SUBMITTAL DATA
PREPARED FOR:

OVERHILLS ELEMENTARY CLASSROOM ADDITION

2626 RAY ROAD
SPRING LAKE, NC 28390

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

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

TABLE OF CONTENTS

SPRINKLER HEADS

TECHNICAL DATA

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

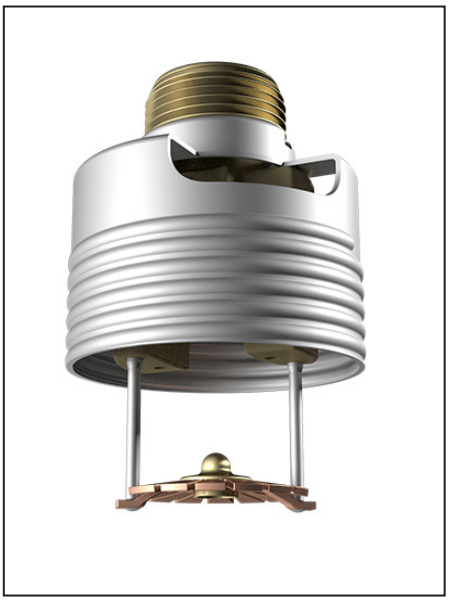
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

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.

VIKING®

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

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.

VIKING®

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

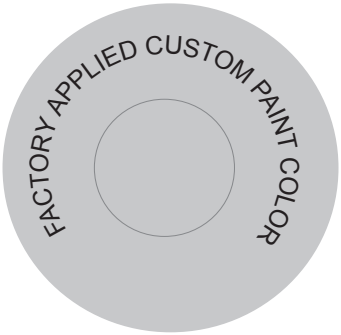
TABLE 2: COVER PLATE ORDERING INFORMATION

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

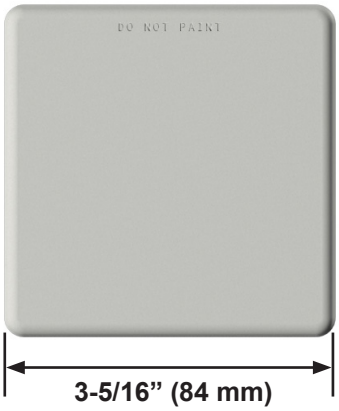


Figure 2: Square Cover Assembly 23179

VIKING®

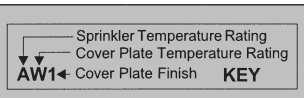
TECHNICAL DATA

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

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.

VIKING®

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

DESIGN CRITERIA

(Also refer to the Approval Chart)

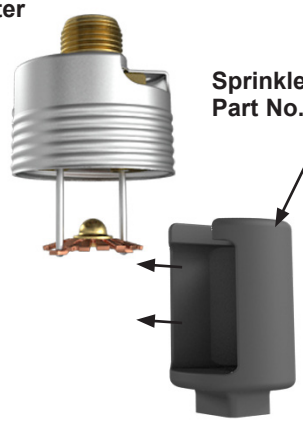
cULus Listing Requirements: Mirage® Quick Response Extended Coverage Concealed Pendent Sprinklers VK632 and VK634 are cULus Listed for installation in accordance with the latest edition of NFPA 13 for extended coverage pendent spray sprinklers:

- 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.

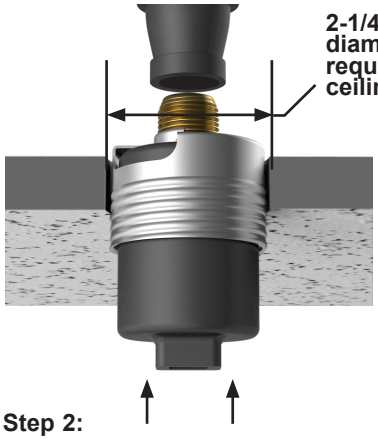
NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

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.**

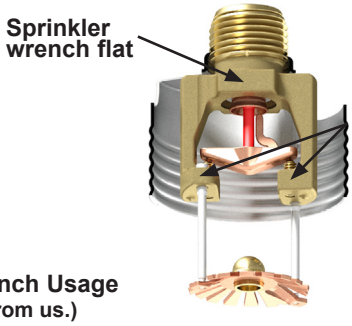


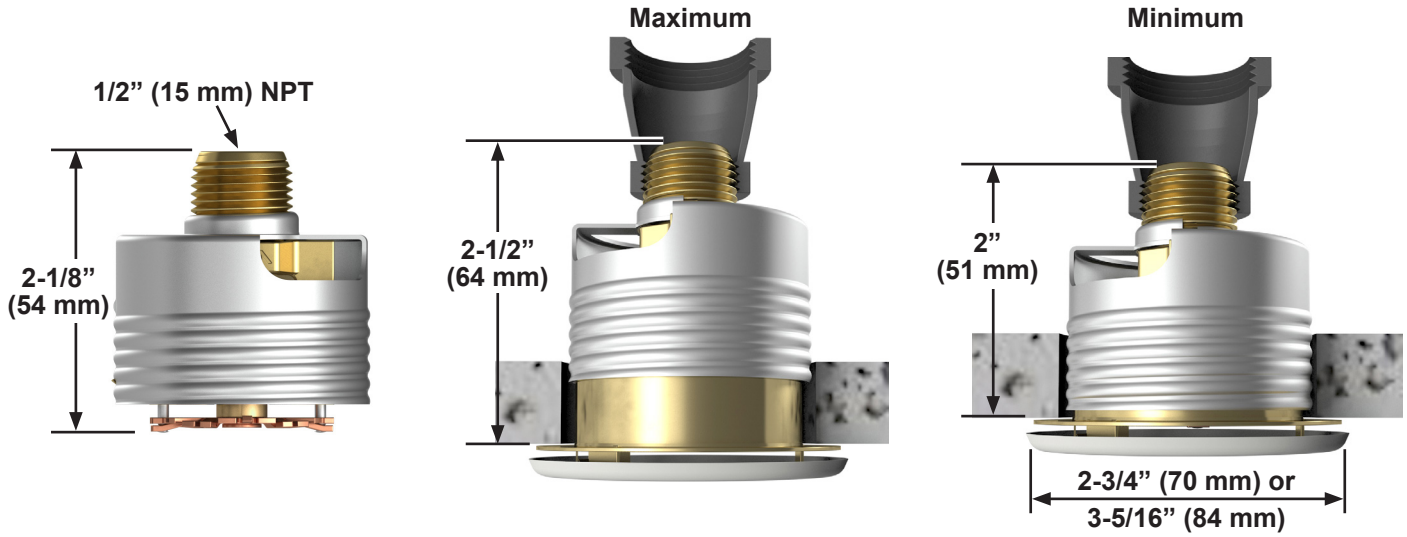
Figure 3: Sprinkler Installation and Proper Wrench Usage
**** A 1/2" ratchet is required (Not available from us.)**

VIKING®

TECHNICAL DATA

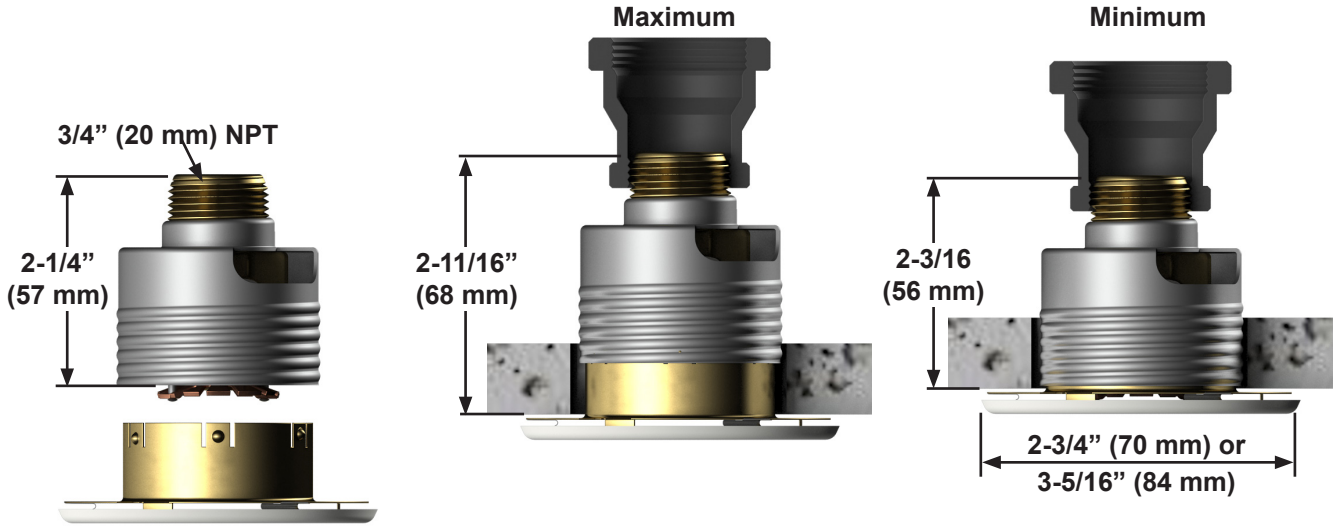
MIRAGE® QUICK RESPONSE EXTENDED COVERAGE CONCEALED PENDENT SPRINKLERS (VK632 AND VK634)

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



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).

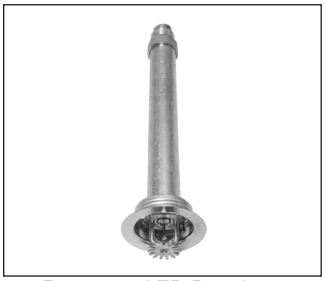
Product Description

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)

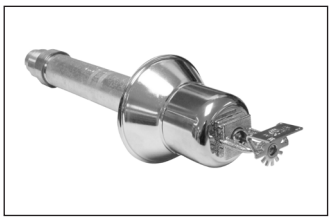


Recessed FP Pendent
(See Fig. 3)

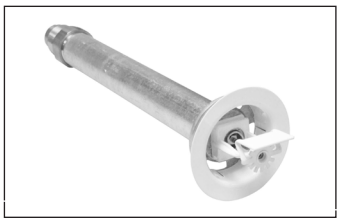
Concealed
(See Fig. 4)

Recessed F1 Pendent
(See Fig. 5)

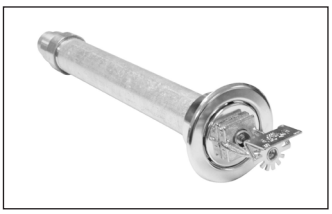
Horizontal Sidewall
(See Fig. 6)



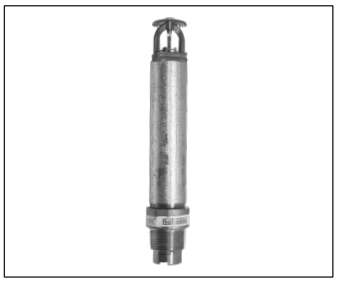
Horizontal Sidewall / HB
(See Fig. 7)



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

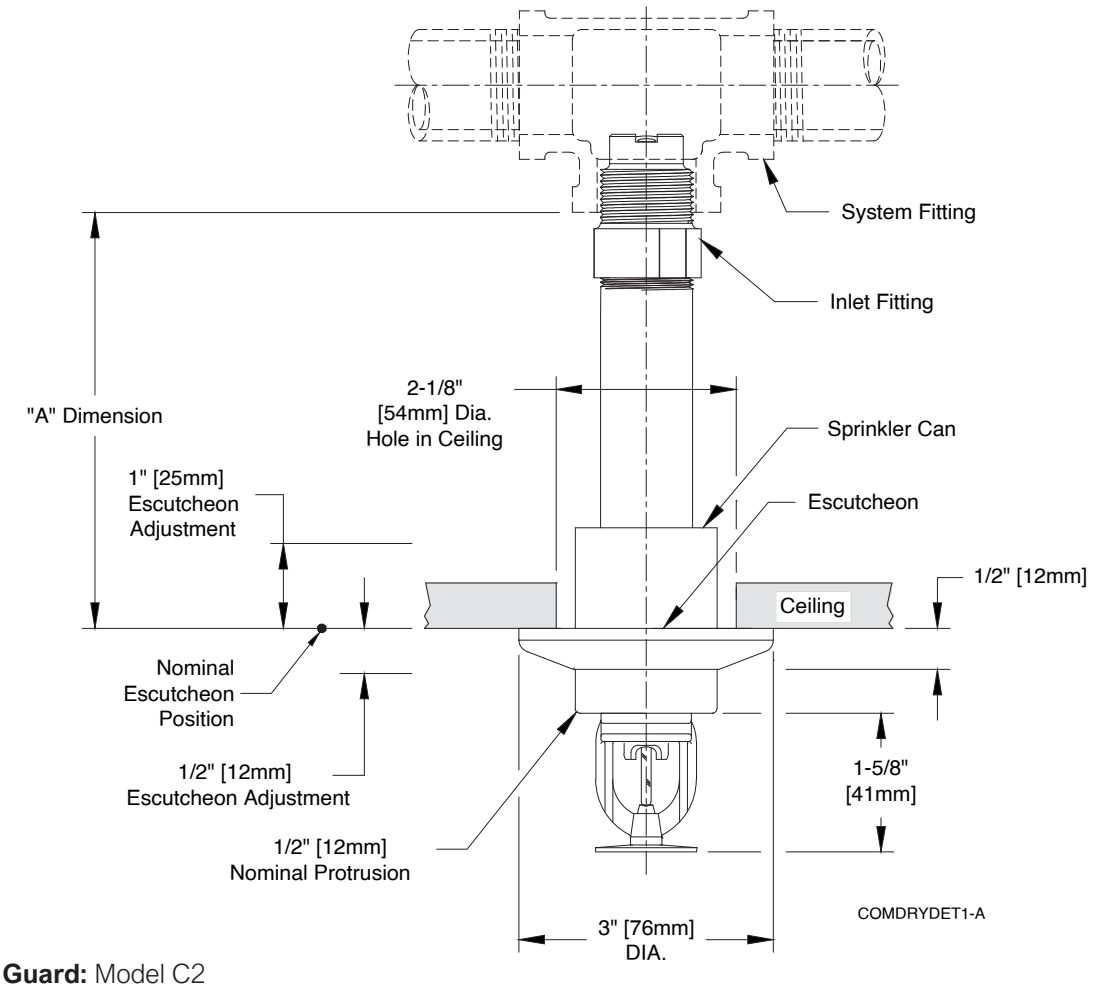
[1] For listed and approved sprinkler, escutcheon, and inlet configurations see the Available Configurations, Listings, and Approvals table in this Bulletin.
[2] High temperature classification is FM Approved with Standard and Model HB escutcheons only.

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

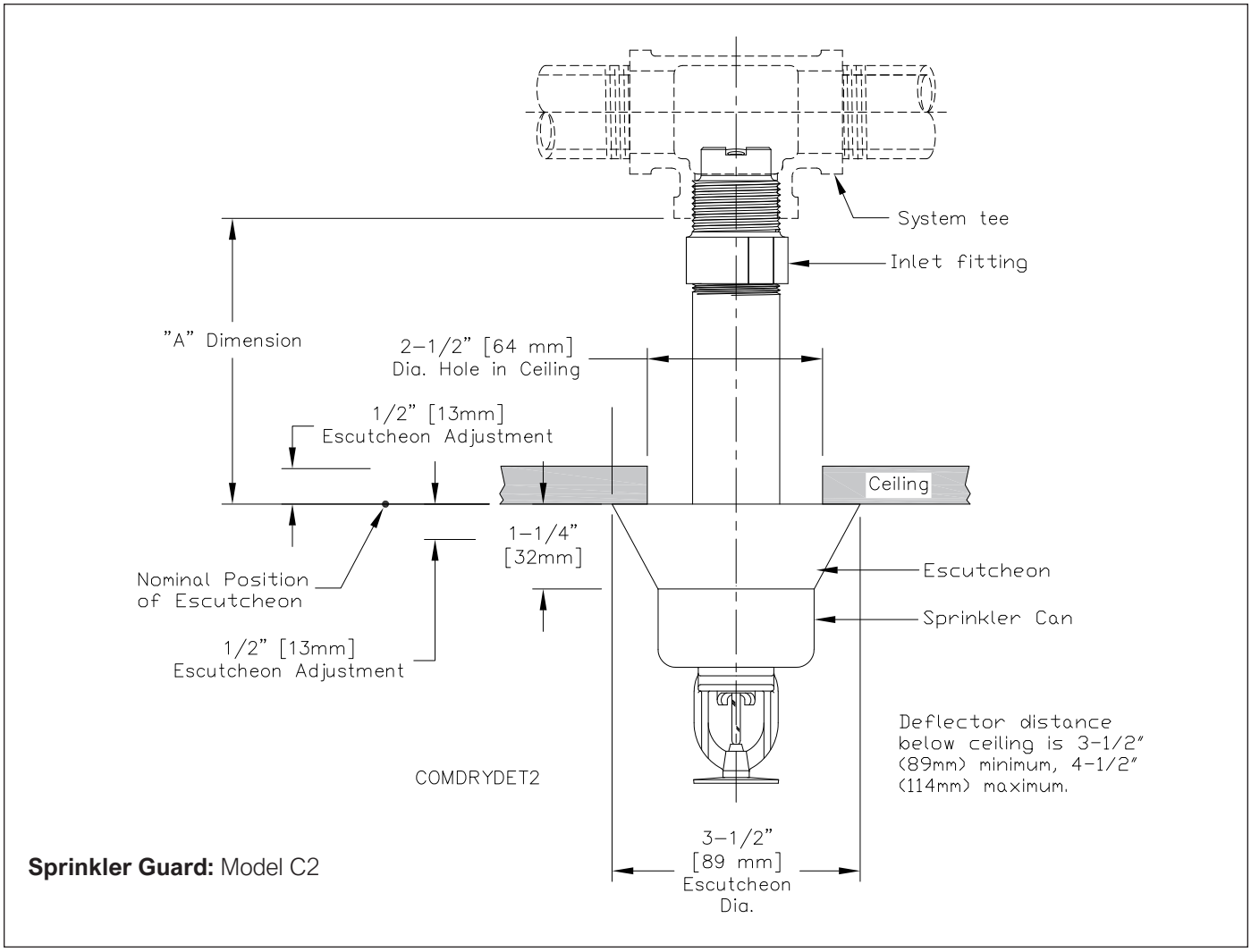


Fig. 2

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

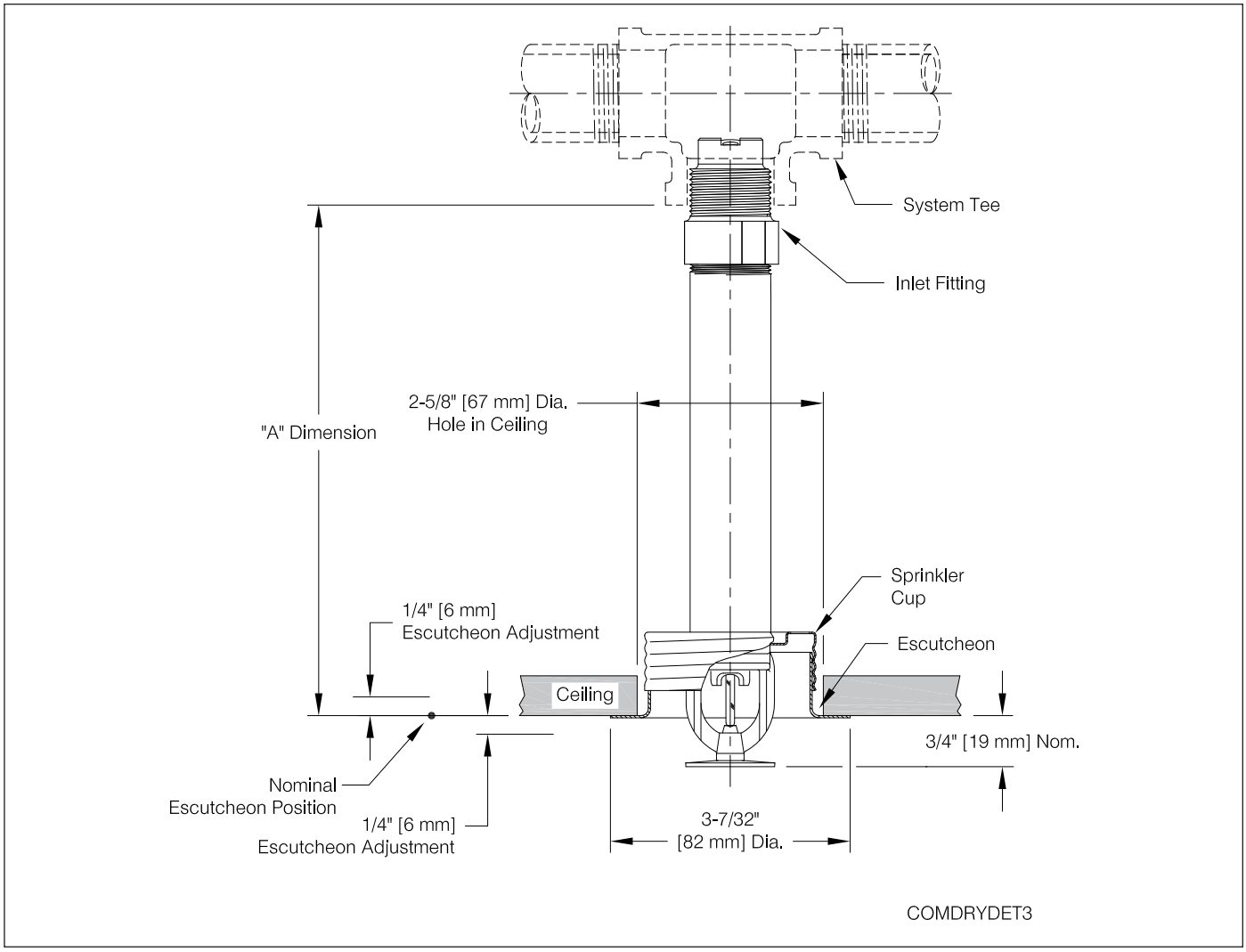


Fig. 3

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

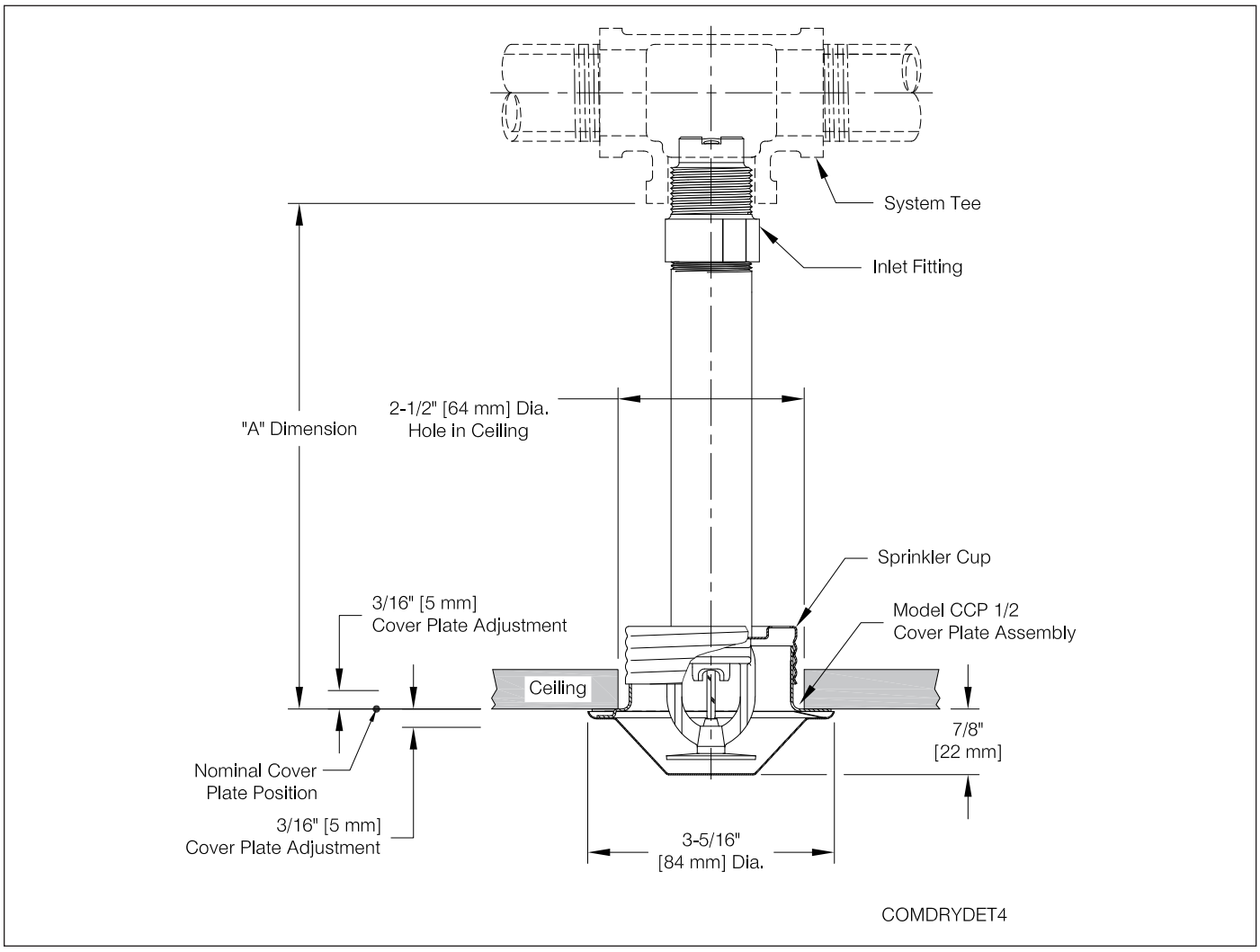


Fig. 4

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.

