED MILD STEEL, EXCEPT FOR TYPE 316 STAINLESS STEEL FOR SPRINKLERS WITH ENT FINISH

(PIPE WRENCH MAY ONLY BE USED ON OUTER STEEL PIPE OF SPRINKLER)

COMDRYDET13

APPEARANCE OF DEFLECTOR MAY VARY DEPENDING ON MODEL

Fig. 15

Installation Instructions

When used on wet pipe systems, Reliable Model F3QR56 dry sprinklers may be installed in ductile or malleable cast iron threaded tees, or CPVC tees and adapters upon verification that the sprinkler inlet fitting does not interfere with the interior of the fitting (see Figure 12).

When used on dry pipe systems, Reliable Model F3QR56 dry pendent sprinklers MUST ONLY BE installed in the outlets of ductile or malleable cast iron threaded tees on horizontal pipe such that the inlet of the sprinkler protrudes above the bottom level of the pipe.

When used on dry pipe systems, Reliable Model F3QR56 dry sidewall and dry upright sprinklers may be installed in ductile or malleable cast iron threaded tees, or CPVC tees and adapters upon verification that the sprinkler inlet fitting does not interfere with the interior of the fitting (see Figure 12).

DO NOT install Reliable dry sprinklers into elbows or couplings, welded outlets, mechanical tees, or gasket sealed CPVC fittings.

Dry sprinklers connected to wet pipe systems must be installed as indicated in Figure 11 and as required by NFPA 13 with the Exposed Minimum Barrel Length located in a heated area.

An orange protective clip is factory installed on the sprinkler to protect the glass bulb thermal element from damage. The clip should remain in place during installation of the sprinkler and be removed when the sprinkler system is placed in service. Sprinklers with 3/4" NPT and ISO7-1R3/4 inlets are supplied with a protective cap on the inlet that must be removed before installation.

Use the following steps for installation:

1. Cut a hole in the wall or ceiling directly in-line with the outlet of the fitting. See the Installation Data table for the recommended hole diameter based on the escutcheon or cover plate option selected.
2. Apply pipe joint compound or PTFE tape to the male threads of the sprinkler's inlet fitting.
3. Install the sprinkler in the fitting using the installation wrench specified in the Installation Data table. The Model F3R wrench is designed to be inserted into the groves in the sprinkler's wrench boss as shown in Fig. 13. The Model XLO2 wrench is designed to fit into the cup and engage the wrench boss as shown in Fig. 14. Do NOT wrench any part of the sprinkler assembly other than the wrench boss. When inserting or removing the wrench from the sprinkler, care should be taken to prevent damage to the sprinkler. The sprinkler is then tightened into the pipe fitting to achieve a leak free connection. The recommended minimum to maximum installation torque is 22 - 30 lb-ft (30 – 40 N-m) for 1" NPT and ISO7-1R1 sprinklers, and 14 - 20 lb-ft (19 – 27 N-m) for 3/4" NPT and ISO7-1R3/4 sprinklers.

3a. Alternatively, where access to the outer tube of the sprinkler is available, the Model F3QR56 Dry sprinkler may be installed using a pipe wrench. The pipe wrench shall only be permitted to interface with the galvanized steel outer tube portion of the sprinkler (Item #8 in Fig. 15). Do NOT wrench any other portion of the sprinkler assembly. A pipe wrench can install the sprinkler into the fitting with a large amount of torque; consideration should be given to the need for future removal of the sprinkler because the installation torque will have to be matched or exceeded to remove the sprinkler. The recommended minimum to maximum installation torque is 22 - 30 lb-ft (30 – 40 N-m) for 1" NPT and ISO7-1R1 sprinklers, and 14 - 20 lb-ft (19 – 27 N-m) for 3/4" NPT and ISO7-1R3/4 sprinklers.

4. Standard and Model HB escutcheons can be installed by slipping the escutcheon over the can until the escutcheon is seated against the ceiling or wall. Model F1 escutcheons are installed by pressing the escutcheon onto the collar until the escutcheon is seated against the ceiling or wall. The Model FP escutcheon is installed by pressing or threading the escutcheon into the cup by hand; the escutcheon can be tightened against the ceiling or wall by turning the escutcheon in a clockwise direction and removed by turning the escutcheon in a counter-clockwise direction. To install the Model CCP cover plate, first remove the protective clip. Install the Model CCP cover plate on the sprinkler by pressing or threading the cover plate into the cup by hand; the cover plate can be tightened against the ceiling by turning the cover plate in a clockwise direction and removed by turning the cover plate in a counter-clockwise direction.
5. Remove the orange protective clip when placing the sprinkler system in service.

Installation Data

Sprinkler Model	Escutcheon or Cover Plate	Suggested Hole Diameter in Wall or Ceiling	Installation Wrench	Required Centerline of Sprinkler Tube/Inlet to Finished Ceiling Vertical Dimension*
F3QR56 Dry Pendent	Standard Escutcheon	2-1/8" (54 mm)	F3R	Not Applicable
	HB Extended Escutcheon	2-1/2" (64 mm)	F3R	
	F1 Recessed Escutcheon	2-1/4" (57 mm)	XLO2	
	FP Recessed Escutcheon	2-1/2" (64 mm)	XLO2	
	CCP Cover Plate		XLO2	
F3QR56 Dry Horizontal Sidewall	Standard Escutcheon	2-1/8" (54 mm)	F3R	4-5/8" to 12-5/8" (118 mm to 321 mm)
	HB Extended Escutcheon	2-1/2" (64 mm)	F3R	
	F1 Recessed Escutcheon	2-1/4" (57 mm)	XLO2	cULus, NYC 4-5/8" to 6-5/8" (118 mm to 168 mm)
	FP Recessed Escutcheon	2-1/2" (64 mm)	XLO2	
	F1 Recessed Escutcheon	2-1/4" (57 mm)	XLO2	FM 4-5/8" to 12-5/8" (118 mm to 321 mm)
	FP Recessed Escutcheon	2-1/2" (64 mm)	XLO2	
F3QR56 Dry Upright	N/A	1-1/2" (38mm)	F3R	Not Applicable

***Note:** Based on 5/8" (16 mm) centerline of sprinkler tube/inlet to defector vertical distance.

Maintenance

The Model F3QR56 Dry Sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25. Do not remove the factory applied thermally sensitive wax fillet between the bulb supporting cup and the wrenching boss. Do not replace this wax with a substitute substance.

An Alternate substance may interfere with proper operation of the sprinkler. Do not clean sprinklers with soap and water, ammonia or any other cleaning fluids. Remove dust by using a soft brush or gently vacuuming. Replace any sprinkler which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should be maintained in the original cartons and packaging until used to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

Ordering Information

Specify:

1. Sprinkler: [Model F3QR56 Dry Pendent SIN R5714] [Model F3QR56 Dry Horizontal Sidewall SIN R5734] [Model F2QR Dry Upright SIN R5724]
2. Escutcheon/Cover Plate: [None][Standard escutcheon] [Model HB extended escutcheon][Model F1 recessed escutcheon][Model FP recessed escutcheon][Model CCP cover plate – pendent only]
3. Inlet Threads: [1" NPT][ISO7-1R1][3/4" NPT][ISO7-1R3/4]
4. Inlet Fitting: [Long – Standard Inlet Fitting][Short "PL" – Wet Pipe Systems only]
5. Sprinkler Temperature Rating: See Temperature Ratings Table
6. Sprinkler Finish: See Finish Combinations Table
7. Escutcheon/Cover Plate Finish: See Finish Combinations Table
8. Length:
   *For dry pendents and dry sidewalls: "A" Dimension is from face of tee to face of finished ceiling or wall in 1/4" (6mm) increments. See Fig. 1 through Fig. 9.
   *For dry uprights: Order dimension is from face of tee to top of deflector in 1/4" (6mm) increments. See Fig. 10.

Notes:

1. For Dry Upright, customer is responsible for determining the correct deflector distance from structure above.
2. Length is based on normally gauged pipe thread "make-up" of .600" (15mm) per ANSI B2.1 (approximately 7-1/2 threads).

Installation Wrench

Model F3R Sprinkler Wrench (Standard and HB escutcheons)
Model XLO2 Sprinkler Wrench (FP Recessed and CCP Concealed)

Manufactured by

Reliable®

Reliable Automatic Sprinkler Co., Inc.
(800) 431-1588 Sales Offices
(800) 848-6051 Sales Fax
(914) 829-2042 Corporate Offices
www.reliablesprinkler.com Internet Address

Recycled Paper

Revision lines indicate updated or new data.

EG. Printed in U.S.A. 11/22 P/N 9999970175

Reliable®

F1FR56 Series
Quick Response Sprinklers

K-factor 5.6 (80)

Features

- Standard coverage quick-response sprinklers
- Upright, pendent, horizontal sidewall, and vertical sidewall deflectors
- Low profile, compact design
- Available in a wide variety of finishes

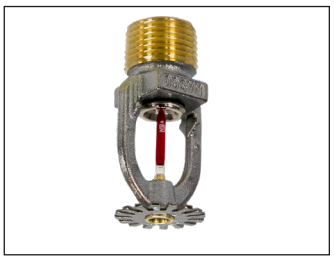
Product Description

Reliable Model F1FR56 series sprinklers are quick-response standard spray automatic fire sprinklers utilizing a sensitive 3.0 mm glass bulb thermal element.

Pendent and horizontal sidewall sprinklers may be installed exposed or surface mounted using escutcheons such as the Reliable Models B, C, or HB (reference Technical Bulletin 204). When installed recessed or concealed, the Model F1FR56 series sprinklers are specifically listed with and may only be installed with listed Reliable escutcheons and cover plates. Refer to the technical information on the following pages for specific listings for recessed and concealed installations and refer to Figures 5 and 6 for dimensional information.

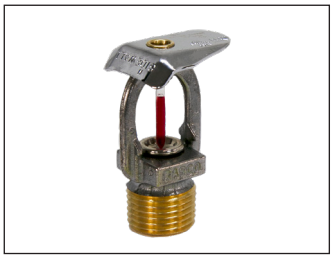
When fitted with an approved water shield, these sprinklers may considered intermediate sprinklers for use in racks, below grated walkways, and other areas where intermediate level sprinklers are required.

Table A provides a summary of the approvals and availability of specific Model F1FR series sprinkler configurations. Additional technical information for each sprinkler model is provided on the following pages.

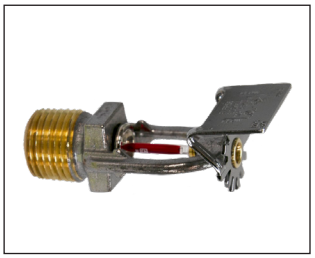


Model F1FR56 Pendent

Model F1FR56 Upright



Model F1FR56 Vertical Sidewall



Model F1FR56
Horizontal Sidewall

Note: Not all versions of the product are shown.

Note: This bulletin may contain information on New and Legacy sprinklers that reflects a dimensional change only. Sprinkler Identification Number (SIN), application, performance, and listings/approval are not otherwise affected. Sprinklers with New frames will include the suffix “N” in the order.

F1FR Series Sprinklers Summary

Table A

Sprinkler Model	K-Factor gpm/psi$^{1/2}$ (lpm/bar$^{1/2}$)	Orientation	Listings & Approvals	Max. Working Pressure psi (bar)	Sprinkler Identification Number (SIN)
F1FR56	5.6 (80)	Upright Intermediate Upright	cULus, FM, LPCB, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1425
		Pendent	cULus, FM, LPCB, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1414
		Concealed Pendent	cULus, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1414
		Horizontal Sidewall	cULus, FM	175 (12) 250 (17) (cULus only)	RA1435
		Vertical Sidewall	cULus, FM, LPCB, UKCA	175 (12)	RA1485

Model F1FR56 Upright Sprinkler — SIN RA1425

Technical Specifications
Style: Upright, Intermediate Upright
Threads: 1/2" NPT or ISO 7-R1/2
Nominal K-Factor: 5.6 (80 metric)
Max. Working Pressure:
175 psi (12 bar)
250 psi (17 bar) (cULus only)

Material Specifications
Thermal Sensor: 3 mm Glass Bulb
Sprinkler Frame: Brass Alloy
Cap: Bronze Alloy
Sealing Washer: Nickel with PTFE
Load Screw: Copper Alloy
Deflector: Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings
135°F (57°C)
155°F (68°C)
175°F (79°C)
200°F (93°C)
286°F (141°C)

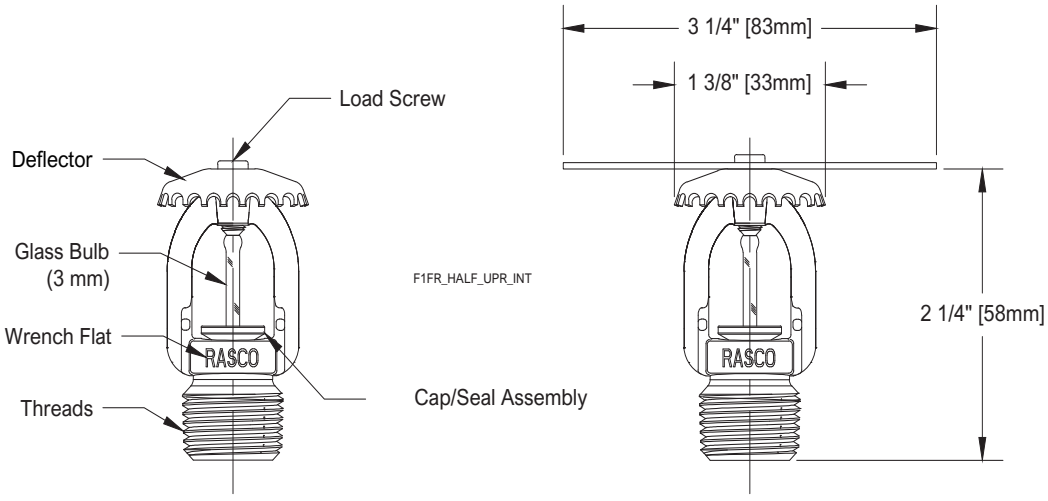
Guards & Shields (New Frames)
Factory Water Shield (cULus, FM)
F-1 Guard (cULus, FM)
F-3 Guard with Shield (cULus, FM)

Guards and Shields (Legacy Frames)
Factory Water Shield
C-1 Guard (FM)
C-3 Guard with Shield (cULus, FM)
D-1 Guard (cULus)
D-3 Guard with Shield (cULus)

Sprinkler Wrench
Model W2
Model J (New frame with guard installed)
Model JD (Legacy frame with guard installed)

Listings and Approvals
cULus Listed
FM Approved
LPCB
VdS
EC
WM
UKCA: 0832-UKCA-CPR-S5045

Model F1FR56 Upright Sprinkler Components and Dimensions — **Figure 1**



Shown with Optional
Factory Installed Water Shield
(Intermediate Upright)

Model F1FR56 Pendent Sprinkler — SIN RA1414

Technical Specifications

Style:
Pendent
Recessed Pendent
Concealed Pendent

Threads: 1/2" NPT or ISO 7-R1/2

Nominal K-Factor: 5.6 (80 metric)

Max. Working Pressure:
175 psi (12 bar)
250 psi (17 bar) (cULus only)

Material Specifications

Thermal Sensor: 3 mm Glass Bulb
Sprinkler Frame: Brass Alloy
Cap: Bronze Alloy
Sealing Washer: Nickel with PTFE
Load Screw: Copper Alloy
Deflector: Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings[1]
135°F (57°C)
155°F (68°C)
175°F (79°C)
200°F (93°C)
286°F (141°C)

Recessed Escutcheons
Model F1 (cULus, LPCB, VdS, CE, WM)
Model F2 (cULus, FM, LPCB, VdS, CE, WM)
Model FP (cULus, VdS, CE, WM)

Cover Plate
Model CCP (cULus, VdS[2], CE[2])

Guards & Shields (New Frames)[3]
F-1 Guard (FM)
F-5 Guard/Shield Kit (FM)
F-7 Guard (cULus)
F-8 Guard/Shield Kit (cULus)
S-1 Shield (cULus, FM)

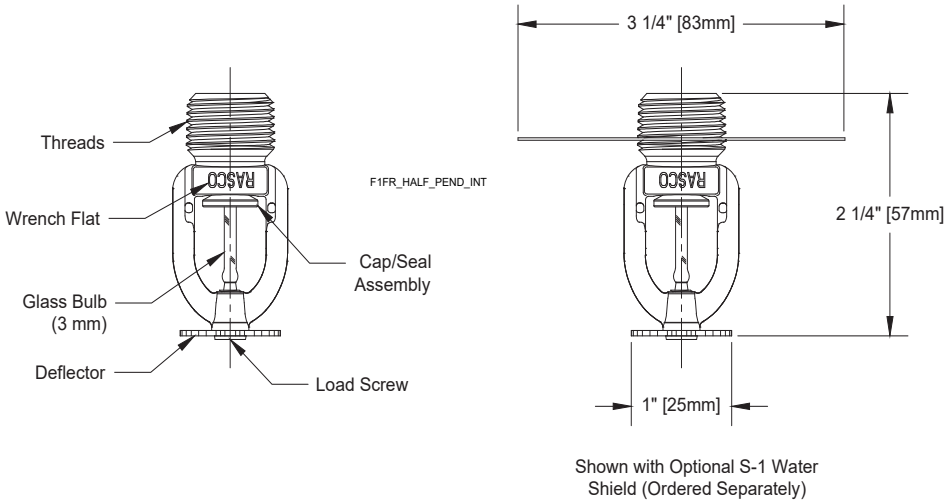
Guards & Shields (Legacy Frames)[3]
C-1 Guard (FM)
C-5 Guard/Shield Kit (FM)
D-1 Guard (cULus, FM)
D-4 Guard/Shield Kit (FM)
D-5 Guard/Shield Kit (cULus, FM)
S-1 Shield (cULus, FM)

Sprinkler Wrenches
Model W2 (pendent)
Model W4 (recessed or concealed)
Model J (New frame with guard installed)
Model JD (Legacy frame with guard installed)

Listings and Approvals[4]
cULus Listed
FM Approved
LPCB
VdS
EC
WM
UKCA: 0832-UKCA-CPR-S5045, 0831-UKCA-CPR-5072 (CCP)

Notes:
1. 286°F (141°C) temperature rated sprinkler not listed for recessed or concealed use.
2. VdS and CE approval for CCP concealed use is for 155°C (68°C) sprinkler ONLY.
3. Not suitable for recessed or concealed pendent installations.
4. When used surface mounted or exposed. See Recessed Escutcheon and Cover Plate section for specific approvals when installed recessed or concealed.

Model F1FR56 Pendent Sprinkler Components and Dimensions — Figure 2



Shown with Optional S-1 Water Shield (Ordered Separately)

Note: Please refer to Figure 8 for recessed and concealed installation.

Model F1FR56 Horizontal Sidewall Sprinkler — SIN RA1435

Technical Specifications
- **Style:**
  - Horizontal Sidewall
  - Recessed Horizontal Sidewall
- **Threads:** 1/2" NPT or ISO 7-R1/2
- **Nominal K-Factor:** 5.6 (80 metric)
- **Max. Working Pressure:**
  - 175 psi (12 bar)
  - 250 psi (17 bar) (cULus only)

Material Specifications
- **Thermal Sensor:** 3 mm Glass Bulb
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy
- **Sealing Washer:** Nickel with PTFE
- **Load Screw:** Copper Alloy
- **Deflector:** Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings [1]
- 135°F (57°C)
- 155°F (68°C)
- 175°F (79°C)
- 200°F (93°C)
- 286°F (141°C)

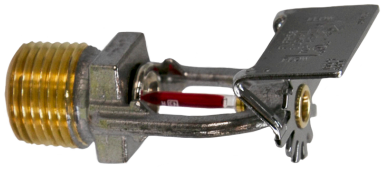
Recessed Escutcheons[2]
- Model F1 (cULus)
- Model F2 (cULus, FM)
- Model FP (cULus)

Guards & Shields (New Frames)[3]
- F-4 Guard (FM)
- F-7 Guard (cULus)

Guards & Shields (Legacy Frames)[3]
- C1 Guard (FM)
- D1 Guard (cULus)

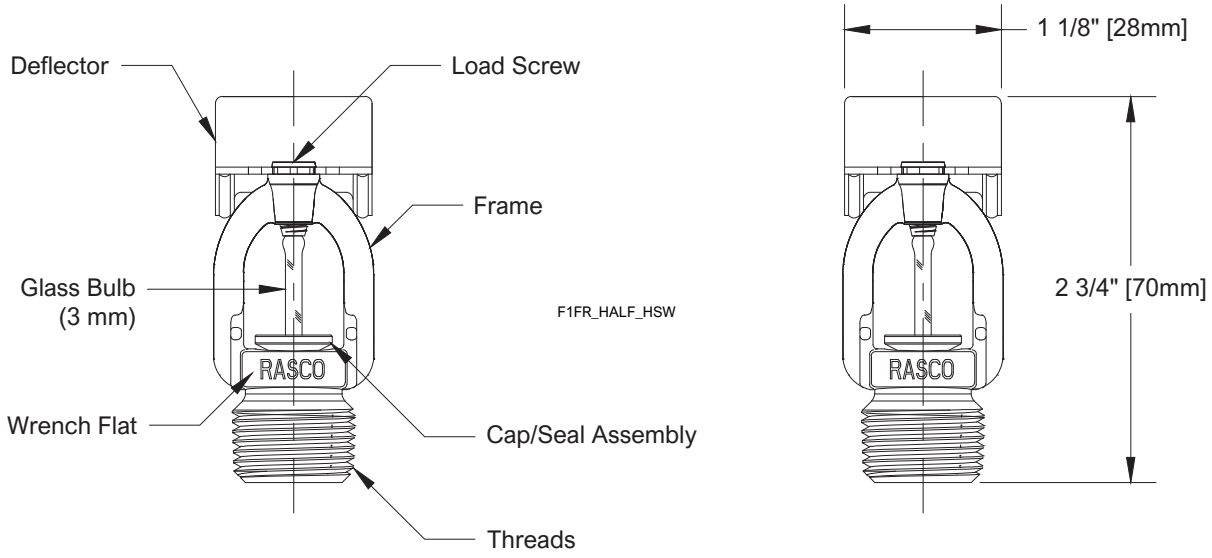
Sprinkler Wrenches
- Model W2 (non-recessed)
- Model W4 (recessed)
- Model J (New frame with guard installed)
- Model JD (Legacy frame with guard installed)

Listings and Approvals
- cULus Listed[4]
- FM Approved[5]



Notes:
1. 286°F (141°C) temperature rated sprinkler not listed for recessed use.
2. FM approved recessed installation when used with Model F2 escutcheon ONLY.
3. Not suitable for recessed horizontal sidewall installations.
4. cULus Listed for Light and Ordinary Hazard when installed exposed or surface mounted. Listed for Light Hazard ONLY when installed recessed.
5. FM Approved for Light Hazard ONLY.

Model F1FR56 Horizontal Sidewall Sprinkler Components and Dimensions — **Figure 3**



Note: Please refer to Figure 9 for recessed installation.

Model F1FR56 Vertical Sidewall Sprinkler — SIN RA1485

Technical Specifications
Style:
Upright Vertical Sidewall
Pendent Vertical Sidewall
Threads: 1/2" NPT or ISO 7-R1/2
Nominal K-Factor: 5.6 (80 metric)
Max. Working Pressure: 175 psi (12 bar)

Material Specifications
Thermal Sensor: 3 mm Glass Bulb
Sprinkler Frame: Brass Alloy
Cap: Bronze Alloy
Sealing Washer: Nickel with PTFE
Load Screw: Copper Alloy
Deflector: Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings
135°F (57°C)
155°F (68°C)
175°F (79°C)
200°F (93°C)
286°F (141°C)

Guards & Shields (New Frames)
F-2 Guard (FM)

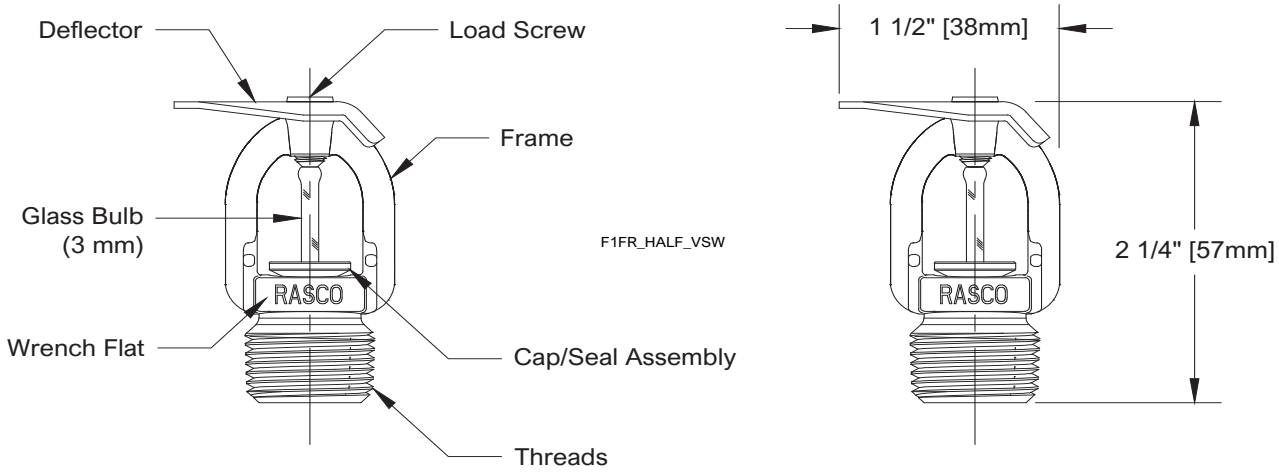
Guards & Shields (Legacy Frames)
C1 Guard (FM)

Sprinkler Wrenches
Model W2
Model J (New frame with guard installed)
Model JD (Legacy frame with guard installed)

Listings and Approvals[1]
cULus Listed
FM Approved
LPCB[2]
UKCA: 0832-UKCA-CPR-S5045

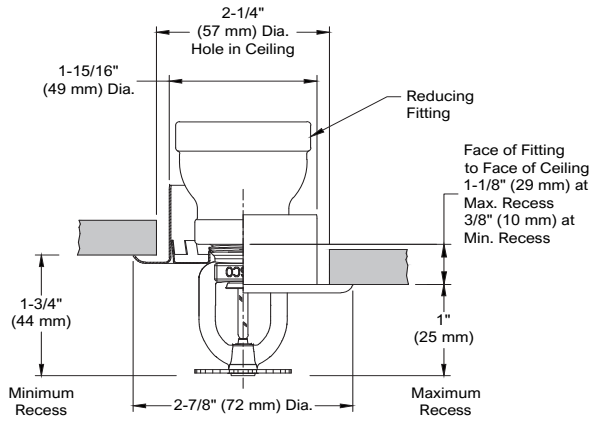
Notes:
1. Listed and approved for Light Hazard ONLY.
2. LPCB approved for use in pendent position ONLY.

Model F1FR56 Vertical Sprinkler Components and Dimensions — **Figure 4**

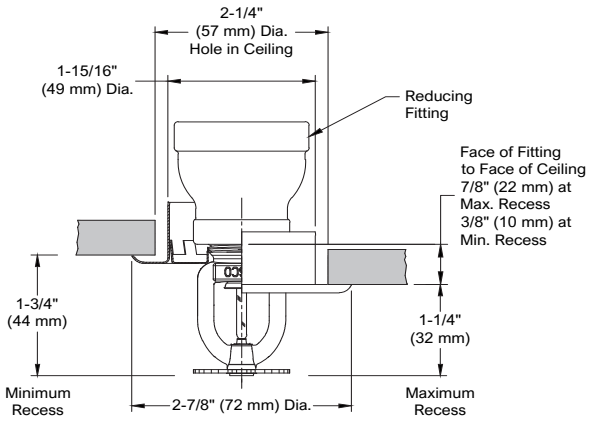


Recessed and Concealed Installation: Pendent Sprinklers

Figure 5

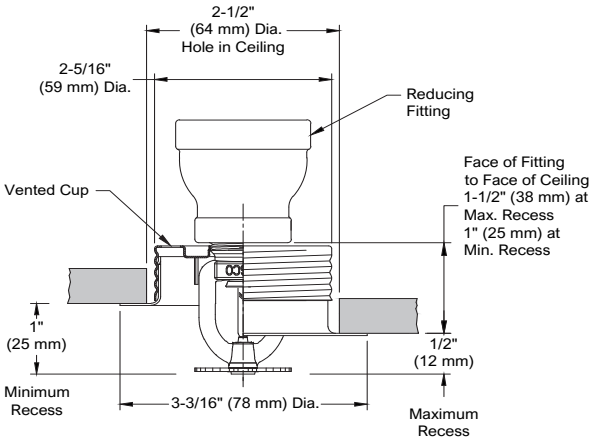


Models F1 & F1FR Pendent Sprinkler
with Model F1 Recessed Escutcheon
3/4" (19mm) Nominal Adjustment



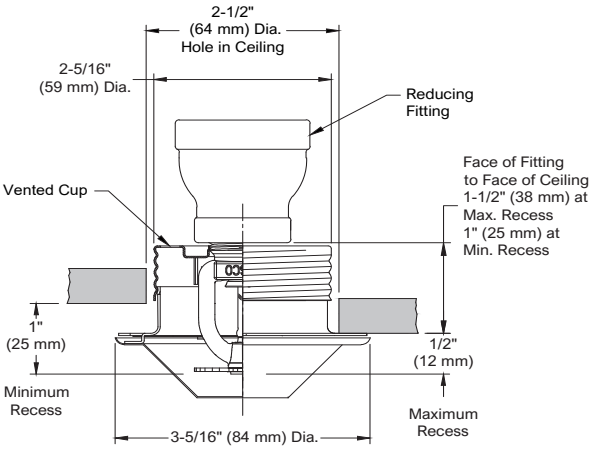
Models F1 & F1FR Pendent Sprinkler
with Model F2 Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

F1_REC_PEND_CCP



Models F1 & F1FR Pendent Sprinkler
with Model FP Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

Note: Model FP recessed assemblies may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings in the Model FP cup are unobstructed following installation.



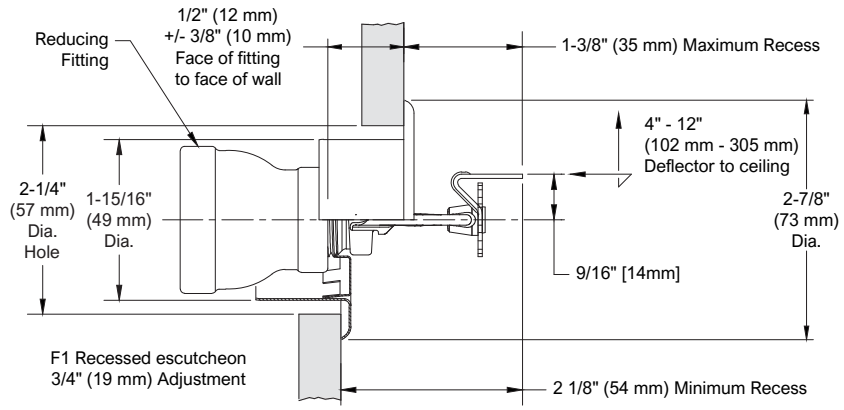
Model F1FR56 CCP Conical Concealed Sprinkler
1/2" (13mm) Nominal Adjustment
(Nominal Cover Plate Projection is 1" (25 mm))

Note: Model CCP concealed assemblies may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings in the Model CCP cup are unobstructed following installation.

F1 Escutcheon
(F2 Similar)

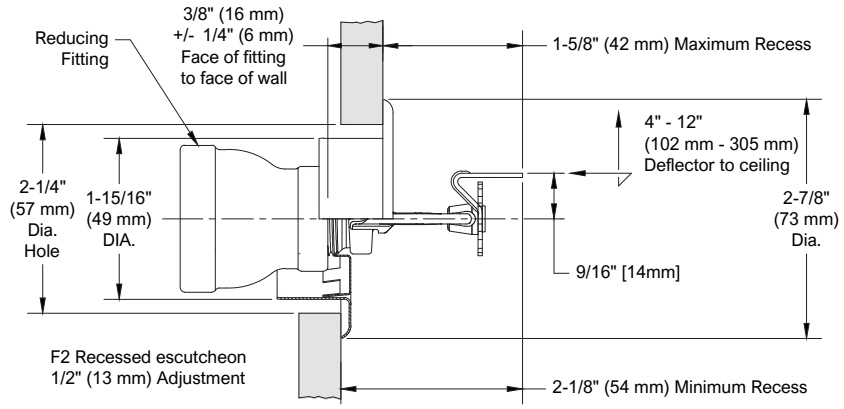
FP Escutcheon

CCP Cover Plate

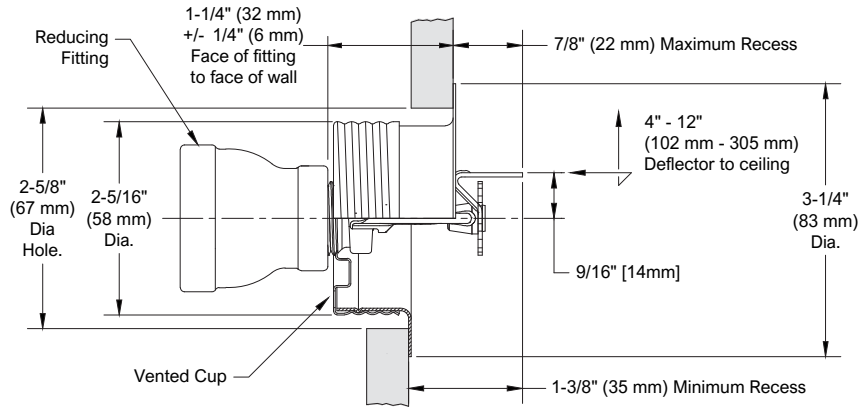


Model F1FR Horizontal Sidewall Sprinkler
with Model F1 Recessed Escutcheon
3/4" (19mm) Nominal Adjustment

F1FR_REC_HSW



Model F1FR Horizontal Sidewall Sprinkler
with Model F2 Recessed Escutcheon
1/2" (13mm) Nominal Adjustment



Model F1FR Horizontal Sidewall Sprinkler
with Model FP Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

Note: Model FP recessed assemblies may not be used where the pressure in the space behind the sprinkler is positive with respect to the space in the protected area. Ensure that the openings in the Model FP cup are unobstructed following installation.

Wrenches

Model W2 (upright, pendent)

Model J (New frame with guard installed)
Model JD (Legacy frame with guard installed, similar but with zinc finish)

Model W4
(recessed, concealed pendent)

Finishes[1]

Table B

Standard Finishes			Special Application Finishes		
Sprinkler	**F1, F2 and FP[2] Escutcheons**	**CCP Cover Plate[2]**	**Sprinkler**	**F1, F2 and FP[2] Escutcheons**	**CCP Cover Plate[2]**
Bronze	Brass	Chrome	Electroless Nickel PTFE[3][4]	Bright Brass	Bright Brass
Chrome	Chrome	White Paint	Bright Brass[5]	Satin Chrome	Satin Chrome
White Polyester[3]	White Polyester		Satin Chrome	Custom Color Polyester	Custom Color Paint
			Custom Color Polyester[3]		

Notes:
1. Paint or any other coating applied over the factory finish will void all approvals and warranties.
2. Model FP escutcheons and Model CCP sprinklers utilize a galvanized steel cup with a finished trim ring or cover plate.
3. cULus Listed as corrosion resistant.
4. FM Approved as corrosion resistant.
5. For 200°F (93°C) maximum temperature rated sprinklers only.

Installation

Model F1FR Series sprinklers must be installed in accordance with NFPA13 and the requirements of all applicable authorities having jurisdiction. Model F1FR Series sprinklers must be installed with the Reliable sprinkler installation wrench identified in this Bulletin. Any other wrench may damage the sprinkler. The Models W2 and W4 wrenches have two sets of jaws. Use the smallest set of jaws that fit on the wrench flats of the sprinkler. A leak tight sprinkler joint can be obtained with a torque of 8 to 18 lb-ft (11 to 24 N·m). Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

Glass bulb sprinklers have orange bulb protectors or protective caps to minimize bulb damage during shipping, handling and installation. Reliable sprinkler installation wrenches are designed to install sprinklers with bulb protectors in place. Remove the bulb protector at the time when the sprinkler system is placed in service for fire protection. Removal of the bulb protector before this time may leave the bulb vulnerable to damage. Remove bulb protectors by undoing the clasp by hand. Do not use tools to remove bulb protectors.

Maintenance

Reliable Model F1FR series sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any Authorities Having Jurisdiction.

Prior to installation, sprinklers should remain in the original cartons and packaging until used. This will minimize the potential for damage to sprinklers that could cause improper operation or non-operation.

Do not clean sprinklers with soap and water, ammonia liquid or any other cleaning fluids. Remove dust by gentle vacuuming without touching the sprinkler.

Replace any sprinkler which has been painted (other than factory applied). A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Failure to properly maintain sprinklers may result in inadvertent operation or non-operation during a fire event.

Guarantee

For the guarantee, terms, and conditions, visit www.reliablesprinkler.com.

Ordering Information

Specify the following when ordering:

Model
- F1FR56

Deflector/Orientation
- Upright
- Intermediate Upright
- Pendent
- CCP Concealed Pendent
- Horizontal Sidewall
- Vertical Sidewall

Temperature Rating
- See sprinkler technical specifications

Sprinkler Finish
- See Table B

Recessed Escutcheon[1][2]
- F1
- F2
- FP

Escutcheon Finish
- See Table B

CCP Cover Plate Temperature Rating
- 135°F (57°C) [For use with 135°F (57°C) and 155°F (68°C) sprinklers.]
- 165°F (74°C) [For use with 175°F (79°C) and 200°F (93°C) sprinklers.]

CCP Cover Plate Finish
- See Table B

Sprinkler Wrench
- Model W2
- Model W4 (recessed, concealed)
- Model J (New frame with guard installed)
- Model JD (Legacy frame with guard installed)

Notes:
1. 286°F (141°C) sprinklers are not listed to be used recessed or concealed.
2. For FM, recessed sprinklers must use the Model F2 escutcheon.

P/N 9999970623

PIPE

SCHEDULE 10 & 40

Always ready to protect your most valuable assets.

As the leading supplier of steel sprinkler pipe, we understand that there are no second chances in fire suppression. You need products of enduring quality and exceptional strength–plus reliable service. You need Bull Moose.

Bull Moose Fire Sprinkler Pipe Product Information

	Nominal Pipe Size (Inches)	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"
SCHEDULE 10	O.D. (in)	1.315	1.660	1.900	2.375	2.875	3.500	4.500	6.625	8.625
	I.D. (in)	1.097	1.442	1.682	2.157	2.635	3.260	4.260	6.357	8.249
	Empty Weight (lb/ft)	1.410	1.810	2.090	2.640	3.530	4.340	5.620	9.290	16.940
	Water Filled Weight (lb/ft)	1.820	2.518	3.053	4.223	5.893	7.957	11.796	23.038	40.086
	C.R.R.	15.27	9.91	7.76	6.27	4.92	3.54	2.50	1.158	1.805
	Pieces per Lift	91	61	61	37	30	19	19	10	7
	Lift Weight (lbs) 21' lengths	2,695	2,319	2,677	2,051	2,224	1,732	2,242	1,951	2,490
	Lift Weight (lbs) 24' lengths	3,079	2,650	3,060	2,344	2,542	1,979	2,563	2,230	2,848
	Lift Weight (lbs) 25' lengths	3,208	2,760	3,187	2,442	2,648	2,062	2,670		

	NPS (In.)	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
SCHEDULE 40		1.315	1.660	1.900	2.375	2.875	3.500	4.500
		1.049	1.380	1.610	2.067	2.469	3.068	4.026
		1.680	2.270	2.720	3.660	5.800	7.580	10.800
		2.055	2.918	3.602	5.114	7.875	10.783	16.316
		1.00	1.00	1.00	1.00	1.00	1.00	1.00
		70	51	44	30	30	19	19
		2,470	2,431	2,513	2,306	3,654	3,024	4,309
		2,822	2,778	2,872	2,635	4,176	3,456	4,925
		2,940	2,894	2,992	2,745	4,350	3,601	5,130

SCHEDULE 10 & 40 ADVANTAGES:

- UL listed (US & Canada) and FM approved
- ASTM A135 and A795 Type E, Grade A Certified
- Complies with NFPA-13, 13R and 14
- Industry-leading hydraulic characteristics
- CRR of 1.0 and greater
- All pipe NDT weld tested

OTHER BENEFITS/SERVICES:

- We have the most stocking locations in the industry, for best delivery and availability
- Plain end or roll groove
- Eddy Guard II™ bacterial-resistant internal coating
- Custom length options
- Hot dipped galvanization
- Reddi-Pipe® red or black pipe eliminates field painting
- Compatible for use in wet, dry, preaction and deluge sprinkler systems
- The only maker with EPDs (to help earn LEED points).

Exclusive maker of Reddi-Pipe®
RED OR BLACK PAINTED PIPE.

CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

c UL us LISTED

FM APPROVED

NFPA

AFSA American Fire Sprinkler Association

NFSA The Voice of the Fire Sprinkler Industry

BULL MOOSE TUBE

800.325.4467
sales@BullMooseIndustries.com
BullMooseTube.com

HANGER MATERIAL

Threaded Rods

Low Carbon Steel Threaded Rod

The most economical and most common form of Threaded Rod. Typically used by the plumbing and contracting trades. Used in maintenance departments in various applications including hanging, mounting, bracing, supporting, and fastening applications.

- Low carbon steel according to ASTM A307, Grade A requirements
- Conforms to ASME B18.31.3
- Class 1A rolled threads
- Zinc Plated according to Fe/Zn 3AT Per ASTM F1941
- Hot Dip Galvanized according to ASTM A153 or F2329
- 60,000 psi Min. Tensile Strength

Thread - Coarse																	
		1 ft		2 ft		3 ft			6 ft			10 ft			12 ft		
		Plain	Zinc	Plain	Zinc	Plain	Zinc	Hot Dip Galvanized	Plain	Zinc	Hot Dip Galvanized	Plain	Zinc	Hot Dip Galvanized	Plain	Zinc	Hot Dip Galvanized
Diameter	Thread Size	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
#6	32	-	-	-	-	47002	47052	-	47102	47152	-	-	-	-	-	-	-
#8	32	-	-	-	-	47003	47053	-	47103	47153	-	47136	47186	-	-	-	-
#10	24	-	-	-	-	47004	47054	-	47104	47154	-	47137	47187	-	-	-	-
#12	24	-	-	-	-	47006	47056	-	-	47156	-	-	-	-	-	-	-
1/4"	20	0156376	0156317	0156377	0156318	47007	47057	-	47107	47157	-	47140	47190	-	47207	47257	-
5/16"	18	0156378	0156319	0156379	0156320	47009	47059	-	47109	47159	-	47141	47191	-	47209	47259	-
3/8"	16	0156380	0156321	0156381	0156322	47011	47061	47602	47111	47161	47618	47142	47192	47634	47211	47261	47650
7/16"	14	0156382	0156323	0156383	0156324	47013	47063	0156404	47113	47163	-	47143	47193	-	47213	47263	-
1/2"	13	0156384	0156325	0156385	0156326	47015	47065	47604	47115	47165	47620	47144	47194	47636	47215	47265	47652
9/16"	12	0156386	0156327	0156387	0156328	47017	47067	-	47117	47167	-	47145	47195	-	47217	47267	-
5/8"	11	0156388	0156329	0156389	0156330	47019	47069	47606	47119	47169	47622	47146	47196	47638	47219	47269	47654
3/4"	10	0156390	0156331	0156391	0156332	47021	47071	47607	47121	47171	47623	47147	47197	47639	47221	47271	47655
7/8"	9	0156392	0156333	0156393	0156334	47023	47073	0156408	47123	47173	47624	47148	47198	47640	47223	47273	47656
1"	8	0156394	0156335	0156395	0156336	47025	47075	47609	47125	47175	47625	47149	47199	47641	47225	47275	47657
1-1/8"	7	-	-	-	-	47027	47077	-	47127	47177	47626	47150	47200	47642	47227	47277	47658
1-1/4"	7	-	-	-	-	47028	47078	47611	47128	47178	47627	47151	47201	47643	47228	47278	47659
1-3/8"	6	-	-	-	-	47029	47079	-	47129	47179	-	47233	47237	47644	47229	47279	47660
1-1/2"	6	-	-	-	-	47030	47080	-	47130	47180	47629	47234	47238	47645	47230	47280	47661
1-3/4"	5	-	-	-	-	47031	47081	-	47131	47181	47630	47235	47239	47646	47231	47281	47662
2"	4.5	-	-	-	-	47032	47082	-	47132	47182	-	47236	47240	47647	47232	47282	47663

Thread - Fine							
		3 ft		6 ft		12 ft	
		Plain	Zinc	Plain	Zinc	Plain	Zinc
Diameter	Thread Size	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
#10	32	47005	47055	47105	47155	-	-
1/4"	28	47008	47058	47108	47158	47208	47258
5/16"	24	47010	47060	47110	47160	47210	47260
3/8"	24	47012	47062	47112	47162	47212	47262
7/16"	20	47014	47064	47114	47164	47214	47264
1/2"	20	47016	47066	47116	47166	47216	47266
9/16"	18	47018	47068	47118	47168	-	47268
5/8"	18	47020	47070	47120	47170	47220	47270
3/4"	16	47022	47072	47122	47172	47222	47272
7/8"	14	47024	47074	47124	47174	47224	47274
1"	14	47026	47076	47126	47176	47226	47276
1-1/8"	12	47033	47085	47133	47183	47094	-
1-1/4"	12	47034	47086	47134	47184	47095	47098
1-1/2"	12	47035	47087	47135	47185	47096	-

Left Hand Low Carbon Steel Threaded Rod

The most economical and most common form of Threaded Rod. Typically used by the plumbing and contracting trades. Used in maintenance departments in various applications; left hand threading. Plain Finish, or bare metal finish which may contain a light coating of oil.

- 6 foot lengths

Thread - Left Hand - Coarse		
		Plain
Diameter	Thread Size	Part No.
1/4"	20	47302
5/16"	18	47303
3/8"	16	47304
1/2"	13	47306
5/8"	11	47308
3/4"	10	47309
7/8"	9	47310
1"	8	47311
1-1/8"	7	47312
1-1/4"	7	47313
1-1/2"	6	47315
2"	4.5	47318

Metric Threaded Rod

- Made from heat treated Class 8.8 steel.

Thread - Coarse				
		Class 4.6		Class 8.8
		Plain	Zinc	Plain
Diameter	Thread Size	Part No.	Part No.	Part No.
M2	0.4	-	0162065	-
M3	0.5	-	0162068	-
M4	0.7	47556	0162070	-
M5	0.8	47570	0162071	-
M6	1.0	47571	0162072	47870
M8	1.25	47572	0162073	47872
M10	1.5	47573	0162075	47873
M12	1.75	47574	0162078	47874
M14	2.0	47575	0162081	47875
M16	2.0	47576	0162083	47876
M18	2.5	47577	0162085	47877
M20	2.5	47578	0162086	47878
M22	2.5	47579	-	47879
M24	3.0	47580	0162088	47880

Thread - Coarse				
		Class 4.6		Class 8.8
		Plain	Zinc	Plain
Diameter	Thread Size	Part No.	Part No.	Part No.
M27	3.0	47581	0162089	47881
M30	3.5	47582	0162090	47882
M33	3.5	47733	-	47883
M36	4.0	47583	-	47884
M39	4.0	47734	-	47885
M42	4.5	47735	-	47886
M48	5.0	47737	-	-

Thread - Fine		
		Class 4.6
		Zinc
Diameter	Thread Size	Part No.
M8	1.0	0162074
M10	1.0	0162077
M10	1.25	0162076
M12	1.25	0162080
M12	1.5	0162079
M14	1.5	0162082
M16	1.5	0162084

Fig. 69 (Formerly Afcon Fig. 300) Adjustable Swivel Ring, Tapped Per NFPA Standards

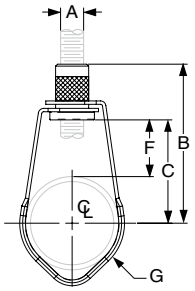
Size Range: 1/2" through 8"
Material: Carbon steel
Finish: Strap is Pre-Galvanized Zinc Material. Nut is Zinc Plated.
Service: Recommended for suspension of non-insulated **stationary** pipe line.
Maximum Temperature: 450° F
Approvals: Complies with Federal Specification A-A-1192A (Type 10), *WW-H-171-E (Type 10)*, and ANSI/MSS SP-58 (Type 10). UL Listed and FM Approved (Sizes 3/4" - 8").
Features:

- 1/2" - 2" sizes designed for use with steel and CPVC piping and manufactured with FBC System Compatible oil.
- 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.

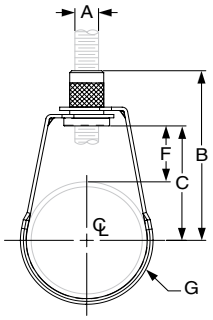
Ordering: Specify size, figure number and name.
Non-captured nut also available upon request.

1/2" through 2" Size
Rounded Edge Design

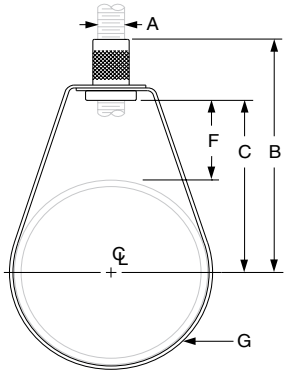
c UL us LISTED FM APPROVED



1/2" through 1" pipe



1 1/4" through 2" pipe



2 1/2" through 8" pipe

2 1/2" through 8" Size

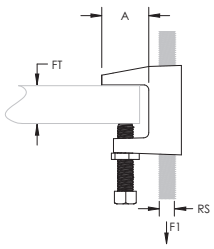
FIG. 69: DIMENSIONS (IN) • LOADS (LBS) • WEIGHT (LBS)

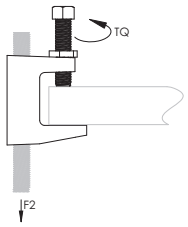
Pipe Size	Max Load	Weight	Rod Size A	B	C	F	G Width
1/2	300	0.10	3/8	2 7/8	2	1 9/16	5/8
3/4		0.10		2 3/4	1 7/8	1 5/16	
1		0.10		2 9/16	1 11/16	1	
1 1/4		0.10		2 5/8	1 3/4	7/8	
1 1/2		0.10		2 3/4	1 7/8		
2		0.11		3 1/4	2 3/8	1 1/8	
2 1/2	525	0.20		4	2 3/4	1 5/16	3/4
3		0.20		3 13/16	2 15/16	1 3/16	
4	650	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 9/16	7 9/16	3 1/4	

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

300 Universal Beam Clamp

- Conforms with Federal Specification WW-H-171 (Type 23), Manufacturers Standardization Society ANSI®/MSS-SP-58 (Type 19 and 23)





Material: Steel

Part Number	Rod Size RS	Flange Thickness FT	A	Torque TQ	Static Load 1 F1	Static Load 2 F2	Certifications	Standard Packaging Quantity
Finish: Plain								
3000037PL	3/8"	13/16" Max	1 1/8"	5 ft lb	500 lb	250 lb	cULus, FM	100 pc
3000050PL	1/2"	13/16" Max	1 1/8"	8 ft lb	950 lb	760 lb	cULus, FM	50 pc
3000062PL	5/8"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000075PL	3/4"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000087PL	7/8"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
Finish: Electrogalvanized								
3000037EG	3/8"	13/16" Max	1 1/8"	5 ft lb	500 lb	250 lb	cULus, FM	100 pc
3000050EG	1/2"	13/16" Max	1 1/8"	8 ft lb	950 lb	760 lb	cULus, FM	50 pc
3000062EG	5/8"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000075EG	3/4"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000087EG	7/8"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc

Setscrew must be tightened and torqued onto the sloped side of the I-beam.

Recognizing that torque wrenches are generally not used or available on many job sites, the setscrew should be tightened so it contacts the I-beam and then an additional 1/4 to 1/2 turn added.

FITTINGS

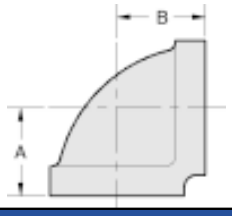
C.I. THREADED FITTINGS

S.P FITTINGS
A Division of Star Pipe Products

LISTED LISTED APPROVED

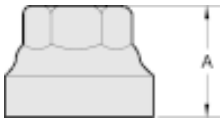
For fire protection services request submittal GRS 1.3

CAST IRON THREADED FITTINGS ARE UL, ULC LISTED AND FACTORY MUTUAL APPROVED FOR 300 PSI SERVICE. GRAY IRON PER ASTM A126 CLASS B. DIMENSIONS CONFORM TO ANSI B16.4 CLASS 125 EXCEPT PLUGS CONFORM TO ASME B16.14. THREADS ARE NPT PER ANSI/ASME B1.20.1.



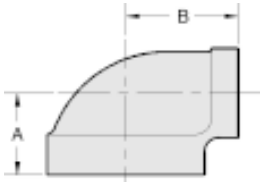
CAST IRON 90 DEGREE ELBOW

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS A	DIMENSIONS B	WEIGHT EACH PIECE
1	CB90033	300	1.50	1.50	0.95
1 1/4	CB90044	300	1.75	1.75	1.34
1 1/2	CB90055	300	1.94	1.94	1.80
2	CB90066	300	2.25	2.25	2.90
2 1/2	CB90077	300	2.70	2.70	4.75



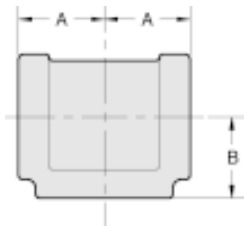
CAST IRON RED. COUPLING

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSION A	WEIGHT EACH PIECE
1X1/2	CRC031	300	1.70	0.62
1X3/4	CRC032	300	1.70	0.80



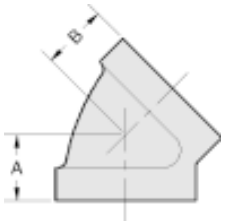
CAST IRON RED. 90 DEG. ELBOW

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS A	DIMENSIONS B	WEIGHT EACH PIECE
1X1/2	CB90031	300	1.26	1.36	0.64
1X3/4	CB90032	300	1.37	1.45	0.87
1 1/4X1/2	CB90041	300	1.34	1.53	0.96
1 1/4X3/4	CB90042	300	1.45	1.62	1.13
1 1/4X1	CB90043	300	1.58	1.67	1.16
1 1/2x1 1/2	CB90051	300	1.41	1.66	1.17
1 1/2x3/4	CB90052	300	1.52	1.75	1.28
1 1/2X1	CB90053	300	1.65	1.80	1.51
1 1/2X1 1/4	CB90054	300	1.82	1.88	1.62
2X1/2	CB90061	300	1.49	1.88	2.00
2X3/4	CB90062	300	1.60	1.97	2.05
2X1	CB90063	300	1.73	2.02	2.10
2X1 1/4	CB90064	300	1.90	2.10	2.30
2X1 1/2	CB90065	300	2.02	2.16	2.60



CAST IRON STRAIGHT TEE

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS A	DIMENSIONS B	WEIGHT EACH PIECE
1	CT333	300	1.50	1.50	1.21
1 1/4	CT444	300	1.75	1.75	1.87
1 1/2	CT555	300	1.94	1.94	2.51
2	CT666	300	2.25	2.25	3.96
2 1/2	CT777	300	2.70	2.70	6.45



CAST IRON 45 DEGREE ELBOW

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS A	DIMENSIONS B	WEIGHT EACH PIECE
1	CB45033	300	1.12	1.12	0.84
1 1/4	CB45044	300	1.29	1.29	1.40
1 1/2	CB45055	300	1.43	1.43	1.80
2	CB45066	300	1.68	1.68	2.79

CAST IRON PLUGS

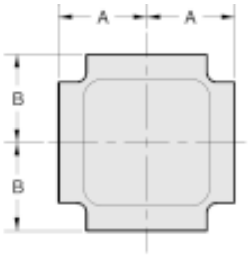
NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSION A	WEIGHT EACH PIECE
1/2	CPL001	300	0.94	0.10
3/4	CPL002	300	1.07	0.17
1	CPL003	300	1.25	0.28
1 1/4	CPL004	300	1.36	0.44
1 1/2	CPL005	300	1.45	0.62
2	CPL006	300	1.56	0.91

C.I. THREADED FITTINGS

S.P FITTINGS
A Division of Star Pipe Products

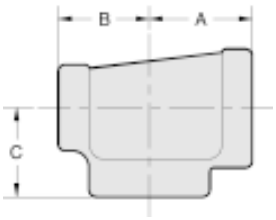
LISTED LISTED APPROVED

For fire protection services request submittal GRS 1.3



CAST IRON CROSS

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS		WEIGHT EACH PIECE
			A	B	
1	CX033	300	1.50	1.50	1.54
1 1/4	CX044	300	1.75	1.75	2.40
1 1/2	CX055	300	1.94	1.94	3.10
2	CX066	300	2.25	2.25	4.00
1 1/4X1	CX043	300	1.58	1.67	2.05
1 1/2X1	CX053	300	1.65	1.80	2.40
2X1	CX063	300	1.73	2.02	2.75



CAST IRON REDUCING TEE

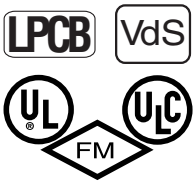
NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS			WEIGHT EACH PIECE
			A	B	C	
1X1X1/2	CT331	300	1.26	1.26	1.36	0.95
1X1X3/4	CT332	300	1.37	1.37	1.45	1.10
1X1/2X1	CT313	300	1.50	1.36	1.50	1.08
1X3/4X1	CT323	300	1.50	1.45	1.50	1.18
1X1X1 1/4	CT334	300	1.67	1.67	1.58	1.52
1X1X1 1/2	CT335	300	1.80	1.80	1.65	1.73
1 1/4X1X1/2	CT431	300	1.34	1.26	1.53	1.17
1 1/4X1X3/4	CT432	300	1.45	1.37	1.62	1.38
1 1/4X1X1	CT433	300	1.58	1.50	1.57	1.47
1 1/4X1X1 1/4	CT434	300	1.75	1.67	1.75	1.80
1 1/4X1X1 1/2	CT435	300	1.88	1.80	1.82	2.05
1 1/4X1 1/4X1/2	CT441	300	1.34	1.34	1.53	1.37
1 1/4X1 1/4X3/4	CT442	300	1.45	1.45	1.62	1.54
1 1/4X1 1/4X1	CT443	300	1.58	1.58	1.67	1.65
1 1/4X1 1/4X1 1/2	CT445	300	1.88	1.88	1.82	2.21
1 1/4X1 1/4X2	CT446	300	2.10	2.10	1.90	2.55
1 1/2X1X1/2	CT531	300	1.41	1.34	1.66	1.41
1 1/2X1X3/4	CT532	300	1.52	1.37	1.75	1.65
1 1/2X1X1	CT533	300	1.65	1.50	1.80	1.65
1 1/2X1X1 1/4	CT534	300	1.82	1.67	1.88	2.00
1 1/2X1X1 1/2	CT535	300	1.94	1.80	1.94	2.30
1 1/2X1 1/4X1/2	CT541	300	1.41	1.34	1.66	1.58
1 1/2X1 1/4X3/4	CT542	300	1.52	1.45	1.75	1.72
1 1/2X1 1/4X1	CT543	300	1.65	1.58	1.80	1.85
1 1/2x1 1/4x1 1/4	CT544	300	1.82	1.75	1.88	2.22
1 1/2x1 1/4x1 1/2	CT545	300	1.94	1.88	1.94	2.45
1 1/2X1 1/4X2	CT546	300	2.16	2.10	2.02	2.80
1 1/2X1 1/2X1/2	CT551	300	1.41	1.41	1.66	1.76
1 1/2X1 1/2X3/4	CT552	300	1.52	1.52	1.75	1.87
1 1/2X1 1/2X1	CT553	300	1.65	1.65	1.80	1.94
1 1/2X1 1/2X1 1/4	CT554	300	1.82	1.82	1.88	2.29
1 1/2X1 1/2X2	CT556	300	2.16	2.16	2.02	3.28
2X1X2	CT636	300	2.25	2.02	2.25	3.40
2X1 1/4X2	CT646	300	2.25	2.10	2.25	2.80
2X1 1/2X1/2	CT651	300	1.49	1.41	1.88	2.09
2X1 1/2X3/4	CT652	300	1.60	1.52	1.97	2.40
2X1 1/2X1	CT653	300	1.73	1.65	2.02	2.54
2X1 1/2X1 1/4	CT654	300	1.90	1.82	2.10	2.85
2X1 1/2X1 1/2	CT655	300	1.49	1.41	1.88	2.24
2X1 1/2X2	CT656	300	2.25	2.16	2.25	3.75
2X2X1/2	CT661	300	1.49	1.49	1.88	2.60
2X2X3/4	CT662	300	1.60	1.60	1.97	2.71
2X2X1	CT663	300	1.73	1.73	2.02	2.97
2X2X1 1/4	CT664	300	1.90	1.90	2.10	3.32
2X2X1 1/2	CT665	300	2.02	2.02	2.16	3.72
2x2x2 1/2	CT667	300	2.60	2.60	2.39	5.10

tyco / Fire & Building Products

Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500
www.tyco-fire.com

Grinnell Grooved Fire Protection Products
Grooved Fittings

General Description



See Fire Protection Submittal Sheet for Pressure Rating and Listing/Approval Information

The grooved fittings provide an economical and efficient method of changing direction, adding an outlet, reducing, or capping grooved piping systems. Grooved fittings are available in durable ductile iron or fabricated steel as indicated.