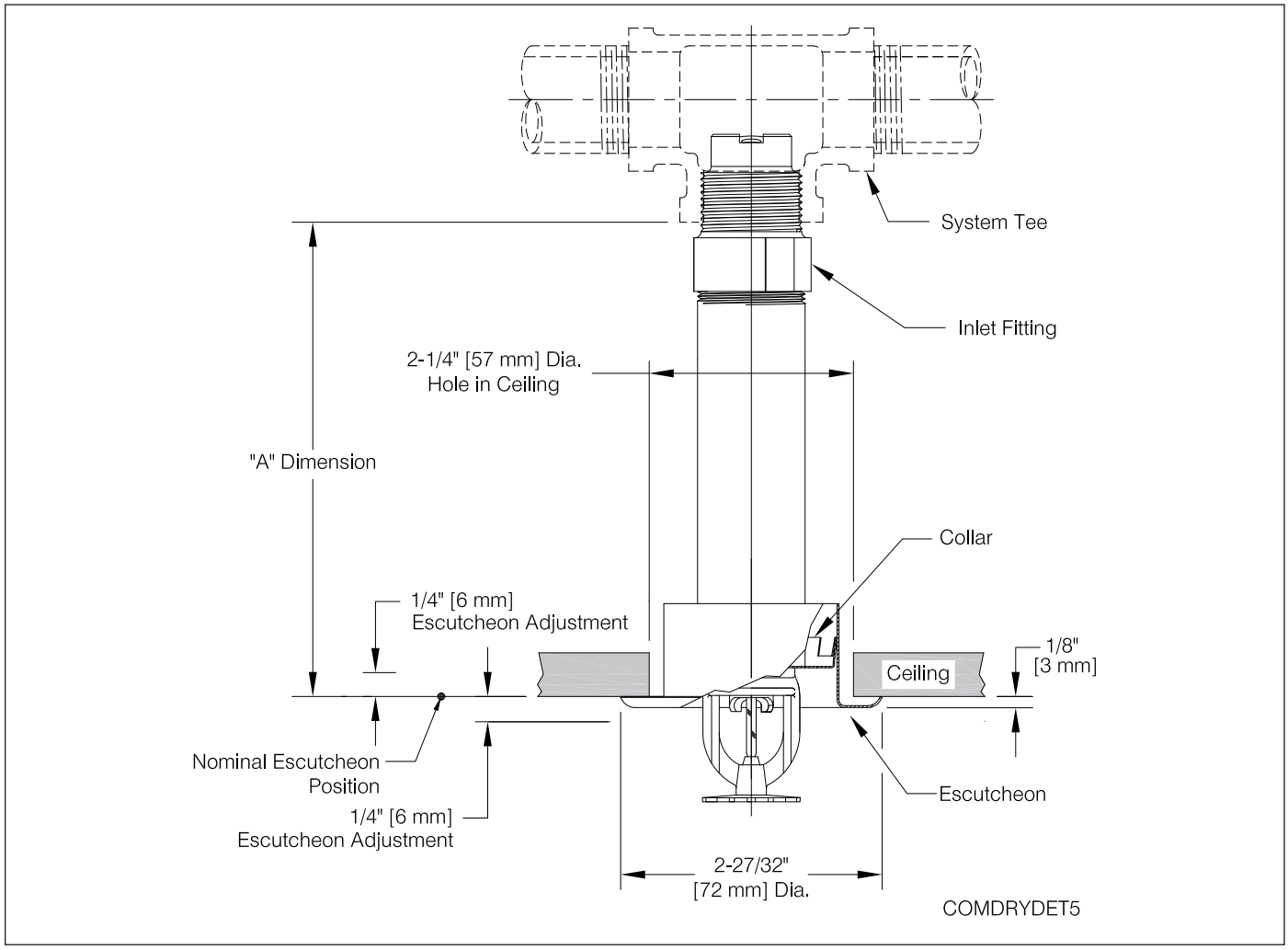


Fig. 5

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

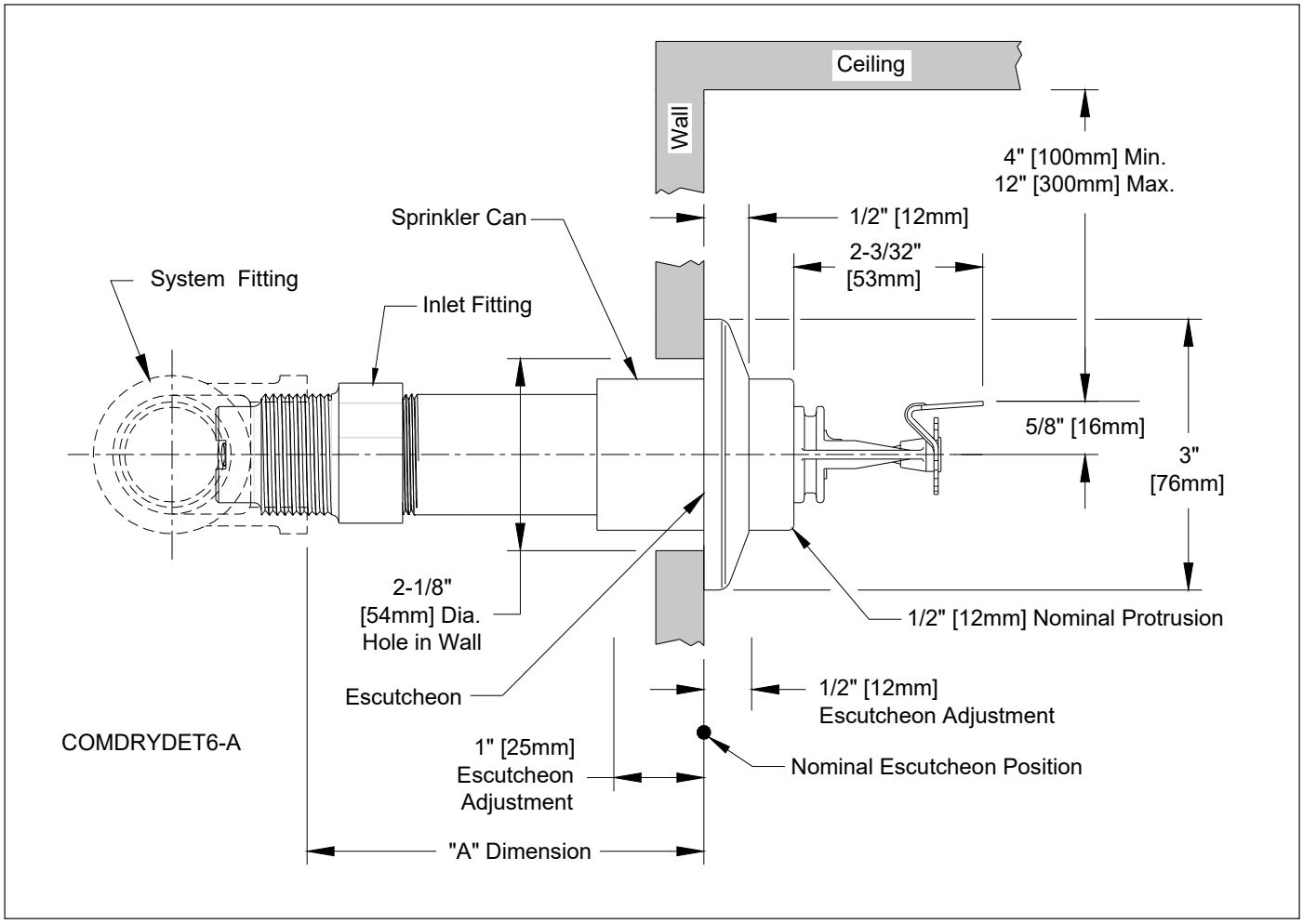


Fig. 6

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

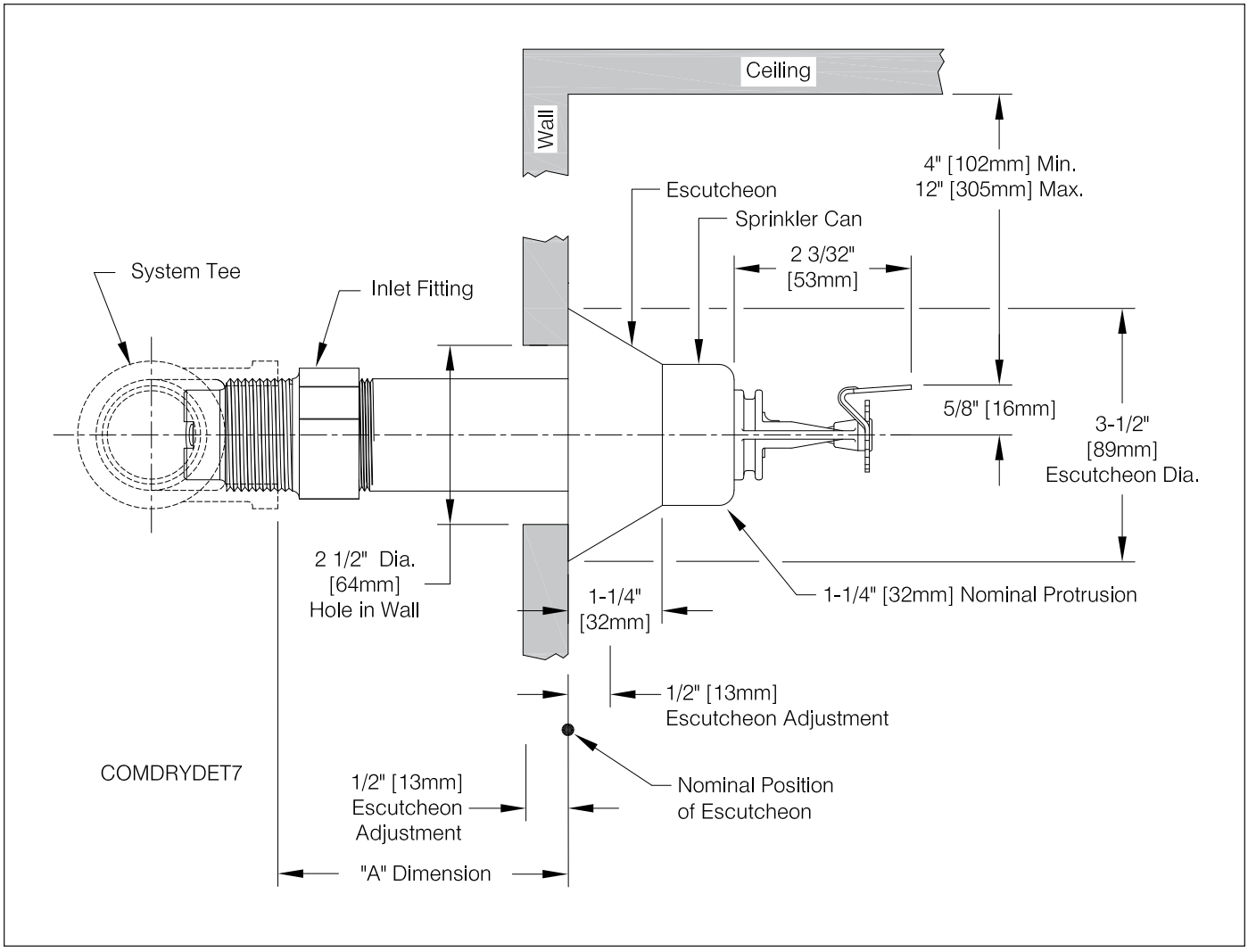


Fig. 7

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

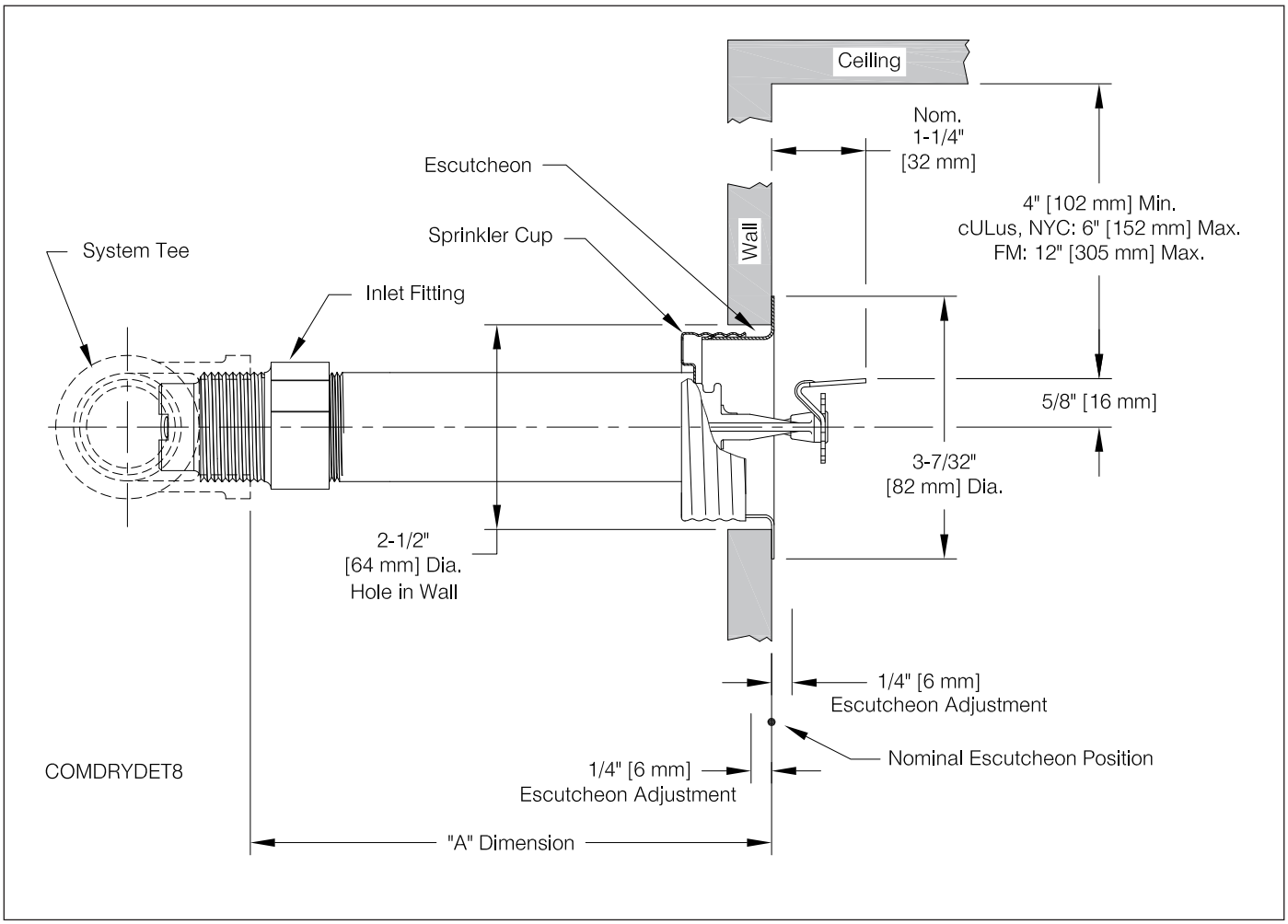


Fig. 8

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

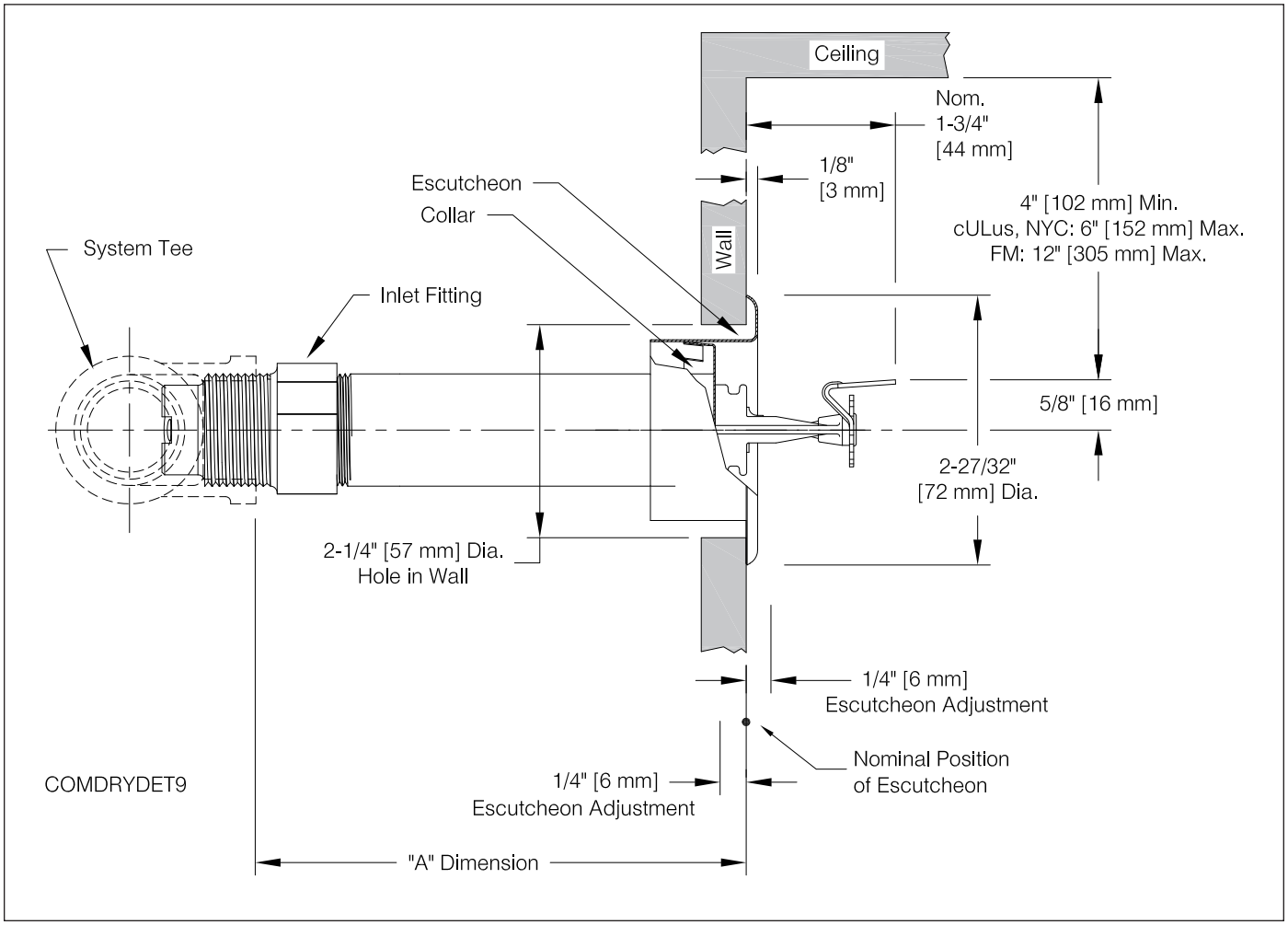


Fig. 9

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)

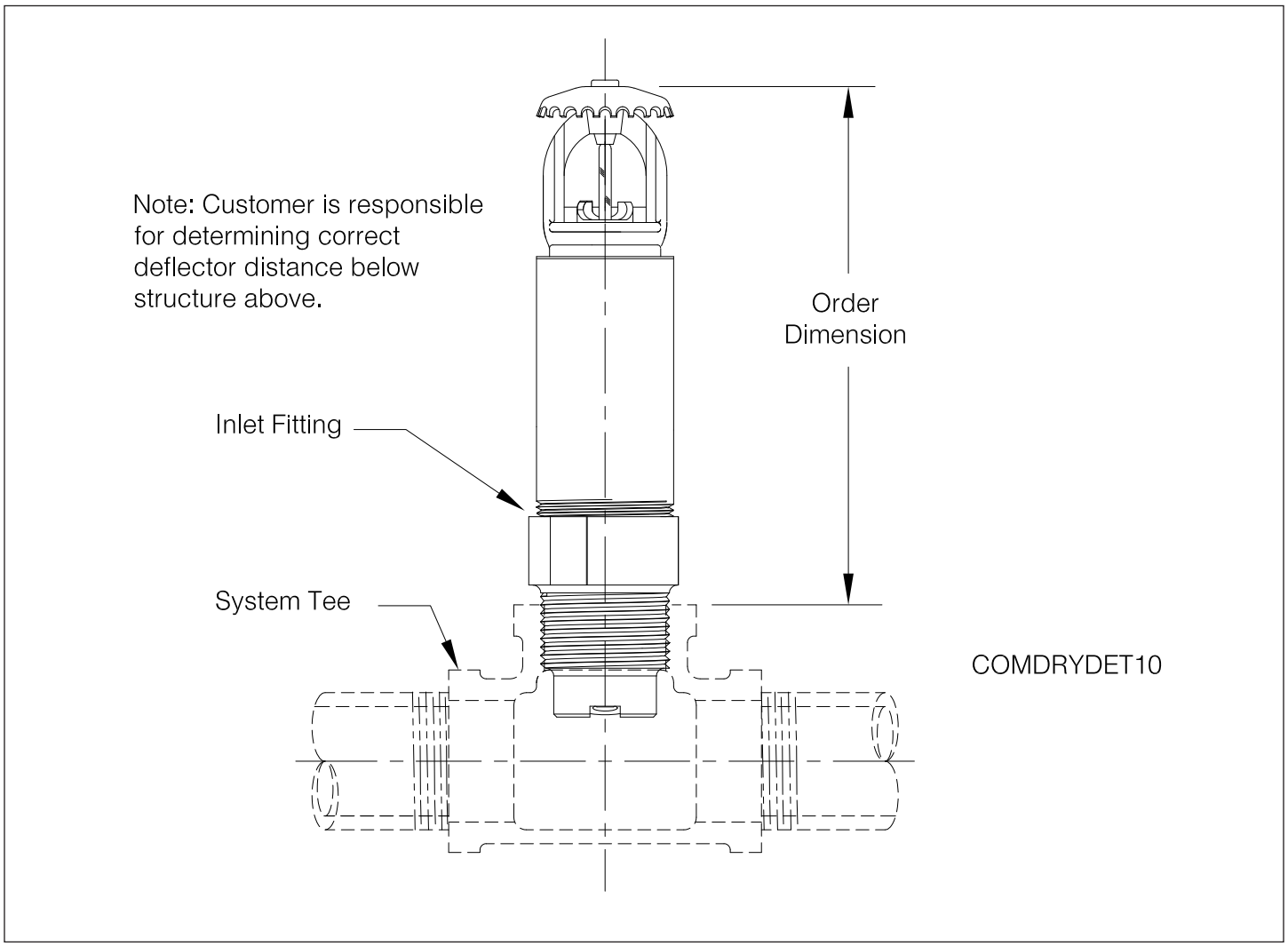


Fig. 10

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

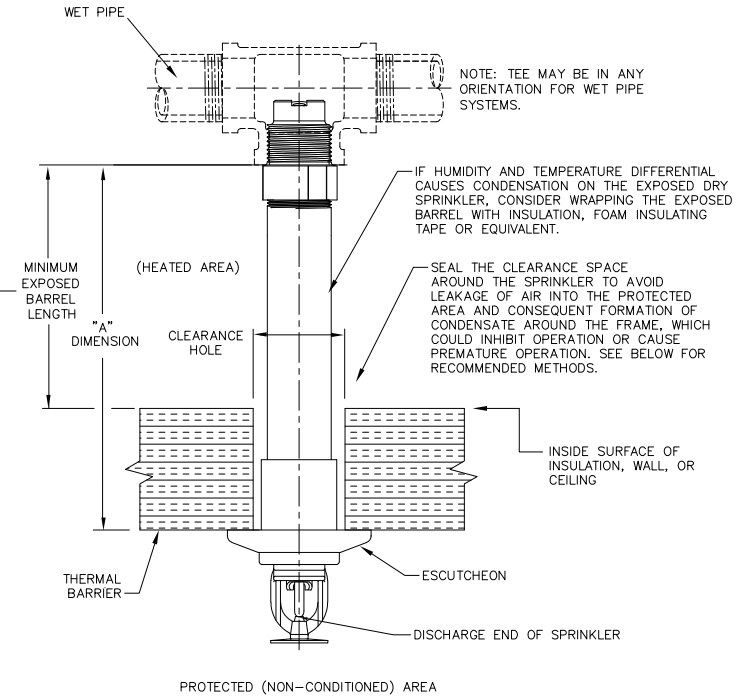
NOTE: STANDARD DRY PENDENT IS SHOWN, HOWEVER, MINIMUM EXPOSED BARREL LENGTH APPLIES TO ALL STYLES OF DRY SPRINKLERS CONNECTED TO A WET PIPE SYSTEM.

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)

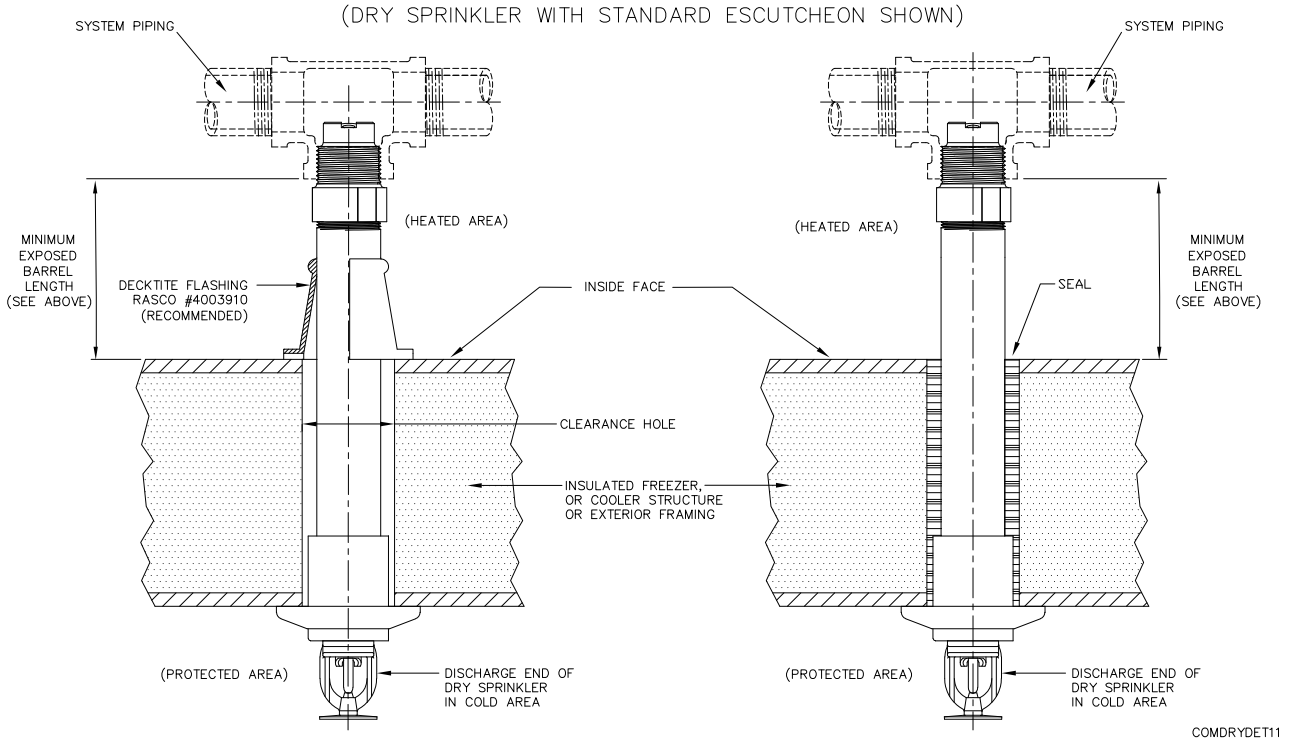


Fig. 11

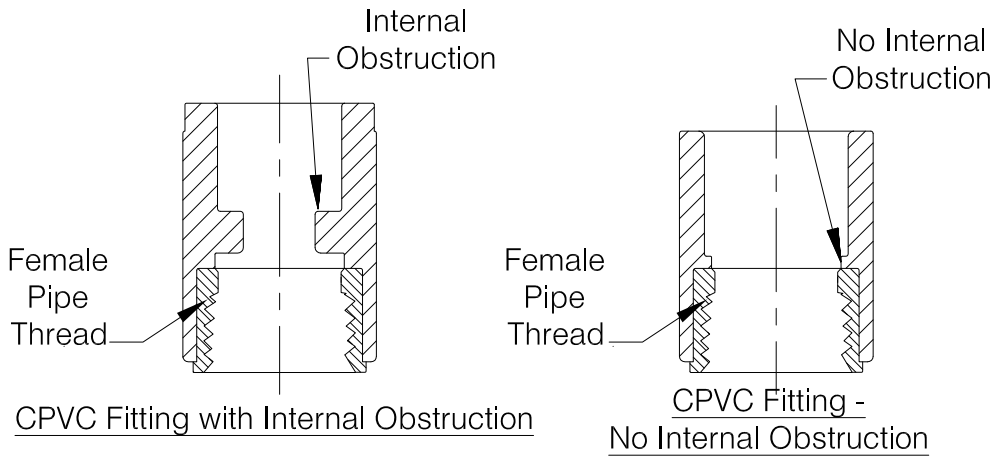
CAUTION

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.

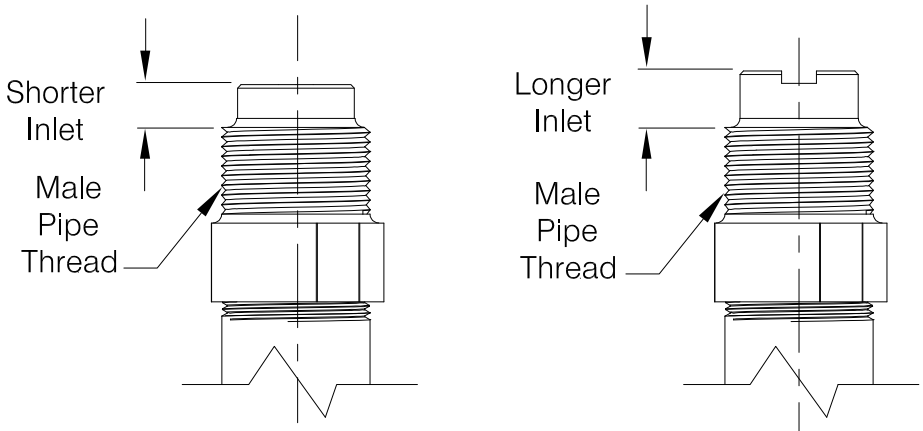
Short inlet ("PL") versions of Reliable dry sprinklers are available that may or may not be compatible with fittings having internal obstructions in existing installations. Sprinklers with the short inlet ("PL") should only be installed in CPVC fittings of wet-pipe systems.

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

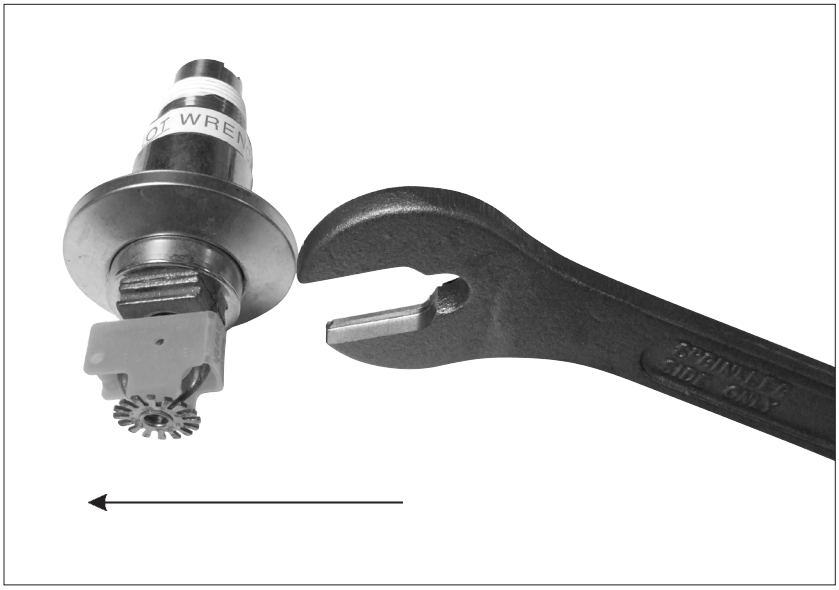


Fig. 13 - Model F3R Wrench

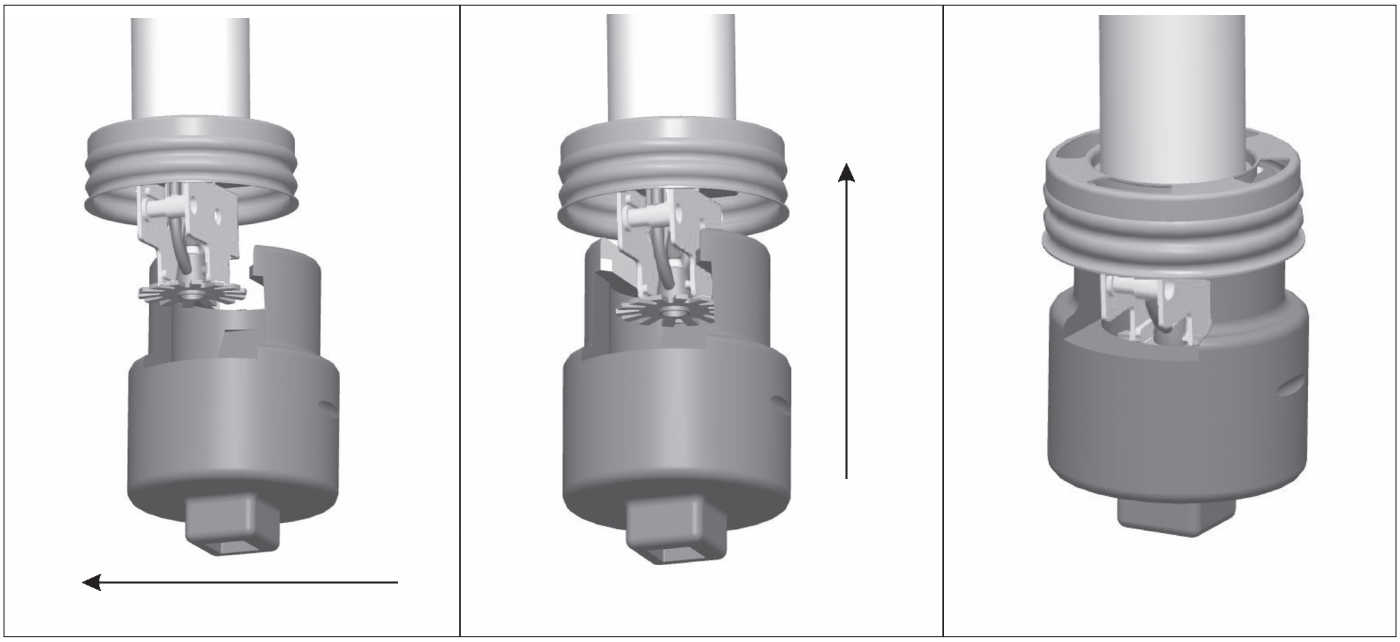
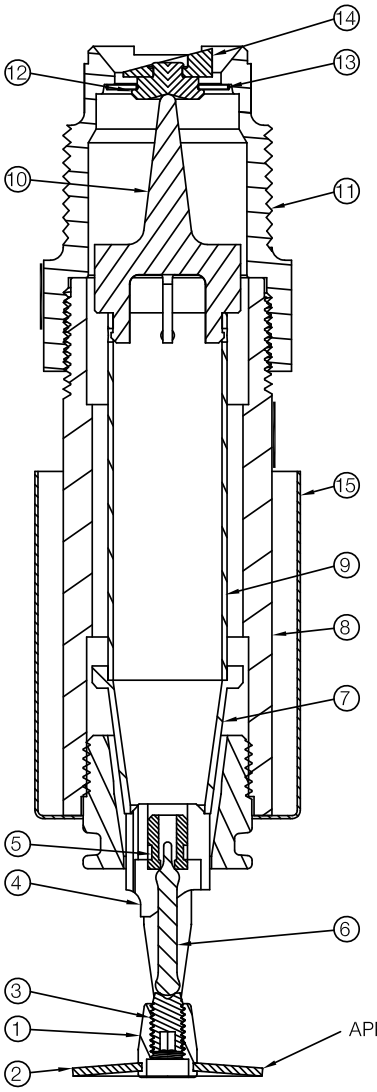


Fig. 14 - Model XLO2 Wrench

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

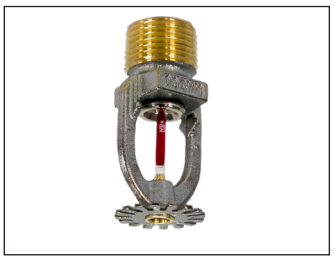
Product Description

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.

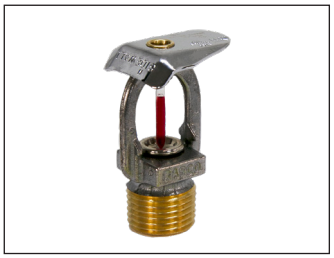
When fitted with an approved water shield, these sprinklers may considered intermediate sprinklers for use in racks, below grated walkways, and other areas where intermediate level sprinklers are required.

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.

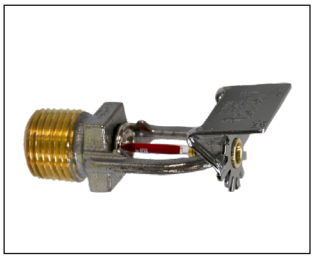


Model F1FR56 Pendent

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)

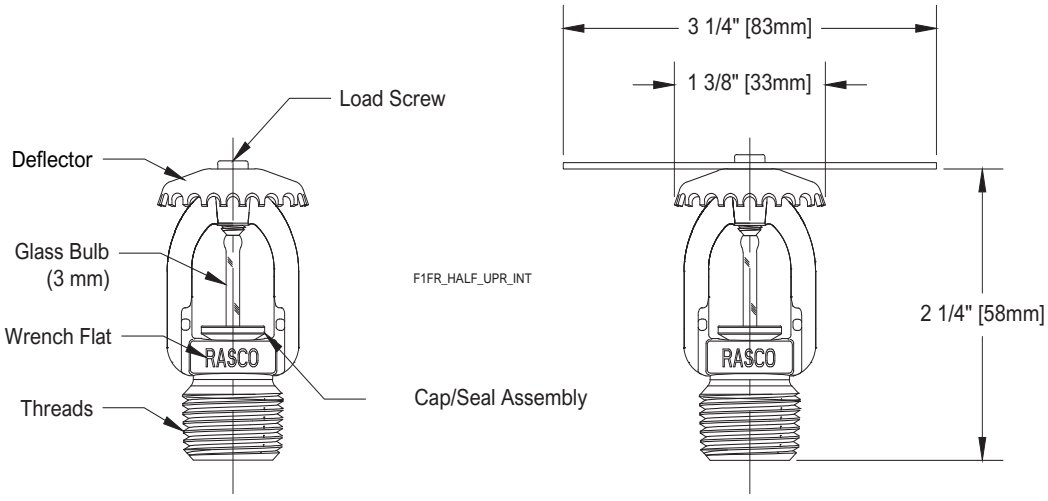
Guards & Shields (New Frames)
Factory Water Shield (cULus, FM)
F-1 Guard (cULus, FM)
F-3 Guard with Shield (cULus, FM)

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)

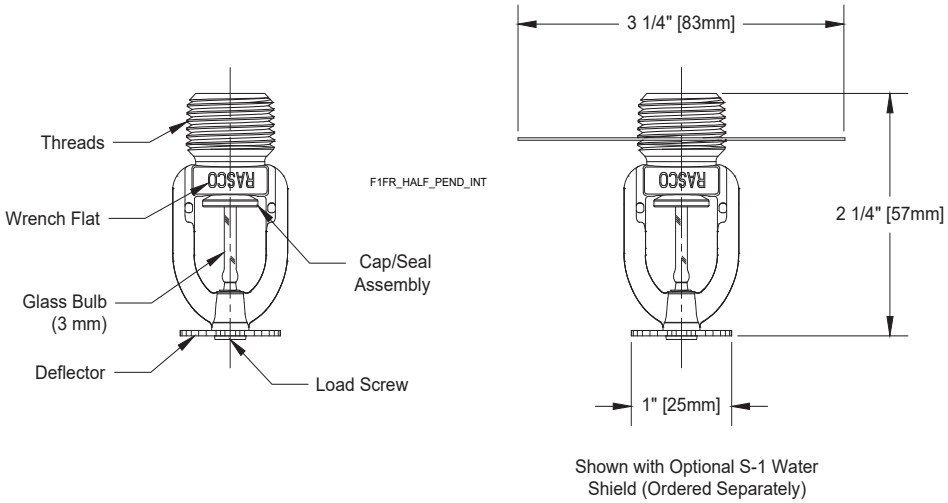
Guards & Shields (Legacy Frames)[3]
C-1 Guard (FM)
C-5 Guard/Shield Kit (FM)
D-1 Guard (cULus, FM)
D-4 Guard/Shield Kit (FM)
D-5 Guard/Shield Kit (cULus, FM)
S-1 Shield (cULus, FM)

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)

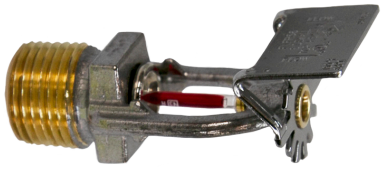
Recessed Escutcheons[2]
- Model F1 (cULus)
- Model F2 (cULus, FM)
- Model FP (cULus)

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

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

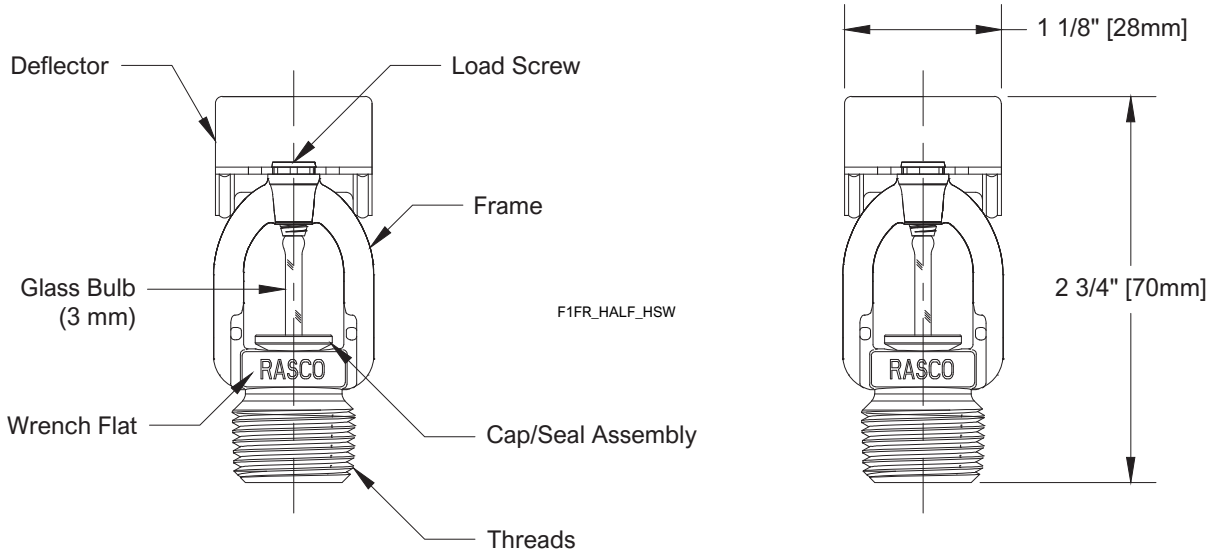
Sprinkler Wrenches
- Model W2 (non-recessed)
- Model W4 (recessed)
- Model J (New frame with guard installed)
- Model JD (Legacy frame with guard installed)

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)

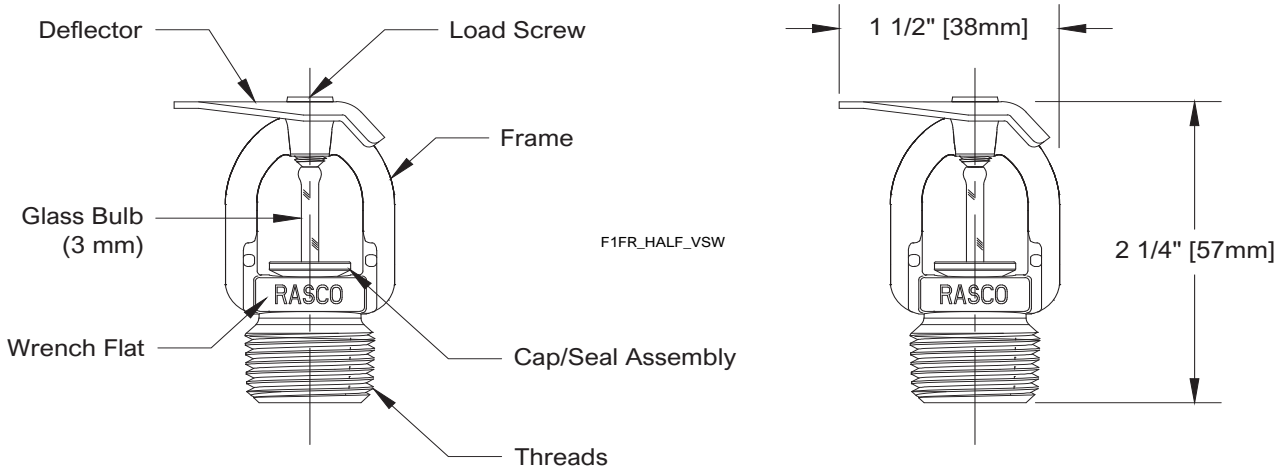
Guards & Shields (Legacy Frames)
C1 Guard (FM)

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

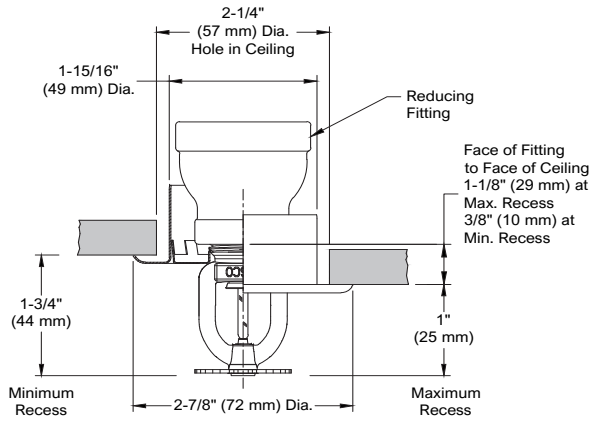
Notes:
1. Listed and approved for Light Hazard ONLY.
2. LPCB approved for use in pendent position ONLY.