Note: Figure 510S and 519S fittings are special short radius fittings with smaller center to end dimensions than standard grooved fittings. Depending on the size and coupling used, there may be interferences at the bolt pads that require repositioning of the coupling orientation. The use of flange adapters is not recommended with Figures 510S and 519S fittings. Contact Tyco Fire Products for details.

WARNING

The Fittings described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. ***Failure to do so may impair the performance of this device.***

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.

Technical Data

Approvals:

UL, FM, ULC, VdS, and LPCB;

Note: See Fire Protection Submittal Sheet for exact Listing / Approval information.

Material:

Cast: Figures: 201, 210, 219, 250, 260, 501, 510, 519, 510DE, 501S, 510S and 519S - Ductile iron conforming to ASTM A-536, Grade 65-45-12

Fabricated Steel: Figures 391, 392, 393, 312, 313, 321, 327, 341 and 350 - Carbon Steel, (Sizes 1¼" - 6" are Schedule 40); (Sizes 8" - 12" are Schedule 30), conforming to ASTM A-53 Grade B

Protective Coatings:

- Non-lead orange paint
- Fire brigade red (optional) non-lead paint
- Hot dipped galvanized conforming to ASTM A-153

Ordering Procedure

When placing an order, indicate the full product name. Please specify the quantity, figure number, wall thickness, and size.

Grinnell Grooved Piping Products, valves, accessories and other products are available throughout the U.S., Canada, and internationally, through a network of distribution centers. You may write directly or call 215-362-0700 for the distributor nearest you.

Care and Maintenance

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in accordance with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. The installing contractor or product manufacturer should be contacted relative to any questions. Any impairment must be immediately corrected. It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service.

Limited Warranty

Products manufactured by Tyco Fire Products are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by Tyco Fire Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire Products or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association (NFPA), and/or the standards of any other Authorities Having Jurisdiction. Materials found by Tyco Fire Products to be defective shall be either repaired or replaced, at Tyco Fire Products' sole option. Tyco Fire Products neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. Tyco Fire Products shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

IN NO EVENT SHALL TYCO FIRE PRODUCTS BE LIABLE, IN CONTRACT, TORT, STRICT LIABILITY OR UNDER ANY OTHER LEGAL THEORY, FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LABOR CHARGES, REGARDLESS OF WHETHER TYCO FIRE PRODUCTS WAS INFORMED ABOUT THE POSSIBILITY OF SUCH DAMAGES, AND IN NO EVENT SHALL TYCO FIRE PRODUCTS' LIABILITY EXCEED AN AMOUNT EQUAL TO THE SALES PRICE.

THE FOREGOING WARRANTY IS MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Figures 201, 210, 219, and 260

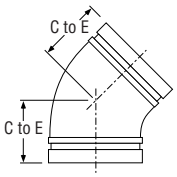


Figure 201

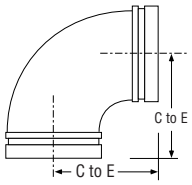


Figure 210

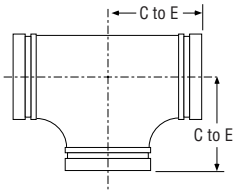


Figure 219

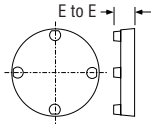


Figure 260

Friction Resistance* (Expressed as Equivalent Straight Pipe)				
Size Inches *mm*	Elbow 90° Feet *Meters*	Elbow 45° Feet *Meters*	Tee Branch Feet *Meters*	Tee Run Feet *Meters*
1¼ *42.4*	1.9 *0.6*	1.0 *0.3*	4.8 *1.5*	1.9 *0.6*
1½ *48.3*	2.3 *0.7*	1.2 *0.4*	5.8 *1.8*	2.3 *0.7*
2 *60.3*	3.2 *1.0*	1.6 *0.5*	8.0 *2.5*	3.2 *1.0*
2½ *73.0*	3.9 *1.2*	2.0 *0.6*	9.8 *3.0*	3.9 *1.2*
76.1mm	4.1 *1.2*	2.1 *0.6*	10.3 *3.1*	4.1 *1.2*
3 *88.9*	4.9 *1.5*	2.4 *0.7*	12.2 *3.7*	4.9 *1.5*
108.0mm	6.5 *2.0*	3.3 *1.0*	16.3 *5.0*	6.5 *2.0*
4 *114.3*	6.5 *2.0*	3.3 *1.0*	16.3 *5.0*	6.5 *2.0*
133.0mm	8.0 *2.4*	4.0 *1.2*	20.0 *6.1*	8.0 *2.4*
139.7mm	8.0 *2.4*	4.1 *1.3*	20.0 *6.1*	8.0 *2.4*
5 *141.3*	8.2 *2.5*	4.1 *1.3*	20.5 *6.3*	8.2 *2.5*
159.0mm	9.5 *2.9*	4.8 *1.4*	23.8 *7.2*	9.5 *2.9*
165.1mm	9.5 *2.9*	4.8 *1.4*	23.8 *7.2*	9.5 *2.9*
6 *168.3*	9.9 *3.0*	5.0 *1.5*	24.8 *7.6*	9.9 *3.0*
216.3mm	13.1 *4.0*	6.6 *2.0*	32.8 *10.0*	13.1 *4.0*
8 *219.1*	13.1 *4.0*	6.6 *2.0*	32.8 *10.0*	13.1 *4.0*
10 *273.0*	16.5 *5.0*	8.3 *2.5*	41.3 *12.6*	16.5 *5.0*
12 *323.4*	19.9 *6.1*	9.9 *3.0*	49.7 *15.1*	19.9 *6.1*

For reducing tees and branches, use the value that is corresponding to the branch size. Example: for 8" x 8" x 2" tee, the branch value 2" is 8.0 feet.

* Friction resistance for all elbows and tees except Figures 510S and 519S.

Nominal Size	Figure 201 45° Elbow C to E Inches *mm*	Figure 201 45° Elbow Appx. Wt. Lbs. *Kg.*	Figure 210 90° Elbow C to E Inches *mm*	Figure 210 90° Elbow Appx. Wt. Lbs. *Kg.*	Figure 219 Tee C to E Inches *mm*	Figure 219 Tee Appx. Wt. Lbs. *Kg.*	Figure 260‡ End Cap E to E Inches *mm*	Figure 260‡ End Cap Appx. Wt. Lbs. *Kg.*
1¼"	1.75 *44.5*	0.9 *0.4*	2.75 *69.9*	1.0 *0.5*	2.75 *69.9*	1.4 *0.6*	0.88 *22.4*	0.4 *0.2*
1½"	1.75 *44.5*	1.1 *0.5*	2.75 *69.9*	1.2 *0.5*	2.75 *69.9*	1.8 *0.8*	0.88 *22.4*	0.6 *0.3*
2"	2.00 *50.8*	1.8 *0.8*	3.25 *82.6*	2.0 *0.9*	3.25 *82.6*	2.7 *1.2*	0.88 *22.4*	0.9 *0.4*
2½"	2.25 *57.2*	2.2 *1.0*	3.75 *95.3*	3.0 *1.4*	3.75 *95.3*	5.8 *2.6*	0.88 *22.4*	0.9 *0.4*
76.1mm	2.25 *57.2*	2.2 *1.0*	3.75 *95.3*	3.0 *1.4*	3.75 *95.3*	5.8 *2.6*	0.94 *23.9*	1.1 *0.5*
3"	2.50 *63.5*	3.5 *1.6*	4.25 *108.0*	4.5 *2.0*	4.25 *108.0*	7.0 *3.2*	0.88 *22.4*	1.1 *0.5*
108.0mm	2.88 *73.0*	5.5 *2.5*	4.75 *120.7*	8.5 *3.9*	4.75 *120.7*	11.5 *5.2*	-	-
4"	3.00 *76.2*	5.2 *2.4*	5.00 *127.0*	8.5 *3.9*	5.00 *127.0*	11.8 *5.4*	1.00 *25.4*	2.6 *1.2*
133.0mm	3.25 *82.6*	7.7 *3.5*	5.25 *133.4*	11.3 *5.1*	5.25 *133.4*	10.6 *4.8*	-	-
139.7mm	3.25 *82.6*	7.7 *3.5*	5.50 *139.7*	11.3 *5.1*	5.50 *139.7*	15.3 *6.9*	0.92 *23.4*	4.7 *2.1*
5"	3.25 *82.6*	8.5 *3.9*	5.50 *139.7*	13.5 *6.1*	5.50 *139.7*	17.0 *7.7*	1.00 *25.4*	5.0 *2.3*
159.0mm	3.50 *88.9*	12.0 *5.4*	6.00 *152.4*	14.6 *6.6*	6.00 *152.4*	13.9 *6.3*	-	-
165.1mm	3.50 *88.9*	12.0 *5.4*	6.50 *165.1*	18.5 *8.4*	6.50 *165.1*	26.0 *11.8*	1.00 *25.4*	7.5 *3.4*
6"	3.50 *88.9*	12.0 *5.4*	6.50 *165.1*	18.5 *8.4*	6.50 *165.1*	26.0 *11.8*	1.00 *25.4*	7.5 *3.4*
216.3mm	4.25 *108.0*	23.0 *10.4*	7.75 *196.9*	36.5 *16.6*	7.75 *196.9*	45.0 *20.4*	-	-
8"	4.25 *108.0*	23.0 *10.4*	7.75 *196.9*	36.5 *16.6*	7.75 *196.9*	45.0 *20.4*	1.19 *30.2*	12.8 *5.8*
10"	4.75 *120.7*	31.0 *14.1*	9.00 *228.6*	60.0 *27.2*	9.00 *228.6*	72.1 *32.7*	1.25 *31.8*	20.0 *9.1*
12"	5.25 *133.4*	40.0 *18.1*	10.00 *254.0*	67.0 *30.4*	10.00 *254.0*	92.5 *42.0*	1.25 *31.8*	36.0 *16.3*

‡ - Available with tapped plugs, contact Tyco Fire & Building Products.

Figures 501, 510, 519 and 510DE

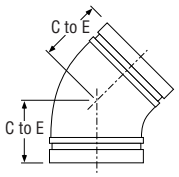


Figure 501

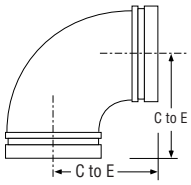


Figure 510

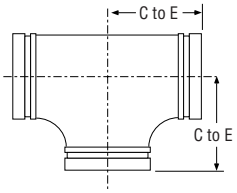


Figure 519

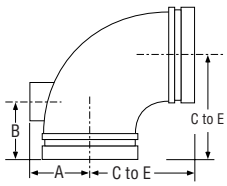


Figure 510DE

Nominal Size	Figure 501 45° Elbow C to E Inches *mm*	Figure 501 45° Elbow Appx. Wt. Lbs. *Kg.*	Figure 510 90° Elbow C to E Inches *mm*	Figure 510 90° Elbow Appx. Wt. Lbs. *Kg.*	Figure 519 Tee C to E Inches *mm*	Figure 519 Tee Appx. Wt. Lbs. *Kg.*	Figure 510DE 90° Drain Elbow C to E Inches *mm*	Figure 510DE 90° Drain Elbow A Inches *mm*	Figure 510DE 90° Drain Elbow B Inches *mm*	Figure 510DE 90° Drain Elbow Appx. Wt. Lbs. *Kg.*
1¼"	1.75 *44.5*	0.9 *0.4*	2.75 *69.9*	1.0 *0.5*	2.75 *69.9*	1.4 *0.6*	-	-	-	-
1½"	1.75 *44.5*	1.1 *0.5*	2.75 *69.9*	1.2 *0.5*	2.75 *69.9*	1.8 *0.8*	-	-	-	-
2"	2.00 *50.8*	1.8 *0.8*	3.25 *82.6*	2.0 *0.9*	3.25 *82.6*	2.7 *1.2*	-	-	-	-
2½"	2.25 *57.2*	2.2 *1.0*	3.75 *95.3*	3.0 *1.4*	3.75 *95.3*	5.8 *2.6*	3.75 *95.3*	2.00 *50.8*	2.75 *69.9*	2.7 *1.2*
3"	2.50 *63.5*	3.5 *1.6*	4.25 *108.0*	4.5 *2.0*	4.25 *108.0*	7.0 *3.2*	4.25 *108.0*	2.34 *59.4*	2.75 *69.9*	3.7 *1.7*
4"	3.00 *76.2*	5.2 *2.4*	5.00 *127.0*	8.5 *3.9*	5.00 *127.0*	11.8 *5.4*	5.00 *127.0*	2.85 *72.4*	2.75 *69.9*	7.0 *3.2*
5"	3.25 *82.6*	8.5 *3.9*	5.50 *139.7*	13.5 *6.1*	5.50 *139.7*	17.0 *7.7*	5.50 *139.7*	3.38 *85.9*	2.75 *69.9*	13.0 *5.9*
6"	3.50 *88.9*	12.0 *5.4*	6.50 *165.1*	18.5 *8.4*	6.50 *165.1*	26.0 *11.8*	6.50 *165.1*	3.92 *99.6*	2.75 *69.9*	13.4 *6.1*
8"	4.25 *108.0*	23.0 *10.4*	7.75 *196.9*	36.5 *16.6*	7.75 *196.9*	45.0 *20.4*	7.75 *196.9*	4.95 *125.7*	2.75 *69.9*	26.3 *11.9*

Figures 501S, 510S and 519S

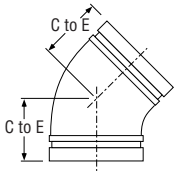


Figure 501S

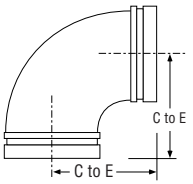


Figure 510S*

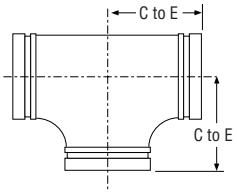


Figure 519S*

Friction Resistance 501S, 510S & 519S (Expressed as Equivalent Straight Pipe)				
Size Inches *mm*	Elbow 90° Feet *Meters*	Elbow 45° Feet *Meters*	Tee Branch Feet *Meters*	Tee Run Feet *Meters*
2 *60.3*	3.2 *1.0*	1.6 *0.5*	8.0 *2.5*	3.2 *1.0*
2½ *73.0*	3.9 *1.2*	2.0 *0.6*	9.8 *3.0*	3.9 *1.2*
76.1mm	4.1 *1.2*	2.1 *0.6*	10.3 *3.1*	4.1 *1.2*
3 *88.9*	4.9 *1.5*	2.4 *0.7*	12.2 *3.7*	4.9 *1.5*
4 *114.3*	6.5 *2.0*	3.3 *1.0*	16.3 *5.0*	6.5 *2.0*
139.7mm	8.0 *2.4*	4.1 *1.3*	20.0 *6.1*	8.0 *2.4*
5 *141.3*	8.2 *2.5*	4.1 *1.3*	20.5 *6.3*	8.2 *2.5*
165.1mm	9.5 *2.9*	4.8 *1.4*	23.8 *7.2*	9.5 *2.9*
6 *168.3*	9.9 *3.0*	5.0 *1.5*	24.8 *7.6*	9.9 *3.0*
8 *219.1*	13.1 *4.0*	6.6 *2.0*	32.8 *10.0*	13.1 *4.0*

Nominal Size	Figure 501S 45° Elbow C to E Inches *mm*	Figure 501S 45° Elbow Appx Wt. Lbs. *Kg.*	Figure 510S 90° Elbow C to E Inches *mm*	Figure 510S 90° Elbow Appx. Wt. Lbs. *Kg.*	Figure 519S Tee C to E Inches *mm*	Figure 519S Tee Appx. Wt. Lbs. *Kg.*
2"	2.00 *50.8*	1.8 *0.8*	2.75 *69.9*	1.5 *0.7*	2.75 *69.9*	2.1 *1.0*
2½"	2.25 *57.2*	2.2 *1.0*	3.00 *76.2*	2.2 *1.0*	3.00 *76.2*	3.0 *1.4*
76.1mm	2.25 *57.2*	2.2 *1.0*	3.00 *76.2*	2.3 *1.0*	3.00 *76.2*	3.1 *1.4*
3"	2.50 *63.5*	3.5 *1.6*	3.38 *85.9*	3.0 *1.3*	3.38 *85.9*	4.1 *1.9*
4"	3.00 *76.2*	5.2 *2.4*	4.00 *101.6*	5.6 *2.6*	4.00 *101.6*	7.7 *3.5*
139.7mm	3.25 *82.6*	7.7 *3.5*	4.88 *124.0*	8.6 *3.9*	4.88 *124.0*	12.0 *5.4*
5"	3.25 *82.6*	8.5 *3.9*	4.88 *124.0*	8.8 *3.9*	4.88 *124.0*	12.0 *5.4*
165.1mm	3.50 *88.9*	12.0 *5.4*	5.50 *139.7*	11.00 *5.0*	5.50 *139.7*	15.0 *6.8*
6"	3.50 *88.9*	12.0 *5.4*	5.50 *139.7*	11.2 *5.1*	5.50 *139.7*	15.2 *6.9*
8"	4.25 *108.0*	23.0 *10.4*	6.88 *174.8*	23.4 *10.6*	6.88 *174.8*	31.2 *14.2*

***Note: Figure 510S and 519S fittings are special short radius fittings with smaller center to end dimensions than standard grooved fittings. Depending on the size and coupling used, there may be interferences at the bolt pads which requires repositioning of the coupling orientation. The use of flange adapters is not recommended with Figures 510S and 519S fittings. Contact Tyco Fire Products for details.**

Figures 250 and 350

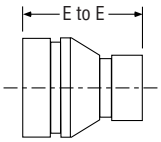


Figure 250
Cast

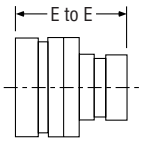


Figure 350
Fabricated
Sizes 3" to 6"

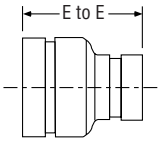


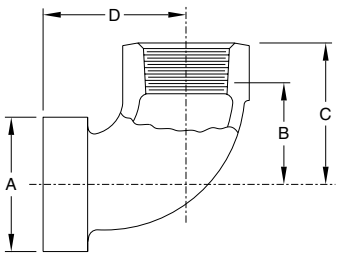
Figure 350
Fabricated
Sizes 8" to 12"

Figures 250 and 350 Concentric Reducer - Groove x Groove								
Nominal Size *Inches*	E to E Inches *mm*	Appx. Wt. Lbs. *Kg.*	Nominal Size *Inches*	E to E Inches *mm*	Appx. Wt. Lbs. *Kg.*	Nominal Size *Inches*	E to E Inches *mm*	Appx. Wt. Lbs. *Kg.*
*2 x 1¼	2.50 *63.5*	1.0 *0.5*	*139.7mm x 3	3.50 *88.9*	4.2 *1.9*	*6 x 5	4.00 *101.6*	5.8 *2.6*
*2 x 1½	2.50 *63.5*	1.3 *0.6*	*139.7mm x 4	3.50 *88.9*	4.4 *2.0*	8 x 2	5.00 *127.0*	12.2 *5.5*
*2½ x 2	2.50 *63.5*	1.2 *0.5*	5 x 1½	3.50 *88.9*	4.6 *2.1*	8 x 2½	5.00 *127.0*	12.1 *5.5*
*76.1mm x 1½	2.50 *63.5*	1.5 *0.7*	5 x 2	3.50 *88.9*	4.6 *2.1*	8 x 3	5.00 *127.0*	12.0 *5.5*
*76.1mm x 2	2.50 *63.5*	1.6 *0.8*	5 x 2½	3.50 *88.9*	4.5 *2.0*	8 x 4	5.00 *127.0*	11.9 *5.4*
3 x 1¼	2.50 *63.5*	1.3 *0.6*	5 x 3	3.50 *88.9*	4.4 *2.0*	8 x 5	5.00 *127.0*	11.3 *5.1*
3 x 1½	2.50 *63.5*	1.3 *0.6*	*5 x 4	3.50 *88.9*	4.5 *2.0*	8 x 6	5.00 *127.0*	10.8 *4.9*
*3 x 2	2.50 *63.5*	1.3 *0.6*	*165.1mm x 3	4.00 *101.6*	5.5 *2.5*	10 x 4	6.00 *152.4*	21.9 *10.0*
*3 x 2½	3.00 *76.2*	1.5 *0.7*	*165.1mm x 4	4.00 *101.6*	6.0 *2.7*	10 x 5	6.00 *152.4*	21.6 *9.8*
*3 x 76.1mm	3.00 *76.2*	2.0 *0.9*	*165.1mm x 139.7mm	4.00 *101.6*	5.6 *2.5*	10 x 6	6.00 *152.4*	21.1 *9.6*
4 x 1¼	3.00 *76.2*	2.2 *1.0*	*6 x 2	4.00 *101.6*	6.0 *2.7*	10 x 8	6.00 *152.4*	19.5 *8.9*
4 x 1½	3.00 *76.2*	2.3 *1.0*	6 x 2½	4.00 *101.6*	6.0 *2.7*	12 x 4	7.00 *177.8*	28.0 *12.7*
*4 x 2	3.00 *76.2*	2.3 *1.0*	*6 x 76.1mm	4.00 *101.6*	6.0 *2.7*	12 x 6	7.00 *177.8*	30.0 *13.6*
*4 x 2½	3.00 *76.2*	2.3 *1.0*	6 x 3	4.00 *101.6*	6.0 *2.7*	12 x 8	7.00 *177.8*	28.0 *12.7*
*4 x 76.1mm	3.00 *76.2*	3.2 *1.5*	*6 x 4	4.00 *101.6*	5.9 *2.7*	12 x 10	7.00 *177.8*	33.0 *15.0*
4 x 3	3.00 *76.2*	2.6 *1.2*	*6 x 139.7mm	4.00 *101.6*	6.3 *2.9*			

Note: Sizes marked with an asterisk (*) are only available in Figure 250 Cast.
Sizes without an asterisk are only available in Figure 350 Fabricated.

ADA CAP®

Patented



Pipe		Nominal Dimensions				Net Wt. Lbs. *Kg.*
		O.D.	Takeout	Center to End		
Size Inches	Outlet NPT* Inches	A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	
1½	½	1.900 *48.3*	1.25 *31.8*	1.75 *44.5*	1.89 *48.0*	0.77 *0.3*
	¾		1.25 *31.8*	1.75 *44.5*	1.89 *48.0*	0.77 *0.3*
	1		1.37 *34.8*	2.00 *50.8*	2.02 *51.3*	0.88 *0.4*
2	½	2.375 *60.3*	1.25 *31.8*	1.75 *44.5*	1.89 *48.0*	0.92 *0.4*
	¾		1.25 *31.8*	1.75 *44.5*	1.89 *48.0*	0.92 *0.4*
	1		1.37 *34.8*	2.00 *50.8*	2.02 *51.3*	1.06 *0.5*
2½	½	2.875 *73.0*	1.47 *37.3*	1.97 *50.0*	1.89 *48.0*	1.28 *0.6*
	¾		1.47 *37.3*	1.97 *50.0*	1.89 *48.0*	1.28 *0.6*
	1		1.37 *34.8*	2.00 *50.8*	2.02 *51.3*	1.50 *0.7*

* ISO-7 threaded outlets are available upon request.

Figures 391, 392, 393, 312 and 313

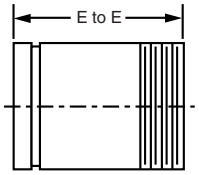


Figure 391

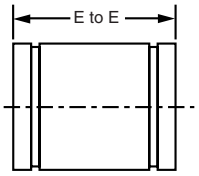


Figure 392

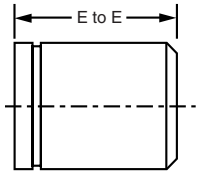


Figure 393

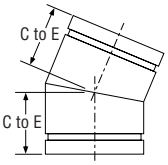


Figure 312

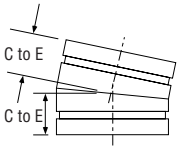


Figure 313

Nominal Size	Figures 391, 392 and 393 Adapter Nipples E to E Inches *mm*	Appx. Wt. Lbs. *Kg.*	Figure 312 22½° Elbow C to E Inches *mm*	Appx. Wt. Lbs. *Kg.*	Figure 313 11¼° Elbow C to E Inches *mm*	Appx. Wt. Lbs. *Kg.*
1¼"	4.00 *101.6*	0.8 *0.4*	1.75 *44.5*	0.4 *0.2*	1.38 *35.1*	0.4 *0.2*
1½"	4.00 *101.6*	0.9 *0.4*	1.75 *44.5*	0.5 *0.2*	1.38 *35.1*	0.5 *0.2*
2"	4.00 *101.6*	1.2 *0.5*	1.88 *47.8*	0.6 *0.3*	1.38 *35.1*	0.6 *0.3*
2½"	4.00 *101.6*	1.9 *0.9*	2.00 *50.8*	0.7 *0.3*	1.50 *38.1*	1.1 *0.5*
3"	4.00 *101.6*	2.5 *1.1*	2.25 *57.2*	1.4 *0.6*	1.50 *38.1*	1.2 *0.5*
4"	6.00 *152.4*	5.5 *2.5*	2.63 *66.8*	2.4 *1.1*	1.75 *44.5*	2.2 *1.0*
5"	6.00 *152.4*	7.4 *3.4*	2.88 *73.2*	4.1 *1.9*	2.00 *50.8*	3.3 *1.5*
6"	6.00 *152.4*	9.5 *4.3*	3.13 *79.5*	5.6 *2.5*	2.00 *50.8*	4.6 *2.1*
8"	6.00 *152.4*	14.2 *6.4*	3.88 *98.6*	11.1 *5.0*	2.00 *50.8*	8.7 *3.9*
10"	8.00 *203.2*	27.0 *12.2*	4.38 *11.3*	14.0 *6.4*	2.13 *54.1*	9.1 *4.1*
12"	8.00 *203.2*	33.0 *15.0*	4.88 *124.0*	22.0 *10.0*	2.25 *57.2*	16.7 *7.6*

Figures 327 and 341

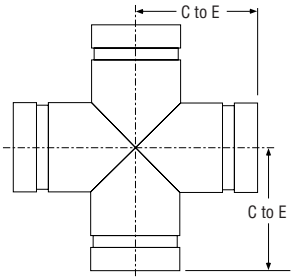


Figure 327

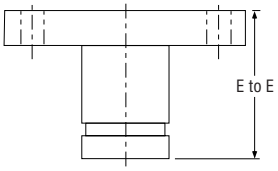


Figure 341

Nominal Size	Figure 327 Cross C to E nches *mm*	Appx. Wt. Lbs. *kg.*	Figure 341 150 lbs. Flange Adapter E to E Inches *mm*	Appx. Wt. Lbs. *kg.*
1¼"	2.75 *69.6*	2.0 *0.9*	4.00 *101.6*	2.8 *1.3*
1½"	2.75 *69.9*	2.2 *2.0*	4.00 *101.6*	3.2 *1.5*
2"	3.25 *82.6*	2.7 *1.2*	4.0 *101.6*	5.2 *2.4*
2½"	3.75 *95.3*	5.0 *2.3*	4.00 *101.6*	8.0 *3.6*
3"	4.25 *108.0*	7.1 *3.2*	4.00 *101.6*	10.2 *4.6*
4"	5.00 *127.0*	11.9 *5.4*	6.00 *152.4*	17.2 *7.8*
5"	5.50 *139.7*	17.1 *7.8*	6.00 *152.4*	21.4 *9.7*
6"	6.50 *165.1*	27.5 *12.5*	6.00 *152.4*	26.0 *11.8*
8"	7.75 *196.9*	47.0 *21.3*	6.00 *152.4*	38.4 *17.4*
10"	9.00 *228.6*	68.0 *30.8*	8.00 *203.2*	65.0 *29.5*
12"	10.00 *254.0*	107.0 *48.5*	8.00 *203.2*	91.0 *41.3*

Figure 321

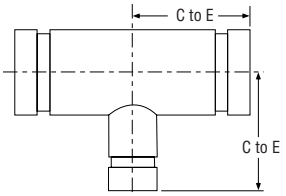


Figure 321

Figure 321 Reducing Tee					
Nominal Size Inches	C to E Inches *mm*	Appx. Wt. Lbs. *Kg.*	Nominal Size Inches	C to E Inches *mm*	Appx. Wt. Lbs. *Kg.*
1½ x 1½ x 1¼	3.25 *82.6*	2.0 *0.9*	6 x 6 x 4	6.50 *165.1*	26.6 *12.1*
2 x 2 x 1½	3.25 *82.6*	2.7 *1.2*	6 x 6 x 5	6.50 *165.1*	27.0 *12.2*
2½ x 2½ x 1¼	3.75 *95.3*	4.2 *1.9*	8 x 8 x 2	7.75 *196.9*	36.2 *16.4*
2½ x 2½ x 1½	3.75 *95.3*	4.2 *1.9*	8 x 8 x 3	7.75 *196.9*	36.5 *16.6*
2½ x 2½ x 2	3.75 *95.3*	4.3 *2.0*	8 x 8 x 4	7.75 *196.9*	36.6 *16.6*
3 x 3 x 1½	4.25 *108.0*	5.3 *2.4*	8 x 8 x 5	7.75 *196.9*	36.8 *16.7*
3 x 3 x 2	4.25 *108.0*	5.5 *2.5*	8 x 8 x 6	7.75 *196.9*	37.0 *16.8*
3 x 3 x 2½	4.25 *108.0*	5.8 *2.6*	10 x 10 x 2	9.00 *228.6*	57.1 *25.9*
4 x 4 x 1¼	5.00 *127.0*	9.8 *4.4*	10 x 10 x 3	9.00 *228.6*	57.4 *26.0*
4 x 4 x 1½	5.00 *127.0*	9.9 *4.5*	10 x 10 x 4	9.00 *228.6*	57.6 *26.1*
4 x 4 x 2	5.00 *127.0*	10.1 *4.6*	10 x 10 x 5	9.00 *228.6*	57.8 *26.2*
4 x 4 x 2½	5.00 *127.0*	10.3 *4.7*	10 x 10 x 6	9.00 *228.6*	58.0 *26.3*
4 x 4 x 3	5.00 *127.0*	10.5 *4.8*	10 x 10 x 8	9.00 *228.6*	58.4 *26.5*
5 x 5 x 2	5.50 *139.7*	14.5 *6.6*	12 x 12 x 3	10.00 *254.0*	80.2 *36.4*
5 x 5 x 2½	5.50 *139.7*	14.8 *6.7*	12 x 12 x 4	10.00 *254.0*	80.5 *36.5*
5 x 5 x 3	5.50 *139.7*	15.2 *6.9*	12 x 12 x 5	10.00 *254.0*	80.7 *36.6*
5 x 5 x 4	5.50 *139.7*	15.8 *7.2*	12 x 12 x 6	10.00 *254.0*	80.9 *36.7*
6 x 6 x 2	6.50 *165.1*	26.5 *11.9*	12 x 12 x 8	10.00 *254.0*	91.4 *41.5*
6 x 6 x 2½	6.50 *165.1*	26.5 *12.0*	12 x 12 x 10	10.00 *254.0*	91.8 *41.6*
6 x 6 x 3	6.50 *165.1*	26.5 *12.0*			

General Notes: It is the Designer's responsibility to select products suitable for the intended service and to ensure that pressure ratings and performance data is not exceeded. Always read and understand the installation instructions (IH-1000). Never remove any piping component or correct or modify any piping deficiencies without first depressurizing and draining the system. Material and gasket selection should be verified to be compatible for the specific application.

ISO 9001 Certified Company

VALVES

Engineering Specification

Job Name _____ Contractor _____

Job Location _____ Approval _____

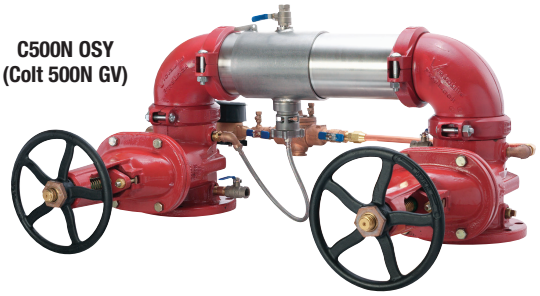
Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

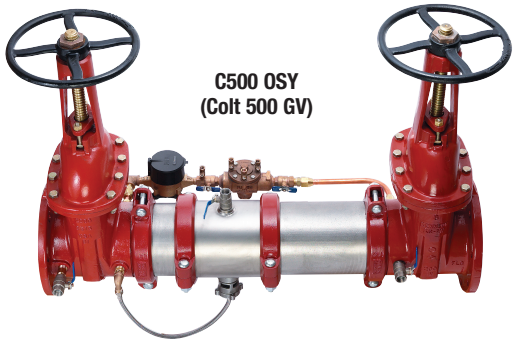
Colt™ Series C500 (Colt 500), C500N (Colt 500N), C500Z (Colt 500Z)

Reduced Pressure Detector Assemblies

Sizes: 2½" – 10"



C500N OSY
(Colt 500N GV)



C500 OSY
(Colt 500 GV)

The Colt C500, C500N, C500Z Reduced Pressure Detector Assemblies are designed to protect drinking water supplies from dangerous cross-connections in accordance with national plumbing codes and water authority requirements for health-hazard non-potable service applications such as irrigation, fire line, or industrial processing. The Colt C500, C500N, C500Z are used to monitor unauthorized use of water from the fire protection system.

Features

- Extremely Compact Design
- 70% Lighter than Traditional Designs
- 304 (Schedule 40) Stainless Steel Housing & Sleeve
- Groove Fittings Allow Integral Pipeline Adjustment
- Patented Link Check Provides Lowest Pressure Loss
- Unmatched Ease of Serviceability
- Replaceable Check Disc Rubber
- Available with Grooved Butterfly Valve Shutoffs
- Bottom Mounted Cast Stainless Steel Relief Valve
- Metered Bypass to Detect Leakage or Theft of Water from the Fire Sprinkler System

Specifications

The Colt C500, C500N, C500Z Reduced Pressure Detector Assemblies shall consist of two independent Link Check modules, a differential pressure relief valve located between and below the two modules, two drip tight shutoff valves, and required test cocks. Link Check modules and relief valve shall be contained within a sleeve accessible single housing constructed from 304 (Schedule 40) stainless steel pipe with groove end connections. Link Checks shall have reversible elastomer discs and in operation produce drip tight closure against the reverse flow of liquid caused by backpressure or backsiphonage. The bypass assembly consists of a meter registering either gallon or cubic measurements, a reduced pressure zone assembly and required test cocks. Assembly shall be Colt C500, C500N, C500Z as manufactured by the Ames Fire & Waterworks.

⚠ WARNING

It is illegal to use this product in any plumbing system providing water for human consumption, such as drinking or dishwashing, in the United States. Before installing standard material product, consult your local water authority, building and plumbing codes.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

AMES
FIRE & WATERWORKS
A WATTS Brand

Configurations

- Horizontal
- "Z" pattern horizontal
- "N" pattern horizontal

Materials

- Housing & Sleeve: 304 (Schedule 40) Stainless Steel
- Elastomers: EPDM, Silicone and Buna 'N'
- Link Checks: Noryl®, Stainless Steel
- Check Discs: Reversible Silicone or EPDM
- Test Cocks: Lead Free* Bronze Body
- Pins & Fasteners: 300 Series Stainless Steel
- Springs: Stainless Steel

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Pressure – Temperature

Temperature Range: 33°F – 140°F (0.5°C – 60°C)

Maximum Working Pressure: 175 psi (12.1 bar)

Available Models

Suffix:

OSY — UL/FM outside stem and yoke resilient seated gate valves

BFG — UL/FM grooved gear operated butterfly valves w/ tamper switch

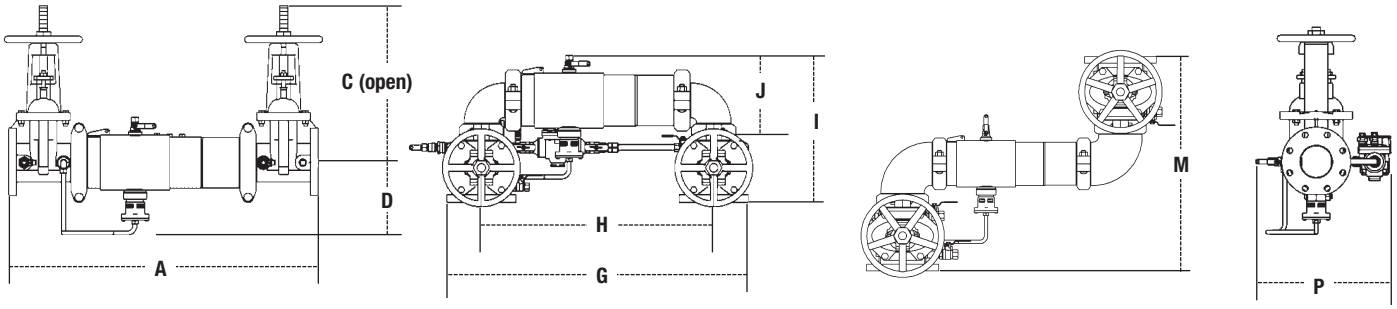
*OSY FxG — Flanged inlet gate connection and grooved outlet gate connection

*OSY GxF — Grooved inlet gate connection and flanged outlet gate connection

*OSY GxG — Grooved inlet gate connection and grooved outlet gate connection

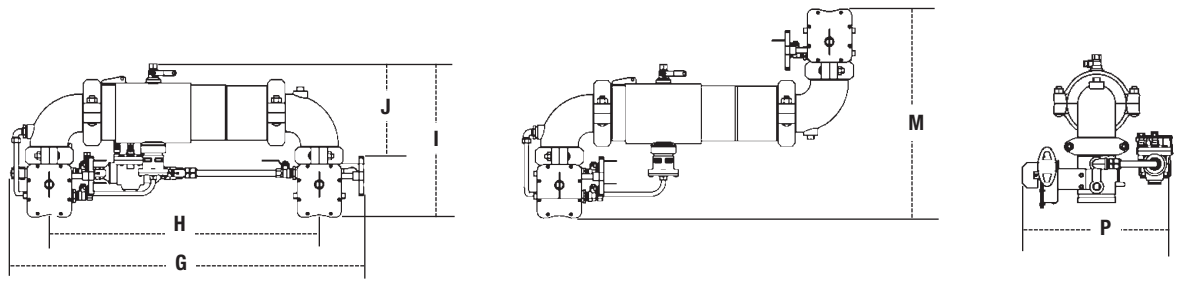
Available with grooved NRS gate valves — consult factory*
Post indicator plate and operating nut available — consult factory*
*Consult factory for dimensions

Dimensions – Weights



C500, C500N, C500Z

SIZE	DIMENSIONS																		WEIGHT			
	A		C (OSY)		D		G		H		I		J		M		P		C500		C500N	
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*	*lbs.*	*kgs.*
2½	30¾	781	16⅜	416	6½	165	29 1/16	738	21½	546	15½	393	8 13/16	223	21¼	540	13 3/16	335	118	54	126	57
3	31¾	806	18⅞	479	6 1/16	170	30¼	768	22¼	565	17⅛	435	9 3/16	233	23	584	14½	368	134	61	147	67
4	33¾	857	22¾	578	7	178	35⅝	905	23½	597	18½	470	9 15/16	252	26¼	667	15 3/16	386	164	74	187	85
6	43½	1105	30⅛	765	8½	216	44¾	1137	33¼	845	23 3/16	589	13 1/16	332	34¼	870	19	483	276	125	317	144
8	49¾	1264	37¾	959	9 1/16	246	54⅛	1375	40⅛	1019	27 7/16	697	15 11/16	399	36⅞	937	21 3/16	538	441	200	516	234
10	57¾	1467	45¾	1162	11 3/16	285	66	1676	49½	1257	32½	826	17 5/16	440	44½	1124	24	610	723	328	893	405



C500NBFG/C500ZBFG

SIZE	DIMENSIONS												WEIGHT	
	G		H		I		J		M		P		C500BFG	
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*
2½	32½	826	23	584	15½	394	9½	241	19¾	502	15 13/16	402	81	37
3	34	864	24	610	16 5/16	414	10 1/16	256	21¼	540	16⅛	410	84	38
4	35⅝	905	25½	648	17 3/16	437	10 15/16	279	23½	597	16⅝	422	101	46
6	46½	1181	35¼	895	20½	521	13½	343	27¼	692	19	483	174	79

Noryl® is a registered trademark of SABIC Innovative Plastics™.

Approvals

- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at The University of Southern California (FCCCHR-USC)
  (Excluding 10" 'N' and 'Z' configurations)
- AWWA C511-97

1047 B64.4 (**BFG & OSY Only)

For additional approval information please contact the factory or visit our website at www.amesfirewater.com

Capacity

UL/FM Certified Flow Characteristics

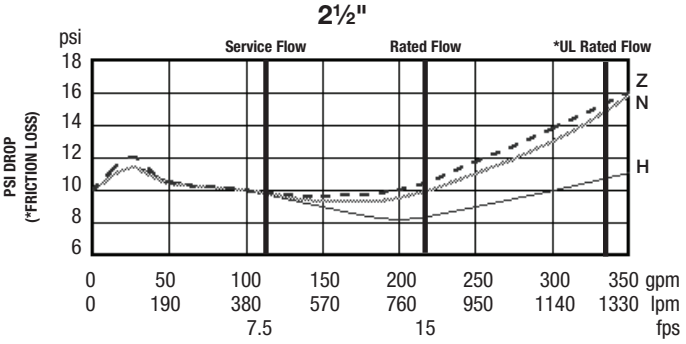
N&Z Flow characteristics collected using butterfly shutoff valves.

Flow capacity chart identifies valve performance based upon rated water velocity up to 25fps

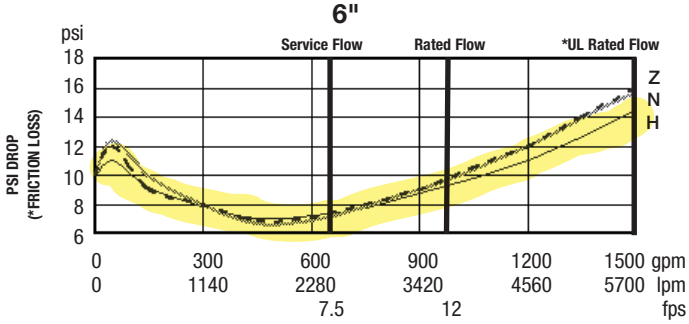
- Service Flow is typically determined by a rated velocity of 7.5fps based upon schedule 40 pipe.
- Rated Flow identifies maximum continuous duty performance determined by AWWA.
- UL Flow Rate is 150% of Rated Flow and is not recommended for continuous duty.
- AWWA Manual M22 [Appendix C] recommends that the maximum water velocity in services be not more than 10fps.

Horizontal — N - Pattern ----- Z - Pattern

2½"



6"



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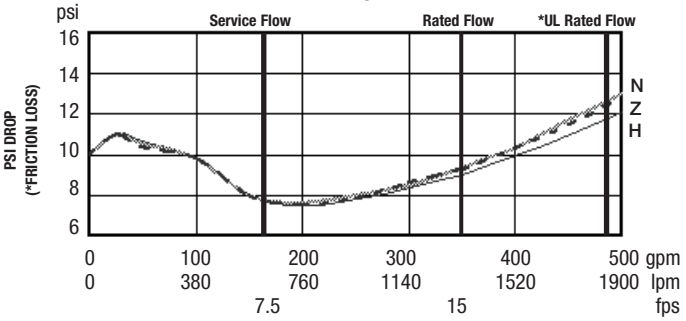
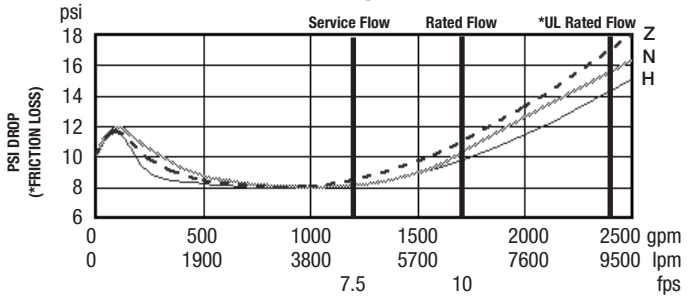


8"



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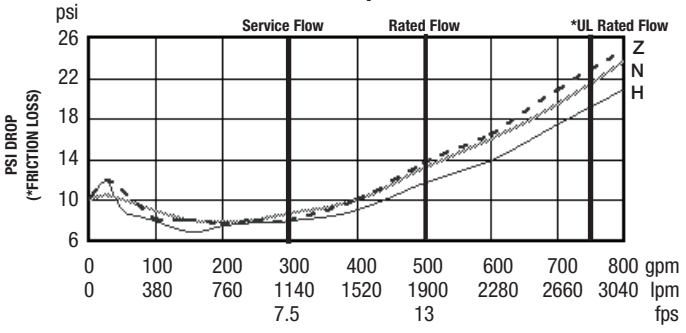
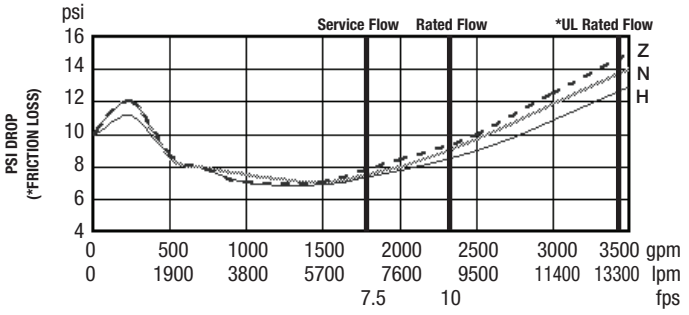


10"



NOTICE

Inquire with governing authorities for local installation requirements

AMES
FIRE & WATERWORKS

A **WATTS** *Brand*

USA: Backflow Tel: (978) 689-6066 • Fax: (978) 975-8350 • AmesFireWater.com
USA: Control Valves Tel: (713) 943-0688 • Fax: (713) 944-9445 • AmesFireWater.com
Canada: Tel: (888) 208-8927 • Fax: (905) 481-2316 • AmesFireWater.ca
Latin America: Tel: (52) 55-4122-0138 • AmesFireWater.com

VIKING®

TECHNICAL DATA

EASY RISER® SWING CHECK VALVE MODELS E-1 & F-1

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

1. DESCRIPTION

The Viking Easy Riser® Swing Check Valve is a general purpose rubber-faced check valve approved for use in fire service systems. The valve is for use in wet system risers, preaction system risers and wherever a check valve with a drain connection and gauge connections can be utilized. When used with a flow switch on wet pipe systems not requiring a mechanical alarm, the Easy Riser® Swing Check Valve may replace an alarm check valve.

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

1-A Features

1. Ductile iron body for less weight and extra strength.
2. Rated to 300 psi (20.7 bar) water working pressure.
3. Rubber-faced clapper hinged to access cover for quick removal and easy servicing. All moving parts can be serviced without removing the valve from the installed position.
4. With the cover/clapper assembly removed, clapper rubber replacement requires removal of only one screw.
5. Valve housing tapped for inlet and outlet pressure gauges, and system main drain.

1-B Accessories

300 PSI (20.7 bar) Trim Package including:

A. All necessary nipples and fittings
B. Main Drain Ball Valve
C. Necessary gauges

2. LISTINGS AND APPROVALS:.

cULus Listed: HMER
FM Approved: Single Check Valves
NYC Department of Buildings: MEA 89-92-E, Vol. XI
VNIIPO (250 psi (17.2 bar) MWP)
CE: Pressure Equipment Directive 97/23/EC (250 psi (17.2 bar) MWP)

3. TECHNICAL DATA

Specifications:

Standard Flanged Connections: ANSI B16.42 Class 150 (mates with ANSI Class 125 and Class 150 flanges).

Standard Grooved Connections: ANSI/AWWA C606

Drain outlet: 2-1/2” and 3” valves - one 1-1/4” (32 mm) NPT; 4”, 6” & 8” valves - 2” (50 mm) NPT

Gauge Outlets: two 1/4” (8 mm) NPT

Other Outlets: two 1/2” (15 mm) NPT

Systems with water working pressures above 175 psi (12 bar) may require extra-heavy pattern fittings. Viking Easy Riser® Swing Check Valve flanges are Ductile Iron ANSI B16.42, Class 150, with a maximum water working pressure of 300 psi (20.7 bar). ANSI B16.42, Class 150 flanges are NOT compatible with ANSI Class 250 or Class 300 flanges. To mate the Easy Riser® Swing Check Valve with ANSI Class 250 or Class 300 flanges, use the grooved-inlet/grooved-outlet style installed with listed grooved/flanged adapters of the appropriate pressure rating. For piping with grooved connections, the grooved-inlet and/or grooved-outlet style Easy Riser® Swing Check Valve may be installed with listed grooved couplings of the appropriate pressure rating.

Material Standards:

Refer to Figure 1.

Ordering Information:

See Table 1 for part numbers and shipping weights.

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4. INSTALLATION

The Easy Riser® Swing Check Valve must be installed in an area not subject to freezing temperatures or physical damage. When corrosive atmospheres and/or contaminated water supplies are present, it is the owner's responsibility to verify compatibility with the Easy Riser® Swing Check Valve, trim, and associated equipment.

Prior to installing the valve, thoroughly flush the water supply piping to verify that no foreign matter is present.

The Easy Riser® Swing Check Valve may be installed in the vertical position with direction of flow up, or in the horizontal position with the access cover up.

1. Remove all plastic thread protectors from the openings of the Easy Riser® Swing Check Valve.
2. Apply a small amount of pipe-joint compound or tape to the external threads of all pipe connections required. Take care not to allow any compound, tape, or other foreign matter inside any of the nipples or openings of the valve or trim components.
3. Easy Riser® Swing Check Valve Trim Charts are provided with Trim Packages and on the Viking website.
4. Verify that all system components are rated for the water working pressure of the system.

Hydrostatic Test:

The Easy Riser® Swing Check Valve is manufactured and listed for use at a maximum water working pressure of 300 psi (20.7 bar). The valve is factory tested at 600 psi (41.4 bar). Easy Riser® Swing Check Valves may be hydrostatically tested at 350 psi (24.1 bar) and/or 50 psi (3.5 bar) above the normal water working pressure for limited periods of time (two hours) for the purpose of acceptance by the Authority Having Jurisdiction. If air testing is required, DO NOT exceed 40 psi (2.8 bar) air pressure.

5. OPERATION (Refer to Figure 1.)

Water flowing through the Viking Easy Riser® Swing Check Valve lifts the rubber-gasketed clapper (8 and 9) off the seat (12) and flows into the sprinkler piping. When flow through the valve stops, the clapper (8) closes quickly. The rubber gasket (9) forms a tight seal against the brass water seat (12), trapping pressurized water above the clapper and preventing reverse flow from the sprinkler piping.

6. INSPECTIONS, TESTS, AND MAINTENANCE

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition.

The Viking Easy Riser® Swing Check Valve and trim must be kept free of foreign matter, freezing conditions, corrosive atmospheres, contaminated water supplies, and any condition that could impair its operation or damage the device.

It is imperative that the system be inspected and tested on a regular basis. The frequency of the inspections may vary due to contaminated water supplies, corrosive water supplies, and corrosive atmospheres. For minimum maintenance and inspection requirements, refer to NFPA 25. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

⚠ WARNING

Any system maintenance that involves placing a control valve or detection system out of service may eliminate the fire protection capabilities of that system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected areas.

6-A. Five-Year Internal Inspection

Internal inspection of check valves is recommended every five years unless inspections and tests indicate more frequent inspections are required. (Refer to Figure 1.)

1. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the area affected that the system will be taken out of service. Consideration should be given to employment of a fire patrol in the affected areas.
2. Close the water supply main control valve, placing the system out of service.
3. Open the main drain. If necessary, open the system test valve to vent and completely drain the system.
4. Use the appropriate wrench to loosen and remove cover screws (14), and remove cover and clapper assembly (2-11).
5. Inspect water seat (12). Wipe away all contaminants, dirt, and mineral deposits. DO NOT use solvents or abrasives.
6. Inspect cover and clapper assembly (2-11) and cover gasket (13). Test the hinged clapper (8) for freedom of movement. Renew or replace damaged or worn parts as required.

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⚠ CAUTION

NEVER apply any lubricant to seats, gaskets, or any internal operating parts of the valve. Petroleum-based grease or oil will damage rubber components and may prevent proper operation.

7. When internal inspection of the Easy Riser® Swing Check Valve is complete, perform step 5 of paragraph 6-B. MAINTENANCE to re-install cover and clapper assembly (2-11).

6-B. Maintenance (Refer to Figure 1.)