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

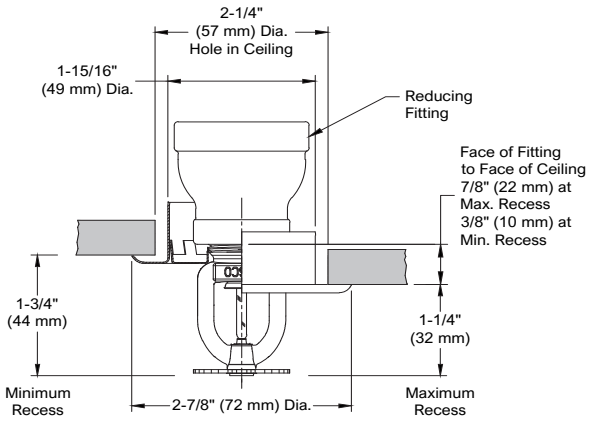


Recessed and Concealed Installation: Pendent Sprinklers

Figure 5

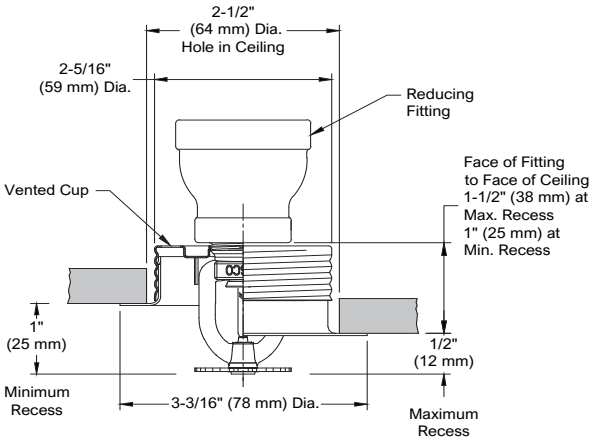


Models F1 & F1FR Pendent Sprinkler
with Model F1 Recessed Escutcheon
3/4" (19mm) Nominal Adjustment



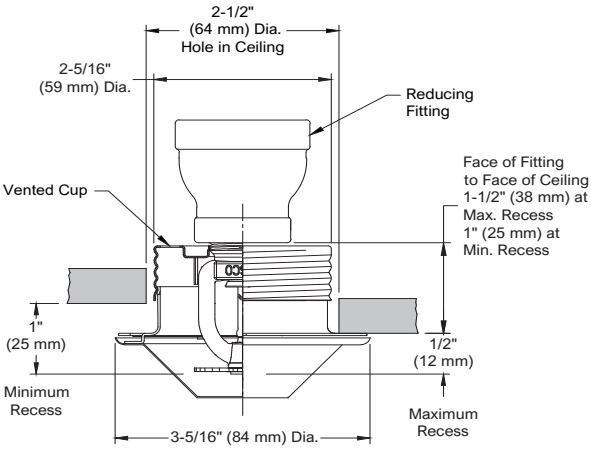
Models F1 & F1FR Pendent Sprinkler
with Model F2 Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

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.



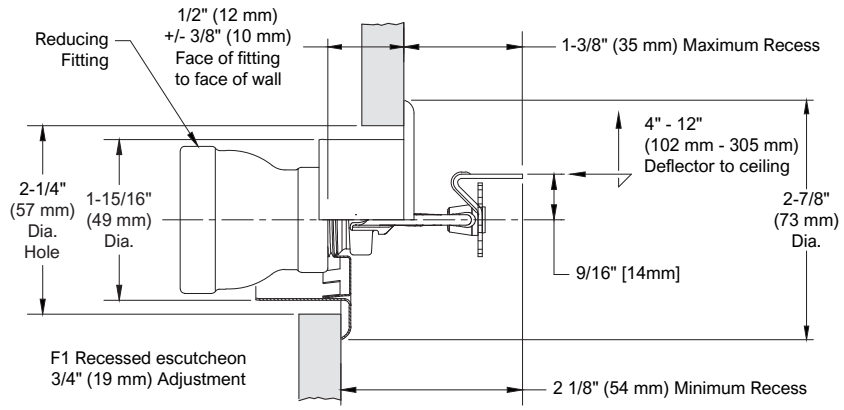
Model F1FR56 CCP Conical Concealed Sprinkler
1/2" (13mm) Nominal Adjustment
(Nominal Cover Plate Projection is 1" (25 mm))

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)

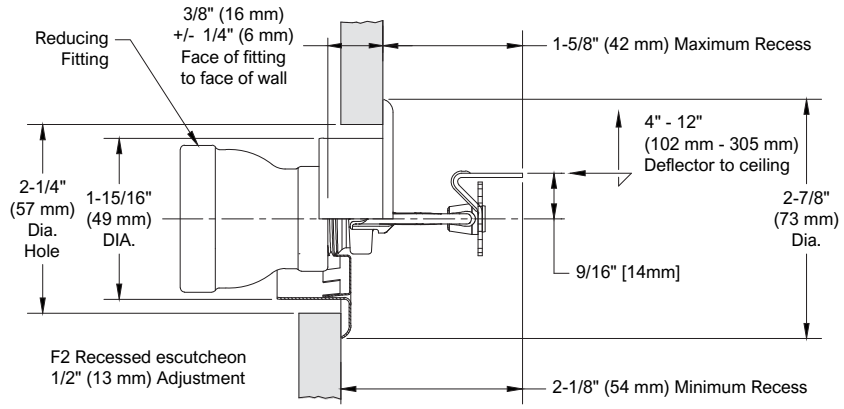
FP Escutcheon

CCP Cover Plate

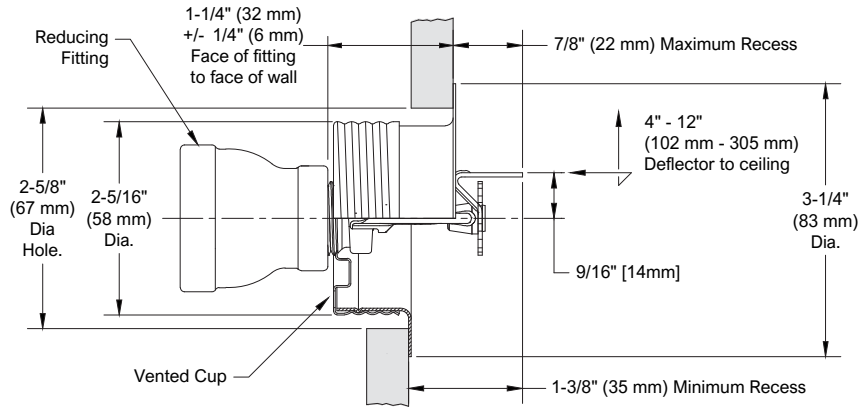


Model F1FR Horizontal Sidewall Sprinkler
with Model F1 Recessed Escutcheon
3/4" (19mm) Nominal Adjustment

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

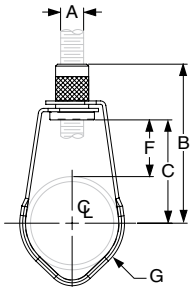
Size Range: 1/2" through 8"
Material: Carbon steel
Finish: Strap is Pre-Galvanized Zinc Material. Nut is Zinc Plated.
Service: Recommended for suspension of non-insulated **stationary** pipe line.
Maximum Temperature: 450° F
Approvals: Complies with Federal Specification A-A-1192A (Type 10), *WW-H-171-E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

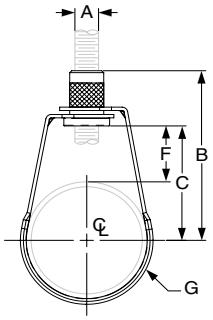
Ordering: Specify size, figure number and name.
Non-captured nut also available upon request.

1/2" through 2" Size
Rounded Edge Design

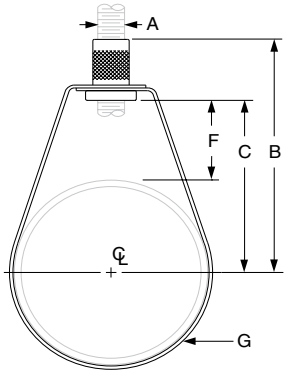
c UL us LISTED FM APPROVED



1/2" through 1" pipe



1 1/4" through 2" pipe



2 1/2" through 8" pipe

2 1/2" through 8" Size

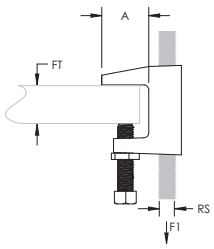
FIG. 69: DIMENSIONS (IN) • LOADS (LBS) • WEIGHT (LBS)

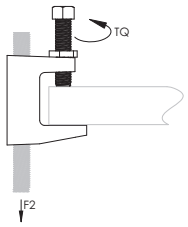
Pipe Size	Max Load	Weight	Rod Size A	B	C	F	G Width
1/2	300	0.10	3/8	2 7/8	2	1 9/16	5/8
3/4		0.10		2 3/4	1 7/8	1 5/16	
1		0.10		2 9/16	1 11/16	1	
1 1/4		0.10		2 5/8	1 3/4	7/8	
1 1/2		0.10		2 3/4	1 7/8		
2		0.11		3 1/4	2 3/8	1 1/8	
2 1/2	525	0.20		4	2 3/4	1 5/16	3/4
3		0.20		3 13/16	2 15/16	1 3/16	
4	650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

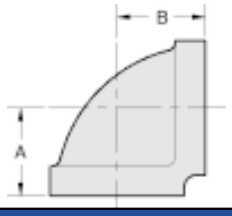
C.I. THREADED FITTINGS

S.P FITTINGS
A Division of Star Pipe Products

LISTED LISTED APPROVED

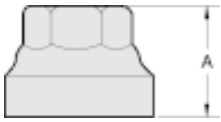
For fire protection services request submittal GRS 1.3

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.



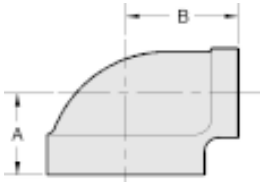
CAST IRON 90 DEGREE ELBOW

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



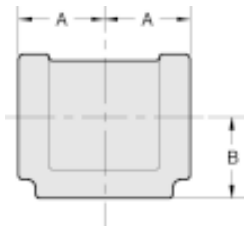
CAST IRON RED. COUPLING

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



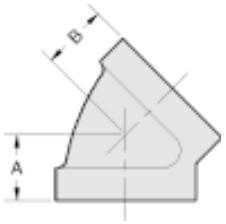
CAST IRON RED. 90 DEG. ELBOW

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

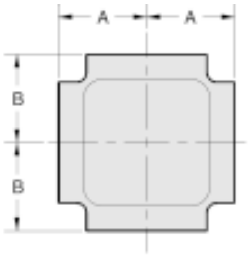
NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSION A	WEIGHT EACH PIECE
1/2	CPL001	300	0.94	0.10
3/4	CPL002	300	1.07	0.17
1	CPL003	300	1.25	0.28
1 1/4	CPL004	300	1.36	0.44
1 1/2	CPL005	300	1.45	0.62
2	CPL006	300	1.56	0.91

C.I. THREADED FITTINGS

S.P FITTINGS
A Division of Star Pipe Products

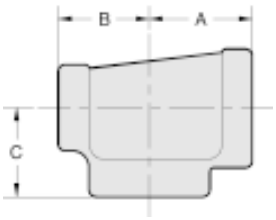
LISTED LISTED APPROVED

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

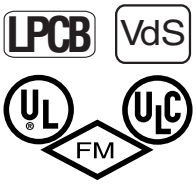
NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS			WEIGHT EACH PIECE
			A	B	C	
1X1X1/2	CT331	300	1.26	1.26	1.36	0.95
1X1X3/4	CT332	300	1.37	1.37	1.45	1.10
1X1/2X1	CT313	300	1.50	1.36	1.50	1.08
1X3/4X1	CT323	300	1.50	1.45	1.50	1.18
1X1X1 1/4	CT334	300	1.67	1.67	1.58	1.52
1X1X1 1/2	CT335	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

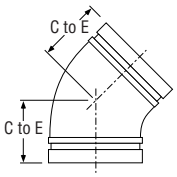


Figure 201

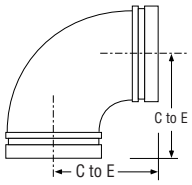


Figure 210

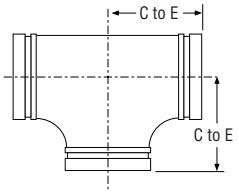


Figure 219

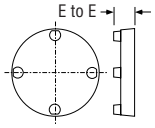


Figure 260

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

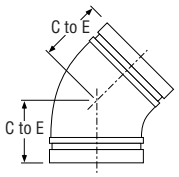


Figure 501

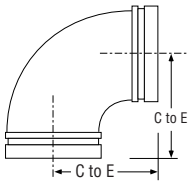


Figure 510

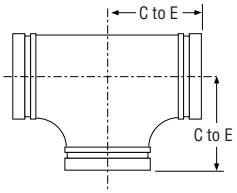


Figure 519

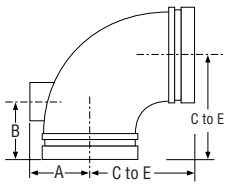


Figure 510DE

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

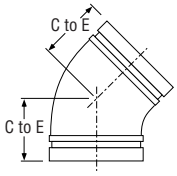


Figure 501S

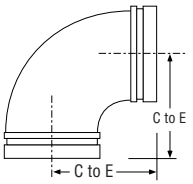


Figure 510S*

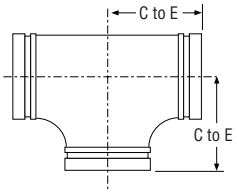


Figure 519S*

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

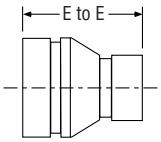


Figure 250
Cast

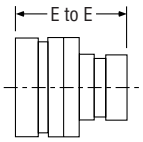


Figure 350
Fabricated
Sizes 3" to 6"

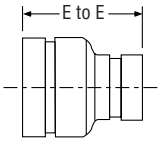


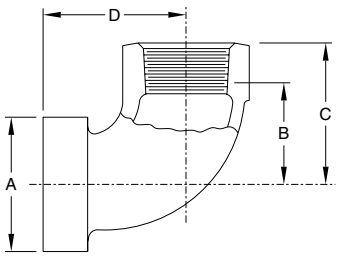
Figure 350
Fabricated
Sizes 8" to 12"

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

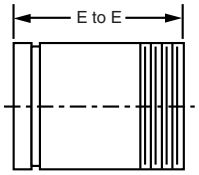


Figure 391

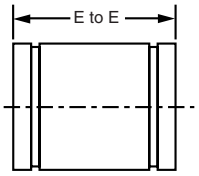


Figure 392

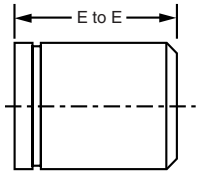


Figure 393

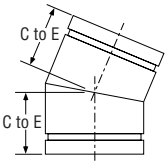


Figure 312

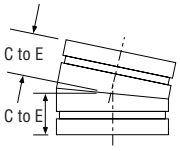


Figure 313

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

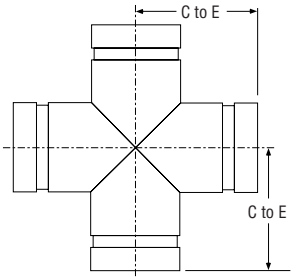


Figure 327

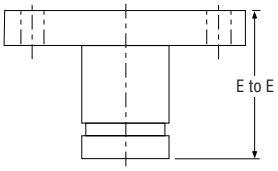


Figure 341

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

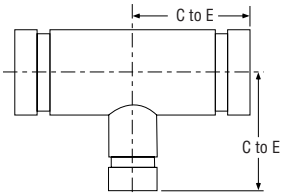


Figure 321

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 _____

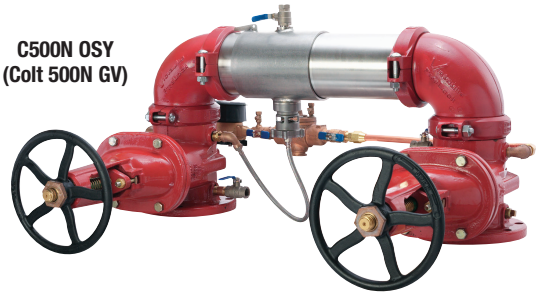
Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

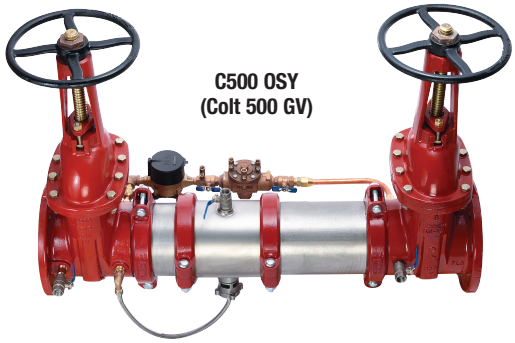
Colt™ Series C500 (Colt 500), C500N (Colt 500N), C500Z (Colt 500Z)

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

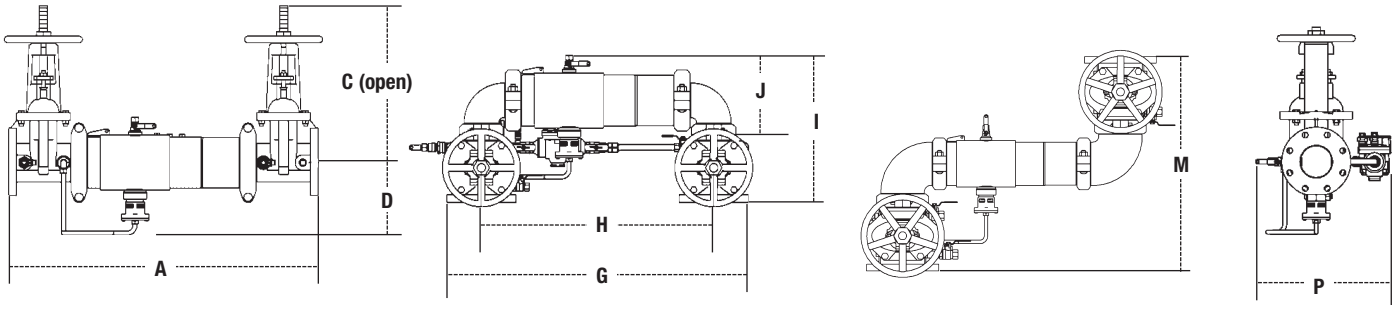
*OSY FxG — Flanged inlet gate connection and grooved outlet gate connection

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

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

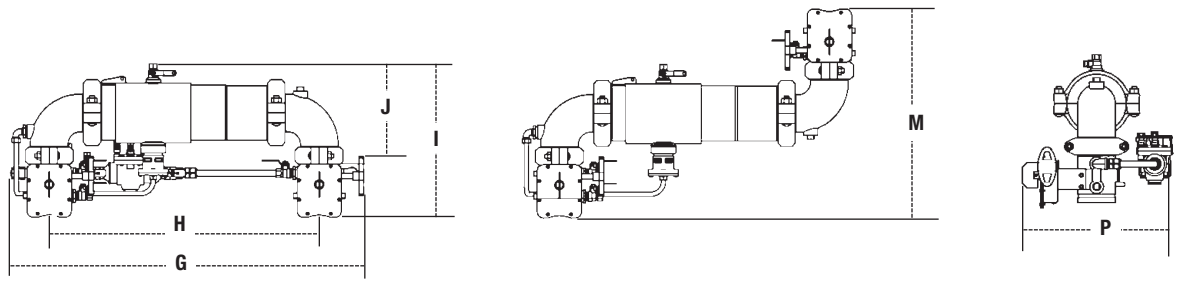
Available with grooved NRS gate valves — consult factory*
Post indicator plate and operating nut available — consult factory*
*Consult factory for dimensions

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

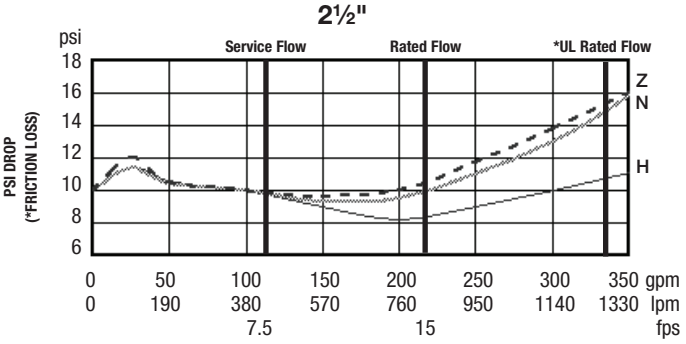
N&Z Flow characteristics collected using butterfly shutoff valves.

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

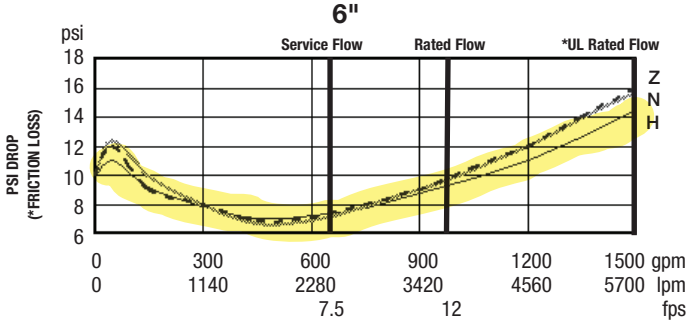
- Service Flow is typically determined by a rated velocity of 7.5fps based upon schedule 40 pipe.
- Rated Flow identifies maximum continuous duty performance determined by AWWA.
- UL Flow Rate is 150% of Rated Flow and is not recommended for continuous duty.
- AWWA Manual M22 [Appendix C] recommends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

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

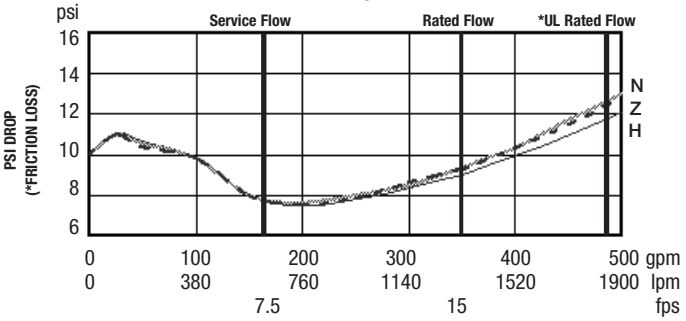
2½"



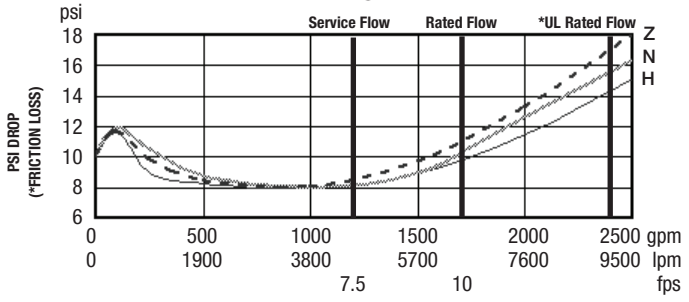
6"



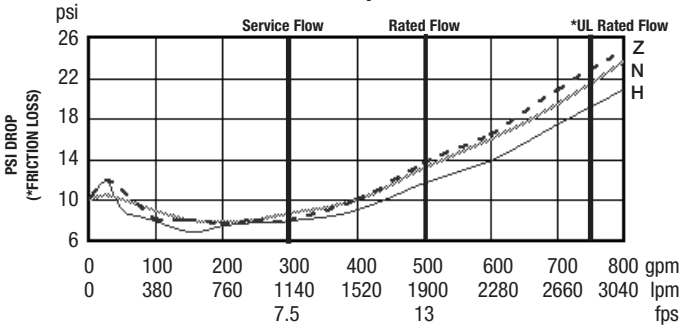
3"



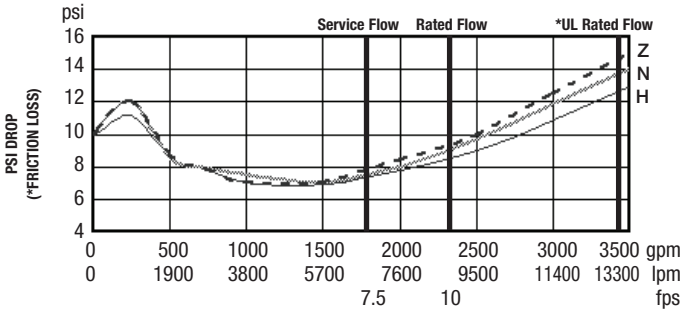
8"



4"



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.

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

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.

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

⚠ 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
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

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)

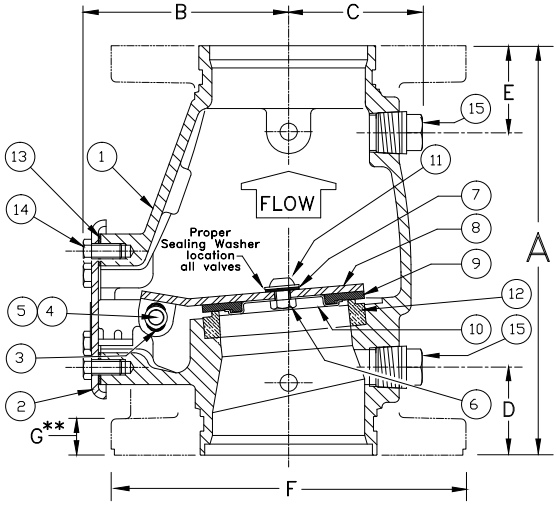
Table 3 - Trim Package Part Numbers

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

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



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.

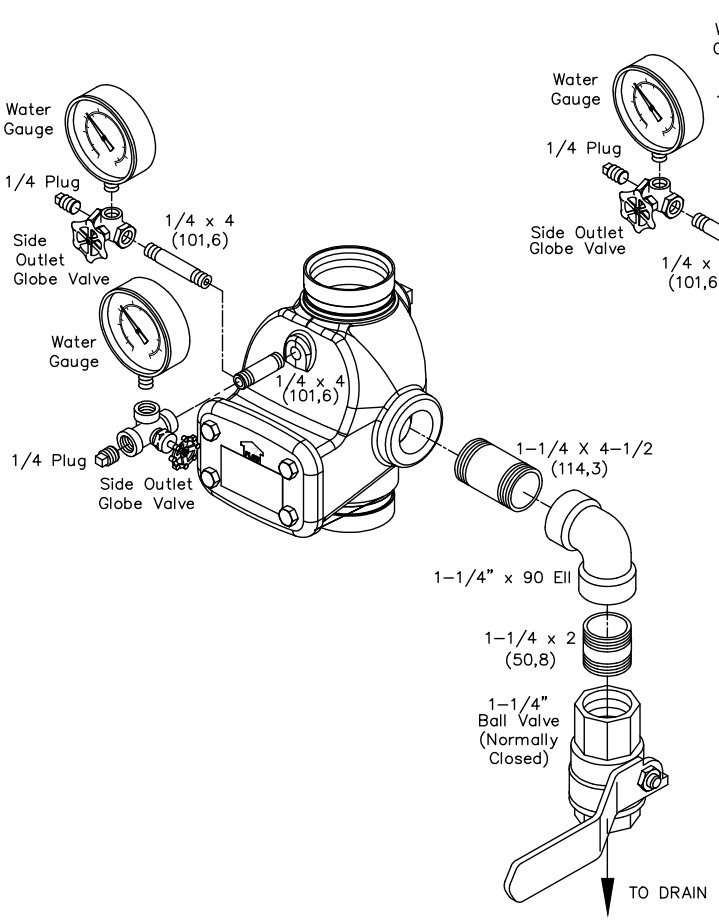
Sub-Assemblies

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

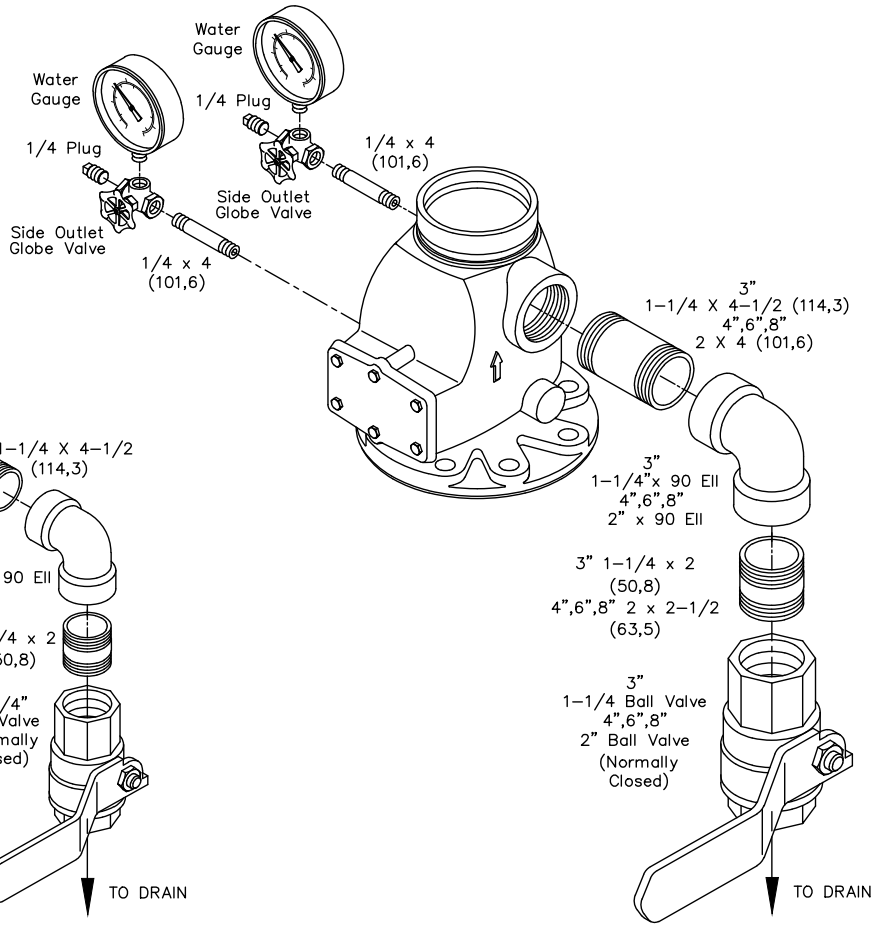
TECHNICAL DATA

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
Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

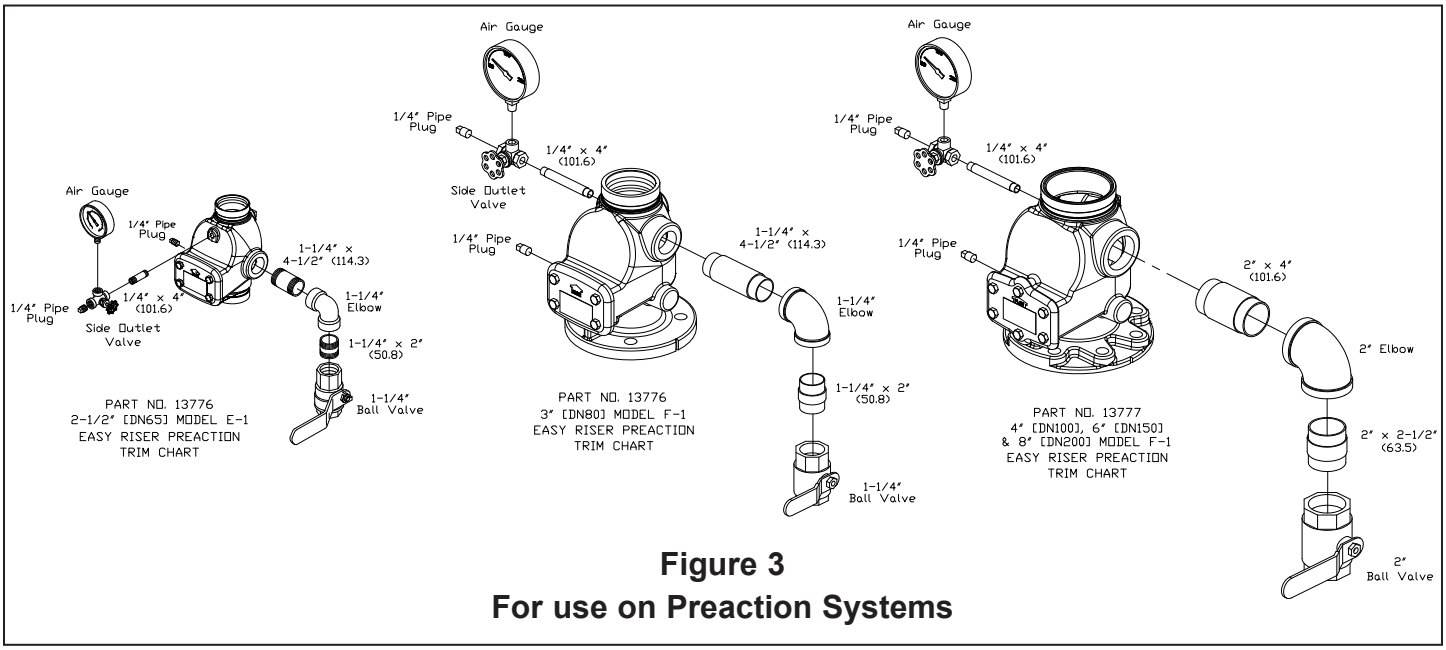
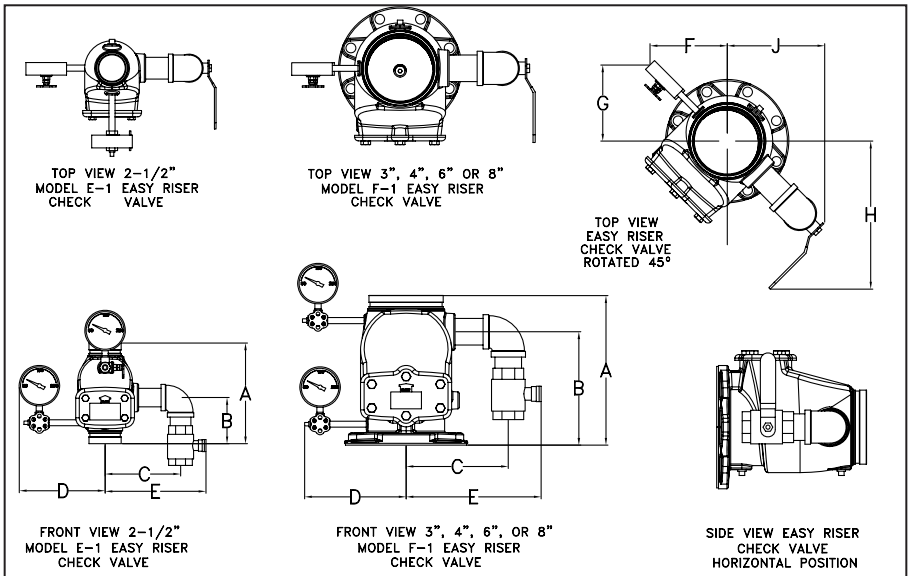


Figure 3
For use on Preaction Systems



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.