1. Perform steps 1 through 5 of paragraph 6-A, FIVE-YEAR INTERNAL INSPECTION.
2. To replace clapper assembly (3, 6-11):
   a. Remove the cover screws (14) from the cover (2) using a Socket Wrench with a 9/16" socket.
   b. Remove the cover and clapper assembly (2-11) from the valve.
   c. Remove the cover gasket (13) by sliding it over the clapper assembly.
   d. Remove the existing clapper assembly (3, 6-11) from the cover assembly (2):
      i. Remove one of the retaining rings (5) from the clapper hinge pin (4) using a flat head screwdriver.
      ii. Remove the clapper hinge pin (4) from the cover and clapper assembly. This will allow the clapper assembly (3, 6-11) to be removed from the cover assembly (2).
   e. Install the new clapper assembly (3, 6-11) onto the cover assembly (2):
      i. Make sure the clapper rubber (9) is facing opposite the direction of the flow arrow on the inside of the cover (2).
      ii. Line up the holes of the cover assembly (2) and the clapper assembly (3, 6-11) and insert the hinge pin (4).
      iii. Install the retaining ring (5) onto the hinge pin (4).
      iv. Install the cover gasket (13) onto the new cover and clapper assembly (2-11) by sliding the cover gasket (13) over the clapper assembly (3, 6-11) and lining up the holes with the cover (2).
      v. To install the new cover and clapper assembly (2-11) into the valve, slide the clapper assembly into the valve with the clapper rubber (9) lined up with the water seat (12). Ensure the rubber retainer (10) fits inside the seat of the valve (pull back slightly and there should be some resistance).
      vi. Line up the holes of the cover (2) and cover gasket (13) with the valve body (1) and replace the cover screws (14) using a Socket Wrench with a 9/16" socket.
3. To replace the clapper rubber (9):
   i. Remove the cover screws (14) from the cover (2) using a Socket Wrench with a 9/16" socket.
   ii. Remove the cover and clapper assembly (2-11) from the valve.
   iii. Remove the cover gasket (13) by sliding it over the clapper assembly (3, 6-11).
   iv. Use a 7/32" Allen wrench to hold the button head socket screw (11) in place and remove the jam nut (6) from the clapper rubber (9) using a Socket Wrench with a 9/16" socket.
   v. Remove the button head socket screw (11) and sealing washer (7) from the clapper assembly (3, 6-11).
   vi. Remove the clapper rubber retainer (10) from the clapper (8) to free the clapper rubber (9).
   vii. To install the new clapper rubber (9), position the clapper rubber (9) on the clapper assembly so the grooved edge is facing down. This will allow the clapper rubber retainer (10) to fit up into the grooved edge of the clapper rubber (9).
   viii. Install the button head socket screw (11) and sealing washer assembly (7) and the jam nut (6) using a 7/32" Allen wrench and a Socket Wrench with a 9/16" socket.
   ix. Install the cover gasket (13) onto the cover (2) by sliding it over the clapper assembly (3, 6-11).
   x. Re-install the cover and clapper assembly (2-11) back into the valve, with the clapper rubber (9) lined up with the water seat (12). Ensure the clapper rubber retainer (10) fits inside the seat of the valve (pull back slightly and there should be some resistance).
   xi. Line up the holes of the cover (2) and cover gasket (13) with the valve body (1) and replace the cover screws (14) using a Socket Wrench with a 9/16" socket.
4. To replace the cover gasket (13):
   i. Remove the cover screws (14) from the cover (2) using a Socket Wrench with a 9/16" socket.
   ii. Remove the cover and clapper assembly (2-11) from the valve.
   iii. Remove the cover gasket (13) by sliding it over the clapper assembly (3, 6-11).
   iv. Install the new cover gasket (13) by sliding it over the clapper assembly (3, 6-11), onto the cover (2).
5. Reinstall the cover and clapper assembly (2-11) into the valve:
   i. Line up the clapper rubber (9) with the water seat (12). Ensure the clapper rubber retainer (10) fits inside the seat of the valve (pull back slightly and there should be some resistance).
   ii. Line up the holes of the cover (2) and cover gasket (13) with the valve body (1) and replace the cover screws (14) using a Socket Wrench with a 9/16" socket.

VIKING®

TECHNICAL DATA

EASY RISER® SWING CHECK VALVE MODELS E-1 & F-1

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

7. AVAILABILITY

The Viking Easy Riser® Swing Check Valve is available through a network of domestic and international distributors. See the Viking Corp. Web site for closest distributor or contact The Viking Corporation.

8. GUARANTEES

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

Table 1 - Valve Part Numbers and Specifications

Description	Nominal Size	Part Number	Friction Loss*	Shipping Weight
Flange/Flange				
Flange Drilling	**Model F-1**			
ANSI	3"	08505	10 ft. (3.1m)	35 lbs. (16 kg)
ANSI	4"	08508	13 ft. (4.0 m)	44 lbs. (20 kg)
ANSI	6"	08511	20 ft. (6.0 m)	75 lbs. (34 kg)
ANSI/Japan	DN100	09039	13 ft. (4.0 m)	44 lbs. (20 kg)
ANSI/Japan	DN150	09385	20 ft. (6.0 m)	75 lbs. (34 kg)
ANSI/Japan	DN200	14023	23 ft. (7.0 m)	119 lbs. (54 kg)
PN10/16	DN80	08796	10 ft. (3.1m)	35 lbs. (16 kg)
PN10/16	DN100	08797	13 ft. (4.0 m)	44 lbs. (20 kg)
PN10/16	DN150	08835	20 ft. (6.0 m)	75 lbs. (34 kg)
PN10	DN200	08836	23 ft. (7.0 m)	119 lbs. (54 kg)
PN16	DN200	12355	23 ft. (7.0 m)	119 lbs. (54 kg)
Flange/Groove				
Flange Drilling / Pipe O.D.	**Model F-1**			
ANSI / 89mm	3"	08506	10 ft. (3.1m)	27 lbs. (12 kg)
ANSI / 114mm	4"	08509	13 ft. (4.0 m)	37 lbs. (17 kg)
ANSI / 168mm	6"	08512	20 ft. (6.0 m)	64 lbs. (29 kg)
ANSI / 219mm	8"	08515	23 ft. (7.0 m)	119 lbs. (54 kg)
PN10/16 / 89mm	DN80	12648	10 ft. (3.1m)	27 lbs. (12 kg)
PN10/16 / 114mm	DN100	12649	13 ft. (4.0 m)	37 lbs. (17 kg)
PN10/16 / 165mm	DN150	12652	20 ft. (6.0 m)	64 lbs. (29 kg)
PN10/16 / 168mm	DN150	08512	20 ft. (6.0 m)	64 lbs. (29 kg)
PN10 / 219mm	DN200	12651	23 ft. (7.0 m)	119 lbs. (54 kg)
PN16 / 219mm	DN200	12650	23 ft. (7.0 m)	119 lbs. (54 kg)
Groove/Groove				
Pipe O.D.	**Model E-1**			
73mm	2½" / DN65	07929	6 ft. (1.8m)	16 lbs. (7 kg)
76 mm	2½" / DN65	13516	6 ft. (1.8m)	16 lbs. (7 kg)
	Model F-1			
89mm	3" / DN80	08507	10 ft. (3.1m)	20 lbs. (9 kg)
114mm	4" / DN100	08510	13 ft. (4.0 m)	27 lbs. (12 kg)
165mm	DN150	12356	20 ft. (6.0 m)	51 lbs. (23 kg)
168mm	6" / DN150	08513	20 ft. (6.0 m)	51 lbs. (23 kg)
219mm	8" / DN200	08516	23 ft. (7.0 m)	106 lbs. (48 kg)

*Expressed in equivalent length of Schedule 40 pipe based on Hazen & Williams formula: C = 120.

Table 2 - Torque Values for Easy Riser Swing Check Valve Cover Screws

Valve Size	Screw Size	Torque Value
2-1/2" (DN65)	3/8"-16 H.H.C.	19 ft-lb (2.63 kg-m)
3" (DN80)	3/8"-16 H.H.C.	19 ft-lb (2.63 kg-m)
4" (DN100)	3/8"-16 H.H.C.	19 ft-lb (2.63 kg-m)
6" (DN150)	½"-13 H.H.C.	45 ft-lb (6.23 kg-m)
8" (DN200)	5/8"-11 H.H.C.	93 ft-lb (12.9 kg-m)

Table 3 - Trim Package Part Numbers

Valve Size	Part Number
Wet System Trim Packages	
2-1/2", 3" (DN65), (DN80)	07236
4", 6", 8", (DN100), (DN150), (DN200)	07237
Preaction System Trim Packages	
2-1/2", 3" (DN65)	13776
4", 6", 8", (DN80), (DN100), (DN150), (DN200)	13777

TECHNICAL DATA

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Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
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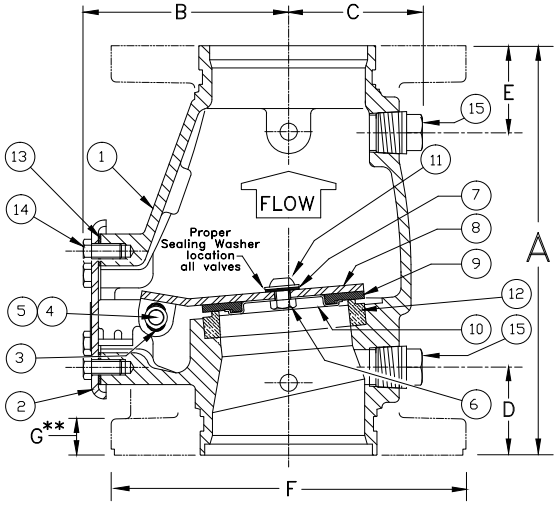


SIZE	A	B	C	D	E	F	G**
2-1/2" (65mm)	9" (228,6)	4-1/2" (114,3)	2-5/8" (66,7)	2" (50,8)	2" (50,8)	Flg-Flg Not Available	
3" (80mm)	10-1/8" (257)	4-13/16" (122,2)	2-11/16" (68,3)	2-9/32" (58.1)	2-9/32" (58.1)	7-7/8" (200)	25/32" (20)
4" (100mm)	10-5/8" (269,9)	5-3/16" (131,8)	3-1/8" (79.4)	2-1/4" (57.2)	2-1/4" (57,2)	9" (228,6)	15/16" (23,81)
6" (150mm)	13-3/8" (340)	6-13/16" (173,3)	4-1/16" (103.2)	2-1/4" (57,2)	2-1/4" (57,2)	11" (279,4)	1" (25,4)
8" (200mm)	17" (431,8)	8-13/16" (223,4)	5" (127)	2-1/2" (63,4)	2-7/8" (73,0)	13-1/2" (342,9)	1-1/8" (28,58)

Dimensions shown in parentheses are millimeter.

* For availability of Flg X Flg, Flg X Grv, or Grv X Grv options refer to Table 1.

** 4", 6", and 8" valves are manufactured with sculptured flanges. Dimension indicates thickness of flange at bolt holes.

Figure 1 - Replacement Parts

ITEM NO.	PART NUMBER E-1 2-1/2" (DN65)	F-1 3" (DN80)	F-1 4" (DN100)	F-1 6" (DN150)	F-1 8" (DN200)	DESCRIPTION	MATERIAL	NO. REQ'D 2-1/2"	3"	4"	6"	8"
1	--	--	--	--	--	Body	Ductile Iron, ASTM A536 (65-45-12)	1	1	1	1	1
2	--	--	--	--	--	Cover Assembly	E-Coated HSLA Steel, A715 and Stainless Steel, UNS-S30400	1	1	1	1	1
3	07576	07576	07576	07576	None	Bushing	Lubricomp 189 Ryton	2	2	2	2	0
4	05355A	05355A	04900A	04991A	05334A	Clapper Hinge Pin	Stainless Steel, UNS-S30400	1	1	1	1	1
5	05445A	05445A	05445A	05445A	05369A	Hinge Pin Retaining Ring	Stainless Steel, UNS-S15700	2	2	2	2	2
6	01755A					Clapper Hex Jam Nut #10-24 UNC	Stainless Steel, UNS-S30400	1	0	0	0	0
		08159	08159			Clapper Hex Jam Nut 3/8"-24 UNF	Stainless Steel, UNS-S30400	0	1	1	0	0
				08144	08144	Clapper Hex Jam Nut ½"-20 UNF	Stainless Steel, UNS-S30400	0	0	0	1	1
7	--	08158	08158	08143	08143	Sealing Washer	EPDM and Stainless Steel	1	1	1	1	1
8	*	*	*	*	*	Clapper	PTFE Coated HR Steel UNS-G10180	1	1	1	1	1
9	*	*	*	*	*	Clapper Rubber	EPDM, ASTM D2000	1	1	1	1	1
10	*	*	*	*	*	Clapper Rubber Retainer	Stainless Steel, UNS-S30400	1	1	1	1	1
11	06595A					H.H.C. Screw, #10-24 UNC x 1/2" (12.7 mm) lg.	Stainless Steel, UNS-S30400	1	0	0	0	0
		10194	10194			Screw, Button Head, Socket, 3/8" - 24 UNF x 1/2 (12.7 mm) lg.	Stainless Steel, UNS-S30400	0	1	1	0	0
				10308		Screw, Button Head, Socket, 1/2" - 20 UNF x 3/4 (19.1 mm) lg.	Stainless Steel, UNS-S30400	0	0	0	1	0
					10686	Screw, Button Head, Socket, 1/2" - 20 UNF x 7/8 (22.2 mm) lg.	Stainless Steel, UNS-S30400	0	0	0	0	1
12	--	--	--	--	--	Seat	Brass, UNS-C84400	1	1	1	1	1
13	05354B	05354B	04649B	04992B	05339C	Cover Gasket	EPDM, ASTM D2000	1	1	1	1	1
14	01517A	01517A	01517A			Screw, Hex Head Cap, 3/8" - 16 UNC x 3/4 (19.1 mm) lg.	Steel, Zinc Plated	4	4	6	0	0
				04993A		Screw, Hex Head Cap, 1/2" - 13 x 7/8 (22.2 mm) lg.	Steel, Zinc Plated	0	0	0	6	0
					01922A	Screw, Hex Head Cap, 5/8" - 11 UNC x 1-1/4" (31.8 mm) lg.	Steel, Zinc Plated	0	0	0	0	6
15	--	--	--	--	--	1/2" (15 mm) NPT Pipe Plug	Steel	2	2	2	2	2

-- Indicates replacement part is not available

* Indicates replacement part only available in a Sub-Assembly listed below.

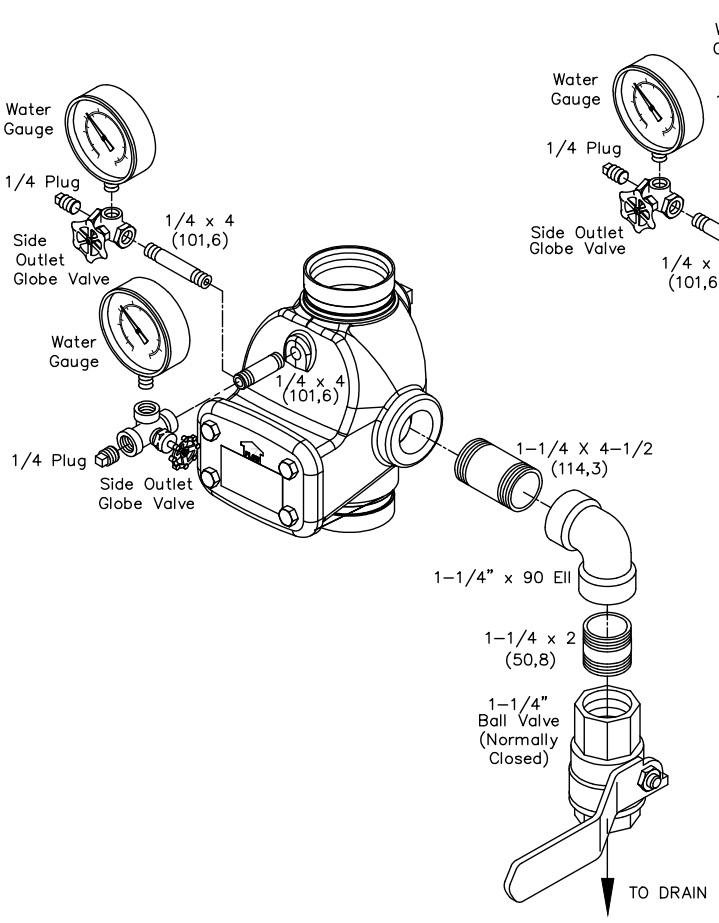
Sub-Assemblies

3, 6-11	05499B	08518	08519	08520	08521	Clapper Assembly	
6, 7, 9-11,13	06343A	08522	08523	08524	08525	Replacement Rubber Kit	

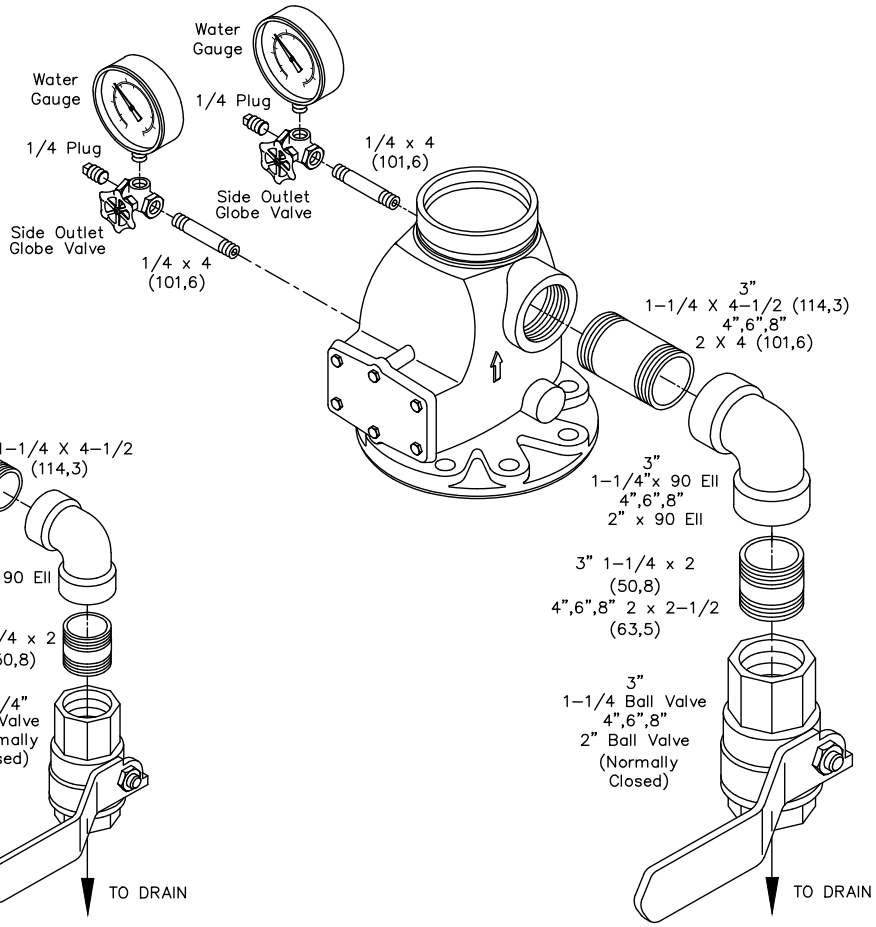
TECHNICAL DATA

EASY RISER® SWING CHECK VALVE MODELS E-1 & F-1

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com



2-1/2" Model E-1
Easy Riser Check Valve
Trim Chart



3", 4", 6" and 8" Model F-1
Easy Riser Check Valve
Trim Chart

Figure 2

Note 1: 300 psi (20.7 bar) water pressure gauges are provided with trim. 600 psi (41.4 bar) water pressure gauges are available. Order separately when needed*. Refer to Viking's current price schedule.

* NFPA 13 requires gauges to have a minimum limit not less than twice the normal water working pressure at the point where the gauges are installed. When normal water working pressure exceeds 150 psi (10.3 bar), order 600 psi (41.4 bar) water pressure gauges separately.

Note 2: System Drain Ball Valve is UL Listed and FM Approved for 300 psi (20.7 bar) water working pressure.

TECHNICAL DATA

EASY RISER® SWING CHECK VALVE MODELS E-1 & F-1

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
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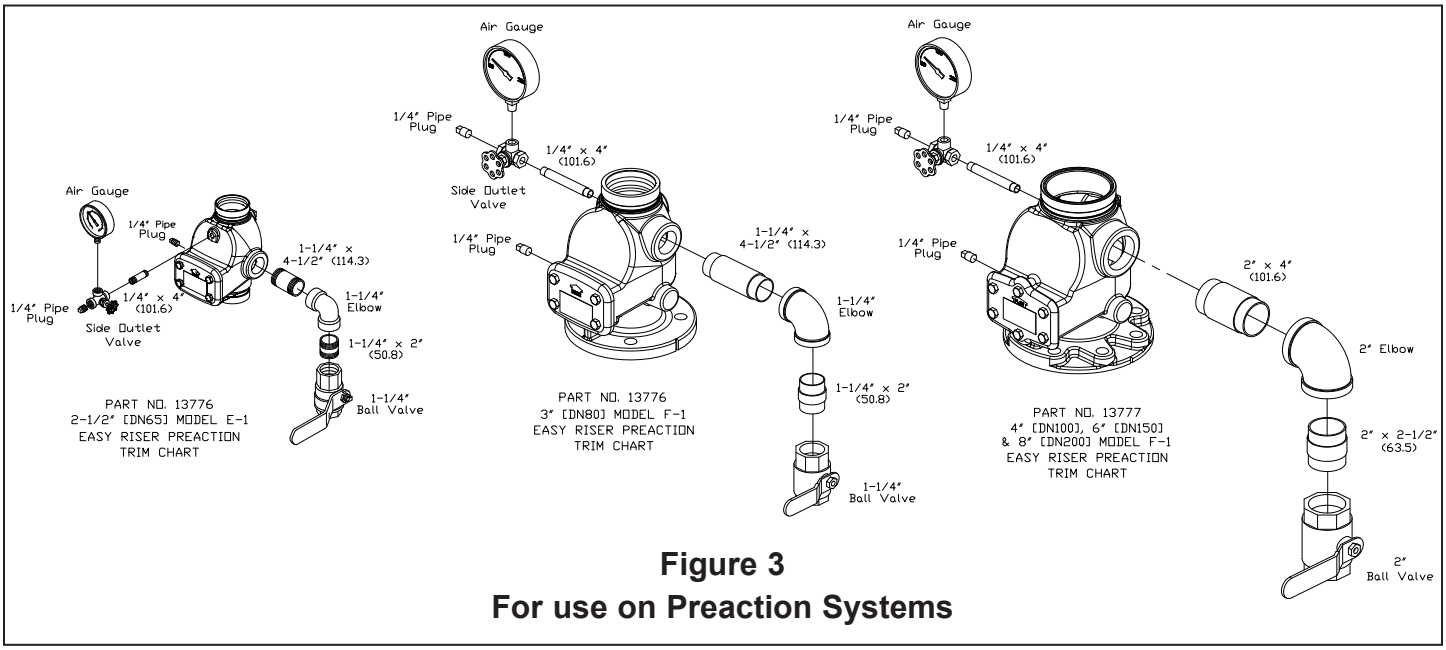
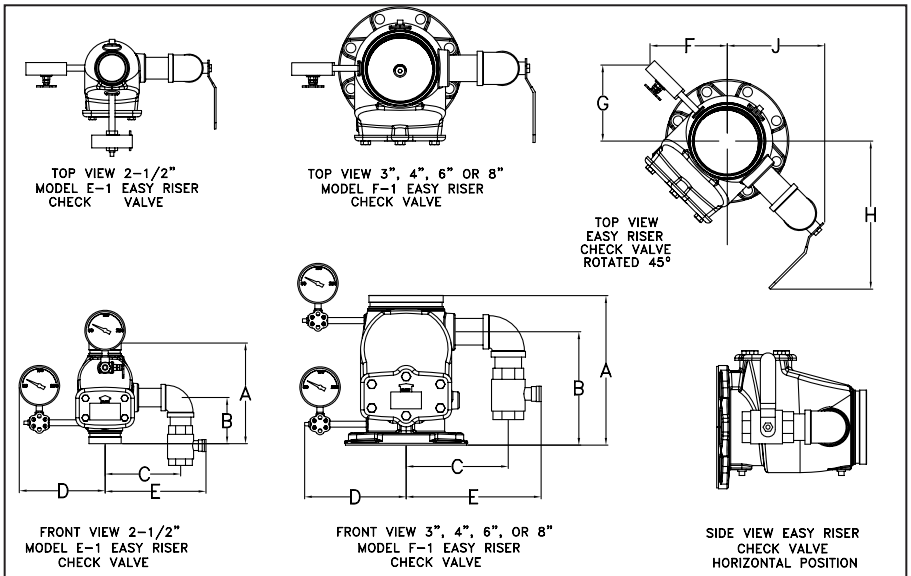


Figure 3
For use on Preaction Systems



SIZE	A	B	C	D	E	F	G	H	J
2-1/2" (65mm)	9" (228,6)	4-1/8" (105)	6-3/4" (171)	7-5/8" (194)	9" (229)	5-1/2" (139)	5-3/8" (137)	10-7/16" (265)	6-5/8" (169)
3" (80mm)	10-1/8" (257)	7-1/4" (184)	6-3/4" (171)	7-7/8" (200)	8-7/8" (226)	5-15/16" (150)	5-7/8" (149)	9-7/8" (251)	6-7/16" (163)
4" (100mm)	10-5/8" (270)	7-3/8" (187)	8-3/8" (213)	8-7/16" (214)	11-5/16" (287)	6-3/16"" (157)	6-1/8" (155)	12-11/16" (322)	8-1/16" (205)
6" (150mm)	13-3/8" (340)	10-1/8" (257)	9-1/8" (232)	9-1/2" (241)	12-1/16" (306)	6-7/8" (175)	6-13/16" (173)	13-3/16" (336)	8-5/8" (219)
8" (200mm)	17" (432)	13-1/8" (333)	9-15/16" (253)	10-3/4" (273)	13-1/16" (332)	7-5/8" (193)	7-1/2" (191)	13-15/16" (354)	9-5/16" (237)

Figure 4

Dimensions in parentheses are millimeter.
Dimensions are approximate.

tyco / Fire & Building Products

Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500
www:tyco-fire.com

Tyco Fire Products Model BFV-1 Butterfly Valve

General Description

See Fire Protection Submittal Sheet for Pressure Rating and Listing/Approval Information

The Model BFV-1 Butterfly Valve is specifically designed to provide for efficient control of fire protection water supplies. The Model BFV-1 is designed to meet the increasing pressure requirements of the Fire Protection Industry with a maximum operating pressure of 300 psi. Flow may be from either direction, and the valves may be positioned in any orientation. The valve is furnished with grooved ends for use with grooved couplings and can be easily adapted to flanged components utilizing Grinnell Figure 71 Class 150 flange adapters. The body and disc construction provides for increased strength and durability. The Model BFV-1 Butterfly Valve is provided with 2 sets of SPDT Supervisory Switches for use in outdoor and indoor applications. A high strength stainless steel upper stem is provided for dependability. The surfaces at the upper stem and lower trunnion areas incorporate a reduced dynamic torque and anti-compression set design to ensure low operating torque and increased seal longevity.

This unique Tyco design feature prevents elastomeric failure of the disc encapsulation that is commonly experienced with other manufacturers. This is accomplished by providing uniform compression throughout the opening and closing operation of the disc.

The Model BFV-1 Butterfly Valves are a redesignation for the Central Figure 570, Central Figure 580 and Grinnell Figure 580.

WARNING

The Model BFV-1 Butterfly Valve described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of this device.

The owner is responsible for maintaining his fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.

Technical Data

Model: BFV-1
Sizes: 2-1/2", 3", 4", 5", 6", 8" & 10"
Maximum Working Pressure: 300 psi (2068 kPa)
Factory Hydro Test: 100% at 600 psi (4137 kPa) in accordance with test requirements of MSS SP-67, UL, FM and ULC
Approvals: UL, FM and ULC for both indoor and outdoor use. Note: 8" - 10" are FM approved only. See Fire Protection Submittal Sheet for exact Listing / Approval information.
Materials of Construction:
Body: Ductile iron conforming to ASTM A-536, Grade 65-45-12
Body Coating: Epoxy
Disc: Ductile iron conforming to ASTM A-536, Grade 65-45-12
Disc Seal: Grade EPDM "E"encapsulated rubber conforming to ASTM D-2000
Upper Stem: Type 440 Stainless Steel (2-1/2"-8") Type 17-4 Stainless Steel (10")
Lower Plug and Stem: Type 17-4 Stainless Steel
Operator: Gear operator with iron housing coated with Epoxy
Bracket: Steel - Black Zinc Plated

Ordering Information

When placing an order, indicate the full product name. Please specify the quantity, valve model number, size, type of seal; EPDM "E", and part number from the following list.

Valve Size	Valve Part Number
2-1/2"	59-300-F-025
3"	59-300-F-030
4"	59-300-F-040
5"	59-300-F-050
6"	59-300-F-060
8"	59-300-F-080
10"	59-300-F-100

Tyco Fire Products, valves, accessories and other products are available throughout the U.S., Canada, and internationally, through a network of distribution centers. You may write directly or call 215-362-0700 for the distributor nearest you.

Care and Maintenance

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in accordance with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. The installing contractor or product manufacturer should be contacted relative to any questions. Any impairment must be immediately corrected.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service.

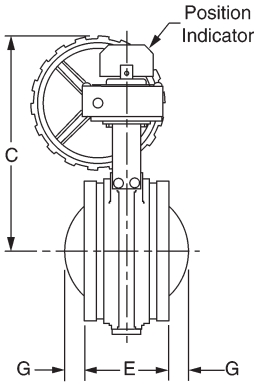
Limited Warranty

Products manufactured by Tyco Fire Products are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by Tyco Fire Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire Products or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by Tyco Fire Products to be defective shall be either repaired or replaced, at Tyco Fire Products' sole option. Tyco Fire Products neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. Tyco Fire Products shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

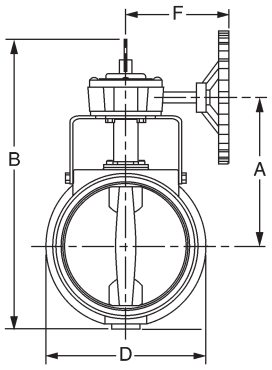
IN NO EVENT SHALL TYCO FIRE PRODUCTS BE LIABLE, IN CONTRACT, TORT, STRICT LIABILITY OR UNDER ANY OTHER LEGAL THEORY, FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LABOR CHARGES, REGARDLESS OF WHETHER TYCO FIRE PRODUCTS WAS INFORMED ABOUT THE POSSIBILITY OF SUCH DAMAGES, AND IN NO EVENT SHALL TYCO FIRE PRODUCTS' LIABILITY EXCEED AN AMOUNT EQUAL TO THE SALES PRICE.

THE FOREGOING WARRANTY IS MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

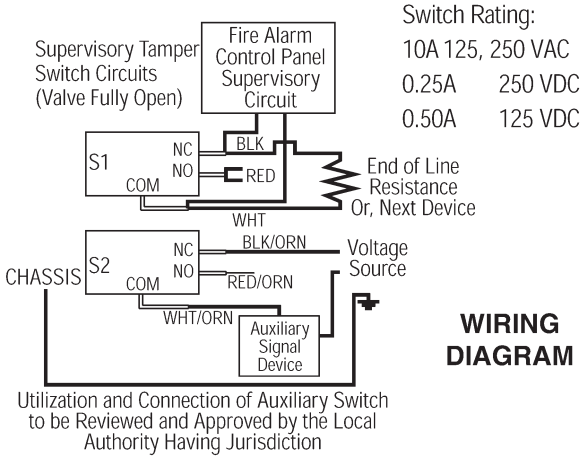
Model BFV-1 Butterfly Valve



Side view with valve open



Front view with valve open



WIRING DIAGRAM

Utilization and Connection of Auxiliary Switch to be Reviewed and Approved by the Local Authority Having Jurisdiction

Nominal Dimensions								Approx. Weight
Size Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	F Inches *mm*	G Inches *mm*	lbs. *Kg.*
2½" *73.0*	5.08 *129.0*	10.41 *264.4*	6.97 *177.0*	2.88 *73.0*	3.81 *96.8*	5.72 *145.3*	N/A*	12.0 *5.4*
3" *88.9*	5.41 *137.4*	11.38 *289.1*	7.29 *185.2*	3.50 *88.9*	3.81 *96.8*	5.72 *145.3*	N/A*	14.0 *6.4*
4" *114.3*	6.37 *161.8*	12.70 *322.6*	8.25 *209.6*	4.75 *120.7*	4.56 *115.8*	5.72 *145.3*	N/A*	22.0 *10.0*
5" *141.3*	7.33 *186.2*	14.56 *369.8*	10.41 *264.4*	6.25 *158.8*	5.81 *147.6*	6.18 *157.0*	N/A*	31.0 *14.1*
6" *168.3*	7.62 *193.5*	15.23 *386.8*	10.70 *271.8*	6.75 *171.5*	5.81 *147.6*	6.18 *157.0*	N/A*	36.0 *16.3*
8" *219.1*	9.24 *234.7*	17.50 *444.5*	13.37 *339.6*	10.00 *254.0*	5.25 *133.4*	6.43 *163.3*	1.22 *31.0*	52.0 *23.6*
10" *273.0*	11.81 *299.9*	21.78 *553.2*	16.93 *430.0*	12.00 *304.3*	6.25 *158.8*	7.96 *202.2*	1.75 *44.5*	75.0 *34.1*

* End of disc does not extend beyond valve body.

Friction Resistance	
Size	Equiv. Length in Feet
2 ½"	6'
3"	7'
4"	6'
5"	10'
6"	13'
8"	14'
10"	16'

Note: Friction Resistance is specified in equivalent length of Std. weight (C-120) steel pipe.

General Notes: It is the Designer's responsibility to select products suitable for the intended service and to ensure that pressure ratings and performance data is not exceeded. Always read and understand the installation instructions (IH-1000). Never remove any piping component or correct or modify any piping deficiencies without first depressurizing and draining the system. Material and gasket selection should be verified to be compatible for the specific application.

ISO 9001 Certified Company

UNITED BRASS WORKS, INC

714 S. Main St.. Randleman, N.C. 27317

Phone: 800/334-3

035 Fax: 800/498-4696

Model 125SUL Globe Valve
Soft Disc

UL Listed for Fire Sprinkler Service at 250 WOG

200 WOG @ 180 ° Max

100% Pressure Tested

Threaded Ends

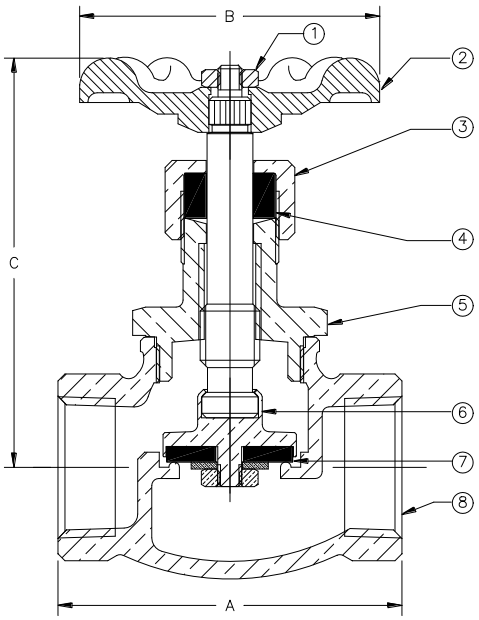
Rising Stem • Integral Seat

Swivel Disc Holder

Contains Lead. Not Intended for Use in Potable Water Systems

MATERIAL LIST

NO.	DESCRIPTION	MATERIAL
1	Hex Nut	Steel
2	Hand Wheel	Zinc
3	Packing Nut	Brass
4	Packing	Graphite Non-Asb.
5	Bonnet (¼" – 1") Bonnet (1¼" – 2")	Brass Bronze
6	Stem & Disc Holder	Brass
7	Disc	Buna N
8	Body	Bronze



Size	½"	¾"	1"	1 ¼"	1 ½"	2"
A	2.22	2.47	2.97	3.56	4.06	4.69
B	2.03	2.38	2.75	3.00	3.72	3.72
C (closed)	3.38	3.50	4.25	4.75	5.50	5.50
Ship Wt. (lbs.)	0.69	0.94	1.76	2.50	3.26	5.32
Qty. Unit Pack	12	6	6	4	2	2
Qty. Per Case	72	60	36	24	12	12

HYDRAULIC CALCULATIONS

Hydraulic Overview

Job Number: B22243 - HIGHLAND ELEMENTARY
Report Description: Light Hazard (A)

Job

Job Number: B22243	Designer:
Job Name: HIGHLAND ELEMENTARY	Phone: 919.243.2464 FAX:
Address 1: 1915 BUFFALO LAKE ROAD	State Certification/License Number: 16269FS
Address 2: SANFORD, NC 27332	AHJ: HARNETT CO
Address 3:	Job Site/Building: HARNETT CO SCHOOLS

System

Density: 0.10 gpm/ft²	Area of Application: 1500 ft² (Actual 1383 ft²)
Most Demanding Sprinkler Data: 5.6 K-Factor 19.60 at 12.250	Hose Streams: 100.00
Coverage Per Sprinkler: 196 ft²	Number Of Sprinklers Calculated: 8 0
System Pressure Demand: 51.151	System Flow Demand: 161.54
Total Demand: 261.54 @ 51.151	Pressure Result: +16.317 (24.2%)

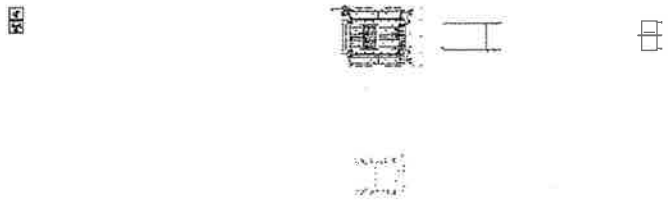
Supplies

Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	1020.00	100.00	69.000	50.000

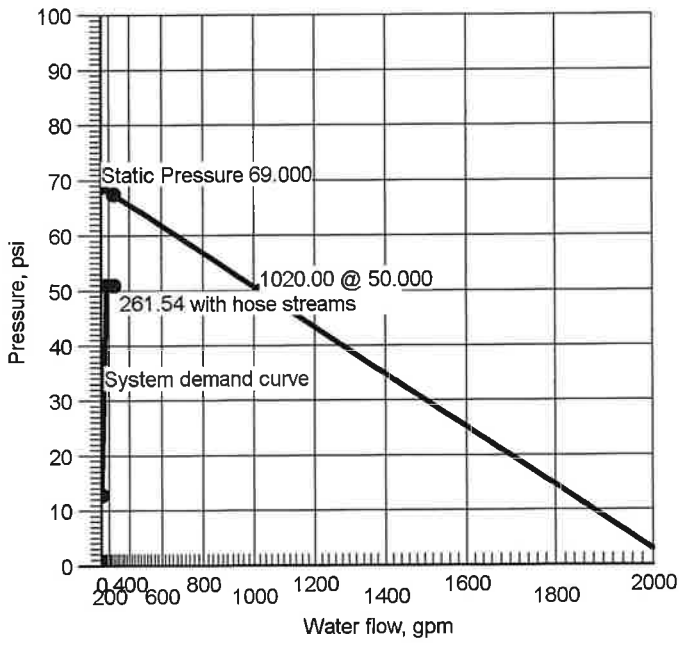
Check Point Gauges

Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
BOR (13)	38.306	26.1	161.54

PIPING NO PUMP



Water Supply at Node 1 (1020.00, 100.00, 69.000, 50.000)



Hydraulic Calculations

for

Project Name: HIGHLAND ELEMENTARY
Location: 1915 BUFFALO LAKE ROAD, SANFORD, NC 27332,
Drawing Name: PIPING NO PUMP

Calculation Date: 4/19/2023

Design

Remote Area Number:	A
Remote Area Location:	CLERESTORY
Occupancy Classification:	Light Hazard
Commodity Classification:	N/A
Density	0.10 gpm/ft²
Area of Application:	1500 ft² (Actual 1383 ft²)
Coverage per Sprinkler:	196 ft²
Type of sprinklers calculated:	Other
No. of sprinklers calculated:	8
No. of nozzles calculated:	0

In-rack Demand: N/A gpm at Node: N/A

Hose Streams: 100.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 1: 261.54 @ 51.151 (Safety Margin = 16.317)

Type of System: WET

Volume of Dry/PreAction/Antifreeze/OtherA N/A

Name of Contractor:
Address:
Phone Number:
Name of designer:
Authority Having Jurisdiction:HARNETT CO

Notes:

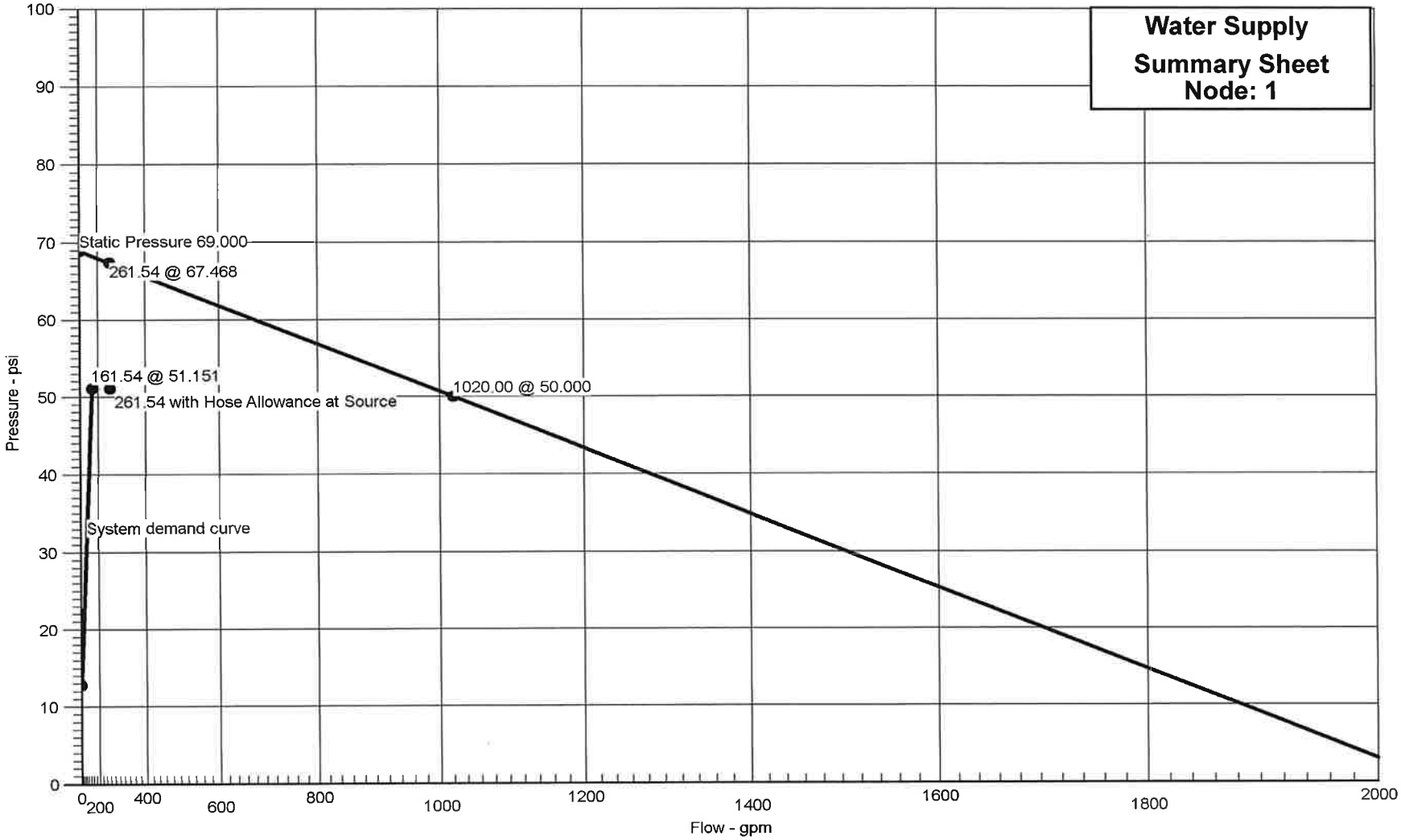
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: HIGHLAND ELEMENTARY
Remote Area Number: A

$N^{1.85}$

Date: 4/19/2023



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	729	20.62	19.60	5.6	13.555			
⇨ **Sprinkler**	**730**	**19.60**	**19.60**	**5.6**	**12.250**			
Sprinkler	739	20.74	19.60	5.6	13.715			
Sprinkler	740	19.72	19.60	5.6	12.395			
Sprinkler	753	20.79	19.60	5.6	13.777			
Sprinkler	754	19.76	19.60	5.6	12.452			
Sprinkler	765	20.67	19.60	5.6	13.627			
Sprinkler	766	19.65	19.60	5.6	12.315			

⇨ Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @ Flow (gpm)		Available (psi) @ Total Demand (gpm)		Required Pressure (psi)
1	Water Supply	69.000	50.000	1020.00	67.468	261.54	51.151

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	-2'-5	Supply	51.151	161.54	
729	27'-4	Sprinkler	13.555	20.62	
730	27'-4	Sprinkler	12.250	19.60	
739	27'-4	Sprinkler	13.715	20.74	
740	27'-4	Sprinkler	12.395	19.72	
753	27'-4	Sprinkler	13.777	20.79	
754	27'-4	Sprinkler	12.452	19.76	
765	27'-4	Sprinkler	13.627	20.67	
766	27'-4	Sprinkler	12.315	19.65	
8	1'-8		49.309		
13	1'-8	Gauge	38.306		
18	12'-3		33.641		
50	12'-3		33.280		
67	12'-3		33.061		
97	12'-3		33.183		
106	1'-8		49.326		
115	12'-3		33.061		
116	12'-3		33.172		
131	12'-3		33.061		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
313	18'-2½		30.475		
333	28'-4		17.991		
334	28'-4		13.958		
376	28'-4		18.204		
377	28'-4		14.126		
391	12'-3		32.961		
395	19'-8½		29.731		
403	18'-11½		30.140		
406	19'-8½		29.809		
422	19'-8½		29.801		
426	28'-4		19.263		
427	12'-3		32.958		
467	28'-4		18.286		
468	28'-4		14.192		
514	28'-4		18.087		
515	28'-4		14.034		
523	18'-2½		30.465		
580	12'-3		32.961		
596	12'-3		33.043		
609	12'-3		32.961		
626	12'-3		33.043		
639	12'-3		32.962		
656	12'-3		33.043		

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
730	27'-4	5.6	19.60	1	(See Notes)	14'-11½	120	12.250	• • • • • **Route 1** • • • • •
						2'-0	0.125357	-0.419	Sprinkler,
334	28'-4		19.60	1.0490		16'-11½		2.127	E(2'-0)
334	28'-4		20.62	1	(See Notes)	3'-6	120	13.958	Flow (q) from Route 5
						5'-0	0.473864		
333	28'-4		40.22	1.0490		8'-6		4.034	PO(5'-0)
333	28'-4			2		15'-0	120	17.991	
							0.014157		
376	28'-4		40.22	2.1570		15'-0		0.212	
376	28'-4		40.45	2	(See Notes)	8'-4	120	18.204	Flow (q) from Route 3
						12'-3½	0.051315		
426	28'-4		80.67	2.1570		20'-8		1.060	PO(12'-3½)
426	28'-4		80.87	2½	(See Notes)	46'-9	120	19.263	Flow (q) from Route 2
						49'-5	0.069950	6.966	
427	12'-3		161.54	2.6350		96'-2½		6.729	4E(8'-3), PO(16'-5½)
427	12'-3			4		38'-7	120	32.958	
							0.005551		
116	12'-3		145.44	4.2600		38'-7		0.214	
116	12'-3		4.62	4		1'-9½	120	33.172	Flow (q) from Route 9
							0.005881		
97	12'-3		150.05	4.2600		1'-9½		0.011	
97	12'-3		4.85	4		15'-7	120	33.183	Flow (q) from Route 16
							0.006238		
50	12'-3		154.90	4.2600		15'-7		0.097	
50	12'-3		6.65	4	(See Notes)	14'-1	120	33.280	Flow (q) from Route 17
						39'-6	0.006742	0.000	
18	12'-3		161.54	4.2600		53'-7		0.361	E(13'-2), PO(26'-4)
18	12'-3			6	(See Notes)	9'-9½	120	33.641	
						70'-5	0.000960	4.588	
13	1'-8		161.54	6.3570		80'-2½		0.077	sCV(40'-3), BV(12'-7), E(17'-7), BOR
13	1'-8			6	(See Notes)	3'-3	120	38.306	
							0.000960	-0.000	
8	1'-8		161.54	6.3570		3'-3		11.003	BFP(-11.000)

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes (Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
8	1'-8			6	(See Notes)	0'-0	140	49.309	
106	1'-8		161.54	6.2800		22'-1	0.000766	-0.000	E(22'-1)
						22'-1		0.017	
106	1'-8			6	(See Notes)	53'-0	140	49.326	
1	-2'-5		161.54	6.2800		22'-1	0.000766	1.767	E(22'-1), S
						75'-1		0.057	
			100.00					51.151	Hose Allowance At Source
1			261.54						Total(Pt) Route 1
766	27'-4	5.6	19.65	1	(See Notes)	14'-11½	120	12.315	• • • • • **Route 2** • • • • • Sprinkler,
515	28'-4		19.65	1.0490		2'-0	0.125977	-0.419	E(2'-0)
						16'-11½		2.137	
515	28'-4		20.67	1	(See Notes)	3'-6	120	14.034	Flow (q) from Route 6
514	28'-4		40.32	1.0490		5'-0	0.476198		PO(5'-0)
						8'-6		4.053	
514	28'-4			2		14'-0	120	18.087	
467	28'-4		40.32	2.1570			0.014227		
						14'-0		0.199	
467	28'-4		40.55	2	(See Notes)	6'-8	120	18.286	Flow (q) from Route 4
426	28'-4		80.87	2.1570		12'-3½	0.051549		PO(12'-3½)
						18'-11½		0.977	
								19.263	Total(Pt) Route 2
740	27'-4	5.6	19.72	1	(See Notes)	14'-11½	120	12.395	• • • • • **Route 3** • • • • • Sprinkler,
377	28'-4		19.72	1.0490		2'-0	0.126730	-0.419	E(2'-0)
						16'-11½		2.150	
377	28'-4		20.74	1	(See Notes)	3'-6	120	14.126	Flow (q) from Route 7
376	28'-4		40.45	1.0490		5'-0	0.479034		PO(5'-0)
						8'-6		4.078	
								18.204	Total(Pt) Route 3
754	27'-4	5.6	19.76	1	(See Notes)	14'-11½	120	12.452	• • • • • **Route 4** • • • • • Sprinkler,
468	28'-4		19.76	1.0490		2'-0	0.127264	-0.419	E(2'-0)
						16'-11½		2.159	

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step / Total Flow (q / Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
468	28'-4		20.79	1	(See Notes)	3'-6	120	14.192	Flow (q) from Route 8
467	28'-4		40.55	1.0490		5'-0 8'-6	0.481046	 4.095	PO(5'-0)
								18.286	Total(Pt) Route 4
729	27'-4	5.6	20.62	1	(See Notes)	0'-11½	120	13.555	• • • • • **Route 5** • • • • •
334	28'-4		20.62	1.0490		5'-0 5'-11½	0.137667	-0.419 0.822	Sprinkler, T(5'-0)
								13.958	Total(Pt) Route 5
765	27'-4	5.6	20.67	1	(See Notes)	0'-11½	120	13.627	• • • • • **Route 6** • • • • •
515	28'-4		20.67	1.0490		5'-0 5'-11½	0.138343	-0.419 0.826	Sprinkler, T(5'-0)
								14.034	Total(Pt) Route 6
739	27'-4	5.6	20.74	1	(See Notes)	0'-11½	120	13.715	• • • • • **Route 7** • • • • •
377	28'-4		20.74	1.0490		5'-0 5'-11½	0.139164	-0.419 0.830	Sprinkler, T(5'-0)
								14.126	Total(Pt) Route 7
753	27'-4	5.6	20.79	1	(See Notes)	0'-11½	120	13.777	• • • • • **Route 8** • • • • •
468	28'-4		20.79	1.0490		5'-0 5'-11½	0.139747	-0.419 0.834	Sprinkler, T(5'-0)
								14.192	Total(Pt) Route 8
313	18'-2½		14.22 + 1.89	4	(See Notes)	19'-4	120	30.475	• • • • • **Route 9** • • • • •
131	12'-3		16.11	4.2600		39'-6 58'-10	0.000095	2.581 0.006	Flow (q) from Route 10 and 13 3E(13'-2)
131	12'-3			1½	(See Notes)	108'-9½	120	33.061	PO(9'-11)
116	12'-3		4.62	1.6820		19'-9½ 128'-7	0.000867	 0.111	PO(9'-11)
								33.172	Total(Pt) Route 9
406	19'-8½			1½		0'-9	120	29.809	• • • • • **Route 10** • • • • •
403	18'-11½		2.33	1.6100		 0'-9	0.000302	0.331 0.000	
403	18'-11½			1½	(See Notes)	0'-9	120	30.140	
523	18'-2½		2.33	1.6820		9'-11 10'-7½	0.000244	0.322 0.003	PO(9'-11)

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
523	18'-2½		11.89	4	(See Notes)	66'-5½	120	30.465	Flow (q) from Route 11
313	18'-2½		14.22	4.2600		65'-10 132'-3½	0.000075	0.010	3E(13'-2), T(26'-4)
								30.475	Total(Pt) Route 10
391	12'-3		16.11	4		11'-7½	120	32.961	• • • • • **Route 11** • • • • •
580	12'-3		11.89	4.2600		11'-7½	0.000054	0.001	Flow (q) from Route 14
580	12'-3			4		6'-3	120	32.961	
609	12'-3		7.92	4.2600		6'-3	0.000025	0.000	
609	12'-3			4		13'-5	120	32.961	
639	12'-3		3.96	4.2600		13'-5	0.000007	0.000	
639	12'-3			1½	(See Notes)	105'-0½	120	32.962	PO(9'-11)
656	12'-3		3.96	1.6820		19'-9½ 124'-10	0.000652	0.081	PO(9'-11)
656	12'-3			4		13'-5	120	33.043	
626	12'-3		3.96	4.2600		13'-5	0.000007	0.000	
626	12'-3		3.96	4		6'-3	120	33.043	Flow (q) from Route 15
596	12'-3		7.92	4.2600		6'-3	0.000025	0.000	
596	12'-3		3.97	4	(See Notes)	16'-2½	120	33.043	Flow (q) from Route 18
523	18'-2½		11.89	4.2600		26'-4 42'-6½	0.000054	-2.581 0.002	2E(13'-2)
								30.465	Total(Pt) Route 11
391	12'-3		16.11	2½	(See Notes)	7'-5½	120	32.961	• • • • • **Route 12** • • • • •
395	19'-8½		4.22	2.6350		32'-11½ 40'-5	0.000082	-3.233 0.003	PO(16'-5½), Flow (q) from Route 14 PO(16'-5½)
395	19'-8½			1½	(See Notes)	91'-9	120	29.731	
422	19'-8½		4.22	1.6820		4'-11½ 96'-8½	0.000733	0.071	E(4'-11½)

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
422	19'-8½			1½	(See Notes)	16'-11½	120	29.801	
						14'-10	0.000244		
406	19'-8½		2.33	1.6820		31'-9½		0.008	T(9'-11), E(4'-11½)
								29.809	Total(Pt) Route 12
422	19'-8½			1½	(See Notes)	74'-3½	120	29.801	• • • • • **Route 13** • • • • •
						49'-6	0.000166	0.653	T(9'-11)
313	18'-2½		1.89	1.6820		123'-9½		0.021	2T(9'-11), 2E(4'-11½), PO(9'-11)
								30.475	Total(Pt) Route 13
427	12'-3		145.44	4		24'-3	120	32.958	• • • • • **Route 14** • • • • •
							0.000095		Flow (q) from Route 1
391	12'-3		16.11	4.2600		24'-3		0.002	
								32.961	Total(Pt) Route 14
609	12'-3			1½	(See Notes)	105'-0½	120	32.961	• • • • • **Route 15** • • • • •
						19'-9½	0.000653		PO(9'-11)
626	12'-3		3.96	1.6820		124'-10		0.082	PO(9'-11)
								33.043	Total(Pt) Route 15
131	12'-3		4.62	4		1'-9½	120	33.061	• • • • • **Route 16** • • • • •
							0.000051		Flow (q) from Route 9
115	12'-3		11.49	4.2600		1'-9½		0.000	
115	12'-3			1½	(See Notes)	108'-9½	120	33.061	PO(9'-11)
						19'-9½	0.000948		
97	12'-3		4.85	1.6820		128'-7		0.122	PO(9'-11)
								33.183	Total(Pt) Route 16
115	12'-3		4.85	4		15'-7	120	33.061	• • • • • **Route 17** • • • • •
							0.000018		Flow (q) from Route 16
67	12'-3		6.65	4.2600		15'-7		0.000	
67	12'-3			1½	(See Notes)	108'-9½	120	33.061	PO(9'-11)
						19'-9½	0.001701		
50	12'-3		6.65	1.6820		128'-7		0.219	PO(9'-11)
								33.280	Total(Pt) Route 17
580	12'-3			1½	(See Notes)	105'-0½	120	32.961	• • • • • **Route 18** • • • • •
						19'-9½	0.000656		PO(9'-11)
596	12'-3		3.97	1.6820		124'-10		0.082	PO(9'-11)

Job Name: HIGHLAND ELEMENTARY
Remote Area Number: A

Date: 4/19/2023

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
								33.043	Total(Pt) Route 18

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BalV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connectic	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Overview

Job Number: B22243 - HIGHLAND ELEMENTARY
Report Description: Light Hazard (B)

Job

Job Number: B22243	Designer:
Job Name: HIGHLAND ELEMENTARY	Phone: 919.243.2464 FAX:
Address 1: 1915 BUFFALO LAKE ROAD	State Certification/License Number: 16269FS
Address 2: SANFORD, NC 27332	AHJ: HARNETT CO
Address 3:	Job Site/Building: HARNETT CO SCHOOLS

System

Density: 0.10 gpm/ft²	Area of Application: 1500 ft² (Actual 1639 ft²)
Most Demanding Sprinkler Data: 8 K-Factor 32.98 at 17.000	Hose Streams: 100.00
Coverage Per Sprinkler: 324 ft²	Number Of Sprinklers Calculated: 9 0
System Pressure Demand: 49.509	System Flow Demand: 310.22
Total Demand: 410.22 @ 49.509	Pressure Result: +15.968 (24.4%)

Supplies

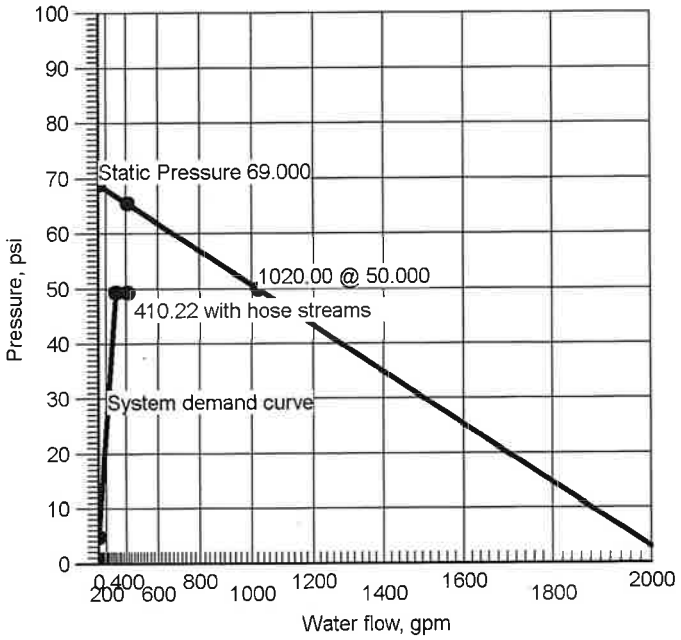
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	1020.00	100.00	69.000	50.000