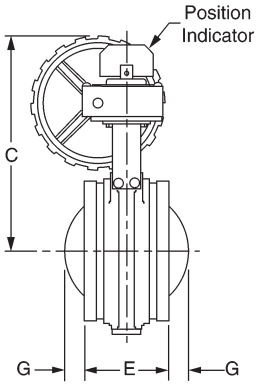
Limited Warranty

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.

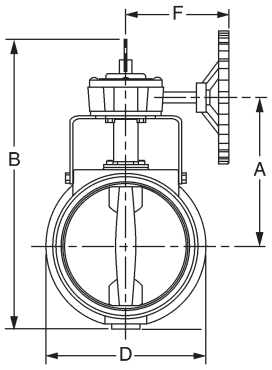
IN NO EVENT SHALL TYCO FIRE PRODUCTS BE LIABLE, IN CONTRACT, TORT, STRICT LIABILITY OR UNDER ANY OTHER LEGAL THEORY, FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LABOR CHARGES, REGARDLESS OF WHETHER TYCO FIRE PRODUCTS WAS INFORMED ABOUT THE POSSIBILITY OF SUCH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

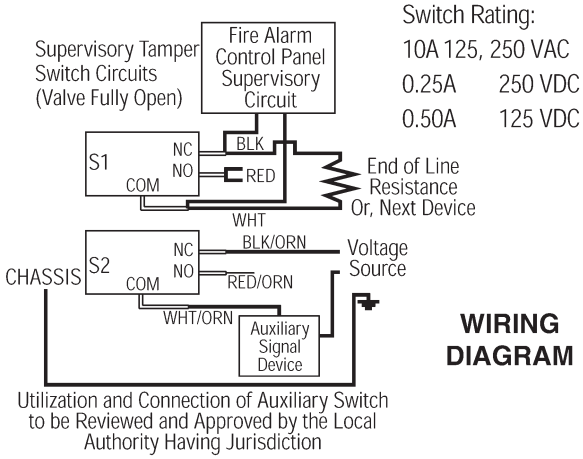
Model BFV-1 Butterfly Valve



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

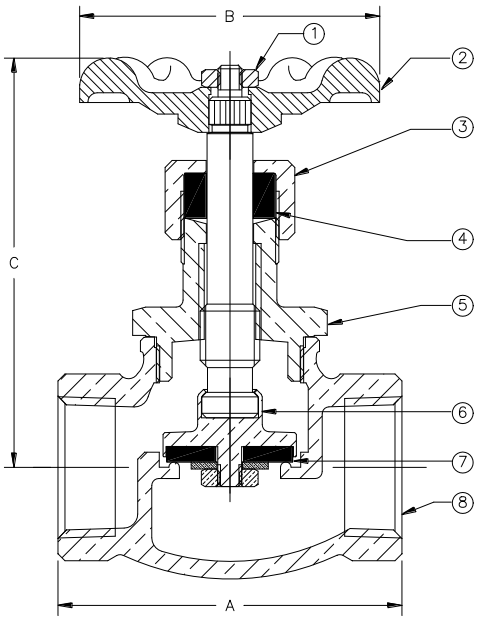
Rising Stem • Integral Seat

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
Report Description: Light Hazard (A)

Job

Job Number: B22243	Designer: BKB
Job Name: OVERHILLS ELEMENTARY	Phone: 919.243.2464 FAX
Address 1: 2626 RAY ROAD	State Certification/License Number: 16269FS
Address 2: SPRING LAKE, NC 28390	AHJ: HARNETT CO
Address 3	Job Site/Building: HARNETT CO SCHOOLS

System

Density: 0.10 gpm/ft²	Area of Application: 1500 ft² (Actual 1576 ft²)
Most Demanding Sprinkler Data: 8 K-Factor 32.98 at 17.000	Hose Streams: 100.00
Coverage Per Sprinkler: 288 ft²	Number Of Sprinklers Calculated: 6 0
System Pressure Demand: 109.634	System Flow Demand: 205.79
Total Demand: 305.79 @ 109.634	Pressure Result: +20.152 (15.5%)

Supplies

Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	776.00	100.00	138.000	92.000
1	Pump	750.00		96.000	80.000

Pumps: Static = Churn (Pressure @ Zero Flow)

Check Point Gauges

Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
BOR (1069)	107.902	19.81	205.79

PIPING

Water Supply at Node 1 (776.00, 0.00, 138.000, 92.000)

Hydraulic Calculations

for

Project Name: OVERHILLS ELEMENTARY
Location: 2626 RAY ROAD, SPRING LAKE, NC 28390,
Drawing Name: PIPING

Calculation Date: 4/19/2023

Design

Remote Area Number:	A
Remote Area Location:	CLEARSTORY
Occupancy Classification:	Light Hazard
Commodity Classification:	N/A
Density	0.10 gpm/ft²
Area of Application:	1500 ft² (Actual 1576 ft²)
Coverage per Sprinkler:	288 ft²
Type of sprinklers calculated:	Pendent
No. of sprinklers calculated:	6
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:	305.79 @ 109.634	(Safety Margin = 20.152)
from Pump at Node: 1:	205.79 @ 109.634	(Safety Margin = 20.152)

Type of System: WET

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

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

Notes:

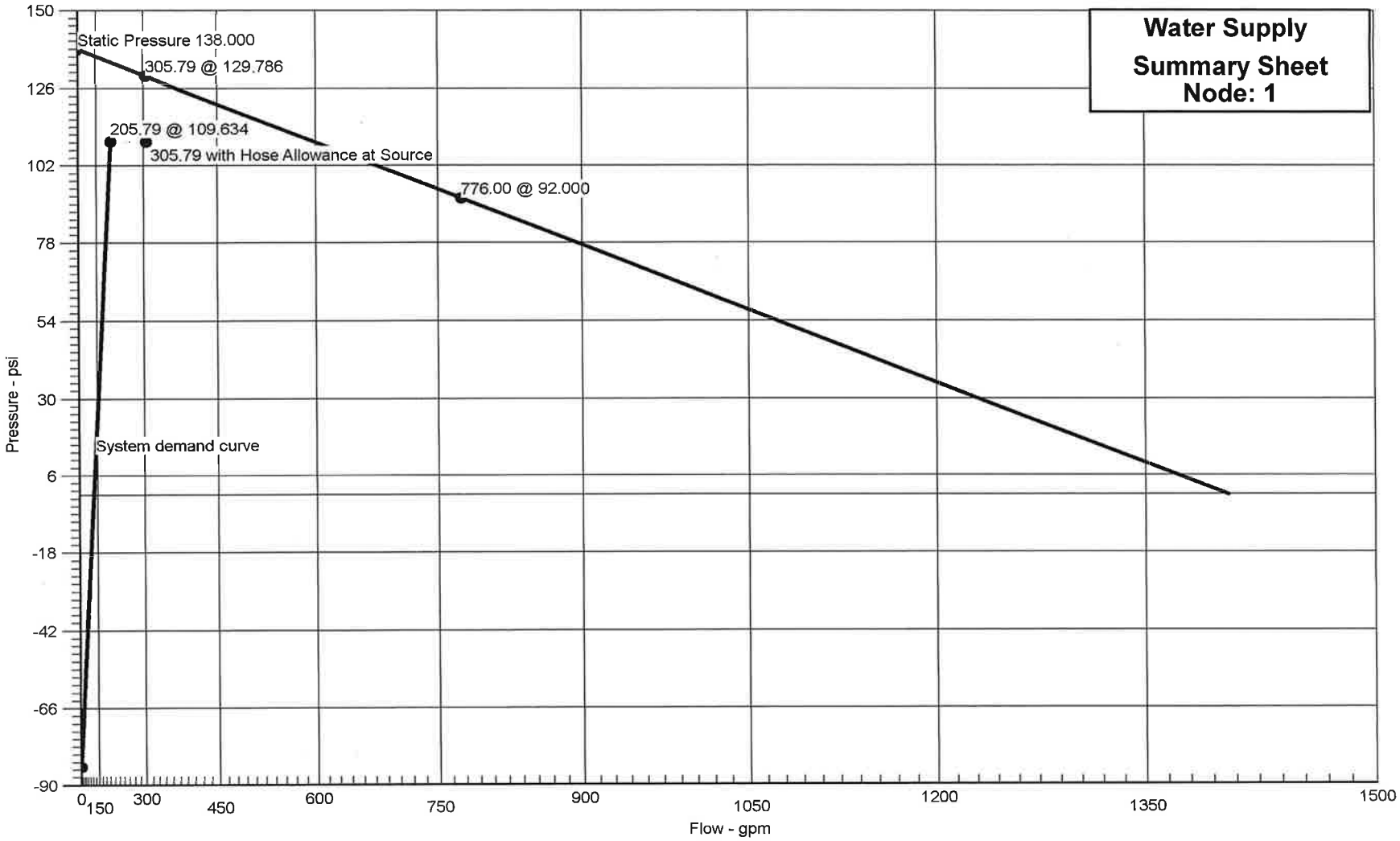
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: OVERHILLS ELEMENTARY
Remote Area Number: A

$N^{1.85}$

Date: 4/19/2023

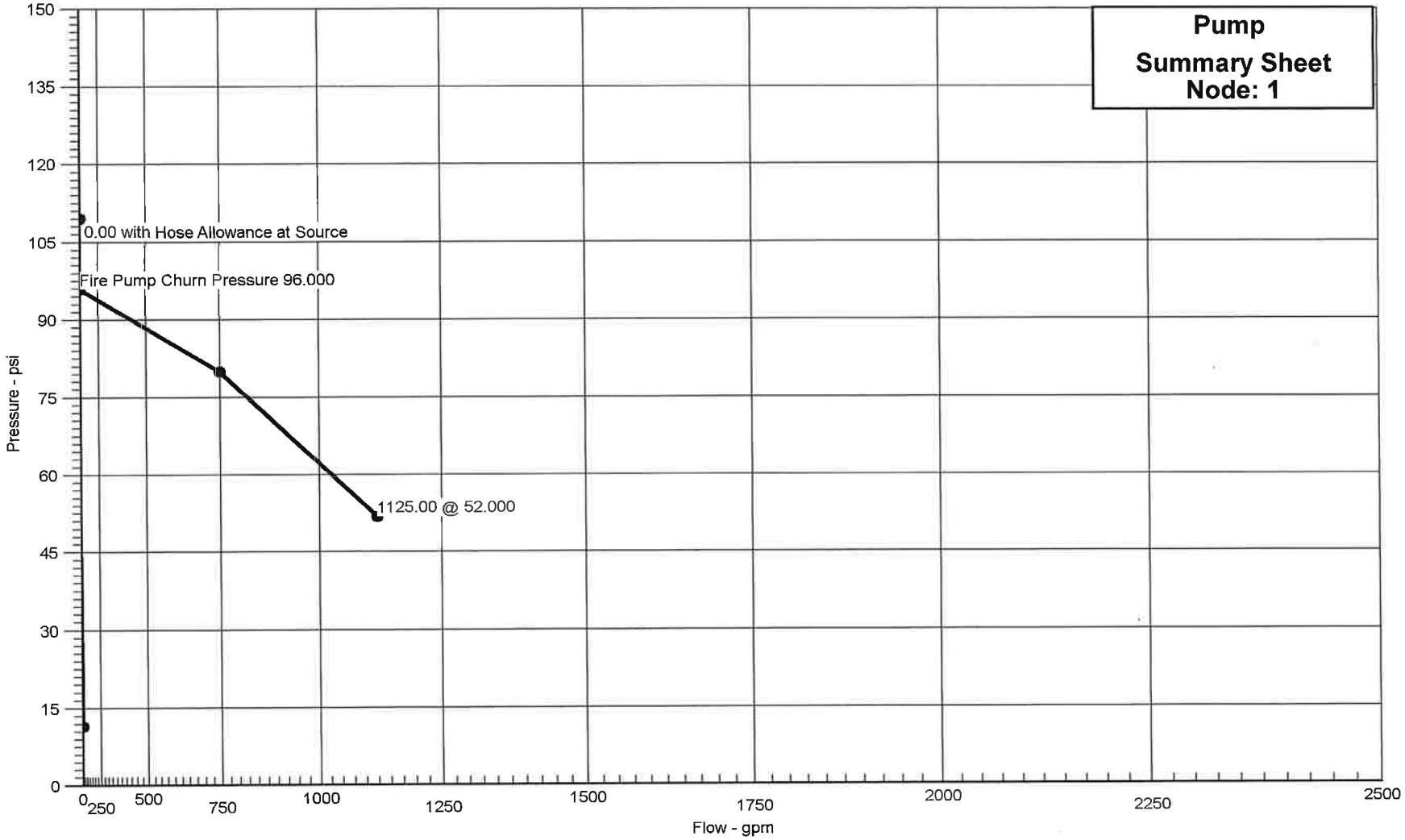


Hydraulic Graph

Job Name: OVERHILLS ELEMENTARY
Remote Area Number: A

$N^{1.85}$

Date: 4/19/2023



Pump Rating: **750.00 @ 80.000**

Supply: **Static:138.000**
Residual:92.000
Flowing:776.00

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	2341	33.75	32.98	8	17.799			
Sprinkler	2342	33.26	32.98	8	17.284			
⇨ **Sprinkler**	**2343**	**32.98**	**32.98**	**8**	**17.000**			
Sprinkler	2354	35.71	32.98	8	19.921			
Sprinkler	2355	35.19	32.98	8	19.344			
Sprinkler	2356	34.90	32.98	8	19.032			

⇨ 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	138.000	92.000	776.00	129.786	305.79	109.634

Pump Analysis

Node	Churn (psi)	Residual @ (psi)	Flow (gpm)	Available @ (psi)	Total Demand (gpm)	Required Pressure (psi)
1	96.000	80.000	750.00	129.786	205.79	109.634

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	1'-2½	Supply	109.634	205.79	P2
2341	28'-0	Sprinkler	17.799	33.75	
2342	28'-0	Sprinkler	17.284	33.26	
2343	28'-0	Sprinkler	17.000	32.98	
2354	28'-0	Sprinkler	19.921	35.71	
2355	28'-0	Sprinkler	19.344	35.19	
2356	28'-0	Sprinkler	19.032	34.90	
22	1'-2½		109.275		
24	12'-5½		92.234		
29	12'-5½		92.171		
30	12'-5½		92.167		
31	12'-5½		92.136		
38	12'-5½		92.131		
41	12'-5½		92.144		
42	12'-5½		92.147		
43	12'-5½		92.205		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
224	28'-9½		25.837		
227	28'-9½		25.154		
229	28'-9½		24.690		
233	28'-9½		35.346		
234	28'-9½		36.430		
235	28'-9½		34.407		
236	28'-9½		33.804		
340	20'-0		88.134		
349	20'-0		88.118		
462	12'-5½		93.093		
463	12'-5½		93.127		
464	12'-5½		92.203		
465	12'-5½		92.165		
469	12'-5½		91.257		
480	12'-5½		91.137		
482	12'-5½		89.418		
490	20'-0		88.004		
491	12'-5½		92.101		
492	12'-5½		92.142		
493	12'-5½		93.038		
494	12'-5½		93.006		
497	20'-0		87.891		
563	12'-5½		95.429		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
564	12'-5½		95.389		
565	12'-5½		95.451		
568	12'-5½		95.546		
571	12'-5½		95.555		
575	12'-5½		95.553		
576	12'-5½		95.557		
577	12'-5½		95.503		
583	12'-5½		95.463		
585	12'-5½		95.189		
587	12'-5½		95.414		
620	12'-5½		96.089		
623	12'-5½		96.113		
658	12'-5½		98.057		
659	12'-5½		98.200		
738	11'-1½		99.555		
774	11'-1½		99.575		
785	11'-1½		99.606		
787	11'-1½		99.668		
788	11'-1½		99.585		
789	11'-1½		99.619		
796	11'-1½		99.564		
805	11'-1½		99.571		
810	11'-1½		100.122		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
812	11'-1½		100.130		
813	11'-1½		99.780		
815	11'-1½		99.706		
825	11'-1½		99.571		
884	11'-1½		99.571		
899	11'-1½		99.571		
938	11'-1½		99.571		
949	11'-1½		99.571		
957	11'-1½		99.571		
971	11'-1½		99.571		
980	11'-1½		99.571		
983	11'-1½		99.571		
1037	11'-1½		99.571		
1069	3'-7½	Gauge	107.902		
1071	4'-2½		107.500		
1097	11'-1½		99.571		
1184	11'-1½		99.571		
1215	11'-1½		99.571		
1275	11'-1½		99.571		
1278	11'-1½		99.571		
1287	11'-1½		99.571		
1295	11'-1½		99.571		
1349	11'-1½		99.571		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1359	11'-1½		99.571		
1457	11'-1½		99.571		
1470	11'-1½		99.571		
1550	11'-1½		99.571		
1561	11'-1½		99.571		

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
2343	28'-0	8	32.98	1	(See Notes)	18'-5½	120	17.000	• • • • • Route 1 • • • • •
229	28'-9½		32.98	1.0490		6'-0 24'-5½	0.328366	-0.335 8.025	Sprinkler, 3E(2'-0)
229	28'-9½		34.90	1	(See Notes)	2'-3½	120	24.690	Flow (q) from Route 4
236	28'-9½		67.89	1.0490		5'-0 7'-3½	1.248153	9.114	PO(5'-0)
236	28'-9½			2		16'-2	120	33.804	
235	28'-9½		67.89	2.1570		16'-2	0.037290	0.603	
235	28'-9½		68.44	2	(See Notes)	2'-7½	120	34.407	Flow (q) from Route 2
234	28'-9½		136.33	2.1570		12'-3½ 14'-11	0.135456	2.022	T(12'-3½)
234	28'-9½		69.46	2	(See Notes)	90'-6½	120	36.430	Flow (q) from Route 3
482	12'-5½		205.79	2.1570		67'-8 158'-2½	0.290156	7.081 45.907	9E(6'-2), PO(12'-3½)
482	12'-5½			2½	(See Notes)	31'-3½	120	89.418	
469	12'-5½		99.67	2.6350		32'-11½ 64'-3	0.028630	1.840	2T(16'-5½)
469	12'-5½			2½	(See Notes)	14'-5	120	91.257	
465	12'-5½		88.95	2.6350		24'-8½ 39'-1½	0.023193	0.907	3E(8'-3)
465	12'-5½			2½		1'-8½	120	92.165	
464	12'-5½		88.40	2.6350		1'-8½	0.022928	0.039	
464	12'-5½		2.22	2½	(See Notes)	5'-6½	120	92.203	Flow (q) from Route 7
463	12'-5½		90.62	2.6350		32'-11½ 38'-6	0.024007	0.924	2T(16'-5½)
463	12'-5½		13.66	2½	(See Notes)	23'-3	120	93.127	Flow (q) from Route 45
564	12'-5½		104.28	2.6350		49'-5 72'-8	0.031125	2.262	2T(16'-5½), C(16'-5½)
564	12'-5½			2½		3'-7	120	95.389	
565	12'-5½		76.09	2.6350		3'-7	0.017374	0.062	

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.
565	12'-5½			1½	(See Notes)	130'-4½	120	95.451	PO(9'-11)
						24'-9	0.024178	0.578	
813	11'-1½		27.91	1.6820		155'-1½		3.751	E(4'-11½), PO(9'-11)
813	11'-1½		149.69	4	(See Notes)	17'-2	120	99.780	Flow (q) from Route 11
						26'-4	0.008033		
812	11'-1½		177.60	4.2600		43'-6		0.349	T(26'-4)
812	11'-1½		28.19	4	(See Notes)	264'-7	120	100.130	Flow (q) from Route 25
						150'-1½	0.010550	2.996	
1071	4'-2½		205.79	4.2600		414'-8½		4.375	6E(13'-2), T(26'-4), f, sCV(28'-11½), BV(15'-9½)
1071	4'-2½			4	(See Notes)	0'-0	120	107.500	
						10'-0	0.013891	0.263	
1069	3'-7½		205.79	4.0260		10'-0		0.139	E(10'-0), BOR
1069	3'-7½			4	(See Notes)	3'-11	120	107.902	
						20'-0	0.013891	1.040	
22	1'-2½		205.79	4.0260		23'-11		0.332	T(20'-0)
22	1'-2½			6	(See Notes)	211'-5½	140	109.275	
						88'-3	0.001198	0.000	
1	1'-2½		205.79	6.2800		299'-8½		0.359	3E(22'-1), 2EE(11'-0½)
			100.00					109.634	Hose Allowance At Source
1			305.79						Total(Pt) Route 1
2342	28'-0	8	33.26	1	(See Notes)	18'-7½	120	17.284	• • • • • **Route 2** • • • • •
						6'-0	0.333438	-0.335	Sprinkler,
227	28'-9½		33.26	1.0490		24'-7½		8.205	3E(2'-0)
227	28'-9½		35.19	1	(See Notes)	2'-3½	120	25.154	Flow (q) from Route 5
						5'-0	1.267224		
235	28'-9½		68.44	1.0490		7'-3½		9.254	PO(5'-0)
								34.407	Total(Pt) Route 2
2341	28'-0	8	33.75	1	(See Notes)	18'-5½	120	17.799	• • • • • **Route 3** • • • • •
						6'-0	0.342619	-0.335	Sprinkler,
224	28'-9½		33.75	1.0490		24'-5½		8.374	3E(2'-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
224	28'-9½		35.71	1	(See Notes)	2'-3½	120	25.837	Flow (q) from Route 6
233	28'-9½		69.46	1.0490		5'-0	1.302153		PO(5'-0)
						7'-3½		9.509	
233	28'-9½			2	(See Notes)	15'-6½	120	35.346	
234	28'-9½		69.46	2.1570		12'-3½	0.038903		T(12'-3½)
						27'-10		1.083	
								36.430	Total(Pt) Route 3
2356	28'-0	8	34.90	1	(See Notes)	2'-5½	120	19.032	• • • • • **Route 4** • • • • •
229	28'-9½		34.90	1.0490		14'-0	0.364524	-0.335	Sprinkler,
						16'-5½		5.993	2E(2'-0), 2T(5'-0)
								24.690	Total(Pt) Route 4
2355	28'-0	8	35.19	1	(See Notes)	2'-7½	120	19.344	• • • • • **Route 5** • • • • •
227	28'-9½		35.19	1.0490		14'-0	0.370036	-0.335	Sprinkler,
						16'-7½		6.145	2E(2'-0), 2T(5'-0)
								25.154	Total(Pt) Route 5
2354	28'-0	8	35.71	1	(See Notes)	2'-5½	120	19.921	• • • • • **Route 6** • • • • •
224	28'-9½		35.71	1.0490		14'-0	0.380246	-0.335	Sprinkler,
						16'-5½		6.251	2E(2'-0), 2T(5'-0)
								25.837	Total(Pt) Route 6
38	12'-5½		12.58	2		47'-6½	120	92.131	• • • • • **Route 7** • • • • •
31	12'-5½		2.86	2.1570			0.000107		Flow (q) from Route 8
						47'-6½		0.005	
31	12'-5½		12.47	2		13'-3	120	92.136	Flow (q) from Route 9
30	12'-5½		15.33	2.1570			0.002377		
						13'-3		0.031	
30	12'-5½		0.55	2		1'-8½	120	92.167	Flow (q) from Route 48
29	12'-5½		15.88	2.1570			0.002537		
						1'-8½		0.004	
29	12'-5½			1½	(See Notes)	123'-3	120	92.171	PO(9'-11)
464	12'-5½		2.22	1.6820		19'-9½	0.000224		
						143'-1		0.032	PO(9'-11)
								92.203	Total(Pt) Route 7

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.
480	12'-5½			2½	(See Notes)	7'-6½	120	91.137	• • • • • **Route 8** • • • • •
497	20'-0		14.32	2.6350		16'-5½ / 24'-0	0.000791	-3.265 / 0.019	PO(16'-5½)
497	20'-0			1½	(See Notes)	28'-0	120	87.891	
349	20'-0		14.32	1.6820		4'-11½ / 32'-11½	0.007040	-0.005 / 0.232	E(4'-11½)
349	20'-0			1½	(See Notes)	109'-5½	120	88.118	
38	12'-5½		12.58	1.6820		24'-9 / 134'-2½	0.005538	3.270 / 0.743	3E(4'-11½), PO(9'-11)
								92.131	Total(Pt) Route 8
469	12'-5½		88.95	2½	(See Notes)	7'-6½	120	91.257	• • • • • **Route 9** • • • • • Flow (q) from Route 1
490	20'-0		10.72	2.6350		16'-5½ / 24'-0	0.000463	-3.265 / 0.011	PO(16'-5½)
490	20'-0			1½	(See Notes)	27'-11	120	88.004	
340	20'-0		10.72	1.6820		4'-11½ / 32'-10½	0.004122	-0.005 / 0.136	E(4'-11½)
340	20'-0		1.74	1½	(See Notes)	109'-7	120	88.134	Flow (q) from Route 10
31	12'-5½		12.47	1.6820		24'-9 / 134'-4	0.005446	3.270 / 0.732	3E(4'-11½), PO(9'-11)
								92.136	Total(Pt) Route 9
349	20'-0			1½	(See Notes)	56'-4	120	88.118	• • • • • **Route 10** • • • • • 2T(9'-11), C(9'-11)
340	20'-0		1.74	1.6820		59'-5 / 115'-9	0.000143	/ 0.017	2T(9'-11), C(9'-11)
								88.134	Total(Pt) Route 10
971	11'-1½		0.06 + 0.08	1½	(See Notes)	52'-2	120	99.571	• • • • • **Route 11** • • • • • Flow (q) from Route 30 and 39
983	11'-1½		0.14	1.6820		19'-9½ / 71'-11½	0.000001	/ 0.000	2E(4'-11½), T(9'-11)
983	11'-1½			1½	(See Notes)	32'-8	120	99.571	
980	11'-1½		0.08	1.6820		9'-11 / 42'-7	0.000000	/ 0.000	PO(9'-11)
980	11'-1½		0.48	4		10'-2	120	99.571	Flow (q) from Route 12
949	11'-1½		0.56	4.2600		/ 10'-2	0.000000	/ 0.000	

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.
949	11'-1½		0.12	4		16'-8	120	99.571	Flow (q) from Route 29
899	11'-1½		0.68	4.2600		16'-8	0.000000	0.000	
899	11'-1½		0.14	4	(See Notes)	13'-2½	120	99.571	Flow (q) from Route 31
825	11'-1½		0.82	4.2600		26'-4 39'-6½	0.000000	0.000	T(26'-4)
825	11'-1½		27.67	4		12'-11	120	99.571	Flow (q) from Route 33
774	11'-1½		28.49	4.2600		12'-11	0.000272	0.004	
774	11'-1½		27.02	4		10'-9	120	99.575	Flow (q) from Route 24
788	11'-1½		55.52	4.2600		10'-9	0.000935	0.010	
788	11'-1½		17.00	4		13'-11	120	99.585	Flow (q) from Route 14
785	11'-1½		72.51	4.2600		13'-11	0.001532	0.021	
785	11'-1½		17.29	4		5'-8	120	99.606	Flow (q) from Route 16
789	11'-1½		89.81	4.2600		5'-8	0.002275	0.013	
789	11'-1½		15.13	4		16'-2	120	99.619	Flow (q) from Route 38
787	11'-1½		104.93	4.2600		16'-2	0.003035	0.049	
787	11'-1½		17.54	4		9'-4	120	99.668	Flow (q) from Route 15
815	11'-1½		122.47	4.2600		9'-4	0.004039	0.038	
815	11'-1½		27.22	4		12'-8	120	99.706	Flow (q) from Route 21
813	11'-1½		149.69	4.2600		12'-8	0.005855	0.074	
								99.780	Total(Pt) Route 11
1457	11'-1½		0.19	1½	(See Notes)	168'-10	120	99.571	• • • • • **Route 12** • • • • •
1470	11'-1½		0.10	1.6820		19'-9½ 188'-7½	0.000001	0.000	PO(9'-11), Flow (q) from Route 27 PO(9'-11)
1470	11'-1½		0.09	4		16'-8	120	99.571	Flow (q) from Route 13
1359	11'-1½		0.19	4.2600		16'-8	0.000000	0.000	

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.
1359	11'-1½		0.10	4		10'-2	120	99.571	Flow (q) from Route 26
1275	11'-1½		0.29	4.2600		10'-2	0.000000	0.000	
1275	11'-1½		0.07	4		8'-6	120	99.571	Flow (q) from Route 18
1215	11'-1½		0.36	4.2600		8'-6	0.000000	0.000	
1215	11'-1½		0.06	4		18'-6	120	99.571	Flow (q) from Route 19
1037	11'-1½		0.42	4.2600		18'-6	0.000000	0.000	
1037	11'-1½		0.06	4		8'-6	120	99.571	Flow (q) from Route 37
980	11'-1½		0.48	4.2600		8'-6	0.000000	0.000	
								99.571	Total(Pt) Route 12
1457	11'-1½		0.19	2½		14'-0	120	99.571	• • • • • **Route 13** • • • • • Flow (q) from Route 27
1550	11'-1½		0.09	2.6350		14'-0	0.000000	0.000	
1550	11'-1½			1½	(See Notes)	168'-10	120	99.571	PO(9'-11)
1561	11'-1½		0.09	1.6820		19'-9½ 188'-7½	0.000001	0.000	PO(9'-11)
1561	11'-1½			4		14'-0	120	99.571	
1470	11'-1½		0.09	4.2600		14'-0	0.000000	0.000	
								99.571	Total(Pt) Route 13
658	12'-5½		34.29	1½	(See Notes)	63'-8½	120	98.057	• • • • • **Route 14** • • • • • T(9'-11), Flow (q) from Route 17
788	11'-1½		17.00	1.6820		34'-8 98'-4½	0.009660	0.578 0.950	3E(4'-11½), PO(9'-11)
								99.585	Total(Pt) Route 14
585	12'-5½		101.51	2½		16'-11½	120	95.189	• • • • • **Route 15** • • • • • Flow (q) from Route 42
583	12'-5½		73.02	2.6350		16'-11½	0.016099	0.273	
583	12'-5½			2½		5'-11	120	95.463	
577	12'-5½		45.99	2.6350		5'-11	0.006846	0.041	