Check Point Gauges

Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
BOR (13)	36.483	51.36	310.22

PIPING NO PUMP

Water Supply at Node 1 (1020.00, 100.00, 69.000, 50.000)



Hydraulic Calculations

for

Project Name: HIGHLAND ELEMENTARY
Location: 1915 BUFFALO LAKE ROAD, SANFORD, NC 27332,
Drawing Name: PIPING NO PUMP

Calculation Date: 4/19/2023

Design

Remote Area Number:	B
Remote Area Location:	CLASSROOMS
Occupancy Classification:	Light Hazard
Commodity Classification:	N/A
Density	0.10 gpm/ft²
Area of Application:	1500 ft² (Actual 1639 ft²)
Coverage per Sprinkler:	324 ft²
Type of sprinklers calculated:	Pendent
No. of sprinklers calculated:	9
No. of nozzles calculated:	0

In-rack Demand: N/A gpm at Node: N/A

Hose Streams: 100.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 1: 410.22 @ 49.509 (Safety Margin = 15.968)

Type of System: WET

Volume of Dry/PreAction/Antifreeze/OtherA N/A

Name of Contractor:
Address:
Phone Number:
Name of designer:
Authority Having Jurisdiction: HARNETT CO

Notes:

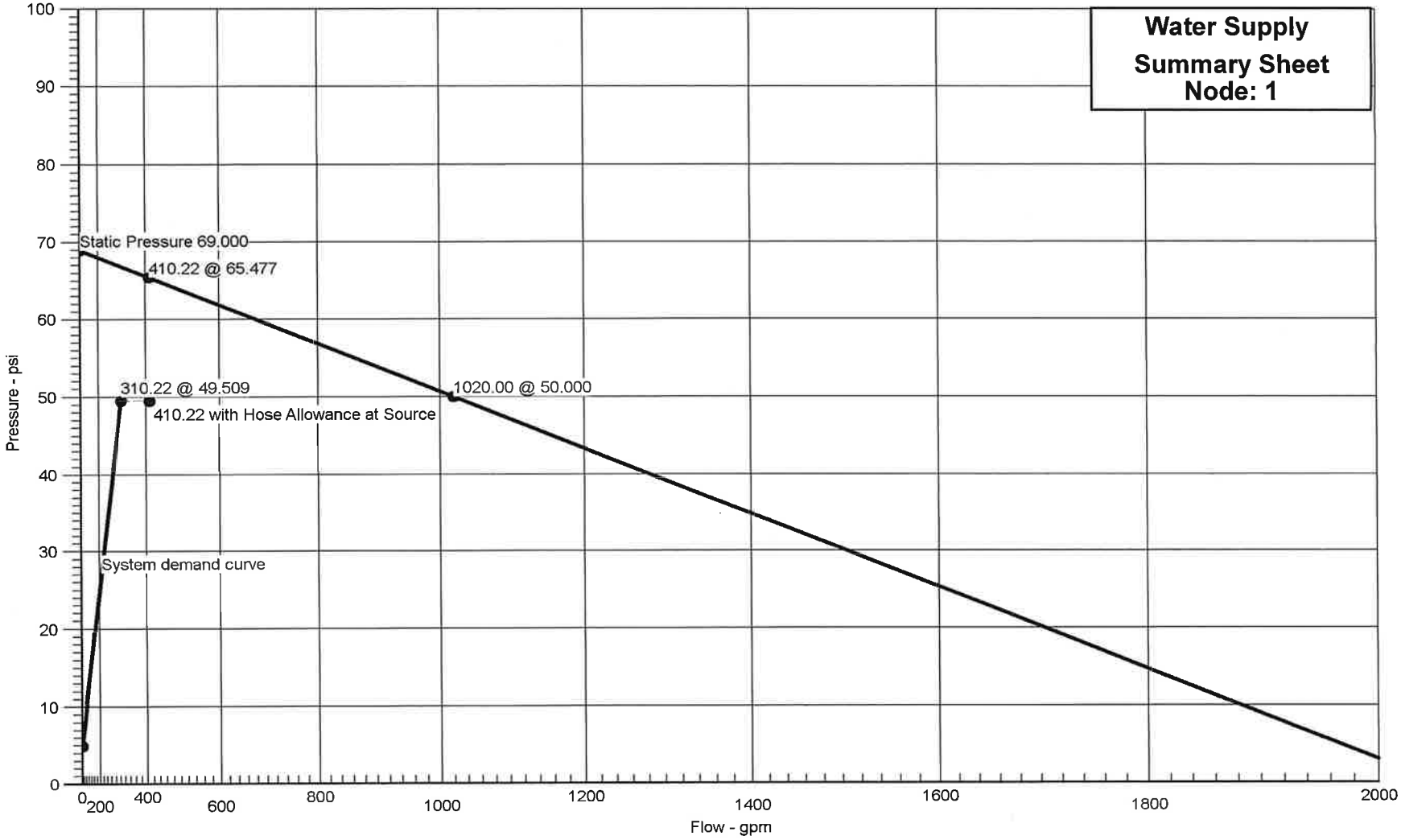
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: HIGHLAND ELEMENTARY
Remote Area Number: B

$N^{1.85}$

Date: 4/19/2023



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	771	33.53	32.98	8	17.562			
Sprinkler	773	33.45	32.98	8	17.484			
⇨ **Sprinkler**	**774**	**32.98**	**32.98**	**8**	**17.000**			
Sprinkler	779	34.87	32.98	8	18.998			
Sprinkler	780	34.92	32.98	8	19.053			
Sprinkler	784	35.04	32.98	8	19.190			
Sprinkler	789	35.07	32.98	8	19.212			
Sprinkler	790	35.12	32.98	8	19.270			
Sprinkler	794	35.24	32.98	8	19.406			

⇨ Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	69.000	50.000	1020.00	65.477	410.22	49.509

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
116	12'-3		30.122		
131	12'-3		25.812		
313	18'-2½		23.064		
391	12'-3		29.440		
395	19'-8½		26.121		
403	18'-11½		22.496		
406	19'-8½		22.182		
422	19'-8½		22.749		
523	18'-2½		22.628		
580	12'-3		29.347		
596	12'-3		25.007		
601	12'-3		23.676		
603	12'-3		23.343		
605	12'-3		23.384		
609	12'-3		29.324		
626	12'-3		24.992		
631	12'-3		23.216		
633	12'-3		22.974		
635	12'-3		23.044		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
639	12'-3		29.310		
656	12'-3		24.983		
661	12'-3		23.171		
663	12'-3		22.929		
665	12'-3		23.001		
1	-2'-5	Supply	49.509	310.22	
771	9'-0	Sprinkler	17.562	33.53	
773	9'-0	Sprinkler	17.484	33.45	
774	9'-0	Sprinkler	17.000	32.98	
779	9'-0	Sprinkler	18.998	34.87	
780	9'-0	Sprinkler	19.053	34.92	
784	9'-0	Sprinkler	19.190	35.04	
789	9'-0	Sprinkler	19.212	35.07	
790	9'-0	Sprinkler	19.270	35.12	
794	9'-0	Sprinkler	19.406	35.24	
8	1'-8		47.493		
13	1'-8	Gauge	36.483		
18	12'-3		31.637		
50	12'-3		30.430		
67	12'-3		25.820		
97	12'-3		30.148		
106	1'-8		47.550		
115	12'-3		25.814		

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step / Total Flow (q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value
774	9'-0	8	32.98	1	(See Notes)	8'-8½	120	17.000	••••• Route 1 •••••
						15'-0	0.328366	-1.401	Sprinkler,
605	12'-3		32.98	1.0490		23'-8½		7.785	5E(2'-0), PO(5'-0)
605	12'-3		8.19	1½	(See Notes)	22'-9½	120	23.384	Flow (q) from Route 16
						9'-11	0.049652		
596	12'-3		41.17	1.6820		32'-8		1.623	PO(9'-11)
596	12'-3		92.30	4	(See Notes)	16'-2½	120	25.007	Flow (q) from Route 5
						26'-4	0.004736	-2.581	
523	18'-2½		133.47	4.2600		42'-6½		0.202	2E(13'-2)
523	18'-2½			4	(See Notes)	66'-5½	120	22.628	
						65'-10	0.003300		
313	18'-2½		109.79	4.2600		132'-3½		0.437	3E(13'-2), T(26'-4)
313	18'-2½			4	(See Notes)	19'-4	120	23.064	
						39'-6	0.002838	2.581	
131	12'-3		101.21	4.2600		58'-10		0.167	3E(13'-2)
131	12'-3			1½	(See Notes)	108'-9½	120	25.812	PO(9'-11)
						19'-9½	0.033515		
116	12'-3		33.29	1.6820		128'-7		4.310	PO(9'-11)
116	12'-3		209.01	4		1'-9½	120	30.122	Flow (q) from Route 2
							0.014273		
97	12'-3		242.31	4.2600		1'-9½		0.026	
97	12'-3		33.39	4		15'-7	120	30.148	Flow (q) from Route 14
							0.018123		
50	12'-3		275.70	4.2600		15'-7		0.282	
50	12'-3		34.52	4	(See Notes)	14'-1	120	30.430	Flow (q) from Route 15
						39'-6	0.022543	0.000	
18	12'-3		310.22	4.2600		53'-7		1.208	E(13'-2), PO(26'-4)
18	12'-3			6	(See Notes)	9'-9½	120	31.637	
						70'-5	0.003209	4.588	
13	1'-8		310.22	6.3570		80'-2½		0.257	sCV(40'-3), BV(12'-7), E(17'-7), BOR
13	1'-8			6	(See Notes)	3'-3	120	36.483	
							0.003209	-0.000	
8	1'-8		310.22	6.3570		3'-3		11.010	BFP(-11.000)

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
8	1'-8			6	(See Notes)	0'-0	140	47.493	
106	1'-8		310.22	6.2800		22'-1 22'-1	0.002561	-0.000 0.056	E(22'-1)
106	1'-8			6	(See Notes)	53'-0	140	47.550	
1	-2'-5		310.22	6.2800		22'-1 75'-1	0.002561	1.767 0.192	E(22'-1), S
			100.00					49.509	Hose Allowance At Source
1			410.22						Total(Pt) Route 1
773	9'-0	8	33.45	1	(See Notes)	8'-6½	120	17.484	• • • • • **Route 2** • • • • • Sprinkler,
603	12'-3		33.45	1.0490		13'-0 21'-6½	0.337005	-1.401 7.260	4E(2'-0), PO(5'-0)
603	12'-3			1½		16'-6½	120	23.343	
601	12'-3		25.26	1.6820		16'-6½	0.020111	0.333	
601	12'-3		33.53	1½	(See Notes)	49'-2½	120	23.676	Flow (q) from Route 3
580	12'-3		58.79	1.6820		9'-11 59'-1½	0.095952	5.671	PO(9'-11)
580	12'-3		117.96	4		11'-7½	120	29.347	Flow (q) from Route 4
391	12'-3		176.75	4.2600		11'-7½	0.007962	0.093	
391	12'-3		32.27	4		62'-10	120	29.440	Flow (q) from Route 10
116	12'-3		209.01	4.2600		62'-10	0.010858	0.682	
								30.122	Total(Pt) Route 2
771	9'-0	8	33.53	1	(See Notes)	9'-2½	120	17.562	• • • • • **Route 3** • • • • • Sprinkler,
601	12'-3		33.53	1.0490		13'-0 22'-2½	0.338390	-1.401 7.515	4E(2'-0), PO(5'-0)
								23.676	Total(Pt) Route 3
779	9'-0	8	34.87	1	(See Notes)	5'-9½	120	18.998	• • • • • **Route 4** • • • • • Sprinkler,
633	12'-3		34.87	1.0490		9'-0 14'-9½	0.363913	-1.401 5.378	2E(2'-0), PO(5'-0)

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes (Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
633	12'-3			1½		13'-4½	120	22.974	
631	12'-3		23.85	1.6820		13'-4½	0.018085	0.242	
631	12'-3		35.04	1½	(See Notes)	53'-6½	120	23.216	Flow (q) from Route 6
609	12'-3		58.90	1.6820		9'-11 63'-5	0.096284	6.107	PO(9'-11)
609	12'-3		59.06	4		6'-3	120	29.324	Flow (q) from Route 7
580	12'-3		117.96	4.2600		6'-3	0.003768	0.023	
								29.347	Total(Pt) Route 4
780	9'-0	8	34.92	1	(See Notes)	5'-9½	120	19.053	• • • • • **Route 5** • • • • • Sprinkler,
635	12'-3		34.92	1.0490		9'-0 14'-9½	0.364887	-1.401 5.392	2E(2'-0), PO(5'-0)
635	12'-3		11.02	1½	(See Notes)	22'-1½	120	23.044	Flow (q) from Route 13
626	12'-3		45.94	1.6820		9'-11 32'-0½	0.060797	1.948	PO(9'-11)
626	12'-3		46.36	4		6'-3	120	24.992	Flow (q) from Route 8
596	12'-3		92.30	4.2600		6'-3	0.002394	0.015	
								25.007	Total(Pt) Route 5
784	9'-0	8	35.04	1	(See Notes)	5'-9½	120	19.190	• • • • • **Route 6** • • • • • Sprinkler,
631	12'-3		35.04	1.0490		9'-0 14'-9½	0.367310	-1.401 5.428	2E(2'-0), PO(5'-0)
								23.216	Total(Pt) Route 6
789	9'-0	8	35.07	1	(See Notes)	4'-11	120	19.212	• • • • • **Route 7** • • • • • Sprinkler,
663	12'-3		35.07	1.0490		9'-0 13'-11	0.367705	-1.401 5.118	2E(2'-0), PO(5'-0)
663	12'-3			1½		13'-4½	120	22.929	
661	12'-3		23.82	1.6820		13'-4½	0.018040	0.241	
661	12'-3		35.24	1½	(See Notes)	53'-6½	120	23.171	Flow (q) from Route 9
639	12'-3		59.06	1.6820		9'-11 63'-5	0.096784	6.139	PO(9'-11)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes
639	12'-3			4		13'-5	120	29.310	
							0.001048		
609	12'-3		59.06	4.2600		13'-5		0.014	
								29.324	Total(Pt) Route 7
790	9'-0	8	35.12	1	(See Notes)	4'-11	120	19.270	• • • • • **Route 8** • • • • • Sprinkler,
						9'-0	0.368727	-1.401	
665	12'-3		35.12	1.0490		13'-11		5.133	2E(2'-0), PO(5'-0)
665	12'-3		11.24	1½	(See Notes)	22'-1½	120	23.001	Flow (q) from Route 12
						9'-11	0.061843		
656	12'-3		46.36	1.6820		32'-0½		1.982	PO(9'-11)
656	12'-3			4		13'-5	120	24.983	
							0.000670		
626	12'-3		46.36	4.2600		13'-5		0.009	
								24.992	Total(Pt) Route 8
794	9'-0	8	35.24	1	(See Notes)	4'-11	120	19.406	• • • • • **Route 9** • • • • • Sprinkler,
						9'-0	0.371130	-1.401	
661	12'-3		35.24	1.0490		13'-11		5.166	2E(2'-0), PO(5'-0)
								23.171	Total(Pt) Route 9
313	18'-2½			1½	(See Notes)	74'-3½	120	23.064	• • • • • **Route 10** • • • • • PO(9'-11)
						49'-6	0.002729	-0.653	
422	19'-8½		8.58	1.6820		123'-9½		0.338	2E(4'-11½), 3T(9'-11)
422	19'-8½		23.69	1½	(See Notes)	91'-9	120	22.749	Flow (q) from Route 11
						14'-10	0.031630		
395	19'-8½		32.27	1.6820		106'-7½		3.372	E(4'-11½), PO(9'-11)
395	19'-8½			2½	(See Notes)	7'-5½	120	26.121	
						16'-5½	0.003554	3.233	
391	12'-3		32.27	2.6350		23'-11		0.085	PO(16'-5½)
								29.440	Total(Pt) Route 10
523	18'-2½			1½	(See Notes)	0'-9	120	22.628	• • • • • **Route 11** • • • • • PO(9'-11)
						9'-11	0.017852	-0.322	
403	18'-11½		23.69	1.6820		10'-7½		0.190	

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
403	18'-11½			1½		0'-9	120	22.496	
406	19'-8½		23.69	1.6100		0'-9	0.022091	-0.331 0.017	
406	19'-8½			1½	(See Notes)	16'-11½	120	22.182	E(4'-11½)
422	19'-8½		23.69	1.6820		14'-10 31'-9½	0.017852	0.568	T(9'-11)
								22.749	Total(Pt) Route 11
663	12'-3		23.82	1½		16'-0	120	22.929	• • • • • **Route 12** • • • • • Flow (q) from Route 7
665	12'-3		11.24	1.6820		16'-0	0.004499	0.072	
								23.001	Total(Pt) Route 12
633	12'-3		23.85	1½		16'-0	120	22.974	• • • • • **Route 13** • • • • • Flow (q) from Route 4
635	12'-3		11.02	1.6820		16'-0	0.004332	0.069	
								23.044	Total(Pt) Route 13
131	12'-3		33.29	4		1'-9½	120	25.812	• • • • • **Route 14** • • • • • Flow (q) from Route 1
115	12'-3		67.91	4.2600		1'-9½	0.001357	0.002	
115	12'-3			1½	(See Notes)	108'-9½	120	25.814	PO(9'-11)
97	12'-3		33.39	1.6820		19'-9½ 128'-7	0.033695	4.333	PO(9'-11)
								30.148	Total(Pt) Route 14
115	12'-3		33.39	4		15'-7	120	25.814	• • • • • **Route 15** • • • • • Flow (q) from Route 14
67	12'-3		34.52	4.2600		15'-7	0.000388	0.006	
67	12'-3			1½	(See Notes)	108'-9½	120	25.820	PO(9'-11)
50	12'-3		34.52	1.6820		19'-9½ 128'-7	0.035841	4.609	PO(9'-11)
								30.430	Total(Pt) Route 15
603	12'-3		25.26	1½		16'-6	120	23.343	• • • • • **Route 16** • • • • • Flow (q) from Route 2
605	12'-3		8.19	1.6820		16'-6	0.002503	0.041	
								23.384	Total(Pt) Route 16

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BalV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connectic	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Overview

Job

Job Number: B22243	Designer:
Job Name: HIGHLAND ELEMENTARY	Phone: 919.243.2464 FAX:
Address 1: 1915 BUFFALO LAKE ROAD	State Certification/License Number: 16269FS
Address 2: SANFORD, NC 27332	AHJ: HARNETT CO
Address 3:	Job Site/Building: HARNETT CO SCHOOLS

System

Density: 0.10 gpm/ft²	Area of Application: 1500 ft² (Actual 1514 ft²)
Most Demanding Sprinkler Data: 8 K-Factor 32.98 at 17.000	Hose Streams: 100.00
Coverage Per Sprinkler: 324 ft²	Number Of Sprinklers Calculated: 8 0
System Pressure Demand: 53.901	System Flow Demand: 285.19
Total Demand: 385.19 @ 53.901	Pressure Result: +11.963 (18.2%)

Supplies

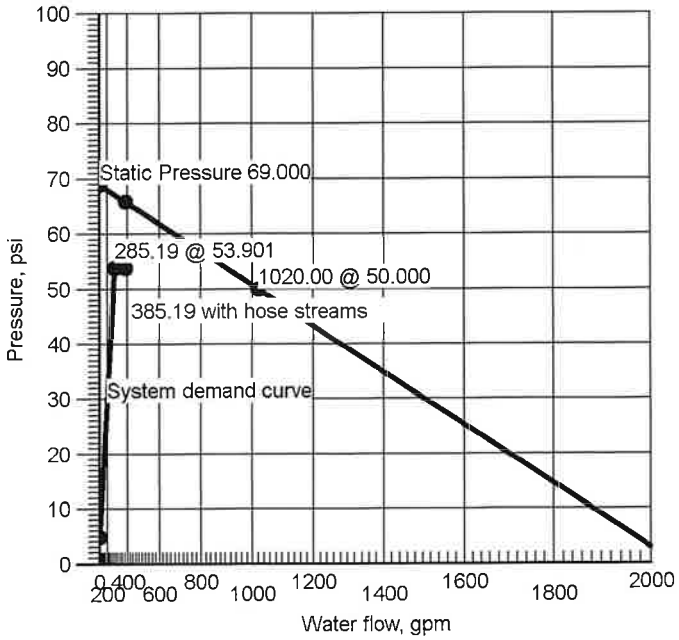
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	1020.00	100.00	69.000	50.000

Check Point Gauges

Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
BOR (13)	40.912	44.59	285.19

PIPING NO PUMP

Water Supply at Node 1 (1020.00, 100.00, 69.000, 50.000)



Hydraulic Calculations

for

Project Name: HIGHLAND ELEMENTARY
Location: 1915 BUFFALO LAKE ROAD, SANFORD, NC 27332,
Drawing Name: PIPING NO PUMP

Calculation Date: 4/19/2023

Design

Remote Area Number:	C
Remote Area Location:	CLASSROOMS
Occupancy Classification:	Light Hazard
Commodity Classification:	N/A
Density	0.10 gpm/ft²
Area of Application:	1500 ft² (Actual 1514 ft²)
Coverage per Sprinkler:	324 ft²
Type of sprinklers calculated:	Pendent
No. of sprinklers calculated:	8
No. of nozzles calculated:	0

In-rack Demand:	N/A gpm	at Node:	N/A		
Hose Streams:	100.00	at Node:	1	Type:	Allowance at Source

Total Water Required (including Hose Streams where applicable):
From Water Supply at Node 1: 385.19 @ 53.901 (Safety Margin = 11.963)
Type of System: WET
Volume of Dry/PreAction/Antifreeze/OtherA N/A

Name of Contractor:
Address:
Phone Number:
Name of designer:
Authority Having Jurisdiction: HARNETT CO

Notes:

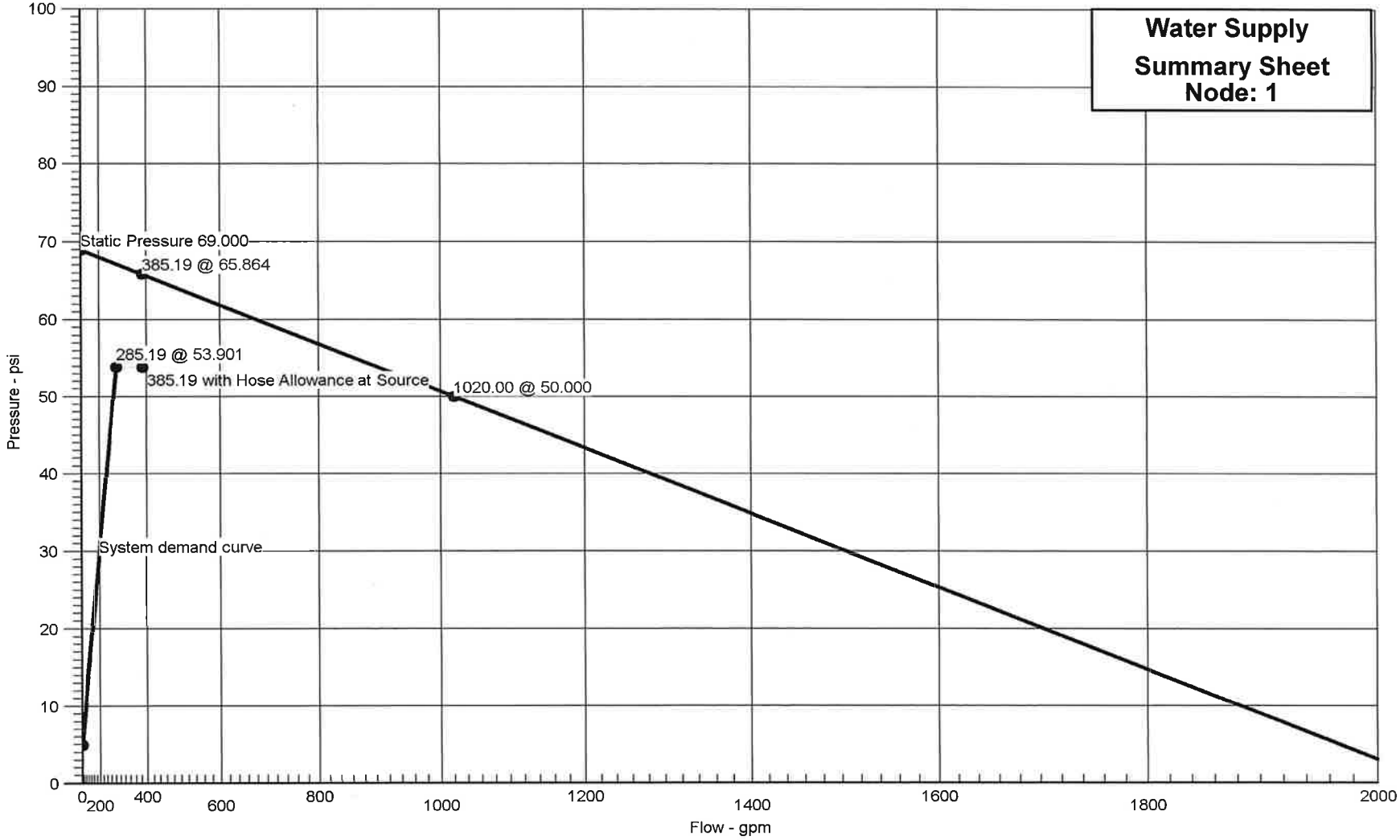
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: HIGHLAND ELEMENTARY
Remote Area Number: C

$N^{1.85}$

Date: 4/19/2023



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	660	36.45	32.98	8	20.762			
Sprinkler	751	35.04	32.98	8	19.186			
Sprinkler	752	35.19	32.98	8	19.345			
Sprinkler	755	36.43	32.98	8	20.741			
⇨ **Sprinkler**	**756**	**32.98**	**32.98**	**8**	**17.000**			
Sprinkler	762	35.84	32.98	8	20.073			
Sprinkler	763	35.99	32.98	8	20.239			
Sprinkler	764	37.26	32.98	8	21.695			

⇨ Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	69.000	50.000	1020.00	65.864	385.19	53.901

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	-2'-5	Supply	53.901	285.19	
660	9'-0	Sprinkler	20.762	36.45	
751	9'-0	Sprinkler	19.186	35.04	
752	9'-0	Sprinkler	19.345	35.19	
755	9'-0	Sprinkler	20.741	36.43	
756	9'-0	Sprinkler	17.000	32.98	
762	9'-0	Sprinkler	20.073	35.84	
763	9'-0	Sprinkler	20.239	35.99	
764	9'-0	Sprinkler	21.695	37.26	
8	1'-8		51.921		
13	1'-8	Gauge	40.912		
18	12'-3		36.104		
50	12'-3		35.070		
67	12'-3		28.563		
97	12'-3		34.846		
106	1'-8		51.970		
115	12'-3		28.555		
116	12'-3		34.828		
131	12'-3		28.551		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
301	12'-3		27.951		
313	18'-2½		25.730		
391	12'-3		34.402		
395	19'-8½		31.039		
403	18'-11½		25.496		
406	19'-8½		25.186		
422	19'-8½		25.895		
435	12'-3		22.916		
437	12'-3		23.114		
443	12'-3		25.306		
444	12'-3		25.651		
447	12'-3		27.934		
490	12'-2		23.891		
492	12'-2		24.097		
493	12'-3		26.553		
496	12'-3		27.941		
523	18'-2½		25.581		
580	12'-3		34.356		
596	12'-3		28.331		
609	12'-3		34.344		
626	12'-3		28.342		
639	12'-3		34.337		
656	12'-3		28.349		

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
756	9'-0	8	32.98	1	(See Notes)	14'-6½	120	17.000	• • • • • Route 1 • • • • •
						15'-0	0.328366	-1.401	Sprinkler,
443	12'-3		32.98	1.0490		29'-6½		9.707	5E(2'-0), PO(5'-0)
443	12'-3		70.23	2		4'-3	120	25.306	Flow (q) from Route 2
							0.080949		
444	12'-3		103.21	2.1570		4'-3		0.344	
444	12'-3		36.43	2	(See Notes)	3'-10	120	25.651	Flow (q) from Route 6
						12'-3½	0.141615		PO(12'-3½)
447	12'-3		139.65	2.1570		16'-1½		2.283	
447	12'-3			4		6'-1½	120	27.934	
							0.002808		
301	12'-3		100.62	4.2600		6'-1½		0.017	
301	12'-3		36.45	4	(See Notes)	32'-10½	120	27.951	Flow (q) from Route 7
						39'-6	0.004975	-2.581	
313	18'-2½		137.07	4.2600		72'-4½		0.360	T(26'-4), E(13'-2)
313	18'-2½			4	(See Notes)	19'-4	120	25.730	
						39'-6	0.004086	2.581	
131	12'-3		123.23	4.2600		58'-10		0.240	3E(13'-2)
131	12'-3			1½	(See Notes)	108'-9½	120	28.551	PO(9'-11)
						19'-9½	0.048805		
116	12'-3		40.79	1.6820		128'-7		6.276	PO(9'-11)
116	12'-3		161.96	4		1'-9½	120	34.828	Flow (q) from Route 4
							0.010264		
97	12'-3		202.75	4.2600		1'-9½		0.018	
97	12'-3		40.85	4		15'-7	120	34.846	Flow (q) from Route 16
							0.014414		
50	12'-3		243.60	4.2600		15'-7		0.224	
50	12'-3		41.60	4	(See Notes)	14'-1	120	35.070	Flow (q) from Route 17
						39'-6	0.019295	0.000	
18	12'-3		285.19	4.2600		53'-7		1.034	E(13'-2), PO(26'-4)
18	12'-3			6	(See Notes)	9'-9½	120	36.104	
						70'-5	0.002747	4.588	
13	1'-8		285.19	6.3570		80'-2½		0.220	sCV(40'-3), BV(12'-7), E(17'-7), BOR

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
13	1'-8			6	(See Notes)	3'-3	120	40.912	
							0.002747	-0.000	BFP(-11.000)
8	1'-8		285.19	6.3570		3'-3		11.009	
8	1'-8			6	(See Notes)	0'-0	140	51.921	
						22'-1	0.002192	-0.000	E(22'-1)
106	1'-8		285.19	6.2800		22'-1		0.048	
106	1'-8			6	(See Notes)	53'-0	140	51.970	
						22'-1	0.002192	1.767	E(22'-1), S
1	-2'-5		285.19	6.2800		75'-1		0.165	
			100.00					53.901	Hose Allowance At Source
1			385.19						Total(Pt) Route 1
751	9'-0	8	35.04	1	(See Notes)	4'-11½	120	19.186	• • • • • **Route 2** • • • • •
						9'-0	0.367249	-1.401	Sprinkler,
435	12'-3		35.04	1.0490		13'-11½		5.131	2E(2'-0), PO(5'-0)
435	12'-3			2		18'-0	120	22.916	
							0.010972		
437	12'-3		35.04	2.1570		18'-0		0.197	
437	12'-3		35.19	2	(See Notes)	30'-7	120	23.114	Flow (q) from Route 3
						24'-7½	0.039705		
443	12'-3		70.23	2.1570		55'-2½		2.192	4E(6'-2)
								25.306	Total(Pt) Route 2
752	9'-0	8	35.19	1	(See Notes)	4'-11½	120	19.345	• • • • • **Route 3** • • • • •
						9'-0	0.370051	-1.401	Sprinkler,
437	12'-3		35.19	1.0490		13'-11½		5.170	2E(2'-0), PO(5'-0)
								23.114	Total(Pt) Route 3
762	9'-0	8	35.84	1	(See Notes)	4'-6½	120	20.073	• • • • • **Route 4** • • • • •
						9'-0	0.382921	-1.365	Sprinkler,
490	12'-2		35.84	1.0490		13'-6½		5.183	2E(2'-0), PO(5'-0)
490	12'-2			2		18'-0	120	23.891	
							0.011440		
492	12'-2		35.84	2.1570		18'-0		0.206	

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
492	12'-2		35.99	2	(See Notes)	35'-7	120	24.097	Flow (q) from Route 5
						24'-7½	0.041400	-0.036	
493	12'-3		71.83	2.1570		60'-2½		2.492	4E(6'-2)
493	12'-3		37.26	2	(See Notes)	3'-2	120	26.553	Flow (q) from Route 8
						12'-3½	0.089689		
496	12'-3		109.09	2.1570		15'-6		1.388	PO(12'-3½)
496	12'-3		39.03	4	(See Notes)	12'-0½	120	27.941	Flow (q) from Route 12
						26'-4	0.005742	-2.581	
523	18'-2½		148.12	4.2600		38'-4½		0.220	2E(13'-2)
523	18'-2½			4	(See Notes)	16'-2½	120	25.581	
						26'-4	0.003975	2.581	
596	12'-3		121.42	4.2600		42'-6½		0.169	2E(13'-2)
596	12'-3			1½	(See Notes)	105'-0½	120	28.331	PO(9'-11)
						19'-9½	0.048260		
580	12'-3		40.55	1.6820		124'-10		6.025	PO(9'-11)
580	12'-3		80.87	4		11'-7½	120	34.356	Flow (q) from Route 11
							0.003975		
391	12'-3		121.42	4.2600		11'-7½		0.046	
391	12'-3		40.54	4		62'-10	120	34.402	Flow (q) from Route 9
							0.006774		
116	12'-3		161.96	4.2600		62'-10		0.426	
								34.828	Total(Pt) Route 4
763	9'-0	8	35.99	1	(See Notes)	4'-6½	120	20.239	• • • • • **Route 5** • • • • • Sprinkler,
						9'-0	0.385854	-1.365	
492	12'-2		35.99	1.0490		13'-6½		5.223	2E(2'-0), PO(5'-0)
								24.097	Total(Pt) Route 5
755	9'-0	8	36.43	1	(See Notes)	7'-0	120	20.741	• • • • • **Route 6** • • • • • Sprinkler,
						9'-0	0.394700	-1.401	
444	12'-3		36.43	1.0490		16'-0		6.310	2E(2'-0), PO(5'-0)
								25.651	Total(Pt) Route 6
660	9'-0	8	36.45	1	(See Notes)	10'-9	120	20.762	• • • • • **Route 7** • • • • • Sprinkler,
						11'-0	0.395065	-1.409	
301	12'-3		36.45	1.0490		21'-9		8.598	3E(2'-0), PO(5'-0)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
								27.951	Total(Pt) Route 7
764	9'-0	8	37.26	1	(See Notes)	6'-2½	120	21.695	• • • • • **Route 8** • • • • •
						9'-0	0.411454	-1.401	Sprinkler,
493	12'-3		37.26	1.0490		15'-2½		6.259	2E(2'-0), PO(5'-0)
								26.553	Total(Pt) Route 8
313	18'-2½			1½	(See Notes)	74'-3½	120	25.730	• • • • • **Route 9** • • • • •
						49'-6	0.006604	-0.653	PO(9'-11)
422	19'-8½		13.84	1.6820		123'-9½		0.817	2E(4'-11½), 3T(9'-11)
422	19'-8½		26.71	1½	(See Notes)	91'-9	120	25.895	Flow (q) from Route 10
						14'-10	0.048251		
395	19'-8½		40.54	1.6820		106'-7½		5.144	E(4'-11½), PO(9'-11)
395	19'-8½			2½	(See Notes)	7'-5½	120	31.039	
						16'-5½	0.005421	3.233	
391	12'-3		40.54	2.6350		23'-11		0.130	PO(16'-5½)
								34.402	Total(Pt) Route 9
523	18'-2½			1½	(See Notes)	0'-9	120	25.581	• • • • • **Route 10** • • • • •
						9'-11	0.022289	-0.322	PO(9'-11)
403	18'-11½		26.71	1.6820		10'-7½		0.237	
403	18'-11½			1½		0'-9	120	25.496	
							0.027581	-0.331	
406	19'-8½		26.71	1.6100		0'-9		0.021	
406	19'-8½			1½	(See Notes)	16'-11½	120	25.186	E(4'-11½)
						14'-10	0.022289		
422	19'-8½		26.71	1.6820		31'-9½		0.709	T(9'-11)
								25.895	Total(Pt) Route 10
639	12'-3		40.41	4		13'-5	120	34.337	• • • • • **Route 11** • • • • •
							0.000519		Flow (q) from Route 14
609	12'-3		40.41	4.2600		13'-5		0.007	
609	12'-3		40.46	4		6'-3	120	34.344	Flow (q) from Route 13
							0.001874		
580	12'-3		80.87	4.2600		6'-3		0.012	
								34.356	Total(Pt) Route 11

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step / Total Flow (q / Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes
									Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
447	12'-3		100.62	4		15'-5½	120	27.934	• • • • • **Route 12** • • • • • Flow (q) from Route 1
496	12'-3		39.03	4.2600		15'-5½	0.000487	0.008	
								27.941	Total(Pt) Route 12
626	12'-3		80.87	1½	(See Notes)	105'-0½	120	28.342	• • • • • **Route 13** • • • • • PO(9'-11), Flow (q) from Route 15
						19'-9½			
609	12'-3		40.46	1.6820		124'-10	0.048073	6.002	PO(9'-11)
								34.344	Total(Pt) Route 13
626	12'-3		80.87	4		13'-5	120	28.342	• • • • • **Route 14** • • • • • Flow (q) from Route 15
656	12'-3		40.41	4.2600		13'-5	0.000519	0.007	
656	12'-3			1½	(See Notes)	105'-0½	120	28.349	PO(9'-11)
						19'-9½			
639	12'-3		40.41	1.6820		124'-10	0.047961	5.988	PO(9'-11)
								34.337	Total(Pt) Route 14
596	12'-3		40.55	4		6'-3	120	28.331	• • • • • **Route 15** • • • • • Flow (q) from Route 4
626	12'-3		80.87	4.2600		6'-3	0.001874	0.012	
								28.342	Total(Pt) Route 15
131	12'-3		40.79	4		1'-9½	120	28.551	• • • • • **Route 16** • • • • • Flow (q) from Route 1
115	12'-3		82.44	4.2600		1'-9½	0.001942	0.003	
115	12'-3			1½	(See Notes)	108'-9½	120	28.555	PO(9'-11)
						19'-9½			
97	12'-3		40.85	1.6820		128'-7	0.048921	6.291	PO(9'-11)
								34.846	Total(Pt) Route 16
115	12'-3		40.85	4		15'-7	120	28.555	• • • • • **Route 17** • • • • • Flow (q) from Route 16
67	12'-3		41.60	4.2600		15'-7	0.000548	0.009	
67	12'-3			1½	(See Notes)	108'-9½	120	28.563	PO(9'-11)
						19'-9½			
50	12'-3		41.60	1.6820		128'-7	0.050599	6.507	PO(9'-11)
								35.070	Total(Pt) Route 17

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BalV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connectic	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Overview

Job Number: B22243 - HIGHLAND ELEMENTARY
Report Description: Ordinary Group I (D)

Job

Job Number: B22243	Designer:
Job Name: HIGHLAND ELEMENTARY	Phone: 919.243.2464 FAX:
Address 1: 1915 BUFFALO LAKE ROAD	State Certification/License Number: 16269FS
Address 2: SANFORD, NC 27332	AHJ: HARNETT CO
Address 3:	Job Site/Building: HARNETT CO SCHOOLS

System

Density: 0.15 gpm/ft²	Area of Application: 1500 ft² (Actual 349 ft²)
Most Demanding Sprinkler Data: 5.6 K-Factor 19.50 at 12.125	Hose Streams: 250.00
Coverage Per Sprinkler: 130 ft²	Number Of Sprinklers Calculated: 5 0
System Pressure Demand: 36.465	System Flow Demand: 98.05
Total Demand: 348.05 @ 36.465	Pressure Result: +29.936 (45.1%)

Supplies

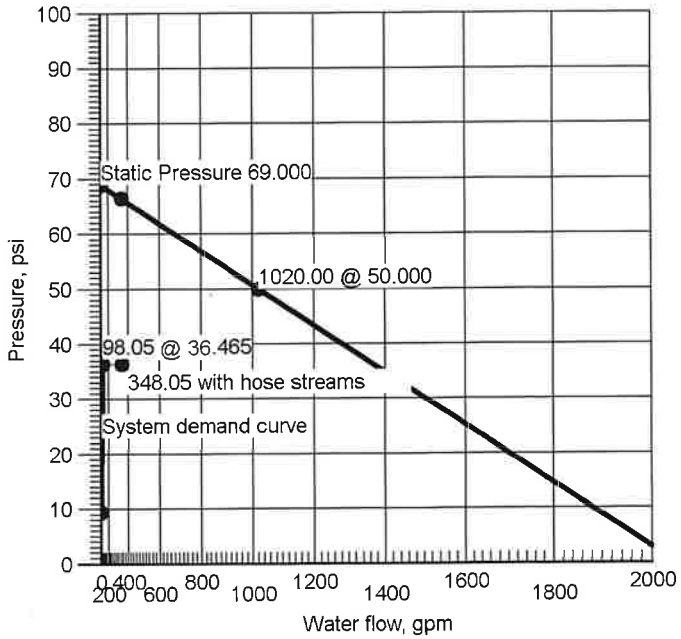
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	1020.00	250.00	69.000	50.000

Check Point Gauges

Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
BOR (13)	23.667	20.15	98.05

PIPING NO PUMP

Water Supply at Node 1 (1020.00, 100.00, 69.000, 50.000)



Hydraulic Calculations

for

Project Name: HIGHLAND ELEMENTARY
Location: 1915 BUFFALO LAKE ROAD, SANFORD, NC 27332,
Drawing Name: PIPING NO PUMP

Calculation Date: 4/19/2023

Design

Remote Area Number:	D
Remote Area Location:	MEZZ
Occupancy Classification:	Ordinary Group I
Commodity Classification:	N/A
Density	0.15 gpm/ft²
Area of Application:	1500 ft² (Actual 349 ft²)
Coverage per Sprinkler:	130 ft²
Type of sprinklers calculated:	Upright
No. of sprinklers calculated:	5
No. of nozzles calculated:	0

In-rack Demand: N/A gpm at Node: N/A

Hose Streams: 250.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 1: 348.05 @ 36.465 (Safety Margin = 29.936)

Type of System: WET

Volume of Dry/PreAction/Antifreeze/OtherA N/A

Name of Contractor:
Address: ,
Phone Number:
Name of designer:
Authority Having Jurisdiction:HARNETT CO

Notes:

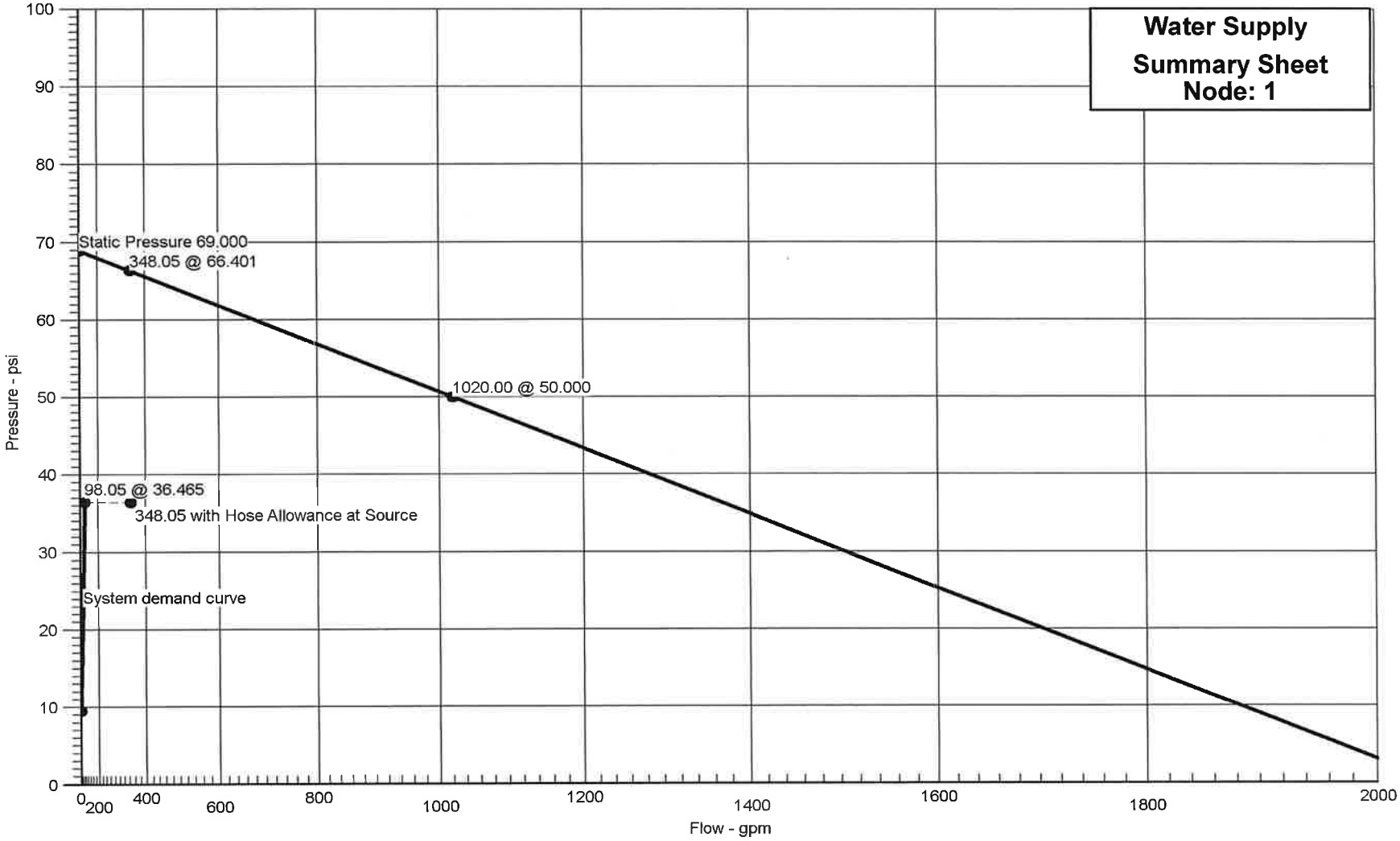
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: HIGHLAND ELEMENTARY
Remote Area Number: D

$N^{1.85}$

Date: 4/19/2023



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	678	19.68	19.50	5.6	12.351			
Sprinkler	679	19.51	19.50	5.6	12.141			
⇨ **Sprinkler**	**680**	**19.50**	**19.50**	**5.6**	**12.125**			
Sprinkler	681	19.55	19.50	5.6	12.186			
Sprinkler	682	19.81	19.50	5.6	12.510			

⇨ Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	69.000	50.000	1020.00	66.401	348.05	36.465

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	-2'-5	Supply	36.465	98.05	
678	19'-8½	Sprinkler	12.351	19.68	
679	19'-8½	Sprinkler	12.141	19.51	
680	19'-8½	Sprinkler	12.125	19.50	
681	19'-8½	Sprinkler	12.186	19.55	
682	19'-8½	Sprinkler	12.510	19.81	
8	1'-8		34.668		
13	1'-8	Gauge	23.667		
18	12'-3		19.048		
50	12'-3		18.905		
67	12'-3		18.472		
97	12'-3		18.870		
106	1'-8		34.675		
115	12'-3		18.472		
116	12'-3		18.867		
131	12'-3		18.472		
313	18'-2½		15.875		
391	12'-3		18.777		
395	19'-8½		15.383		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
403	18'-11½		15.189		
406	19'-8½		14.826		
422	19'-8½		13.749		
523	18'-2½		15.871		
580	12'-3		18.774		
596	12'-3		18.461		
609	12'-3		18.774		
626	12'-3		18.461		
639	12'-3		18.773		
656	12'-3		18.462		

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
680	19'-8½	5.6	19.50	1½	(See Notes)	10'-0	120	12.125	• • • • • Route 1 • • • • • Sprinkler
679	19'-8½		6.33	1.6820		10'-0	0.001554	0.016	
679	19'-8½	5.6	19.51	1½	(See Notes)	10'-0	120	12.141	Sprinkler
678	19'-8½		25.84	1.6820		10'-0	0.020976	0.210	
678	19'-8½	5.6	19.68	1½	(See Notes)	35'-10½	120	12.351	Sprinkler,
395	19'-8½		45.52	1.6820		14'-10 50'-8½	0.059788	3.032	E(4'-11½), PO(9'-11)
395	19'-8½			2½	(See Notes)	7'-5½	120	15.383	
391	12'-3		45.52	2.6350		16'-5½ 23'-11	0.006717	3.233 0.161	PO(16'-5½)
391	12'-3		24.57	4		62'-10	120	18.777	Flow (q) from Route 2
116	12'-3		70.09	4.2600		62'-10	0.001439	0.090	
116	12'-3		9.15	4		1'-9½	120	18.867	Flow (q) from Route 3
97	12'-3		79.25	4.2600		1'-9½	0.001805	0.003	
97	12'-3		9.19	4		15'-7	120	18.870	Flow (q) from Route 10
50	12'-3		88.44	4.2600		15'-7	0.002212	0.034	
50	12'-3		9.61	4	(See Notes)	14'-1 39'-6	120	18.905 0.000	Flow (q) from Route 11
18	12'-3		98.05	4.2600		53'-7	0.002677	0.143	E(13'-2), PO(26'-4)
18	12'-3			6	(See Notes)	9'-9½	120	19.048	
13	1'-8		98.05	6.3570		70'-5 80'-2½	0.000381	4.588 0.031	sCV(40'-3), BV(12'-7), E(17'-7), BOR
13	1'-8			6	(See Notes)	3'-3	120	23.667	
8	1'-8		98.05	6.3570		3'-3	0.000381	-0.000 11.001	BFP(-11.000)
8	1'-8			6	(See Notes)	0'-0	140	34.668	
106	1'-8		98.05	6.2800		22'-1 22'-1	0.000304	-0.000 0.007	E(22'-1)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes (Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value)
106	1'-8			6	(See Notes)	53'-0	140	34.675	
						22'-1	0.000304	1.767	
1	-2'-5		98.05	6.2800		75'-1		0.023	E(22'-1), S
			250.00					36.465	Hose Allowance At Source
1			348.05						Total(Pt) Route 1
									• • • • • Route 2 • • • • •
680	19'-8½	5.6	19.50	1½	(See Notes)	10'-0	120	12.125	Sprinkler
							0.006027		
681	19'-8½		13.17	1.6820		10'-0		0.060	
681	19'-8½	5.6	19.55	1½	(See Notes)	10'-0	120	12.186	Sprinkler
							0.032451		
682	19'-8½		32.72	1.6820		10'-0		0.325	
682	19'-8½	5.6	19.81	1½	(See Notes)	15'-11	120	12.510	Sprinkler
							0.077903		
422	19'-8½		52.52	1.6820		15'-11		1.238	
422	19'-8½			1½	(See Notes)	16'-11½	120	13.749	
						14'-10	0.033889		
406	19'-8½		33.49	1.6820		31'-9½		1.078	T(9'-11), E(4'-11½)
406	19'-8½			1½		0'-9	120	14.826	
							0.041937	0.331	
403	18'-11½		33.49	1.6100		0'-9		0.032	
403	18'-11½			1½	(See Notes)	0'-9	120	15.189	
						9'-11	0.033889	0.322	
523	18'-2½		33.49	1.6820		10'-7½		0.361	PO(9'-11)
523	18'-2½			4	(See Notes)	16'-2½	120	15.871	
						26'-4	0.000207	2.581	
596	12'-3		24.57	4.2600		42'-6½		0.009	2E(13'-2)
596	12'-3			1½	(See Notes)	105'-0½	120	18.461	PO(9'-11)
						19'-9½	0.002512		
580	12'-3		8.21	1.6820		124'-10		0.314	PO(9'-11)
580	12'-3		16.37	4		11'-7½	120	18.774	Flow (q) from Route 5
							0.000207		
391	12'-3		24.57	4.2600		11'-7½		0.002	
								18.777	Total(Pt) Route 2

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step / Total Flow (q / Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes
313	18'-2½		19.03 + 8.92	4	(See Notes)	19'-4	120	15.875	• • • • • **Route 3** • • • • •
						39'-6	0.000263	2.581	Flow (q) from Route 4 and 6
131	12'-3		27.95	4.2600		58'-10		0.015	3E(13'-2)
131	12'-3			1½	(See Notes)	108'-9½	120	18.472	PO(9'-11)
						19'-9½	0.003076		
116	12'-3		9.15	1.6820		128'-7		0.396	PO(9'-11)
								18.867	Total(Pt) Route 3
422	19'-8½			1½	(See Notes)	74'-3½	120	13.749	• • • • • **Route 4** • • • • •
						49'-6	0.011909	0.653	T(9'-11)
313	18'-2½		19.03	1.6820		123'-9½		1.474	2T(9'-11), 2E(4'-11½), PO(9'-11)
								15.875	Total(Pt) Route 4
639	12'-3		8.18	4		13'-5	120	18.773	• • • • • **Route 5** • • • • •
							0.000027		Flow (q) from Route 8
609	12'-3		8.18	4.2600		13'-5		0.000	
609	12'-3		8.19	4		6'-3	120	18.774	Flow (q) from Route 7
							0.000098		
580	12'-3		16.37	4.2600		6'-3		0.001	
								18.774	Total(Pt) Route 5
523	18'-2½		24.57	4	(See Notes)	66'-5½	120	15.871	• • • • • **Route 6** • • • • •
						65'-10	0.000032		Flow (q) from Route 2
313	18'-2½		8.92	4.2600		132'-3½		0.004	3E(13'-2), T(26'-4)
								15.875	Total(Pt) Route 6
626	12'-3		16.37	1½	(See Notes)	105'-0½	120	18.461	• • • • • **Route 7** • • • • •
						19'-9½	0.002502		PO(9'-11), Flow (q) from Route 9
609	12'-3		8.19	1.6820		124'-10		0.312	PO(9'-11)
								18.774	Total(Pt) Route 7
626	12'-3		16.37	4		13'-5	120	18.461	• • • • • **Route 8** • • • • •
							0.000027		Flow (q) from Route 9
656	12'-3		8.18	4.2600		13'-5		0.000	
656	12'-3			1½	(See Notes)	105'-0½	120	18.462	PO(9'-11)
						19'-9½	0.002496		
639	12'-3		8.18	1.6820		124'-10		0.312	PO(9'-11)
								18.773	Total(Pt) Route 8

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
596	12'-3		8.21	4		6'-3	120	18.461	• • • • • **Route 9** • • • • •
626	12'-3		16.37	4.2600		6'-3	0.000098	0.001	Flow (q) from Route 2
								18.461	Total(Pt) Route 9
131	12'-3		9.15	4		1'-9½	120	18.472	• • • • • **Route 10** • • • • •
115	12'-3		18.80	4.2600		1'-9½	0.000126	0.000	Flow (q) from Route 3
115	12'-3			1½	(See Notes)	108'-9½	120	18.472	PO(9'-11)
97	12'-3		9.19	1.6820		19'-9½ 128'-7	0.003099	0.399	PO(9'-11)
								18.870	Total(Pt) Route 10
115	12'-3		9.19	4		15'-7	120	18.472	• • • • • **Route 11** • • • • •
67	12'-3		9.61	4.2600		15'-7	0.000036	0.001	Flow (q) from Route 10
67	12'-3			1½	(See Notes)	108'-9½	120	18.472	PO(9'-11)
50	12'-3		9.61	1.6820		19'-9½ 128'-7	0.003362	0.432	PO(9'-11)
								18.905	Total(Pt) Route 11

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BalV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connectic	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

WATER TEST

FLOW TEST DATA

DATE / TIME	LOCATION	PRESSURE		FLOW (GPM)	PITOT PRESSURE (PSI)
		STATIC (PSI)	RESIDUAL (PSI)		
07-29-2022 09:30 AM	HYDRANT #1	74	54		
07-29-2022 09:30 AM	HYDRANT #3	69	50		
07-29-2022 09:30 AM	HYDRANT #2			1020	36.5

FLOW TEST PERFORMED BY: LKC ENGINEERING

FLOW TEST NOTES:

1. THE CONTRACTOR SHALL OBTAIN A NEW FIRE FLOW TEST LESS THAN 1 YEAR OLD PERFORMED IN CONJUNCTION WITH A 48 HOUR PRESSURE TEST. THE FLOW TEST SHALL BE PERFORMED PER NFPA 291 WITH THE FLOW HYDRANT LOCATED AS CLOSE TO THE POINT OF CONNECTION AS POSSIBLE. THE PRESSURE TEST SHALL RECORD THE 48-HOUR STATIC LOW PRESSURE AND 48 HOUR STATIC HIGH PRESSURE.

2. THE CONTRACTOR SHALL BASE THIER CALCULATIONS ON THE 48-HOUR LOW STATIC PRESSURE AND THE ADJUSTED RESIDUAL PRESSURE AND FLOW. THE ADJUSTED RESIDUAL PRESSURE AND WATER FLOW SHALL BE ACHIEVED BY SHIFTING THE FLOW TEST CURVE DOWN TO THE 48-HOUR LOW PRESSURE STATIC POINT ON A N^1.85 LOGARIHTMIC GRAPH. A 10% SAFETY FACTOR SHALL BE INCLUDED IN THE HYDRAULIC CALCULATIONS BASED ON THE 48 HOUR LOW STATIC PRESSURE.

3. PROVIDE THE FLOW TEST DATA AND HYDRANT LOCATIONS WITH THE SUBMITTED SPRINKLER SHOP DRAWING PACKAGE, INCLUDING STATIC PRESSURE, RESIDUAL PRESSURE, FLOW IN GPM, 48-HOUR STATIC LOW PRESSURE, ADJUSTED RESIDUAL PRESSURE AND FLOW (BASED ON THE 48-HOUR LOW PRESSURE), HORIZONTAL AND VERTICAL DISTANCE OF TEST FROM BASE OF FIRE RISER, ORGANIZATION NAME PERFORMING FLOW AND PRESSURE TESTS, AND THE DATE AND TIME THE TEST WAS PERFORMED.