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
577	12'-5½			2½		19'-0	120	95.503	
575	12'-5½		27.37	2.6350		19'-0	0.002622	0.050	
575	12'-5½			2½		6'-7	120	95.553	
576	12'-5½		11.70	2.6350		6'-7	0.000544	0.004	
576	12'-5½		3.64	1½	(See Notes)	51'-9	120	95.557	PO(9'-11), Flow (q) from Route 22
620	12'-5½		15.34	1.6820		14'-10 66'-7	0.007993	0.532	E(4'-11½)
620	12'-5½		17.33	1½	(See Notes)	45'-5½	120	96.089	Flow (q) from Route 23
659	12'-5½		32.67	1.6820		19'-9½ 65'-3	0.032357	2.112	2E(4'-11½), T(9'-11)
659	12'-5½			1½	(See Notes)	62'-1½	120	98.200	
787	11'-1½		17.54	1.6820		24'-9 86'-10½	0.010240	0.578 0.890	3E(4'-11½), PO(9'-11)
								99.668	Total(Pt) Route 15
658	12'-5½		34.29	1½	(See Notes)	77'-7	120	98.057	• • • • • **Route 16** • • • • •
785	11'-1½		17.29	1.6820		19'-9½ 97'-4½	0.009977	0.578 0.972	Flow (q) from Route 17 2E(4'-11½), PO(9'-11)
								99.606	Total(Pt) Route 16
577	12'-5½			1½	(See Notes)	33'-6	120	95.503	• • • • • **Route 17** • • • • •
623	12'-5½		18.62	1.6820		19'-9½ 53'-3½	0.011438	0.609	PO(9'-11) T(9'-11)
623	12'-5½		15.67	1½	(See Notes)	45'-0½	120	96.113	Flow (q) from Route 34
658	12'-5½		34.29	1.6820		9'-11 54'-11	0.035395	1.944	2E(4'-11½)
								98.057	Total(Pt) Route 17
1278	11'-1½		0.13	1½	(See Notes)	32'-8½	120	99.571	• • • • • **Route 18** • • • • •
1275	11'-1½		0.07	1.6820		9'-11 42'-7½	0.000000	0.000	Flow (q) from Route 20 PO(9'-11)
								99.571	Total(Pt) Route 18

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
1278	11'-1½		0.13	1½	(See Notes)	41'-2½	120	99.571	• • • • • **Route 19** • • • • •
						24'-9	0.000000		T(9'-11), Flow (q) from Route 20
1215	11'-1½		0.06	1.6820		65'-11½		0.000	E(4'-11½), PO(9'-11)
								99.571	Total(Pt) Route 19
1287	11'-1½		0.06 + 0.07	1½	(See Notes)	51'-4½	120	99.571	• • • • • **Route 20** • • • • •
						19'-9½	0.000001		Flow (q) from Route 28 and 35
1278	11'-1½		0.13	1.6820		71'-2		0.000	2E(4'-11½), T(9'-11)
								99.571	Total(Pt) Route 20
568	12'-5½		48.18	1½	(See Notes)	130'-4½	120	95.546	• • • • • **Route 21** • • • • •
						24'-9	0.023091	0.578	PO(9'-11), Flow (q) from Route 41
815	11'-1½		27.22	1.6820		155'-1½		3.582	E(4'-11½), PO(9'-11)
								99.706	Total(Pt) Route 21
568	12'-5½		48.18	2½		6'-1	120	95.546	• • • • • **Route 22** • • • • •
							0.001600		Flow (q) from Route 41
571	12'-5½		20.96	2.6350		6'-1		0.010	
571	12'-5½			2½		18'-3	120	95.555	
							0.000063		
576	12'-5½		3.64	2.6350		18'-3		0.001	
								95.557	Total(Pt) Route 22
571	12'-5½			1½	(See Notes)	33'-6	120	95.555	• • • • • **Route 23** • • • • •
						19'-9½	0.010010		PO(9'-11)
620	12'-5½		17.33	1.6820		53'-3½		0.533	T(9'-11)
								96.089	Total(Pt) Route 23
583	12'-5½			1½	(See Notes)	130'-4½	120	95.463	• • • • • **Route 24** • • • • •
						24'-9	0.022782	0.578	PO(9'-11)
774	11'-1½		27.02	1.6820		155'-1½		3.534	E(4'-11½), PO(9'-11)
								99.575	Total(Pt) Route 24
564	12'-5½		76.09	2½		14'-5	120	95.389	• • • • • **Route 25** • • • • •
							0.002768		Flow (q) from Route 1
563	12'-5½		28.19	2.6350		14'-5		0.040	
563	12'-5½			1½	(See Notes)	132'-4½	120	95.429	
						34'-8	0.024634	0.578	PO(9'-11)
810	11'-1½		28.19	1.6820		167'-0½		4.115	3E(4'-11½), 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.
810	11'-1½			4	(See Notes)	2'-10	120	100.122	
812	11'-1½		28.19	4.2600		26'-4 29'-2	0.000267	0.008	T(26'-4)
								100.130	Total(Pt) Route 25
1295	11'-1½			2½		6'-1	120	99.571	• • • • • Route 26 • • • • •
1349	11'-1½		0.29	2.6350		6'-1	0.000001	0.000	
1349	11'-1½			1½	(See Notes)	168'-10	120	99.571	PO(9'-11)
1359	11'-1½		0.10	1.6820		19'-9½ 188'-7½	0.000001	0.000	PO(9'-11)
								99.571	Total(Pt) Route 26
1349	11'-1½		0.10	2½		16'-8	120	99.571	• • • • • Route 27 • • • • •
1457	11'-1½		0.19	2.6350		16'-8	0.000000	0.000	Flow (q) from Route 26
								99.571	Total(Pt) Route 27
1097	11'-1½			2½		8'-8	120	99.571	• • • • • Route 28 • • • • •
1184	11'-1½		0.42	2.6350		8'-8	0.000001	0.000	
1184	11'-1½			2½		16'-9	120	99.571	
1295	11'-1½		0.35	2.6350		16'-9	0.000001	0.000	
1295	11'-1½			1½	(See Notes)	99'-6	120	99.571	PO(9'-11)
1287	11'-1½		0.06	1.6820		34'-8 134'-2	0.000000	0.000	E(4'-11½), 2T(9'-11)
								99.571	Total(Pt) Route 28
938	11'-1½		0.68	1½	(See Notes)	168'-10	120	99.571	• • • • • Route 29 • • • • •
949	11'-1½		0.12	1.6820		19'-9½ 188'-7½	0.000001	0.000	PO(9'-11), Flow (q) from Route 32 PO(9'-11)
								99.571	Total(Pt) Route 29
938	11'-1½		0.68	2½		6'-4	120	99.571	• • • • • Route 30 • • • • •
957	11'-1½		0.56	2.6350		6'-4	0.000002	0.000	Flow (q) from Route 32

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.
957	11'-1½			2½		18'-0	120	99.571	
1097	11'-1½		0.47	2.6350		18'-0	0.000001	0.000	
1097	11'-1½			1½	(See Notes)	121'-3½	120	99.571	PO(9'-11)
971	11'-1½		0.06	1.6820		44'-6½ 165'-10	0.000000	0.000	7E(4'-11½)
								99.571	Total(Pt) Route 30
805	11'-1½		0.82	2½		14'-1	120	99.571	• • • • • **Route 31** • • • • • Flow (q) from Route 40
884	11'-1½		0.82	2.6350		14'-1	0.000004	0.000	
884	11'-1½			1½	(See Notes)	168'-10	120	99.571	PO(9'-11)
899	11'-1½		0.14	1.6820		19'-9½ 188'-7½	0.000001	0.000	PO(9'-11)
								99.571	Total(Pt) Route 31
884	11'-1½		0.14	2½		16'-8	120	99.571	• • • • • **Route 32** • • • • • Flow (q) from Route 31
938	11'-1½		0.68	2.6350		16'-8	0.000003	0.000	
								99.571	Total(Pt) Route 32
587	12'-5½		28.49	1½	(See Notes)	126'-11½	120	95.414	• • • • • **Route 33** • • • • • Flow (q) from Route 36
738	11'-1½		28.49	1.6820		14'-10 141'-9½	0.025127	0.578 3.563	E(4'-11½), PO(9'-11)
738	11'-1½			4	(See Notes)	19'-11	120	99.555	
796	11'-1½		28.49	4.2600		13'-2 33'-1	0.000272	0.009	E(13'-2)
796	11'-1½			4	(See Notes)	0'-10½	120	99.564	
825	11'-1½		27.67	4.2600		26'-4 27'-2½	0.000258	0.007	T(26'-4)
								99.571	Total(Pt) Route 33
575	12'-5½			1½	(See Notes)	52'-5½	120	95.553	• • • • • **Route 34** • • • • • PO(9'-11)
623	12'-5½		15.67	1.6820		14'-10 67'-4	0.008313	0.560	E(4'-11½)
								96.113	Total(Pt) Route 34

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.
1184	11'-1½			1½	(See Notes)	112'-11	120	99.571	• • • • • **Route 35** • • • • •
						24'-9	0.000000		PO(9'-11)
1287	11'-1½		0.07	1.6820		137'-8		0.000	3E(4'-11½)
								99.571	Total(Pt) Route 35
585	12'-5½		101.51	2½	(See Notes)	13'-8½	120	95.189	• • • • • **Route 36** • • • • •
						65'-11	0.002823		2T(16'-5½), C(16'-5½), Flow (q) from Route 42
587	12'-5½		28.49	2.6350		79'-7		0.225	PO(16'-5½)
								95.414	Total(Pt) Route 36
983	11'-1½			1½	(See Notes)	41'-2	120	99.571	• • • • • **Route 37** • • • • •
						24'-9	0.000000		T(9'-11)
1037	11'-1½		0.06	1.6820		65'-11		0.000	E(4'-11½), PO(9'-11)
								99.571	Total(Pt) Route 37
659	12'-5½			1½	(See Notes)	78'-3	120	98.200	• • • • • **Route 38** • • • • •
						29'-8½	0.007788	0.578	T(9'-11)
789	11'-1½		15.13	1.6820		107'-11½		0.841	2E(4'-11½), PO(9'-11)
								99.619	Total(Pt) Route 38
957	11'-1½			1½	(See Notes)	100'-0	120	99.571	• • • • • **Route 39** • • • • •
						29'-8½	0.000001		PO(9'-11)
971	11'-1½		0.08	1.6820		129'-8½		0.000	2E(4'-11½), T(9'-11)
								99.571	Total(Pt) Route 39
796	11'-1½			1½	(See Notes)	168'-10	120	99.564	• • • • • **Route 40** • • • • •
						19'-9½	0.000035		PO(9'-11)
805	11'-1½		0.82	1.6820		188'-7½		0.007	PO(9'-11)
								99.571	Total(Pt) Route 40
565	12'-5½		27.91	2½		12'-8	120	95.451	• • • • • **Route 41** • • • • •
							0.007461		Flow (q) from Route 1
568	12'-5½		48.18	2.6350		12'-8		0.095	
								95.546	Total(Pt) Route 41
491	12'-5½		91.79	2½		1'-9	120	92.101	• • • • • **Route 42** • • • • •
							0.023309		Flow (q) from Route 46
492	12'-5½		89.19	2.6350		1'-9		0.041	

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'-5½			2½	(See Notes)	6'-2	120	92.142	
493	12'-5½		88.36	2.6350		32'-11½	0.022909		2T(16'-5½)
						39'-1½		0.896	
493	12'-5½		13.15	2½	(See Notes)	23'-3	120	93.038	Flow (q) from Route 43
585	12'-5½		101.51	2.6350		49'-5	0.029614		2T(16'-5½), C(16'-5½)
						72'-8		2.152	
								95.189	Total(Pt) Route 42
491	12'-5½		91.79	1½	(See Notes)	123'-3	120	92.101	• • • • • **Route 43** • • • • •
41	12'-5½		2.60	1.6820		19'-9½	0.000300		PO(9'-11), Flow (q) from Route 46
						143'-1		0.043	PO(9'-11)
41	12'-5½		9.72	2		1'-9	120	92.144	Flow (q) from Route 44
42	12'-5½		12.32	2.1570			0.001587		
						1'-9		0.003	
42	12'-5½		0.83	2	(See Notes)	20'-3½	120	92.147	Flow (q) from Route 47
43	12'-5½		13.15	2.1570		12'-3½	0.001791		PO(12'-3½)
						32'-7		0.058	
43	12'-5½			1½	(See Notes)	123'-3	120	92.205	
494	12'-5½		13.15	1.6820		9'-11	0.006013		PO(9'-11)
						133'-2		0.801	
494	12'-5½			2½	(See Notes)	14'-1½	120	93.006	
493	12'-5½		13.15	2.6350		32'-11½	0.000676		2T(16'-5½)
						47'-0½		0.032	
								93.038	Total(Pt) Route 43
38	12'-5½		12.58	2		13'-1½	120	92.131	• • • • • **Route 44** • • • • •
41	12'-5½		9.72	2.1570			0.001023		Flow (q) from Route 8
						13'-1½		0.013	
								92.144	Total(Pt) Route 44
29	12'-5½		2.22	2	(See Notes)	20'-6	120	92.171	• • • • • **Route 45** • • • • •
24	12'-5½		13.66	2.1570		12'-3½	0.001919		Flow (q) from Route 7
						32'-9½		0.063	PO(12'-3½)
24	12'-5½			1½	(See Notes)	123'-3	120	92.234	
462	12'-5½		13.66	1.6820		9'-11	0.006445		PO(9'-11)
						133'-2		0.858	

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.
462	12'-5½			2½	(See Notes)	14'-11½	120	93.093	
463	12'-5½		13.66	2.6350		32'-11½ / 47'-11	0.000724	0.035	2T(16'-5½)
								93.127	Total(Pt) Route 45
482	12'-5½		99.67	2½	(See Notes)	20'-6	120	89.418	• • • • • **Route 46** • • • • • Flow (q) from Route 1
480	12'-5½		106.11	2.6350		32'-11½ / 53'-5½	0.032147	1.719	2T(16'-5½)
480	12'-5½		14.32	2½	(See Notes)	14'-6½	120	91.137	Flow (q) from Route 8
491	12'-5½		91.79	2.6350		24'-8½ / 39'-3	0.024583	0.964	3E(8'-3)
								92.101	Total(Pt) Route 46
492	12'-5½			1½	(See Notes)	123'-3	120	92.142	• • • • • **Route 47** • • • • • PO(9'-11)
42	12'-5½		0.83	1.6820		19'-9½ / 143'-1	0.000036	0.005	PO(9'-11)
								92.147	Total(Pt) Route 47
465	12'-5½			1½	(See Notes)	123'-3	120	92.165	• • • • • **Route 48** • • • • • PO(9'-11)
30	12'-5½		0.55	1.6820		19'-9½ / 143'-1	0.000017	0.002	PO(9'-11)
								92.167	Total(Pt) Route 48

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
Report Description: Light Hazard (B)

Job

Job Number: B22243	Designer: BKB
Job Name: OVERHILLS ELEMENTARY	Phone: 919.243.2464 FAX
Address 1: 2626 RAY ROAD	State Certification/License Number: 16269FS
Address 2: SPRING LAKE, NC 28390	AHJ: HARNETT CO
Address 3:	Job Site/Building: HARNETT CO SCHOOLS

System

Density: 0.10 gpm/ft²	Area of Application: 1500 ft² (Actual 1589 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: 56.241	System Flow Demand: 274.59
Total Demand: 374.59 @ 56.241	Pressure Result: +69.803 (55.4%)

Supplies

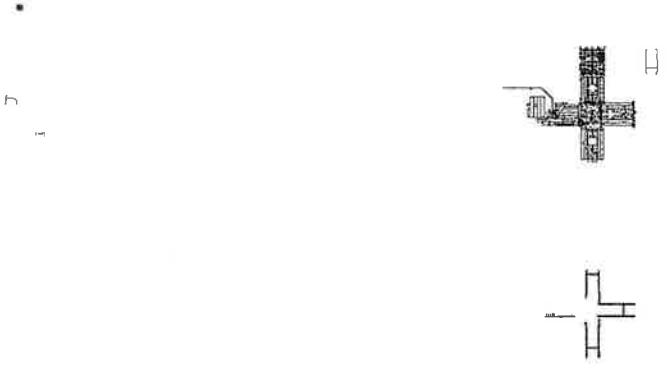
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	776.00	100.00	138.000	92.000
1	Pump	750.00		96.000	80.000

Pumps: Static = Churn (Pressure @ Zero Flow)

Check Point Gauges

Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
BOR (1069)	54.023	37.36	274.59

PIPING



Water Supply at Node 1 (776.00, 0.00, 138.000, 92.000)

Hydraulic Calculations

for

Project Name: OVERHILLS ELEMENTARY
Location: 2626 RAY ROAD, SPRING LAKE, NC 28390,
Drawing Name: PIPING

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 1589 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:	374.59 @ 56.241	(Safety Margin = 69.803)
from Pump at Node: 1:	274.59 @ 56.241	(Safety Margin = 69.803)

Type of System: WET
Volume of Dry/PreAction/Antifreeze/OtherA N/A

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

Notes:

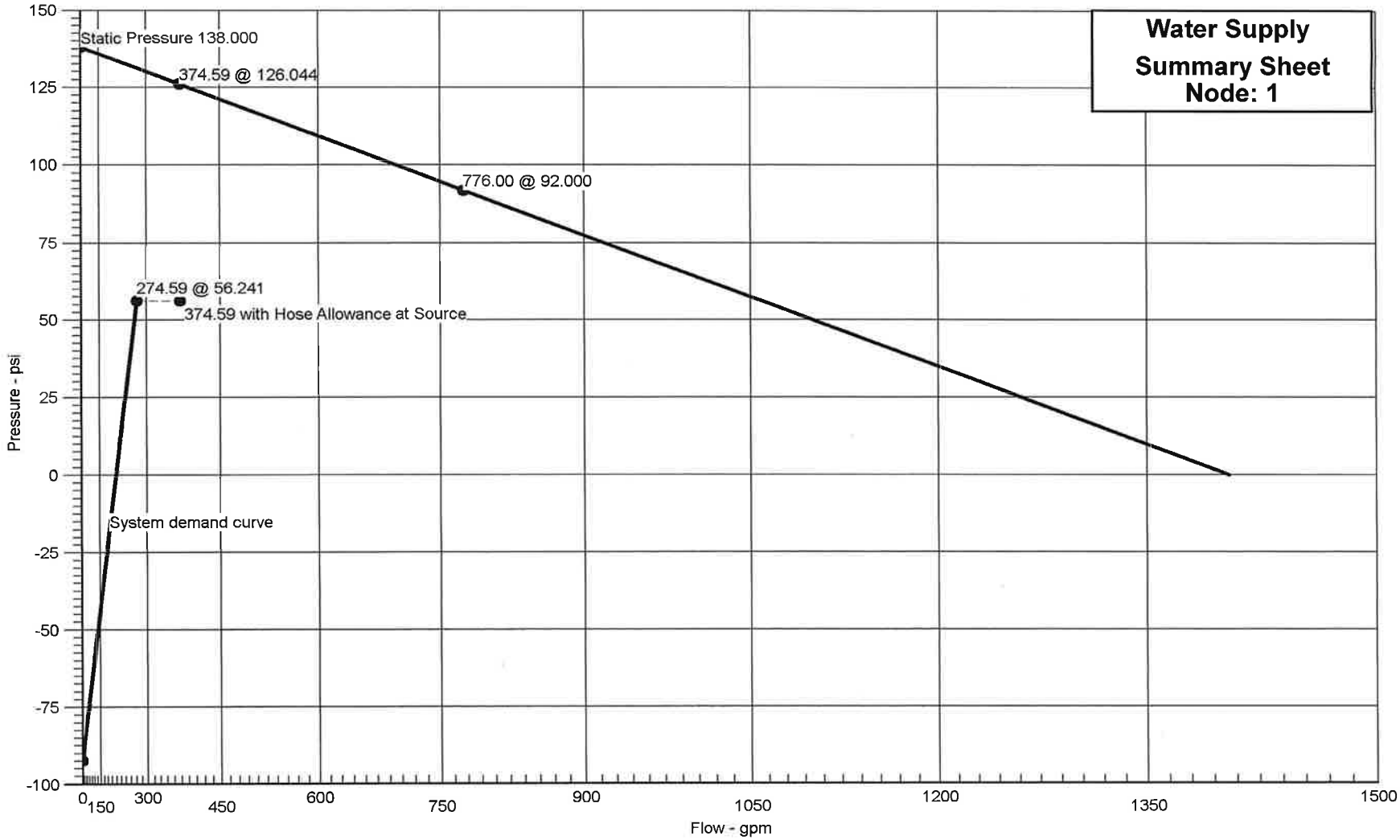
Automatic peaking results Left: 55.261 Right: N/A

Hydraulic Graph

Job Name: OVERHILLS ELEMENTARY
Remote Area Number: B

$N^{1.85}$

Date: 4/19/2023

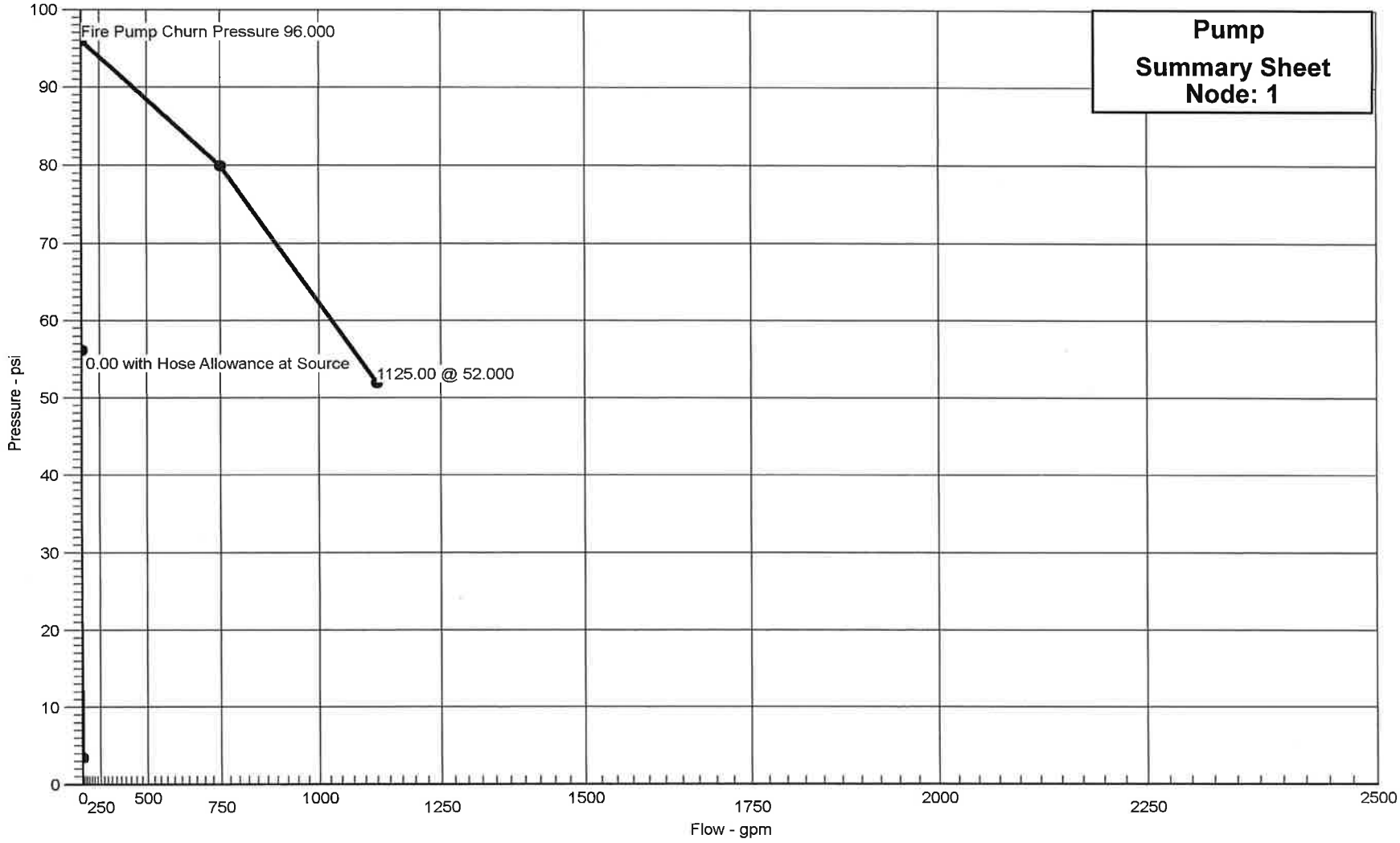


Hydraulic Graph

Job Name: OVERHILLS ELEMENTARY
Remote Area Number: B

$N^{1.85}$

Date: 4/19/2023



Pump Rating: **750.00 @ 80.000**

Supply: **Static:138.000**
Residual:92.000
Flowing:776.00

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	2325	34.66	32.98	8	18.766			
Sprinkler	2326	34.51	32.98	8	18.612			
Sprinkler	2334	33.89	32.98	8	17.947			
Sprinkler	2337	34.60	32.98	8	18.702			
Sprinkler	2338	34.47	32.98	8	18.565			
⇨ Sprinkler	**2344**	**32.98**	**32.98**	**8**	**17.000**			
Sprinkler	2350	34.78	32.98	8	18.906			
Sprinkler	2351	34.69	32.98	8	18.804			

⇨ 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	138.000	92.000	776.00	126.044	374.59	56.241

Pump Analysis

Node	Churn (psi)	Residual @ (psi)	Flow (gpm)	Available @ (psi)	Total Demand (gpm)	Required Pressure (psi)
1	96.000	80.000	750.00	126.044	274.59	56.241

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	1'-2½	Supply	56.241	274.59	P2
2325	9'-4	Sprinkler	18.766	34.66	
2326	9'-4	Sprinkler	18.612	34.51	
2334	8'-8½	Sprinkler	17.947	33.89	
2337	9'-4	Sprinkler	18.702	34.60	
2338	9'-4	Sprinkler	18.565	34.47	
2344	8'-8½	Sprinkler	17.000	32.98	
2350	9'-4	Sprinkler	18.906	34.78	
2351	9'-4	Sprinkler	18.804	34.69	
22	1'-2½		55.629		
24	12'-5½		29.148		
29	12'-5½		28.940		
30	12'-5½		28.909		
31	12'-5½		28.425		
38	12'-5½		25.843		
41	12'-5½		24.602		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
42	12'-5½		24.489		
43	12'-5½		24.140		
128	12'-5½		22.476		
132	12'-5½		22.301		
156	12'-5½		24.058		
170	12'-5½		22.394		
174	12'-5½		22.243		
179	12'-5½		24.119		
207	12'-5½		22.649		
211	12'-5½		22.541		
340	20'-0		26.325		
349	20'-0		26.044		
462	12'-5½		31.977		
463	12'-5½		32.091		
464	12'-5½		30.907		
465	12'-5½		30.872		
469	12'-5½		30.400		
480	12'-5½		29.984		
490	20'-0		27.120		
491	12'-5½		29.901		
492	12'-5½		29.906		
493	12'-5½		30.758		
494	12'-5½		30.248		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
497	20'-0		26.655		
563	12'-5½		35.543		
564	12'-5½		35.476		
565	12'-5½		35.565		
568	12'-5½		35.686		
571	12'-5½		35.695		
575	12'-5½		35.679		
576	12'-5½		35.693		
577	12'-5½		35.554		
583	12'-5½		35.465		
585	12'-5½		34.916		
587	12'-5½		35.307		
620	12'-5½		36.599		
623	12'-5½		36.614		
658	12'-5½		39.935		
659	12'-5½		40.188		
738	11'-1½		42.084		
774	11'-1½		42.118		
785	11'-1½		42.172		
787	11'-1½		42.279		
788	11'-1½		42.136		
789	11'-1½		42.195		
796	11'-1½		42.100		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
805	11'-1½		42.112		
810	11'-1½		43.054		
812	11'-1½		43.067		
813	11'-1½		42.471		
815	11'-1½		42.343		
825	11'-1½		42.112		
884	11'-1½		42.112		
899	11'-1½		42.112		
938	11'-1½		42.112		
949	11'-1½		42.112		
957	11'-1½		42.112		
971	11'-1½		42.112		
980	11'-1½		42.112		
983	11'-1½		42.112		
1037	11'-1½		42.112		
1069	3'-7½	Gauge	54.023		
1071	4'-2½		53.523		
1097	11'-1½		42.112		
1184	11'-1½		42.112		
1215	11'-1½		42.112		
1275	11'-1½		42.112		
1278	11'-1½		42.112		
1287	11'-1½		42.112		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1295	11'-1½		42.112		
1349	11'-1½		42.112		
1359	11'-1½		42.112		
1457	11'-1½		42.112		
1470	11'-1½		42.112		
1550	11'-1½		42.112		
1561	11'-1½		42.112		

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.
2344	8'-8½	8	32.98	1	(See Notes)	11'-7½	120	17.000	• • • • • Route 1 • • • • • Sprinkler, 5E(2'-0), PO(5'-0)
179	12'-5½		32.98	1.0490		15'-0	0.328366	-1.618	
						26'-7½		8.737	
179	12'-5½		13.45	1½	(See Notes)	83'-4	120	24.119	Flow (q) from Route 45 PO(9'-11)
491	12'-5½		46.43	1.6820		9'-11	0.062019		
						93'-2½		5.782	
491	12'-5½			2½	(See Notes)	14'-6½	120	29.901	3E(8'-3), 2T(16'-5½)
480	12'-5½		17.52	2.6350		57'-8	0.001148		
						72'-2		0.083	
480	12'-5½		20.89	2½	(See Notes)	51'-10	120	29.984	Flow (q) from Route 9 2T(16'-5½)
469	12'-5½		38.41	2.6350		32'-11½	0.004905		
						84'-9		0.416	
469	12'-5½		24.12	2½	(See Notes)	14'-5	120	30.400	Flow (q) from Route 10 3E(8'-3)
465	12'-5½		62.53	2.6350		24'-8½	0.012083		
						39'-1½		0.473	
465	12'-5½		20.55	2½		1'-8½	120	30.872	Flow (q) from Route 2
464	12'-5½		83.08	2.6350			0.020440		
						1'-8½		0.035	
464	12'-5½		20.57	2½	(See Notes)	5'-6½	120	30.907	Flow (q) from Route 42 2T(16'-5½)
463	12'-5½		103.64	2.6350		32'-11½	0.030775		
						38'-6		1.184	
463	12'-5½		26.02	2½	(See Notes)	23'-3	120	32.091	Flow (q) from Route 43 2T(16'-5½), C(16'-5½)
564	12'-5½		129.66	2.6350		49'-5	0.046577		
						72'-8		3.384	
564	12'-5½			2½		3'-7	120	35.476	
565	12'-5½		92.29	2.6350			0.024831		
						3'-7		0.089	
565	12'-5½			1½	(See Notes)	130'-4½	120	35.565	PO(9'-11) E(4'-11½), PO(9'-11)
813	11'-1½		37.02	1.6820		24'-9	0.040789	0.578	
						155'-1½		6.328	
813	11'-1½		200.19	4	(See Notes)	17'-2	120	42.471	Flow (q) from Route 7 T(26'-4)
812	11'-1½		237.21	4.2600		26'-4	0.013723		
						43'-6		0.597	

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.
812	11'-1½		37.37	4	(See Notes)	264'-7	120	43.067	Flow (q) from Route 23
1071	4'-2½		274.59	4.2600		150'-1½	0.017988	2.996	
						414'-8½		7.460	6E(13'-2), T(26'-4), f, sCV(28'-11½), BV(15'-9½)
1071	4'-2½			4	(See Notes)	0'-0	120	53.523	
1069	3'-7½		274.59	4.0260		10'-0	0.023685	0.263	E(10'-0), BOR
						10'-0		0.237	
1069	3'-7½			4	(See Notes)	3'-11	120	54.023	
22	1'-2½		274.59	4.0260		20'-0	0.023685	1.040	T(20'-0)
						23'-11		0.566	
22	1'-2½			6	(See Notes)	211'-5½	140	55.629	
1	1'-2½		274.59	6.2800		88'-3	0.002043	0.000	3E(22'-1), 2EE(11'-0½)
						299'-8½		0.612	
			100.00					56.241	Hose Allowance At Source
1			374.59						Total(Pt) Route 1
2334	8'-8½	8	33.89	1	(See Notes)	9'-4½	120	17.947	• • • • • **Route 2** • • • • • Sprinkler,
156	12'-5½		33.89	1.0490		13'-0	0.345243	-1.618	
						22'-4½		7.729	4E(2'-0), PO(5'-0)
156	12'-5½			1½	(See Notes)	30'-2	120	24.058	
41	12'-5½		20.44	1.6820		9'-11	0.013594		PO(9'-11)
						40'-0½		0.545	
41	12'-5½		91.70	2		13'-1½	120	24.602	Flow (q) from Route 3
38	12'-5½		112.14	2.1570			0.094382		
						13'-1½		1.240	
38	12'-5½			2		47'-6½	120	25.843	
31	12'-5½		83.20	2.1570			0.054332		
						47'-6½		2.582	
31	12'-5½			2		13'-3	120	28.425	
30	12'-5½		67.14	2.1570			0.036532		
						13'-3		0.484	
30	12'-5½			1½	(See Notes)	123'-3	120	28.909	PO(9'-11)
465	12'-5½		20.55	1.6820		19'-9½	0.013725		
						143'-1		1.964	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.
								30.872	Total(Pt) Route 2
2338	9'-4	8	34.47	1	(See Notes)	5'-1½	120	18.565	• • • • • **Route 3** • • • • • Sprinkler, 2E(2'-0), PO(5'-0)
174	12'-5½		34.47	1.0490		9'-0 14'-1½	0.356232	-1.347 5.025	
174	12'-5½			1½		15'-4½	120	22.243	
132	12'-5½		10.21	1.6820		15'-4½	0.003766	0.058	
132	12'-5½		34.51	1½	(See Notes)	21'-10½	120	22.301	Flow (q) from Route 4 PO(9'-11)
43	12'-5½		44.73	1.6820		9'-11 31'-9½	0.057869	1.839	
43	12'-5½			2		20'-3½	120	24.140	
42	12'-5½		44.73	2.1570		20'-3½	0.017233	0.349	
42	12'-5½		46.97	2		1'-9	120	24.489	Flow (q) from Route 5
41	12'-5½		91.70	2.1570		1'-9	0.065044	0.113	
								24.602	Total(Pt) Route 3
2326	9'-4	8	34.51	1	(See Notes)	5'-1	120	18.612	• • • • • **Route 4** • • • • • Sprinkler, 2E(2'-0), PO(5'-0)
132	12'-5½		34.51	1.0490		9'-0 14'-1	0.357075	-1.347 5.035	
								22.301	Total(Pt) Route 4
2337	9'-4	8	34.60	1	(See Notes)	5'-0½	120	18.702	• • • • • **Route 5** • • • • • Sprinkler, 2E(2'-0), PO(5'-0)
170	12'-5½		34.60	1.0490		9'-0 14'-0½	0.358663	-1.347 5.039	
170	12'-5½			1½		15'-4½	120	22.394	
128	12'-5½		12.32	1.6820		15'-4½	0.005327	0.082	
128	12'-5½		34.66	1½	(See Notes)	21'-10½	120	22.476	Flow (q) from Route 6 PO(9'-11)
42	12'-5½		46.97	1.6820		9'-11 31'-9½	0.063363	2.014	
								24.489	Total(Pt) Route 5

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.
2325	9'-4	8	34.66	1	(See Notes)	5'-0½	120	18.766	• • • • • Route 6 • • • • • Sprinkler,
128	12'-5½		34.66	1.0490		9'-0 14'-0½	0.359803	-1.347 5.056	2E(2'-0), PO(5'-0)
								22.476	Total(Pt) Route 6
2351	9'-4	8	34.69	1	(See Notes)	5'-1½	120	18.804	• • • • • Route 7 • • • • • Sprinkler,
211	12'-5½		34.69	1.0490		9'-0 14'-1½	0.360467	-1.347 5.085	2E(2'-0), PO(5'-0)
211	12'-5½		24.26	1½	(See Notes)	70'-0	120	22.541	Flow (q) from Route 46
494	12'-5½		58.95	1.6820		9'-11 79'-11	0.096432	7.707	PO(9'-11)
494	12'-5½			2½	(See Notes)	14'-1½	120	30.248	
493	12'-5½		58.95	2.6350		32'-11½ 47'-0½	0.010834	0.510	2T(16'-5½)
493	12'-5½		85.98	2½	(See Notes)	23'-3	120	30.758	Flow (q) from Route 8
585	12'-5½		144.92	2.6350		49'-5 72'-8	0.057220	4.158	2T(16'-5½), C(16'-5½)
585	12'-5½			2½		16'-11½	120	34.916	
583	12'-5½		106.49	2.6350		16'-11½	0.032355	0.549	
583	12'-5½			2½		5'-11	120	35.465	
577	12'-5½		70.27	2.6350		5'-11	0.014995	0.089	
577	12'-5½			2½		19'-0	120	35.554	
575	12'-5½		45.15	2.6350		19'-0	0.006615	0.126	
575	12'-5½			2½		6'-7	120	35.679	
576	12'-5½		24.47	2.6350		6'-7	0.002130	0.014	
576	12'-5½			2½		18'-3	120	35.693	
571	12'-5½		4.01	2.6350		18'-3	0.000075	0.001	
571	12'-5½		19.04	1½	(See Notes)	33'-6	120	35.695	
620	12'-5½		23.06	1.6820		19'-9½ 53'-3½	0.016983	0.905	PO(9'-11), Flow (q) from Route 40 T(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: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value
620	12'-5½		20.46	1½	(See Notes)	45'-5½	120	36.599	Flow (q) from Route 21
659	12'-5½		43.51	1.6820		19'-9½ / 65'-3	0.054991	3.589	2E(4'-11½), T(9'-11)
659	12'-5½			1½	(See Notes)	62'-1½	120	40.188	
787	11'-1½		23.37	1.6820		24'-9 / 86'-10½	0.017408	0.578 / 1.513	3E(4'-11½), PO(9'-11)
787	11'-1½		140.60	4		9'-4	120	42.279	Flow (q) from Route 12
815	11'-1½		163.96	4.2600		9'-4	0.006930	0.065	
815	11'-1½		36.23	4		12'-8	120	42.343	Flow (q) from Route 39
813	11'-1½		200.19	4.2600		12'-8	0.010025	0.127	
								42.471	Total(Pt) Route 7
2350	9'-4	8	34.78	1	(See Notes)	5'-0½	120	18.906	• • • • • **Route 8** • • • • • Sprinkler,
207	12'-5½		34.78	1.0490		9'-0 / 14'-0½	0.362283	-1.347 / 5.090	2E(2'-0), PO(5'-0)
207	12'-5½		22.28	1½	(See Notes)	70'-0	120	22.649	Flow (q) from Route 44
492	12'-5½		57.06	1.6820		9'-11 / 79'-11	0.090808	7.257	PO(9'-11)
492	12'-5½		28.91	2½	(See Notes)	6'-2	120	29.906	Flow (q) from Route 41
493	12'-5½		85.98	2.6350		32'-11½ / 39'-1½	0.021779	0.852	2T(16'-5½)
								30.758	Total(Pt) Route 8
38	12'-5½			1½	(See Notes)	109'-5½	120	25.843	• • • • • **Route 9** • • • • • PO(9'-11)
349	20'-0		28.94	1.6820		24'-9 / 134'-2½	0.025864	-3.270 / 3.471	3E(4'-11½)
349	20'-0			1½	(See Notes)	28'-0	120	26.044	
497	20'-0		20.89	1.6820		14'-10 / 42'-10	0.014148	0.005 / 0.606	E(4'-11½), PO(9'-11)
497	20'-0			2½	(See Notes)	7'-6½	120	26.655	
480	12'-5½		20.89	2.6350		32'-11½ / 40'-5½	0.001589	3.265 / 0.064	2T(16'-5½)
								29.984	Total(Pt) Route 9

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.
31	12'-5½			1½	(See Notes)	109'-7	120	28.425	• • • • • Route 10 • • • • •
						24'-9	0.008706	-3.270	PO(9'-11)
340	20'-0		16.07	1.6820		134'-4		1.170	3E(4'-11½)
340	20'-0		8.05	1½	(See Notes)	27'-11	120	26.325	Flow (q) from Route 11
						14'-10	0.018462	0.005	
490	20'-0		24.12	1.6820		42'-9½		0.790	E(4'-11½), PO(9'-11)
490	20'-0			2½		7'-6½	120	27.120	
							0.002074	3.265	
469	12'-5½		24.12	2.6350		7'-6½		0.016	
								30.400	Total(Pt) Route 10
349	20'-0			1½	(See Notes)	56'-4	120	26.044	• • • • • Route 11 • • • • •
						59'-5	0.002427		2T(9'-11), C(9'-11)
340	20'-0		8.05	1.6820		115'-9		0.281	2T(9'-11), C(9'-11)
								26.325	Total(Pt) Route 11
971	11'-1½		0.08 + 0.11	1½	(See Notes)	52'-2	120	42.112	• • • • • Route 12 • • • • •
						19'-9½	0.000002		Flow (q) from Route 28 and 37
983	11'-1½		0.19	1.6820		71'-11½		0.000	2E(4'-11½), T(9'-11)
983	11'-1½			1½	(See Notes)	32'-8	120	42.112	
						9'-11	0.000001		
980	11'-1½		0.11	1.6820		42'-7		0.000	PO(9'-11)
980	11'-1½		0.64	4		10'-2	120	42.112	Flow (q) from Route 13
							0.000000		
949	11'-1½		0.75	4.2600		10'-2		0.000	
949	11'-1½		0.17	4		16'-8	120	42.112	Flow (q) from Route 27
							0.000000		
899	11'-1½		0.92	4.2600		16'-8		0.000	
899	11'-1½		0.19	4	(See Notes)	13'-2½	120	42.112	Flow (q) from Route 29
						26'-4	0.000001		
825	11'-1½		1.11	4.2600		39'-6½		0.000	T(26'-4)
825	11'-1½		37.33	4		12'-11	120	42.112	Flow (q) from Route 31
							0.000473		
774	11'-1½		38.44	4.2600		12'-11		0.006	

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.
774	11'-1½		36.22	4		10'-9	120	42.118	Flow (q) from Route 22
788	11'-1½		74.65	4.2600		10'-9	0.001616	0.017	
788	11'-1½		22.70	4		13'-11	120	42.136	Flow (q) from Route 15
785	11'-1½		97.35	4.2600		13'-11	0.002642	0.037	
785	11'-1½		23.10	4		5'-8	120	42.172	Flow (q) from Route 16
789	11'-1½		120.45	4.2600		5'-8	0.003917	0.022	
789	11'-1½		20.15	4		16'-2	120	42.195	Flow (q) from Route 36
787	11'-1½		140.60	4.2600		16'-2	0.005214	0.084	
								42.279	Total(Pt) Route 12
1457	11'-1½		0.26	1½	(See Notes)	168'-10	120	42.112	• • • • • **Route 13** • • • • • PO(9'-11), Flow (q) from Route 25 PO(9'-11)
1470	11'-1½		0.13	1.6820		19'-9½ 188'-7½	0.000001	0.000	
1470	11'-1½		0.13	4		16'-8	120	42.112	Flow (q) from Route 14
1359	11'-1½		0.26	4.2600		16'-8	0.000000	0.000	
1359	11'-1½		0.13	4		10'-2	120	42.112	Flow (q) from Route 24
1275	11'-1½		0.39	4.2600		10'-2	0.000000	0.000	
1275	11'-1½		0.10	4		8'-6	120	42.112	Flow (q) from Route 18
1215	11'-1½		0.48	4.2600		8'-6	0.000000	0.000	
1215	11'-1½		0.08	4		18'-6	120	42.112	Flow (q) from Route 19
1037	11'-1½		0.56	4.2600		18'-6	0.000000	0.000	
1037	11'-1½		0.08	4		8'-6	120	42.112	Flow (q) from Route 35
980	11'-1½		0.64	4.2600		8'-6	0.000000	0.000	
								42.112	Total(Pt) Route 13

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.
1457	11'-1½		0.26	2½		14'-0	120	42.112	• • • • • **Route 14** • • • • •
1550	11'-1½		0.13	2.6350		14'-0	0.000000	0.000	Flow (q) from Route 25
1550	11'-1½			1½	(See Notes)	168'-10	120	42.112	PO(9'-11)
1561	11'-1½		0.13	1.6820		19'-9½ 188'-7½	0.000001	0.000	PO(9'-11)
1561	11'-1½			4		14'-0	120	42.112	
1470	11'-1½		0.13	4.2600		14'-0	0.000000	0.000	
								42.112	Total(Pt) Route 14
658	12'-5½		45.80	1½	(See Notes)	63'-8½	120	39.935	• • • • • **Route 15** • • • • •
788	11'-1½		22.70	1.6820		34'-8 98'-4½	0.016499	0.578 1.623	T(9'-11), Flow (q) from Route 17 3E(4'-11½), PO(9'-11)
								42.136	Total(Pt) Route 15
658	12'-5½		45.80	1½	(See Notes)	77'-7	120	39.935	• • • • • **Route 16** • • • • •
785	11'-1½		23.10	1.6820		19'-9½ 97'-4½	0.017044	0.578 1.660	Flow (q) from Route 17 2E(4'-11½), PO(9'-11)
								42.172	Total(Pt) Route 16
577	12'-5½			1½	(See Notes)	33'-6	120	35.554	• • • • • **Route 17** • • • • •
623	12'-5½		25.12	1.6820		19'-9½ 53'-3½	0.019902	1.060	PO(9'-11) T(9'-11)
623	12'-5½		20.68	1½	(See Notes)	45'-0½	120	36.614	Flow (q) from Route 32
658	12'-5½		45.80	1.6820		9'-11 54'-11	0.060457	3.320	2E(4'-11½)
								39.935	Total(Pt) Route 17
1278	11'-1½		0.17	1½	(See Notes)	32'-8½	120	42.112	• • • • • **Route 18** • • • • •
1275	11'-1½		0.10	1.6820		9'-11 42'-7½	0.000001	0.000	Flow (q) from Route 20 PO(9'-11)
								42.112	Total(Pt) Route 18
1278	11'-1½		0.17	1½	(See Notes)	41'-2½	120	42.112	• • • • • **Route 19** • • • • •
1215	11'-1½		0.08	1.6820		24'-9 65'-11½	0.000000	0.000	T(9'-11), Flow (q) from Route 20 E(4'-11½), PO(9'-11)
								42.112	Total(Pt) Route 19

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.
1287	11'-1½		0.08 + 0.09	1½	(See Notes)	51'-4½	120	42.112	• • • • • **Route 20** • • • • •
						19'-9½	0.000002		Flow (q) from Route 26 and 33
1278	11'-1½		0.17	1.6820		71'-2		0.000	2E(4'-11½), T(9'-11)
								42.112	Total(Pt) Route 20
576	12'-5½			1½	(See Notes)	51'-9	120	35.693	• • • • • **Route 21** • • • • •
						14'-10	0.013611		PO(9'-11)
620	12'-5½		20.46	1.6820		66'-7		0.906	E(4'-11½)
								36.599	Total(Pt) Route 21
583	12'-5½			1½	(See Notes)	130'-4½	120	35.465	• • • • • **Route 22** • • • • •
						24'-9	0.039163	0.578	PO(9'-11)
774	11'-1½		36.22	1.6820		155'-1½		6.076	E(4'-11½), PO(9'-11)
								42.118	Total(Pt) Route 22
564	12'-5½		92.29	2½		14'-5	120	35.476	• • • • • **Route 23** • • • • •
							0.004663		Flow (q) from Route 1
563	12'-5½		37.37	2.6350		14'-5		0.067	
563	12'-5½			1½	(See Notes)	132'-4½	120	35.543	PO(9'-11)
						34'-8	0.041506	0.578	
810	11'-1½		37.37	1.6820		167'-0½		6.933	3E(4'-11½), PO(9'-11)
810	11'-1½			4	(See Notes)	2'-10	120	43.054	
						26'-4	0.000449		T(26'-4)
812	11'-1½		37.37	4.2600		29'-2		0.013	
								43.067	Total(Pt) Route 23
1295	11'-1½			2½		6'-1	120	42.112	• • • • • **Route 24** • • • • •
							0.000001		
1349	11'-1½		0.39	2.6350		6'-1		0.000	
1349	11'-1½			1½	(See Notes)	168'-10	120	42.112	PO(9'-11)
						19'-9½	0.000001		
1359	11'-1½		0.13	1.6820		188'-7½		0.000	PO(9'-11)
								42.112	Total(Pt) Route 24
1349	11'-1½		0.13	2½		16'-8	120	42.112	• • • • • **Route 25** • • • • •
							0.000000		Flow (q) from Route 24
1457	11'-1½		0.26	2.6350		16'-8		0.000	
								42.112	Total(Pt) Route 25

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.
1097	11'-1½			2½		8'-8	120	42.112	• • • • • **Route 26** • • • • •
1184	11'-1½		0.56	2.6350		8'-8	0.000002	0.000	
1184	11'-1½			2½		16'-9	120	42.112	
1295	11'-1½		0.47	2.6350		16'-9	0.000001	0.000	
1295	11'-1½			1½	(See Notes)	99'-6	120	42.112	PO(9'-11)
1287	11'-1½		0.08	1.6820		34'-8 134'-2	0.000000	0.000	E(4'-11½), 2T(9'-11)
								42.112	Total(Pt) Route 26
938	11'-1½		0.92	1½	(See Notes)	168'-10	120	42.112	• • • • • **Route 27** • • • • •
949	11'-1½		0.17	1.6820		19'-9½ 188'-7½	0.000002	0.000	PO(9'-11), Flow (q) from Route 30 PO(9'-11)
								42.112	Total(Pt) Route 27
938	11'-1½		0.92	2½		6'-4	120	42.112	• • • • • **Route 28** • • • • •
957	11'-1½		0.75	2.6350		6'-4	0.000003	0.000	Flow (q) from Route 30
957	11'-1½			2½		18'-0	120	42.112	
1097	11'-1½		0.64	2.6350		18'-0	0.000003	0.000	
1097	11'-1½			1½	(See Notes)	121'-3½	120	42.112	PO(9'-11)
971	11'-1½		0.08	1.6820		44'-6½ 165'-10	0.000000	0.000	7E(4'-11½)
								42.112	Total(Pt) Route 28
805	11'-1½		1.11	2½		14'-1	120	42.112	• • • • • **Route 29** • • • • •
884	11'-1½		1.11	2.6350		14'-1	0.000007	0.000	Flow (q) from Route 38
884	11'-1½			1½	(See Notes)	168'-10	120	42.112	PO(9'-11)
899	11'-1½		0.19	1.6820		19'-9½ 188'-7½	0.000002	0.000	PO(9'-11)
								42.112	Total(Pt) Route 29

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.
884	11'-1½		0.19	2½		16'-8	120	42.112	• • • • • **Route 30** • • • • • Flow (q) from Route 29
938	11'-1½		0.92	2.6350		16'-8	0.000005	0.000	
								42.112	Total(Pt) Route 30
587	12'-5½		38.44	1½	(See Notes)	126'-11½	120	35.307	• • • • • **Route 31** • • • • • Flow (q) from Route 34
738	11'-1½		38.44	1.6820		14'-10 141'-9½	0.043718	0.578 6.199	E(4'-11½), PO(9'-11)
738	11'-1½			4	(See Notes)	19'-11	120	42.084	
796	11'-1½		38.44	4.2600		13'-2 33'-1	0.000473	0.016	E(13'-2)
796	11'-1½			4	(See Notes)	0'-10½	120	42.100	
825	11'-1½		37.33	4.2600		26'-4 27'-2½	0.000448	0.012	T(26'-4)
								42.112	Total(Pt) Route 31
575	12'-5½			1½	(See Notes)	52'-5½	120	35.679	• • • • • **Route 32** • • • • • PO(9'-11)
623	12'-5½		20.68	1.6820		14'-10 67'-4	0.013886	0.935	E(4'-11½)
								36.614	Total(Pt) Route 32
1184	11'-1½			1½	(See Notes)	112'-11	120	42.112	• • • • • **Route 33** • • • • • PO(9'-11)
1287	11'-1½		0.09	1.6820		24'-9 137'-8	0.000001	0.000	3E(4'-11½)
								42.112	Total(Pt) Route 33
585	12'-5½			2½	(See Notes)	13'-8½	120	34.916	• • • • • **Route 34** • • • • • 2T(16'-5½), C(16'-5½)
587	12'-5½		38.44	2.6350		65'-11 79'-7	0.004912	0.391	PO(16'-5½)
								35.307	Total(Pt) Route 34
983	11'-1½			1½	(See Notes)	41'-2	120	42.112	• • • • • **Route 35** • • • • • T(9'-11)
1037	11'-1½		0.08	1.6820		24'-9 65'-11	0.000001	0.000	E(4'-11½), PO(9'-11)
								42.112	Total(Pt) Route 35
659	12'-5½			1½	(See Notes)	78'-3	120	40.188	• • • • • **Route 36** • • • • • T(9'-11)
789	11'-1½		20.15	1.6820		29'-8½ 107'-11½	0.013232	0.578 1.428	2E(4'-11½), 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: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value
								42.195	Total(Pt) Route 36
957	11'-1½			1½	(See Notes)	100'-0	120	42.112	• • • • • **Route 37** • • • • • PO(9'-11)
971	11'-1½		0.11	1.6820		29'-8½ / 129'-8½	0.000001	0.000	2E(4'-11½), T(9'-11)
								42.112	Total(Pt) Route 37
796	11'-1½			1½	(See Notes)	168'-10	120	42.100	• • • • • **Route 38** • • • • • PO(9'-11)
805	11'-1½		1.11	1.6820		19'-9½ / 188'-7½	0.000062	0.012	PO(9'-11)
								42.112	Total(Pt) Route 38
565	12'-5½		37.02	2½		12'-8	120	35.565	• • • • • **Route 39** • • • • • Flow (q) from Route 1
568	12'-5½		55.27	2.6350		12'-8	0.009617	0.122	
568	12'-5½			1½	(See Notes)	130'-4½	120	35.686	PO(9'-11)
815	11'-1½		36.23	1.6820		24'-9 / 155'-1½	0.039185	0.578 / 6.079	E(4'-11½), PO(9'-11)
								42.343	Total(Pt) Route 39
568	12'-5½		36.23	2½		6'-1	120	35.686	• • • • • **Route 40** • • • • • Flow (q) from Route 39
571	12'-5½		19.04	2.6350		6'-1	0.001339	0.008	
								35.695	Total(Pt) Route 40
491	12'-5½		17.52	2½		1'-9	120	29.901	• • • • • **Route 41** • • • • • Flow (q) from Route 1
492	12'-5½		28.91	2.6350		1'-9	0.002901	0.005	
								29.906	Total(Pt) Route 41
30	12'-5½		20.55	2		1'-8½	120	28.909	• • • • • **Route 42** • • • • • Flow (q) from Route 2
29	12'-5½		46.59	2.1570		1'-8½	0.018583	0.031	
29	12'-5½			1½	(See Notes)	123'-3	120	28.940	PO(9'-11)
464	12'-5½		20.57	1.6820		19'-9½ / 143'-1	0.013747	1.967	PO(9'-11)
								30.907	Total(Pt) Route 42

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.
29	12'-5½		20.57	2	(See Notes)	20'-6	120	28.940	• • • • • **Route 43** • • • • •
						12'-3½	0.006327		Flow (q) from Route 42
24	12'-5½		26.02	2.1570		32'-9½		0.208	PO(12'-3½)
24	12'-5½			1½	(See Notes)	123'-3	120	29.148	
						9'-11	0.021245		
462	12'-5½		26.02	1.6820		133'-2		2.829	PO(9'-11)
462	12'-5½			2½	(See Notes)	14'-11½	120	31.977	
						32'-11½	0.002387		
463	12'-5½		26.02	2.6350		47'-11		0.114	2T(16'-5½)
								32.091	Total(Pt) Route 43
170	12'-5½		12.32	1½		16'-0	120	22.394	• • • • • **Route 44** • • • • •
							0.015938		Flow (q) from Route 5
207	12'-5½		22.28	1.6820		16'-0		0.255	
								22.649	Total(Pt) Route 44
156	12'-5½		20.44	1½		9'-9½	120	24.058	• • • • • **Route 45** • • • • •
							0.006266		Flow (q) from Route 2
179	12'-5½		13.45	1.6820		9'-9½		0.061	
								24.119	Total(Pt) Route 45
174	12'-5½		10.21	1½		16'-0	120	22.243	• • • • • **Route 46** • • • • •
							0.018655		Flow (q) from Route 3
211	12'-5½		24.26	1.6820		16'-0		0.298	
								22.541	Total(Pt) Route 46

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
Report Description: Light Hazard (C)

Job

Job Number: B22243	Designer: BKB
Job Name: OVERHILLS ELEMENTARY	Phone: 919.243.2464 Fax:
Address 1: 2626 RAY ROAD	State Certification/License Number: 16269FS
Address 2: SPRING LAKE, NC 28390	AHJ: HARNETT CO
Address 3:	Job Site/Building: HARNETT CO SCHOOLS

System

Density: 0.10 gpm/ft²	Area of Application: 1500 ft² (Actual 903 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: 6 0
System Pressure Demand: 58.323	System Flow Demand: 201.42
Total Demand: 301.42 @ 58.323	Pressure Result: +71.679 (55.1%)

Supplies

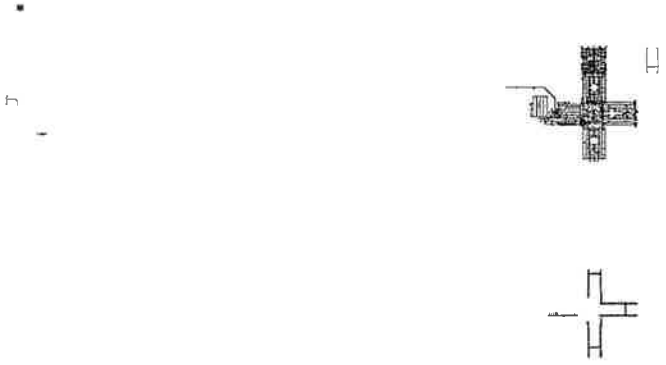
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	776.00	100.00	138.000	92.000
1	Pump	750.00		96.000	80.000

Pumps: Static = Churn (Pressure @ Zero Flow)

Check Point Gauges

Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
BOR (1069)	56.618	26.77	201.42

PIPING



Water Supply at Node 1 (776.00, 0.00, 138.000, 92.000)

Hydraulic Calculations

for

Project Name: OVERHILLS ELEMENTARY
Location: 2626 RAY ROAD, SPRING LAKE, NC 28390,
Drawing Name: PIPING

Calculation Date: 4/19/2023

Design

Remote Area Number:	C
Remote Area Location:	CLASSROOM
Occupancy Classification:	Light Hazard
Commodity Classification:	N/A
Density	0.10 gpm/ft²
Area of Application:	1500 ft² (Actual 903 ft²)
Coverage per Sprinkler:	324 ft²
Type of sprinklers calculated:	Pendent
No. of sprinklers calculated:	6
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:	301.42 @ 58.323	(Safety Margin = 71.679)
from Pump at Node: 1:	201.42 @ 58.323	(Safety Margin = 71.679)

Type of System: WET
Volume of Dry/PreAction/Antifreeze/OtherA N/A

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

Notes:

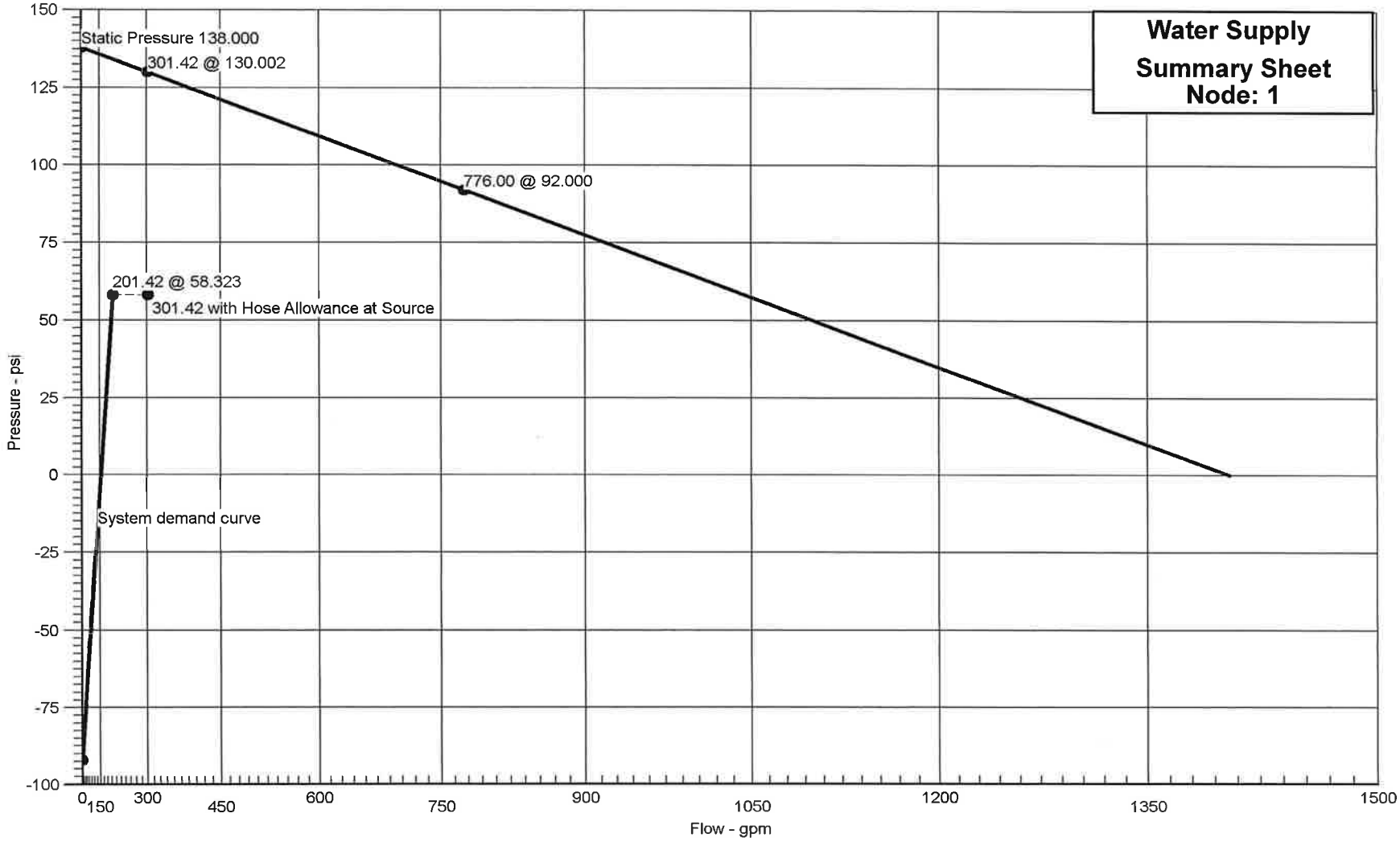
Automatic peaking results Left: 54.867 Right: 58.440

Hydraulic Graph

Job Name: OVERHILLS ELEMENTARY
Remote Area Number: C

$N^{1.85}$

Date: 4/19/2023

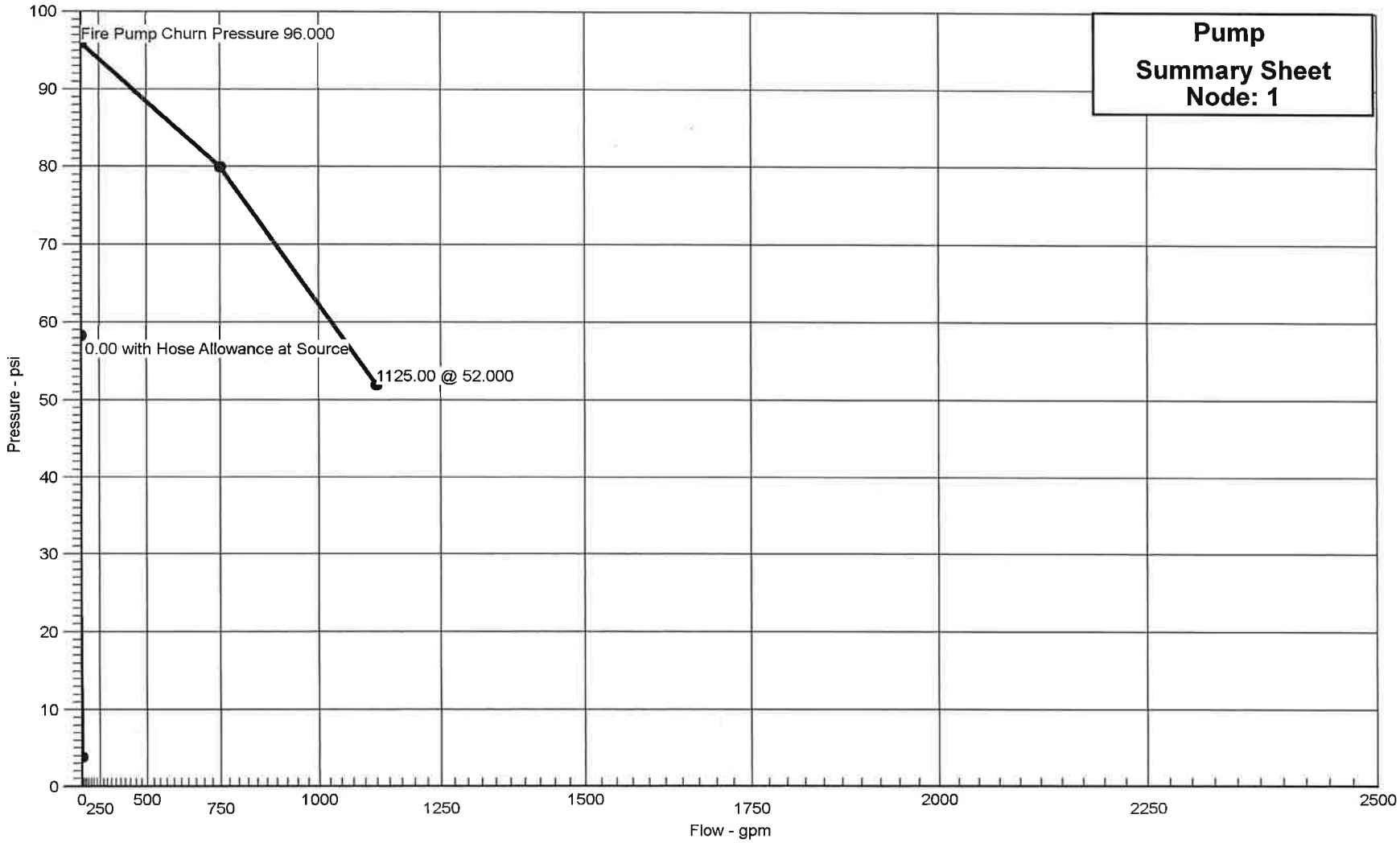


Hydraulic Graph

Job Name: OVERHILLS ELEMENTARY
Remote Area Number: C

$N^{1.85}$

Date: 4/19/2023



Pump Rating: 750.00 @ 80.000

Supply: Static:138.000
Residual:92.000
Flowing:776.00

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
⇨ **Sprinkler**	**2361**	**32.98**	**32.98**	**8**	**17.000**			
Sprinkler	2362	33.01	32.98	8	17.024			
Sprinkler	2371	33.29	32.98	8	17.320			
Sprinkler	2372	33.32	32.98	8	17.345			
Sprinkler	2385	34.39	32.98	8	18.482			
Sprinkler	2386	34.42	32.98	8	18.513			

⇨ 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	138.000	92.000	776.00	130.002	301.42	58.323

Pump Analysis

Node	Churn (psi)	Residual @ Flow (psi) (gpm)		Available @ Total Demand (psi) (gpm)		Required Pressure (psi)
1	96.000	80.000	750.00	130.002	201.42	58.323

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	1'-2½	Supply	58.323	201.42	P2
2361	10'-0	Sprinkler	17.000	32.98	
2362	10'-0	Sprinkler	17.024	33.01	
2371	10'-0	Sprinkler	17.320	33.29	
2372	10'-0	Sprinkler	17.345	33.32	
2385	10'-0	Sprinkler	18.482	34.39	
2386	10'-0	Sprinkler	18.513	34.42	
22	1'-2½		57.978		
24	12'-5½		41.388		
29	12'-5½		41.329		
30	12'-5½		41.326		
31	12'-5½		41.313		
38	12'-5½		41.319		
41	12'-5½		41.349		
42	12'-5½		41.353		
43	12'-5½		41.410		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
259	12'-5		20.319		
262	12'-5½		20.260		
288	12'-5		20.714		
291	12'-5½		20.656		
324	12'-5		22.152		
327	12'-5½		22.095		
340	20'-0		37.314		
349	20'-0		37.369		
462	12'-5½		42.195		
463	12'-5½		42.228		
464	12'-5½		41.321		
465	12'-5½		41.280		
469	12'-5½		40.285		
478	12'-5½		38.946		
480	12'-5½		40.539		
481	12'-5½		38.942		
490	20'-0		37.043		
491	12'-5½		41.348		
492	12'-5½		41.384		
493	12'-5½		42.226		
494	12'-5½		42.195		
497	20'-0		37.282		
563	12'-5½		44.475		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
564	12'-5½		44.437		
565	12'-5½		44.498		
568	12'-5½		44.591		
571	12'-5½		44.602		
575	12'-5½		44.600		
576	12'-5½		44.603		
577	12'-5½		44.555		
583	12'-5½		44.517		
585	12'-5½		44.260		
587	12'-5½		44.476		
620	12'-5½		45.115		
623	12'-5½		45.139		
658	12'-5½		47.007		
659	12'-5½		47.145		
738	11'-1½		48.470		
774	11'-1½		48.488		
785	11'-1½		48.519		
787	11'-1½		48.578		
788	11'-1½		48.498		
789	11'-1½		48.531		
796	11'-1½		48.478		
805	11'-1½		48.485		
810	11'-1½		49.014		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
812	11'-1½		49.021		
813	11'-1½		48.686		
815	11'-1½		48.614		
825	11'-1½		48.485		
884	11'-1½		48.485		
899	11'-1½		48.485		
938	11'-1½		48.485		
949	11'-1½		48.485		
957	11'-1½		48.485		
971	11'-1½		48.485		
980	11'-1½		48.485		
983	11'-1½		48.485		
1037	11'-1½		48.485		
1069	3'-7½	Gauge	56.618		
1071	4'-2½		56.222		
1097	11'-1½		48.485		
1184	11'-1½		48.485		
1215	11'-1½		48.485		
1275	11'-1½		48.485		
1278	11'-1½		48.485		
1287	11'-1½		48.485		
1295	11'-1½		48.485		
1349	11'-1½		48.485		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1359	11'-1½		48.485		
1457	11'-1½		48.485		
1470	11'-1½		48.485		
1550	11'-1½		48.485		
1561	11'-1½		48.485		

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.
2361	10'-0	8	32.98	1	(See Notes)	4'-3½	120	17.000	• • • • • **Route 1** • • • • •
259	12'-5		32.98	1.0490		9'-0 13'-3½	0.328366	-1.040 4.359	Sprinkler, 2E(2'-0), PO(5'-0)
259	12'-5			1½		12'-0	120	20.319	
288	12'-5		32.98	1.6820		 12'-0	0.032943	 0.395	
288	12'-5		33.29	1½		12'-0	120	20.714	Flow (q) from Route 3
324	12'-5		66.28	1.6820		 12'-0	0.119789	 1.437	
324	12'-5		34.39	1½	(See Notes)	35'-1	120	22.152	Flow (q) from Route 5
478	12'-5½		100.67	1.6820		29'-8½ 64'-9	0.259570	-0.018 16.813	4E(4'-11½), PO(9'-11)
478	12'-5½		8.57	2½	(See Notes)	6'-6	120	38.946	Flow (q) from Route 2
469	12'-5½		109.25	2.6350		32'-11½ 39'-5½	0.033924	 1.339	2T(16'-5½)
469	12'-5½			2½	(See Notes)	14'-5	120	40.285	
465	12'-5½		93.49	2.6350		24'-8½ 39'-1½	0.025430	 0.995	3E(8'-3)
465	12'-5½			2½		1'-8½	120	41.280	
464	12'-5½		90.78	2.6350		 1'-8½	0.024086	 0.041	
464	12'-5½			2½	(See Notes)	5'-6½	120	41.321	
463	12'-5½		89.74	2.6350		32'-11½ 38'-6	0.023574	 0.907	2T(16'-5½)
463	12'-5½		13.21	2½	(See Notes)	23'-3	120	42.228	Flow (q) from Route 8
564	12'-5½		102.95	2.6350		49'-5 72'-8	0.030394	 2.209	2T(16'-5½), C(16'-5½)
564	12'-5½			2½		3'-7	120	44.437	
565	12'-5½		75.33	2.6350		 3'-7	0.017056	 0.061	
565	12'-5½			1½	(See Notes)	130'-4½	120	44.498	PO(9'-11)
813	11'-1½		27.33	1.6820		24'-9 155'-1½	0.023269	0.578 3.610	E(4'-11½), 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)
813	11'-1½		146.47	4	(See Notes)	17'-2	120	48.686	Flow (q) from Route 7
812	11'-1½		173.81	4.2600		26'-4 / 43'-6	0.007719	0.336	T(26'-4)
812	11'-1½		27.61	4	(See Notes)	264'-7	120	49.021	Flow (q) from Route 25
1071	4'-2½		201.42	4.2600		150'-1½ / 414'-8½	0.010139	2.996 / 4.205	6E(13'-2), T(26'-4), f, sCV(28'-11½), BV(15'-9½)
1071	4'-2½			4	(See Notes)	0'-0	120	56.222	
1069	3'-7½		201.42	4.0260		10'-0 / 10'-0	0.013351	0.263 / 0.134	E(10'-0), BOR
1069	3'-7½			4	(See Notes)	3'-11	120	56.618	
22	1'-2½		201.42	4.0260		20'-0 / 23'-11	0.013351	1.040 / 0.319	T(20'-0)
22	1'-2½			6	(See Notes)	211'-5½	140	57.978	
1	1'-2½		201.42	6.2800		88'-3 / 299'-8½	0.001152	0.000 / 0.345	3E(22'-1), 2EE(11'-0½)
			100.00					58.323	Hose Allowance At Source
1			301.42					Total(Pt)	Route 1
2362	10'-0	8	33.01	1	(See Notes)	4'-0½	120	17.024	• • • • • **Route 2** • • • • • Sprinkler,
262	12'-5½		33.01	1.0490		9'-0 / 13'-0½	0.328795	-1.058 / 4.294	2E(2'-0), PO(5'-0)
262	12'-5½			1½		12'-0	120	20.260	
291	12'-5½		33.01	1.6820		12'-0	0.032986	0.396	
291	12'-5½		33.32	1½		12'-0	120	20.656	Flow (q) from Route 4
327	12'-5½		66.33	1.6820		12'-0	0.119949	1.439	
327	12'-5½		34.42	1½	(See Notes)	35'-1½	120	22.095	Flow (q) from Route 6
481	12'-5½		100.75	1.6820		29'-8½ / 64'-9½	0.259934	16.847	4E(4'-11½), PO(9'-11)
481	12'-5½			2½		13'-9½	120	38.942	
478	12'-5½		8.57	2.6350		13'-9½	0.000306	0.004	

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.
								38.946	Total(Pt) Route 2
2371	10'-0	8	33.29	1	(See Notes)	4'-3½	120	17.320	• • • • • **Route 3** • • • • •
288	12'-5		33.29	1.0490		9'-0 / 13'-3½	0.334072	-1.040 / 4.435	Sprinkler, 2E(2'-0), PO(5'-0)
								20.714	Total(Pt) Route 3
2372	10'-0	8	33.32	1	(See Notes)	4'-0½	120	17.345	• • • • • **Route 4** • • • • •
291	12'-5½		33.32	1.0490		9'-0 / 13'-0½	0.334526	-1.058 / 4.369	Sprinkler, 2E(2'-0), PO(5'-0)
								20.656	Total(Pt) Route 4
2385	10'-0	8	34.39	1	(See Notes)	4'-3½	120	18.482	• • • • • **Route 5** • • • • •
324	12'-5		34.39	1.0490		9'-0 / 13'-3½	0.354767	-1.040 / 4.709	Sprinkler, 2E(2'-0), PO(5'-0)
								22.152	Total(Pt) Route 5
2386	10'-0	8	34.42	1	(See Notes)	4'-0½	120	18.513	• • • • • **Route 6** • • • • •
327	12'-5½		34.42	1.0490		9'-0 / 13'-0½	0.355311	-1.058 / 4.640	Sprinkler, 2E(2'-0), PO(5'-0)
								22.095	Total(Pt) Route 6
38	12'-5½		12.00 + 2.99	2		13'-1½	120	41.319	• • • • • **Route 7** • • • • •
41	12'-5½		14.98	2.1570		13'-1½	0.002278	0.030	Flow (q) from Route 9 and 44
41	12'-5½		0.22	2		1'-9	120	41.349	
42	12'-5½		15.20	2.1570		1'-9	0.002341	0.004	Flow (q) from Route 50
42	12'-5½			2	(See Notes)	20'-3½	120	41.353	
43	12'-5½		13.01	2.1570		12'-3½ / 32'-7	0.001756	0.057	PO(12'-3½)
43	12'-5½			1½	(See Notes)	123'-3	120	41.410	
494	12'-5½		13.01	1.6820		9'-11 / 133'-2	0.005896	0.785	PO(9'-11)
494	12'-5½			2½	(See Notes)	14'-1½	120	42.195	
493	12'-5½		13.01	2.6350		32'-11½ / 47'-0½	0.000662	0.031	2T(16'-5½)

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.
493	12'-5½		85.46	2½	(See Notes)	23'-3	120	42.226	Flow (q) from Route 42
585	12'-5½		98.47	2.6350		49'-5 72'-8	0.027995	2.034	2T(16'-5½), C(16'-5½)
585	12'-5½			2½		16'-11½	120	44.260	
583	12'-5½		70.62	2.6350		16'-11½	0.015135	0.257	
583	12'-5½			2½		5'-11	120	44.517	
577	12'-5½		44.19	2.6350		5'-11	0.006357	0.038	
577	12'-5½			2½		19'-0	120	44.555	
575	12'-5½		25.99	2.6350		19'-0	0.002381	0.045	
575	12'-5½			2½		6'-7	120	44.600	
576	12'-5½		10.63	2.6350		6'-7	0.000456	0.003	
576	12'-5½		4.38	1½	(See Notes)	51'-9 14'-10	120 0.007681	44.603	PO(9'-11), Flow (q) from Route 22
620	12'-5½		15.01	1.6820		66'-7		0.511	E(4'-11½)
620	12'-5½		16.96	1½	(See Notes)	45'-5½ 19'-9½	120 0.031108	45.115	Flow (q) from Route 23
659	12'-5½		31.98	1.6820		65'-3		2.030	2E(4'-11½), T(9'-11)
659	12'-5½			1½	(See Notes)	62'-1½ 24'-9	120 0.009844	47.145 0.578	
787	11'-1½		17.17	1.6820		86'-10½		0.855	3E(4'-11½), PO(9'-11)
787	11'-1½		102.65	4		9'-4	120	48.578	Flow (q) from Route 12
815	11'-1½		119.82	4.2600		9'-4	0.003879	0.036	
815	11'-1½		26.65	4		12'-8	120	48.614	Flow (q) from Route 21
813	11'-1½		146.47	4.2600		12'-8	0.005624	0.071	
								48.686	Total(Pt) Route 7
31	12'-5½		12.45	2		13'-3	120	41.313	• • • • • **Route 8** • • • • •
30	12'-5½		9.46	2.1570		13'-3	0.000973	0.013	Flow (q) from Route 10

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)
30	12'-5½		2.71	2		1'-8½	120	41.326	Flow (q) from Route 49
29	12'-5½		12.16	2.1570		1'-8½	0.001550	0.003	
29	12'-5½		1.05	2	(See Notes)	20'-6	120	41.329	Flow (q) from Route 47
24	12'-5½		13.21	2.1570		12'-3½ 32'-9½	0.001805	0.059	PO(12'-3½)
24	12'-5½			1½	(See Notes)	123'-3	120	41.388	
462	12'-5½		13.21	1.6820		9'-11 133'-2	0.006063	0.807	PO(9'-11)
462	12'-5½			2½	(See Notes)	14'-11½	120	42.195	
463	12'-5½		13.21	2.6350		32'-11½ 47'-11	0.000681	0.033	2T(16'-5½)
								42.228	Total(Pt) Route 8
480	12'-5½		92.17	2½	(See Notes)	7'-6½	120	40.539	• • • • • **Route 9** • • • • •
497	20'-0		8.68	2.6350		16'-5½ 24'-0	0.000313	-3.265 0.008	Flow (q) from Route 46 PO(16'-5½)
497	20'-0			1½	(See Notes)	28'-0	120	37.282	
349	20'-0		8.68	1.6820		4'-11½ 32'-11½	0.002789	-0.005 0.092	E(4'-11½)
349	20'-0		3.31	1½	(See Notes)	109'-5½	120	37.369	Flow (q) from Route 11
38	12'-5½		12.00	1.6820		24'-9 134'-2½	0.005071	3.270 0.680	3E(4'-11½), PO(9'-11)
								41.319	Total(Pt) Route 9
469	12'-5½		93.49	2½	(See Notes)	7'-6½	120	40.285	• • • • • **Route 10** • • • • •
490	20'-0		15.76	2.6350		16'-5½ 24'-0	0.000944	-3.265 0.023	Flow (q) from Route 1 PO(16'-5½)
490	20'-0			1½	(See Notes)	27'-11	120	37.043	
340	20'-0		15.76	1.6820		4'-11½ 32'-10½	0.008399	-0.005 0.276	E(4'-11½)
340	20'-0			1½	(See Notes)	109'-7	120	37.314	
31	12'-5½		12.45	1.6820		24'-9 134'-4	0.005428	3.270 0.729	3E(4'-11½), PO(9'-11)
								41.313	Total(Pt) Route 10

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.
340	20'-0			1½	(See Notes)	56'-4	120	37.314	• • • • • **Route 11** • • • • •
						59'-5	0.000469		2T(9'-11), C(9'-11)
349	20'-0		3.31	1.6820		115'-9		0.054	2T(9'-11), C(9'-11)
								37.369	Total(Pt) Route 11
971	11'-1½		0.06 + 0.08	1½	(See Notes)	52'-2	120	48.485	• • • • • **Route 12** • • • • •
						19'-9½	0.000001		Flow (q) from Route 30 and 39
983	11'-1½		0.14	1.6820		71'-11½		0.000	2E(4'-11½), T(9'-11)
983	11'-1½			1½	(See Notes)	32'-8	120	48.485	
						9'-11	0.000000		
980	11'-1½		0.08	1.6820		42'-7		0.000	PO(9'-11)
980	11'-1½		0.47	4		10'-2	120	48.485	Flow (q) from Route 13
							0.000000		
949	11'-1½		0.54	4.2600		10'-2		0.000	
949	11'-1½		0.12	4		16'-8	120	48.485	Flow (q) from Route 29
							0.000000		
899	11'-1½		0.67	4.2600		16'-8		0.000	
899	11'-1½		0.14	4	(See Notes)	13'-2½	120	48.485	Flow (q) from Route 31
						26'-4	0.000000		T(26'-4)
825	11'-1½		0.80	4.2600		39'-6½		0.000	
825	11'-1½		27.05	4		12'-11	120	48.485	Flow (q) from Route 33
							0.000261		
774	11'-1½		27.85	4.2600		12'-11		0.003	
774	11'-1½		26.43	4		10'-9	120	48.488	Flow (q) from Route 24
							0.000897		
788	11'-1½		54.28	4.2600		10'-9		0.010	
788	11'-1½		16.63	4		13'-11	120	48.498	Flow (q) from Route 15
							0.001470		
785	11'-1½		70.92	4.2600		13'-11		0.020	
785	11'-1½		16.92	4		5'-8	120	48.519	Flow (q) from Route 16
							0.002184		
789	11'-1½		87.84	4.2600		5'-8		0.012	
789	11'-1½		14.81	4		16'-2	120	48.531	Flow (q) from Route 38
							0.002914		
787	11'-1½		102.65	4.2600		16'-2		0.047	

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
								48.578	Total(Pt) Route 12
1457	11'-1½		0.19	1½	(See Notes)	168'-10	120	48.485	• • • • • **Route 13** • • • • •
						19'-9½	0.000001		PO(9'-11), Flow (q) from Route 27
1470	11'-1½		0.09	1.6820		188'-7½		0.000	PO(9'-11)
1470	11'-1½		0.09	4		16'-8	120	48.485	Flow (q) from Route 14
							0.000000		
1359	11'-1½		0.19	4.2600		16'-8		0.000	
1359	11'-1½		0.10	4		10'-2	120	48.485	Flow (q) from Route 26
							0.000000		
1275	11'-1½		0.28	4.2600		10'-2		0.000	
1275	11'-1½		0.07	4		8'-6	120	48.485	Flow (q) from Route 18
							0.000000		
1215	11'-1½		0.35	4.2600		8'-6		0.000	
1215	11'-1½		0.06	4		18'-6	120	48.485	Flow (q) from Route 19
							0.000000		
1037	11'-1½		0.41	4.2600		18'-6		0.000	
1037	11'-1½		0.06	4		8'-6	120	48.485	Flow (q) from Route 37
							0.000000		
980	11'-1½		0.47	4.2600		8'-6		0.000	
								48.485	Total(Pt) Route 13
1457	11'-1½		0.19	2½		14'-0	120	48.485	• • • • • **Route 14** • • • • •
							0.000000		Flow (q) from Route 27
1550	11'-1½		0.09	2.6350		14'-0		0.000	
1550	11'-1½			1½	(See Notes)	168'-10	120	48.485	PO(9'-11)
						19'-9½	0.000001		
1561	11'-1½		0.09	1.6820		188'-7½		0.000	PO(9'-11)
1561	11'-1½			4		14'-0	120	48.485	
							0.000000		
1470	11'-1½		0.09	4.2600		14'-0		0.000	
								48.485	Total(Pt) Route 14
658	12'-5½		33.56	1½	(See Notes)	63'-8½	120	47.007	• • • • • **Route 15** • • • • •
						34'-8	0.009282	0.578	T(9'-11), Flow (q) from Route 17
788	11'-1½		16.63	1.6820		98'-4½		0.913	3E(4'-11½), PO(9'-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.
								48.498	Total(Pt) Route 15
658	12'-5½		33.56	1½	(See Notes)	77'-7	120	47.007	• • • • • **Route 16** • • • • • Flow (q) from Route 17
785	11'-1½		16.92	1.6820		19'-9½ / 97'-4½	0.009586	0.578 / 0.934	2E(4'-11½), PO(9'-11)
								48.519	Total(Pt) Route 16
577	12'-5½			1½	(See Notes)	33'-6	120	44.555	• • • • • **Route 17** • • • • • PO(9'-11)
623	12'-5½		18.20	1.6820		19'-9½ / 53'-3½	0.010966	0.584	T(9'-11)
623	12'-5½		15.36	1½	(See Notes)	45'-0½	120	45.139	Flow (q) from Route 34
658	12'-5½		33.56	1.6820		9'-11 / 54'-11	0.034008	1.868	2E(4'-11½)
								47.007	Total(Pt) Route 17
1278	11'-1½		0.13	1½	(See Notes)	32'-8½	120	48.485	• • • • • **Route 18** • • • • • Flow (q) from Route 20
1275	11'-1½		0.07	1.6820		9'-11 / 42'-7½	0.000000	0.000	PO(9'-11)
								48.485	Total(Pt) Route 18
1278	11'-1½		0.13	1½	(See Notes)	41'-2½	120	48.485	• • • • • **Route 19** • • • • • T(9'-11), Flow (q) from Route 20
1215	11'-1½		0.06	1.6820		24'-9 / 65'-11½	0.000000	0.000	E(4'-11½), PO(9'-11)
								48.485	Total(Pt) Route 19
1287	11'-1½		0.06 + 0.07	1½	(See Notes)	51'-4½	120	48.485	• • • • • **Route 20** • • • • • Flow (q) from Route 28 and 35
1278	11'-1½		0.13	1.6820		19'-9½ / 71'-2	0.000001	0.000	2E(4'-11½), T(9'-11)
								48.485	Total(Pt) Route 20
568	12'-5½		48.00	1½	(See Notes)	130'-4½	120	44.591	• • • • • **Route 21** • • • • • PO(9'-11), Flow (q) from Route 41
815	11'-1½		26.65	1.6820		24'-9 / 155'-1½	0.022205	0.578 / 3.445	E(4'-11½), PO(9'-11)
								48.614	Total(Pt) Route 21
568	12'-5½		48.00	2½		6'-1	120	44.591	• • • • • **Route 22** • • • • • Flow (q) from Route 41
571	12'-5½		21.35	2.6350		6'-1	0.001655	0.010	

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.
571	12'-5½			2½		18'-3	120	44.602	
576	12'-5½		4.38	2.6350		18'-3	0.000089	0.002	
								44.603	Total(Pt) Route 22
571	12'-5½			1½	(See Notes)	33'-6	120	44.602	• • • • • **Route 23** • • • • •
620	12'-5½		16.96	1.6820		19'-9½ 53'-3½	0.009628	0.513	PO(9'-11) T(9'-11)
								45.115	Total(Pt) Route 23
583	12'-5½			1½	(See Notes)	130'-4½	120	44.517	• • • • • **Route 24** • • • • •
774	11'-1½		26.43	1.6820		24'-9 155'-1½	0.021873	0.578 3.393	PO(9'-11) E(4'-11½), PO(9'-11)
								48.488	Total(Pt) Route 24
564	12'-5½		75.33	2½		14'-5	120	44.437	• • • • • **Route 25** • • • • •
563	12'-5½		27.61	2.6350		14'-5	0.002664	0.038	Flow (q) from Route 1
563	12'-5½			1½	(See Notes)	132'-4½	120	44.475	PO(9'-11)
810	11'-1½		27.61	1.6820		34'-8 167'-0½	0.023711	0.578 3.961	3E(4'-11½), PO(9'-11)
810	11'-1½			4	(See Notes)	2'-10	120	49.014	
812	11'-1½		27.61	4.2600		26'-4 29'-2	0.000257	0.007	T(26'-4)
								49.021	Total(Pt) Route 25
1295	11'-1½			2½		6'-1	120	48.485	• • • • • **Route 26** • • • • •
1349	11'-1½		0.28	2.6350		6'-1	0.000001	0.000	
1349	11'-1½			1½	(See Notes)	168'-10	120	48.485	PO(9'-11)
1359	11'-1½		0.10	1.6820		19'-9½ 188'-7½	0.000001	0.000	PO(9'-11)
								48.485	Total(Pt) Route 26
1349	11'-1½		0.10	2½		16'-8	120	48.485	• • • • • **Route 27** • • • • •
1457	11'-1½		0.19	2.6350		16'-8	0.000000	0.000	Flow (q) from Route 26
								48.485	Total(Pt) Route 27

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
1097	11'-1½			2½		8'-8	120	48.485	• • • • • **Route 28** • • • • •
1184	11'-1½		0.41	2.6350		8'-8	0.000001	0.000	
1184	11'-1½			2½		16'-9	120	48.485	
1295	11'-1½		0.34	2.6350		16'-9	0.000001	0.000	
1295	11'-1½			1½	(See Notes)	99'-6	120	48.485	PO(9'-11)
1287	11'-1½		0.06	1.6820	(See Notes)	34'-8 134'-2	0.000000	0.000	E(4'-11½), 2T(9'-11)
								48.485	Total(Pt) Route 28
938	11'-1½		0.67	1½	(See Notes)	168'-10	120	48.485	• • • • • **Route 29** • • • • •
949	11'-1½		0.12	1.6820	(See Notes)	19'-9½ 188'-7½	0.000001	0.000	PO(9'-11), Flow (q) from Route 32 PO(9'-11)
								48.485	Total(Pt) Route 29
938	11'-1½		0.67	2½		6'-4	120	48.485	• • • • • **Route 30** • • • • •
957	11'-1½		0.54	2.6350		6'-4	0.000002	0.000	Flow (q) from Route 32
957	11'-1½			2½		18'-0	120	48.485	
1097	11'-1½		0.46	2.6350		18'-0	0.000001	0.000	
1097	11'-1½			1½	(See Notes)	121'-3½	120	48.485	PO(9'-11)
971	11'-1½		0.06	1.6820	(See Notes)	44'-6½ 165'-10	0.000000	0.000	7E(4'-11½)
								48.485	Total(Pt) Route 30
805	11'-1½		0.80	2½		14'-1	120	48.485	• • • • • **Route 31** • • • • •
884	11'-1½		0.80	2.6350		14'-1	0.000004	0.000	Flow (q) from Route 40
884	11'-1½			1½	(See Notes)	168'-10	120	48.485	PO(9'-11)
899	11'-1½		0.14	1.6820	(See Notes)	19'-9½ 188'-7½	0.000001	0.000	PO(9'-11)
								48.485	Total(Pt) Route 31

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.
884	11'-1½		0.14	2½		16'-8	120	48.485	• • • • • **Route 32** • • • • •
938	11'-1½		0.67	2.6350		16'-8	0.000003	0.000	Flow (q) from Route 31
								48.485	Total(Pt) Route 32
587	12'-5½		27.85	1½	(See Notes)	126'-11½	120	44.476	• • • • • **Route 33** • • • • •
738	11'-1½		27.85	1.6820		14'-10	0.024088	0.578	Flow (q) from Route 36
						141'-9½		3.416	E(4'-11½), PO(9'-11)
738	11'-1½			4	(See Notes)	19'-11	120	48.470	
796	11'-1½		27.85	4.2600		13'-2	0.000261		E(13'-2)
						33'-1		0.009	
796	11'-1½			4	(See Notes)	0'-10½	120	48.478	
825	11'-1½		27.05	4.2600		26'-4	0.000247		T(26'-4)
						27'-2½		0.007	
								48.485	Total(Pt) Route 33
575	12'-5½			1½	(See Notes)	52'-5½	120	44.600	• • • • • **Route 34** • • • • •
623	12'-5½		15.36	1.6820		14'-10	0.008008		PO(9'-11)
						67'-4		0.539	E(4'-11½)
								45.139	Total(Pt) Route 34
1184	11'-1½			1½	(See Notes)	112'-11	120	48.485	• • • • • **Route 35** • • • • •
1287	11'-1½		0.07	1.6820		24'-9	0.000000		PO(9'-11)
						137'-8		0.000	3E(4'-11½)
								48.485	Total(Pt) Route 35
585	12'-5½			2½	(See Notes)	13'-8½	120	44.260	• • • • • **Route 36** • • • • •
587	12'-5½		27.85	2.6350		65'-11	0.002706		2T(16'-5½), C(16'-5½)
						79'-7		0.215	PO(16'-5½)
								44.476	Total(Pt) Route 36
983	11'-1½			1½	(See Notes)	41'-2	120	48.485	• • • • • **Route 37** • • • • •
1037	11'-1½		0.06	1.6820		24'-9	0.000000		T(9'-11)
						65'-11		0.000	E(4'-11½), PO(9'-11)
								48.485	Total(Pt) Route 37
659	12'-5½			1½	(See Notes)	78'-3	120	47.145	• • • • • **Route 38** • • • • •
789	11'-1½		14.81	1.6820		29'-8½	0.007488	0.578	T(9'-11)
						107'-11½		0.808	2E(4'-11½), 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.
								48.531	Total(Pt) Route 38
957	11'-1½			1½	(See Notes)	100'-0	120	48.485	• • • • • **Route 39** • • • • •
						29'-8½			PO(9'-11)
971	11'-1½		0.08	1.6820		129'-8½	0.000001	0.000	2E(4'-11½), T(9'-11)
								48.485	Total(Pt) Route 39
796	11'-1½			1½	(See Notes)	168'-10	120	48.478	• • • • • **Route 40** • • • • •
						19'-9½			PO(9'-11)
805	11'-1½		0.80	1.6820		188'-7½	0.000034	0.006	PO(9'-11)
								48.485	Total(Pt) Route 40
565	12'-5½		27.33	2½		12'-8	120	44.498	• • • • • **Route 41** • • • • •
									Flow (q) from Route 1
568	12'-5½		48.00	2.6350		12'-8	0.007409	0.094	
								44.591	Total(Pt) Route 41
492	12'-5½		83.27 + 2.19	2½	(See Notes)	6'-2	120	41.384	• • • • • **Route 42** • • • • •
						32'-11½			Flow (q) from Route 43 and 48
493	12'-5½		85.46	2.6350		39'-1½	0.021537	0.842	2T(16'-5½)
								42.226	Total(Pt) Route 42
491	12'-5½		83.49	2½		1'-9	120	41.348	• • • • • **Route 43** • • • • •
									Flow (q) from Route 45
492	12'-5½		83.27	2.6350		1'-9	0.020528	0.036	
								41.384	Total(Pt) Route 43
31	12'-5½		12.45	2		47'-6½	120	41.313	• • • • • **Route 44** • • • • •
									Flow (q) from Route 10
38	12'-5½		2.99	2.1570		47'-6½	0.000115	0.005	
								41.319	Total(Pt) Route 44
480	12'-5½		92.17	2½	(See Notes)	14'-6½	120	40.539	• • • • • **Route 45** • • • • •
						24'-8½			Flow (q) from Route 46
491	12'-5½		83.49	2.6350		39'-3	0.020629	0.809	3E(8'-3)
								41.348	Total(Pt) Route 45
481	12'-5½		8.57	2½	(See Notes)	31'-6	120	38.942	• • • • • **Route 46** • • • • •
						32'-11½			Flow (q) from Route 2
480	12'-5½		92.17	2.6350		64'-5½	0.024772	1.597	2T(16'-5½)
								40.539	Total(Pt) Route 46

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
464	12'-5½			1½	(See Notes)	123'-3	120	41.321	• • • • • **Route 47** • • • • •
						19'-9½	0.000056		PO(9'-11)
29	12'-5½		1.05	1.6820		143'-1		0.008	PO(9'-11)
								41.329	Total(Pt) Route 47
42	12'-5½			1½	(See Notes)	123'-3	120	41.353	• • • • • **Route 48** • • • • •
						19'-9½	0.000218		PO(9'-11)
492	12'-5½		2.19	1.6820		143'-1		0.031	PO(9'-11)
								41.384	Total(Pt) Route 48
465	12'-5½			1½	(See Notes)	123'-3	120	41.280	• • • • • **Route 49** • • • • •
						19'-9½	0.000322		PO(9'-11)
30	12'-5½		2.71	1.6820		143'-1		0.046	PO(9'-11)
								41.326	Total(Pt) Route 49
491	12'-5½		83.49	1½	(See Notes)	123'-3	120	41.348	• • • • • **Route 50** • • • • •
						19'-9½	0.000003		PO(9'-11), Flow (q) from Route 45
41	12'-5½		0.22	1.6820		143'-1		0.000	PO(9'-11)
								41.349	Total(Pt) Route 50

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
Report Description: Ordinary Group I (D)

Job

Job Number: B22243	Designer: BKB
Job Name: OVERHILLS ELEMENTARY	Phone: 919.243.2464 FAX:
Address 1: 2626 RAY ROAD	State Certification/License Number: 16269FS
Address 2: SPRING LAKE, NC 28390	AHJ: HARNETT CO
Address 3:	Job Site/Building: HARNETT CO SCHOOLS

System

Density: 0.15 gpm/ft²	Area of Application: 1500 ft² (Actual 412 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: 28.459	System Flow Demand: 98.13
Total Demand: 348.13 @ 28.459	Pressure Result: +99.100 (77.7%)

Supplies

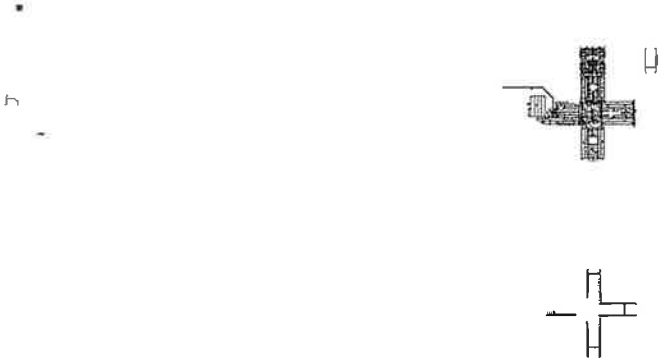
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	776.00	250.00	138.000	92.000
1	Pump	750.00		96.000	80.000

Pumps: Static = Churn (Pressure @ Zero Flow)

Check Point Gauges

Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)
BOR (1069)	27.243	18.8	98.13

PIPING



Water Supply at Node 1 (776.00, 0.00, 138.000, 92.000)

Hydraulic Calculations

for

Project Name: OVERHILLS ELEMENTARY
Location: 2626 RAY ROAD, SPRING LAKE, NC 28390,
Drawing Name: PIPING

Calculation Date: 4/19/2023

Design

Remote Area Number:	D
Remote Area Location:	MEZZANINE
Occupancy Classification:	Ordinary Group I
Commodity Classification:	N/A
Density	0.15 gpm/ft²
Area of Application:	1500 ft² (Actual 412 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:	348.13 @ 28.459	(Safety Margin = 99.100)
from Pump at Node: 1:	98.13 @ 28.459	(Safety Margin = 99.100)

Type of System: WET
Volume of Dry/PreAction/Antifreeze/OtherA N/A

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

Notes:

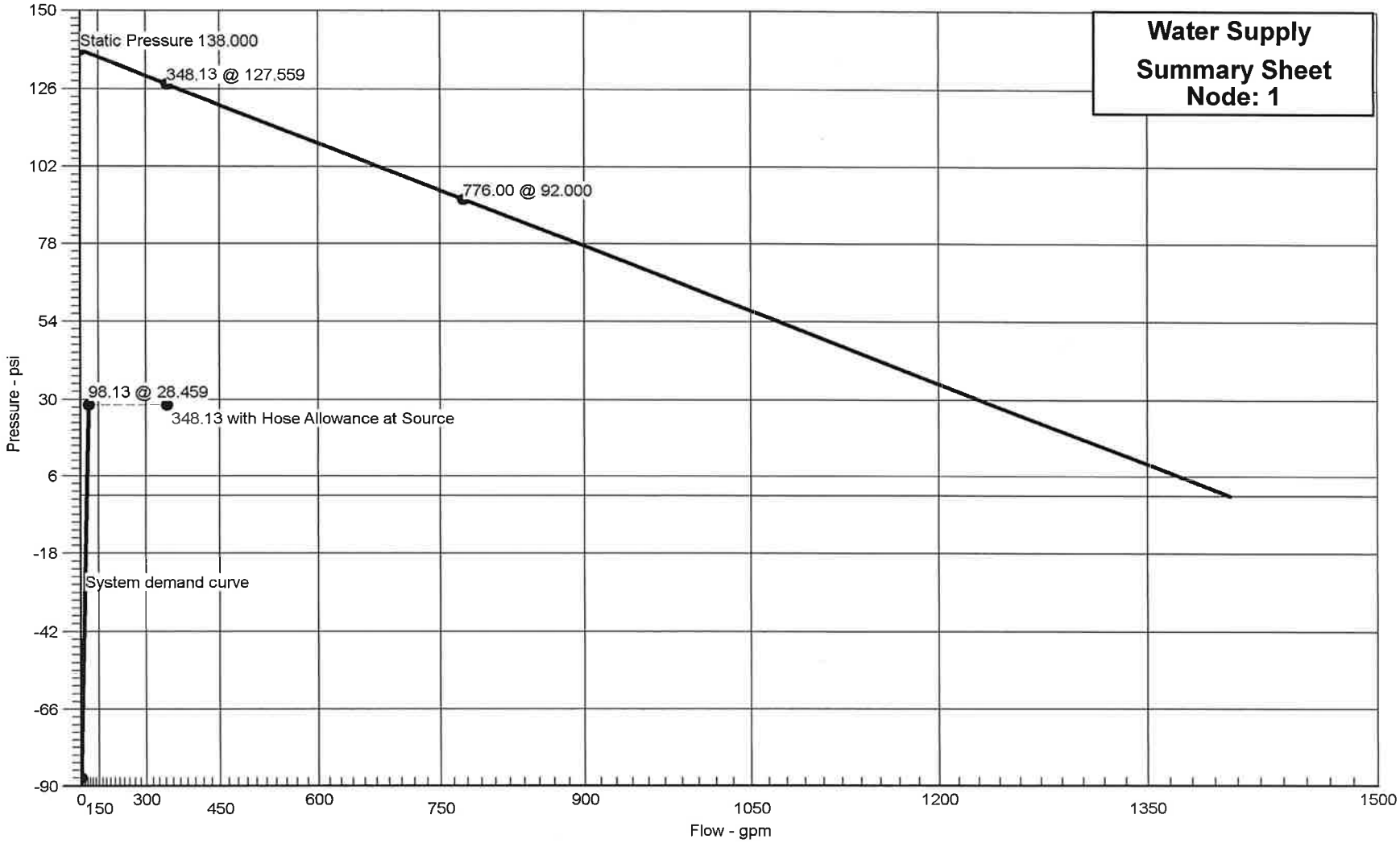
Automatic peaking results Left: 28.010 Right: 28.755

Hydraulic Graph

Job Name: OVERHILLS ELEMENTARY
Remote Area Number: D

$N^{1.85}$

Date: 4/19/2023

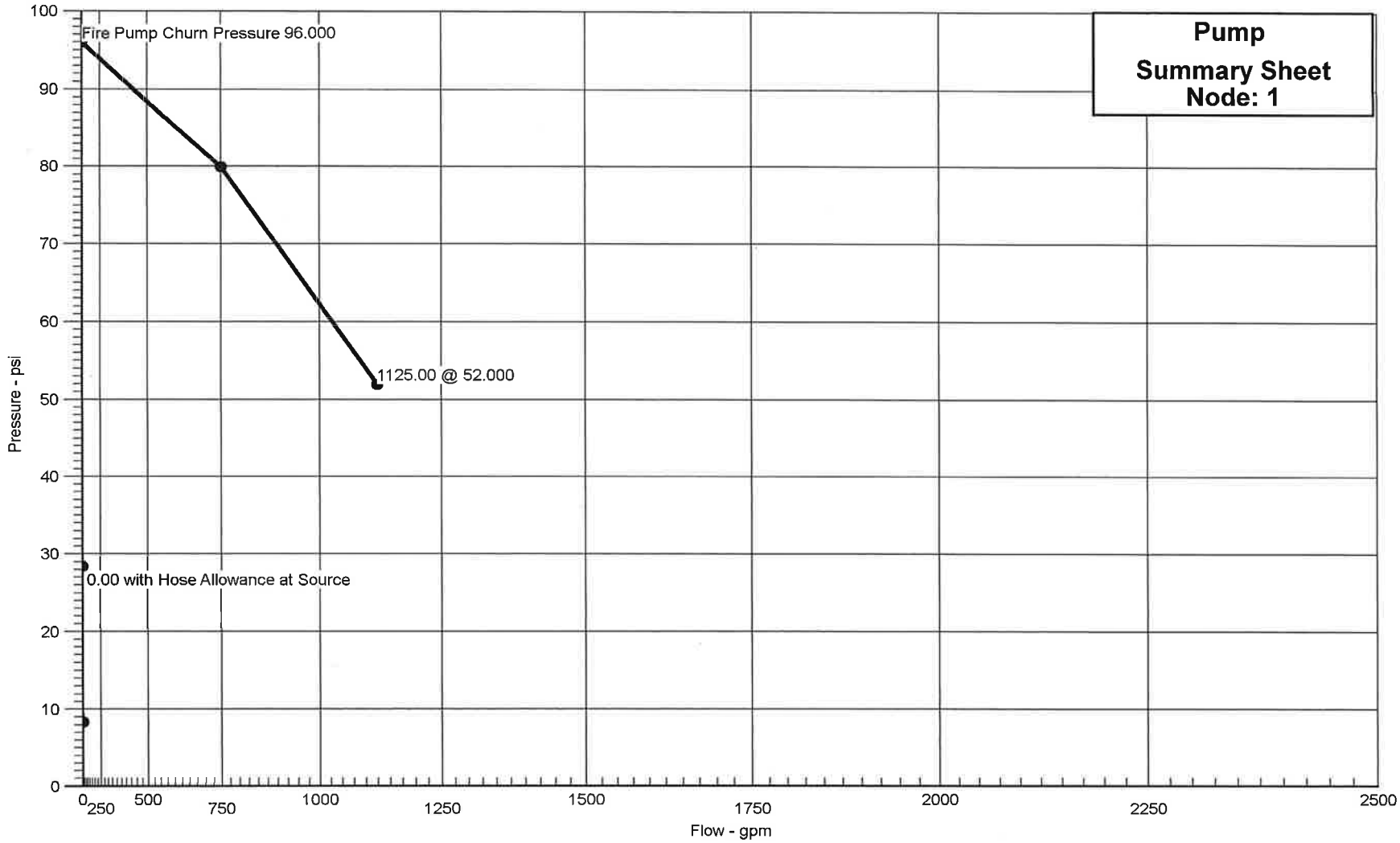


Hydraulic Graph

Job Name: OVERHILLS ELEMENTARY
Remote Area Number: D

$N^{1.85}$

Date: 4/19/2023



Pump Rating: **750.00 @ 80.000**

Supply: **Static:138.000**
Residual:92.000
Flowing:776.00

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Sprinkler	2345	19.59	19.50	5.6	12.241			
⇨ **Sprinkler**	**2349**	**19.50**	**19.50**	**5.6**	**12.125**			
Sprinkler	2363	19.50	19.50	5.6	12.125			
Sprinkler	2377	19.60	19.50	5.6	12.247			
Sprinkler	2381	19.94	19.50	5.6	12.681			

⇨ 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	138.000	92.000	776.00	127.559	348.13	28.459

Pump Analysis

Node	Churn (psi)	Residual @ Flow (psi) (gpm)		Available @ Total Demand (psi) (gpm)		Required Pressure (psi)
1	96.000	80.000	750.00	127.559	98.13	28.459

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
1	1'-2½	Supply	28.459	98.13	P2
2345	20'-7½	Sprinkler	12.241	19.59	
2349	20'-7½	Sprinkler	12.125	19.50	
2363	20'-7½	Sprinkler	12.125	19.50	
2377	20'-7½	Sprinkler	12.247	19.60	
2381	20'-7½	Sprinkler	12.681	19.94	
22	1'-2½		28.368		
24	12'-5½		20.252		
29	12'-5½		20.224		
30	12'-5½		20.220		
31	12'-5½		20.161		
38	12'-5½		20.041		
41	12'-5½		20.108		
42	12'-5½		20.112		
43	12'-5½		20.143		
340	20'-0		16.724		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
349	20'-0		15.089		
462	12'-5½		20.634		
463	12'-5½		20.650		
464	12'-5½		20.446		
465	12'-5½		20.440		
469	12'-5½		20.338		
480	12'-5½		20.269		
490	20'-0		17.066		
491	12'-5½		20.365		
492	12'-5½		20.371		
493	12'-5½		20.579		
494	12'-5½		20.562		
497	20'-0		16.968		
563	12'-5½		21.215		
564	12'-5½		21.205		
565	12'-5½		21.220		
568	12'-5½		21.242		
571	12'-5½		21.244		
575	12'-5½		21.243		
576	12'-5½		21.244		
577	12'-5½		21.229		
583	12'-5½		21.218		
585	12'-5½		21.145		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
587	12'-5½		21.203		
620	12'-5½		21.380		
623	12'-5½		21.385		
658	12'-5½		21.879		
659	12'-5½		21.916		
738	11'-1½		22.691		
774	11'-1½		22.696		
785	11'-1½		22.704		
787	11'-1½		22.720		
788	11'-1½		22.699		
789	11'-1½		22.707		
796	11'-1½		22.693		
805	11'-1½		22.695		
810	11'-1½		22.835		
812	11'-1½		22.837		
813	11'-1½		22.748		
815	11'-1½		22.729		
825	11'-1½		22.695		
884	11'-1½		22.695		
899	11'-1½		22.695		
938	11'-1½		22.695		
949	11'-1½		22.695		
957	11'-1½		22.695		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
971	11'-1½		22.695		
980	11'-1½		22.695		
983	11'-1½		22.695		
1037	11'-1½		22.695		
1069	3'-7½	Gauge	27.243		
1071	4'-2½		26.945		
1097	11'-1½		22.695		
1184	11'-1½		22.695		
1215	11'-1½		22.695		
1275	11'-1½		22.695		
1278	11'-1½		22.695		
1287	11'-1½		22.695		
1295	11'-1½		22.695		
1349	11'-1½		22.695		
1359	11'-1½		22.695		
1457	11'-1½		22.695		
1470	11'-1½		22.695		
1550	11'-1½		22.695		
1561	11'-1½		22.695		
2340	20'-0		13.220		
2347	20'-0		13.098		
2358	20'-0		13.098		
2370	20'-0		13.226		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
2376	20'-0		13.683		

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.
2349	20'-7½	5.6	19.50	1	(See Notes)	0'-7½	120	12.125	• • • • • Route 1 • • • • •
						5'-0	0.124177	0.274	Sprinkler,
2347	20'-0		19.50	1.0490		5'-7½		0.699	PO(5'-0)
2347	20'-0			1½		10'-0	120	13.098	
							0.012139		
2340	20'-0		19.23	1.6820		10'-0		0.121	
2340	20'-0		19.59	1½	(See Notes)	55'-0½	120	13.220	Flow (q) from Route 3
						24'-9	0.044530	3.270	
38	12'-5½		38.82	1.6820		79'-9½		3.552	3E(4'-11½), PO(9'-11)
38	12'-5½			2		47'-6½	120	20.041	
							0.002520		
31	12'-5½		15.82	2.1570		47'-6½		0.120	
31	12'-5½		5.63	2		13'-3	120	20.161	Flow (q) from Route 7
							0.004425		
30	12'-5½		21.45	2.1570		13'-3		0.059	
30	12'-5½			1½	(See Notes)	123'-3	120	20.220	PO(9'-11)
						19'-9½	0.001538		
465	12'-5½		6.29	1.6820		143'-1		0.220	PO(9'-11)
465	12'-5½		27.35	2½		1'-8½	120	20.440	Flow (q) from Route 2
							0.003839		
464	12'-5½		33.64	2.6350		1'-8½		0.006	
464	12'-5½		6.33	2½	(See Notes)	5'-6½	120	20.446	Flow (q) from Route 45
						32'-11½	0.005282		
463	12'-5½		39.98	2.6350		38'-6		0.203	2T(16'-5½)
463	12'-5½		8.82	2½	(See Notes)	23'-3	120	20.650	Flow (q) from Route 46
						49'-5	0.007639		
564	12'-5½		48.80	2.6350		72'-8		0.555	2T(16'-5½), C(16'-5½)
564	12'-5½			2½		3'-7	120	21.205	
							0.004214		
565	12'-5½		35.38	2.6350		3'-7		0.015	
565	12'-5½			1½	(See Notes)	130'-4½	120	21.220	PO(9'-11)
						24'-9	0.006126	0.578	
813	11'-1½		13.29	1.6820		155'-1½		0.950	E(4'-11½), 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 (Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value)
813	11'-1½		71.43	4	(See Notes)	17'-2	120	22.748	Flow (q) from Route 10
812	11'-1½		84.71	4.2600		26'-4 / 43'-6	0.002042	0.089	T(26'-4)
812	11'-1½		13.42	4	(See Notes)	264'-7	120	22.837	Flow (q) from Route 24
1071	4'-2½		98.13	4.2600		150'-1½ / 414'-8½	0.002681	2.996 / 1.112	6E(13'-2), T(26'-4), f, sCV(28'-11½), BV(15'-9½)
1071	4'-2½			4	(See Notes)	0'-0	120	26.945	
1069	3'-7½		98.13	4.0260		10'-0 / 10'-0	0.003530	0.263 / 0.035	E(10'-0), BOR
1069	3'-7½			4	(See Notes)	3'-11	120	27.243	
22	1'-2½		98.13	4.0260		20'-0 / 23'-11	0.003530	1.040 / 0.084	T(20'-0)
22	1'-2½			6	(See Notes)	211'-5½	140	28.368	
1	1'-2½		98.13	6.2800		88'-3 / 299'-8½	0.000304	0.000 / 0.091	3E(22'-1), 2EE(11'-0½)
			250.00					28.459	Hose Allowance At Source
1			348.13						Total(Pt) Route 1
2363	20'-7½	5.6	19.50	1	(See Notes)	0'-7½	120	12.125	• • • • • **Route 2** • • • • • Sprinkler,
2358	20'-0		19.50	1.0490		5'-0 / 5'-7½	0.124177	0.274 / 0.699	PO(5'-0)
2358	20'-0		0.27	1½		10'-0	120	13.098	Flow (q) from Route 8
2370	20'-0		19.77	1.6820		10'-0	0.012781	0.128	
2370	20'-0		19.60	1½		10'-0	120	13.226	Flow (q) from Route 4
2376	20'-0		39.37	1.6820		10'-0	0.045700	0.457	
2376	20'-0		19.94	1½		14'-5	120	13.683	Flow (q) from Route 5
349	20'-0		59.31	1.6820		14'-5	0.097538	1.406	
349	20'-0			1½	(See Notes)	28'-0	120	15.089	
497	20'-0		38.44	1.6820		14'-10 / 42'-10	0.043732	0.005 / 1.873	E(4'-11½), 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 Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
497	20'-0			2½		7'-6½	120	16.968	
480	12'-5½		38.44	2.6350		7'-6½	0.004913	3.265 0.037	
480	12'-5½			2½	(See Notes)	51'-10	120	20.269	2T(16'-5½)
469	12'-5½		12.11	2.6350	(See Notes)	65'-11 117'-8½	0.000580	0.068	2T(16'-5½)
469	12'-5½		15.24	2½	(See Notes)	14'-5	120	20.338	Flow (q) from Route 6
465	12'-5½		27.35	2.6350	(See Notes)	24'-8½ 39'-1½	0.002617	0.102	3E(8'-3)
								20.440	Total(Pt) Route 2
2345	20'-7½	5.6	19.59	1	(See Notes)	0'-7½	120	12.241	• • • • • **Route 3** • • • • •
2340	20'-0		19.59	1.0490	(See Notes)	5'-0 5'-7½	0.125268	0.274 0.705	Sprinkler, PO(5'-0)
								13.220	Total(Pt) Route 3
2377	20'-7½	5.6	19.60	1	(See Notes)	0'-7½	120	12.247	• • • • • **Route 4** • • • • •
2370	20'-0		19.60	1.0490	(See Notes)	5'-0 5'-7½	0.125326	0.274 0.706	Sprinkler, PO(5'-0)
								13.226	Total(Pt) Route 4
2381	20'-7½	5.6	19.94	1	(See Notes)	0'-7½	120	12.681	• • • • • **Route 5** • • • • •
2376	20'-0		19.94	1.0490	(See Notes)	5'-0 5'-7½	0.129428	0.274 0.729	Sprinkler, PO(5'-0)
								13.683	Total(Pt) Route 5
490	20'-0		15.24	2½		7'-6½	120	17.066	• • • • • **Route 6** • • • • •
469	12'-5½		15.24	2.6350		7'-6½	0.000887	3.265 0.007	Flow (q) from Route 9
								20.338	Total(Pt) Route 6
349	20'-0			1½	(See Notes)	56'-4	120	15.089	• • • • • **Route 7** • • • • •
340	20'-0		20.87	1.6820	(See Notes)	59'-5 115'-9	0.014121	1.634	2T(9'-11), C(9'-11) 2T(9'-11), C(9'-11)
340	20'-0			1½	(See Notes)	109'-7	120	16.724	
31	12'-5½		5.63	1.6820	(See Notes)	24'-9 134'-4	0.001251	3.270 0.168	3E(4'-11½), PO(9'-11)
								20.161	Total(Pt) Route 7

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.)
2347	20'-0		19.23	1½		10'-0	120	13.098	• • • • • **Route 8** • • • • •
2358	20'-0		0.27	1.6820		10'-0	0.000005	0.000	Flow (q) from Route 1
								13.098	Total(Pt) Route 8
340	20'-0		5.63	1½	(See Notes)	27'-11	120	16.724	• • • • • **Route 9** • • • • •
490	20'-0		15.24	1.6820		14'-10 42'-9½	0.007894	0.005 0.338	Flow (q) from Route 7 E(4'-11½), PO(9'-11)
								17.066	Total(Pt) Route 9
971	11'-1½		0.03 + 0.04	1½	(See Notes)	52'-2	120	22.695	• • • • • **Route 10** • • • • •
983	11'-1½		0.07	1.6820		19'-9½ 71'-11½	0.000000	0.000	Flow (q) from Route 29 and 38 2E(4'-11½), T(9'-11)
983	11'-1½			1½	(See Notes)	32'-8	120	22.695	
980	11'-1½		0.04	1.6820		9'-11 42'-7	0.000000	0.000	PO(9'-11)
980	11'-1½		0.23	4		10'-2	120	22.695	Flow (q) from Route 11
949	11'-1½		0.27	4.2600		10'-2	0.000000	0.000	
949	11'-1½		0.06	4		16'-8	120	22.695	Flow (q) from Route 28
899	11'-1½		0.33	4.2600		16'-8	0.000000	0.000	
899	11'-1½		0.07	4	(See Notes)	13'-2½	120	22.695	Flow (q) from Route 30
825	11'-1½		0.39	4.2600		26'-4 39'-6½	0.000000	0.000	T(26'-4)
825	11'-1½		13.23	4		12'-11	120	22.695	Flow (q) from Route 32
774	11'-1½		13.63	4.2600		12'-11	0.000070	0.001	
774	11'-1½		12.90	4		10'-9	120	22.696	Flow (q) from Route 23
788	11'-1½		26.53	4.2600		10'-9	0.000238	0.003	
788	11'-1½		8.11	4		13'-11	120	22.699	Flow (q) from Route 13
785	11'-1½		34.64	4.2600		13'-11	0.000390	0.005	

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.
785	11'-1½		8.25	4		5'-8	120	22.704	Flow (q) from Route 15
789	11'-1½		42.88	4.2600		5'-8	0.000580	0.003	
789	11'-1½		7.21	4		16'-2	120	22.707	Flow (q) from Route 37
787	11'-1½		50.09	4.2600		16'-2	0.000773	0.012	
787	11'-1½		8.36	4		9'-4	120	22.720	Flow (q) from Route 14
815	11'-1½		58.46	4.2600		9'-4	0.001028	0.010	
815	11'-1½		12.97	4		12'-8	120	22.729	Flow (q) from Route 20
813	11'-1½		71.43	4.2600		12'-8	0.001490	0.019	
								22.748	Total(Pt) Route 10
1457	11'-1½		0.09	1½	(See Notes)	168'-10	120	22.695	• • • • • **Route 11** • • • • • PO(9'-11), Flow (q) from Route 26 PO(9'-11)
1470	11'-1½		0.05	1.6820		19'-9½ / 188'-7½	0.000000	0.000	
1470	11'-1½		0.05	4		16'-8	120	22.695	Flow (q) from Route 12
1359	11'-1½		0.09	4.2600		16'-8	0.000000	0.000	
1359	11'-1½		0.05	4		10'-2	120	22.695	Flow (q) from Route 25
1275	11'-1½		0.14	4.2600		10'-2	0.000000	0.000	
1275	11'-1½		0.03	4		8'-6	120	22.695	Flow (q) from Route 17
1215	11'-1½		0.17	4.2600		8'-6	0.000000	0.000	
1215	11'-1½		0.03	4		18'-6	120	22.695	Flow (q) from Route 18
1037	11'-1½		0.20	4.2600		18'-6	0.000000	0.000	
1037	11'-1½		0.03	4		8'-6	120	22.695	Flow (q) from Route 36
980	11'-1½		0.23	4.2600		8'-6	0.000000	0.000	
								22.695	Total(Pt) Route 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: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
1457	11'-1½		0.09	2½		14'-0	120	22.695	• • • • • **Route 12** • • • • •
							0.000000		Flow (q) from Route 26
1550	11'-1½		0.05	2.6350		14'-0		0.000	
1550	11'-1½			1½	(See Notes)	168'-10	120	22.695	PO(9'-11)
						19'-9½	0.000000		
1561	11'-1½		0.05	1.6820		188'-7½		0.000	PO(9'-11)
1561	11'-1½			4		14'-0	120	22.695	
							0.000000		
1470	11'-1½		0.05	4.2600		14'-0		0.000	
								22.695	Total(Pt) Route 12
658	12'-5½		16.36	1½	(See Notes)	63'-8½	120	21.879	• • • • • **Route 13** • • • • •
						34'-8	0.002456	0.578	T(9'-11), Flow (q) from Route 16
788	11'-1½		8.11	1.6820		98'-4½		0.242	3E(4'-11½), PO(9'-11)
								22.699	Total(Pt) Route 13
585	12'-5½		49.33	2½		16'-11½	120	21.145	• • • • • **Route 14** • • • • •
							0.004285		Flow (q) from Route 41
583	12'-5½		35.70	2.6350		16'-11½		0.073	
583	12'-5½			2½		5'-11	120	21.218	
							0.001870		
577	12'-5½		22.80	2.6350		5'-11		0.011	
577	12'-5½			2½		19'-0	120	21.229	
							0.000748		
575	12'-5½		13.90	2.6350		19'-0		0.014	
575	12'-5½			2½		6'-7	120	21.243	
							0.000181		
576	12'-5½		6.45	2.6350		6'-7		0.001	
576	12'-5½		0.87	1½	(See Notes)	51'-9	120	21.244	PO(9'-11), Flow (q) from Route 21
						14'-10	0.002031		
620	12'-5½		7.32	1.6820		66'-7		0.135	E(4'-11½)
620	12'-5½		8.25	1½	(See Notes)	45'-5½	120	21.380	Flow (q) from Route 22
						19'-9½	0.008216		
659	12'-5½		15.57	1.6820		65'-3		0.536	2E(4'-11½), T(9'-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.
659	12'-5½			1½	(See Notes)	62'-1½	120	21.916	
						24'-9	0.002600	0.578	
787	11'-1½		8.36	1.6820		86'-10½		0.226	3E(4'-11½), PO(9'-11)
								22.720	Total(Pt) Route 14
658	12'-5½		16.36	1½	(See Notes)	77'-7	120	21.879	• • • • • **Route 15** • • • • •
						19'-9½	0.002537	0.578	Flow (q) from Route 16
785	11'-1½		8.25	1.6820		97'-4½		0.247	2E(4'-11½), PO(9'-11)
								22.704	Total(Pt) Route 15
577	12'-5½			1½	(See Notes)	33'-6	120	21.229	• • • • • **Route 16** • • • • •
						19'-9½	0.002922		PO(9'-11)
623	12'-5½		8.90	1.6820		53'-3½		0.156	T(9'-11)
623	12'-5½		7.45	1½	(See Notes)	45'-0½	120	21.385	Flow (q) from Route 33
						9'-11	0.008999		
658	12'-5½		16.36	1.6820		54'-11		0.494	2E(4'-11½)
								21.879	Total(Pt) Route 16
1278	11'-1½		0.06	1½	(See Notes)	32'-8½	120	22.695	• • • • • **Route 17** • • • • •
						9'-11	0.000000		Flow (q) from Route 19
1275	11'-1½		0.03	1.6820		42'-7½		0.000	PO(9'-11)
								22.695	Total(Pt) Route 17
1278	11'-1½		0.06	1½	(See Notes)	41'-2½	120	22.695	• • • • • **Route 18** • • • • •
						24'-9	0.000000		T(9'-11), Flow (q) from Route 19
1215	11'-1½		0.03	1.6820		65'-11½		0.000	E(4'-11½), PO(9'-11)
								22.695	Total(Pt) Route 18
1287	11'-1½		0.03 + 0.03	1½	(See Notes)	51'-4½	120	22.695	• • • • • **Route 19** • • • • •
						19'-9½	0.000000		Flow (q) from Route 27 and 34
1278	11'-1½		0.06	1.6820		71'-2		0.000	2E(4'-11½), T(9'-11)
								22.695	Total(Pt) Route 19
568	12'-5½		22.10	1½	(See Notes)	130'-4½	120	21.242	• • • • • **Route 20** • • • • •
						24'-9	0.005860	0.578	PO(9'-11), Flow (q) from Route 40
815	11'-1½		12.97	1.6820		155'-1½		0.909	E(4'-11½), PO(9'-11)
								22.729	Total(Pt) Route 20

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
568	12'-5½		22.10	2½		6'-1	120	21.242	• • • • • **Route 21** • • • • •
571	12'-5½		9.12	2.6350		6'-1	0.000343	0.002	Flow (q) from Route 40
571	12'-5½			2½		18'-3	120	21.244	
576	12'-5½		0.87	2.6350		18'-3	0.000004	0.000	
								21.244	Total(Pt) Route 21
571	12'-5½			1½	(See Notes)	33'-6	120	21.244	• • • • • **Route 22** • • • • •
620	12'-5½		8.25	1.6820		19'-9½ 53'-3½	0.002540	0.135	PO(9'-11) T(9'-11)
								21.380	Total(Pt) Route 22
583	12'-5½			1½	(See Notes)	130'-4½	120	21.218	• • • • • **Route 23** • • • • •
774	11'-1½		12.90	1.6820		24'-9 155'-1½	0.005802	0.578 0.900	PO(9'-11) E(4'-11½), PO(9'-11)
								22.696	Total(Pt) Route 23
564	12'-5½		35.38	2½		14'-5	120	21.205	• • • • • **Route 24** • • • • •
563	12'-5½		13.42	2.6350		14'-5	0.000701	0.010	Flow (q) from Route 1
563	12'-5½			1½	(See Notes)	132'-4½	120	21.215	PO(9'-11)
810	11'-1½		13.42	1.6820		34'-8 167'-0½	0.006239	0.578 1.042	3E(4'-11½), PO(9'-11)
810	11'-1½			4	(See Notes)	2'-10	120	22.835	
812	11'-1½		13.42	4.2600		26'-4 29'-2	0.000068	0.002	T(26'-4)
								22.837	Total(Pt) Route 24
1295	11'-1½			2½		6'-1	120	22.695	• • • • • **Route 25** • • • • •
1349	11'-1½		0.14	2.6350		6'-1	0.000000	0.000	
1349	11'-1½			1½	(See Notes)	168'-10	120	22.695	PO(9'-11)
1359	11'-1½		0.05	1.6820		19'-9½ 188'-7½	0.000000	0.000	PO(9'-11)
								22.695	Total(Pt) Route 25

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
1349	11'-1½		0.05	2½		16'-8	120	22.695	• • • • • **Route 26** • • • • • Flow (q) from Route 25
1457	11'-1½		0.09	2.6350		16'-8	0.000000	0.000	
								22.695	Total(Pt) Route 26
1097	11'-1½			2½		8'-8	120	22.695	• • • • • **Route 27** • • • • •
1184	11'-1½		0.20	2.6350		8'-8	0.000000	0.000	
1184	11'-1½			2½		16'-9	120	22.695	
1295	11'-1½		0.17	2.6350		16'-9	0.000000	0.000	
1295	11'-1½			1½	(See Notes)	99'-6	120	22.695	PO(9'-11)
1287	11'-1½		0.03	1.6820	(See Notes)	34'-8 134'-2	0.000000	0.000	E(4'-11½), 2T(9'-11)
								22.695	Total(Pt) Route 27
938	11'-1½		0.33	1½	(See Notes)	168'-10	120	22.695	• • • • • **Route 28** • • • • • PO(9'-11), Flow (q) from Route 31
949	11'-1½		0.06	1.6820	(See Notes)	19'-9½ 188'-7½	0.000000	0.000	PO(9'-11)
								22.695	Total(Pt) Route 28
938	11'-1½		0.33	2½		6'-4	120	22.695	• • • • • **Route 29** • • • • • Flow (q) from Route 31
957	11'-1½		0.27	2.6350		6'-4	0.000000	0.000	
957	11'-1½			2½		18'-0	120	22.695	
1097	11'-1½		0.23	2.6350		18'-0	0.000000	0.000	
1097	11'-1½			1½	(See Notes)	121'-3½	120	22.695	PO(9'-11)
971	11'-1½		0.03	1.6820	(See Notes)	44'-6½ 165'-10	0.000000	0.000	7E(4'-11½)
								22.695	Total(Pt) Route 29
805	11'-1½		0.39	2½		14'-1	120	22.695	• • • • • **Route 30** • • • • • Flow (q) from Route 39
884	11'-1½		0.39	2.6350		14'-1	0.000001	0.000	

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
884	11'-1½			1½	(See Notes)	168'-10	120	22.695	PO(9'-11)
						19'-9½	0.000000		
899	11'-1½		0.07	1.6820		188'-7½		0.000	PO(9'-11)
								22.695	Total(Pt) Route 30
884	11'-1½		0.07	2½		16'-8	120	22.695	• • • • • **Route 31** • • • • •
							0.000001		Flow (q) from Route 30
938	11'-1½		0.33	2.6350		16'-8		0.000	
								22.695	Total(Pt) Route 31
587	12'-5½		13.63	1½	(See Notes)	126'-11½	120	21.203	• • • • • **Route 32** • • • • •
						14'-10	0.006420	0.578	Flow (q) from Route 35
738	11'-1½		13.63	1.6820		141'-9½		0.910	E(4'-11½), PO(9'-11)
738	11'-1½			4	(See Notes)	19'-11	120	22.691	
						13'-2	0.000070		
796	11'-1½		13.63	4.2600		33'-1		0.002	E(13'-2)
796	11'-1½			4	(See Notes)	0'-10½	120	22.693	
						26'-4	0.000066		
825	11'-1½		13.23	4.2600		27'-2½		0.002	T(26'-4)
								22.695	Total(Pt) Route 32
575	12'-5½			1½	(See Notes)	52'-5½	120	21.243	• • • • • **Route 33** • • • • •
						14'-10	0.002102		PO(9'-11)
623	12'-5½		7.45	1.6820		67'-4		0.141	E(4'-11½)
								21.385	Total(Pt) Route 33
1184	11'-1½			1½	(See Notes)	112'-11	120	22.695	• • • • • **Route 34** • • • • •
						24'-9	0.000000		PO(9'-11)
1287	11'-1½		0.03	1.6820		137'-8		0.000	3E(4'-11½)
								22.695	Total(Pt) Route 34
585	12'-5½		49.33	2½	(See Notes)	13'-8½	120	21.145	• • • • • **Route 35** • • • • •
						65'-11	0.000721		2T(16'-5½), C(16'-5½), Flow (q) from Route 41
587	12'-5½		13.63	2.6350		79'-7		0.057	PO(16'-5½)
								21.203	Total(Pt) Route 35
983	11'-1½			1½	(See Notes)	41'-2	120	22.695	• • • • • **Route 36** • • • • •
						24'-9	0.000000		T(9'-11)
1037	11'-1½		0.03	1.6820		65'-11		0.000	E(4'-11½), 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: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
								22.695	Total(Pt) Route 36
659	12'-5½			1½	(See Notes)	78'-3	120	21.916	• • • • • **Route 37** • • • • •
						29'-8½		0.578	T(9'-11)
789	11'-1½		7.21	1.6820		107'-11½	0.001977	0.213	2E(4'-11½), PO(9'-11)
								22.707	Total(Pt) Route 37
957	11'-1½			1½	(See Notes)	100'-0	120	22.695	• • • • • **Route 38** • • • • •
						29'-8½			PO(9'-11)
971	11'-1½		0.04	1.6820		129'-8½	0.000000	0.000	2E(4'-11½), T(9'-11)
								22.695	Total(Pt) Route 38
796	11'-1½			1½	(See Notes)	168'-10	120	22.693	• • • • • **Route 39** • • • • •
						19'-9½			PO(9'-11)
805	11'-1½		0.39	1.6820		188'-7½	0.000009	0.002	PO(9'-11)
								22.695	Total(Pt) Route 39
565	12'-5½		13.29	2½		12'-8	120	21.220	• • • • • **Route 40** • • • • •
									Flow (q) from Route 1
568	12'-5½		22.10	2.6350		12'-8	0.001764	0.022	
								21.242	Total(Pt) Route 40
492	12'-5½		33.18 + 6.88	2½	(See Notes)	6'-2	120	20.371	• • • • • **Route 41** • • • • •
						32'-11½			Flow (q) from Route 42 and 47
493	12'-5½		40.06	2.6350		39'-1½	0.005302	0.207	2T(16'-5½)
493	12'-5½		9.27	2½	(See Notes)	23'-3	120	20.579	Flow (q) from Route 43
						49'-5			
585	12'-5½		49.33	2.6350		72'-8	0.007794	0.566	2T(16'-5½), C(16'-5½)
								21.145	Total(Pt) Route 41
491	12'-5½		6.85 + 26.33	2½		1'-9	120	20.365	• • • • • **Route 42** • • • • •
									Flow (q) from Route 44 and 48
492	12'-5½		33.18	2.6350		1'-9	0.003742	0.007	
								20.371	Total(Pt) Route 42
41	12'-5½			2		1'-9	120	20.108	• • • • • **Route 43** • • • • •
42	12'-5½		16.15	2.1570		1'-9	0.002618	0.005	

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)
42	12'-5½			2	(See Notes)	20'-3½	120	20.112	
43	12'-5½		9.27	2.1570		12'-3½ 32'-7	0.000938	0.031	PO(12'-3½)
43	12'-5½			1½	(See Notes)	123'-3	120	20.143	
494	12'-5½		9.27	1.6820		9'-11 133'-2	0.003150	0.419	PO(9'-11)
494	12'-5½			2½	(See Notes)	14'-1½	120	20.562	
493	12'-5½		9.27	2.6350		32'-11½ 47'-0½	0.000354	0.017	2T(16'-5½)
								20.579	Total(Pt) Route 43
38	12'-5½		15.82	2		13'-1½	120	20.041	• • • • • **Route 44** • • • • • Flow (q) from Route 1
41	12'-5½		23.00	2.1570		13'-1½	0.005035	0.066	
41	12'-5½			1½	(See Notes)	123'-3	120	20.108	PO(9'-11)
491	12'-5½		6.85	1.6820		19'-9½ 143'-1	0.001798	0.257	PO(9'-11)
								20.365	Total(Pt) Route 44
30	12'-5½		6.29	2		1'-8½	120	20.220	• • • • • **Route 45** • • • • • Flow (q) from Route 1
29	12'-5½		15.15	2.1570		1'-8½	0.002327	0.004	
29	12'-5½			1½	(See Notes)	123'-3	120	20.224	PO(9'-11)
464	12'-5½		6.33	1.6820		19'-9½ 143'-1	0.001556	0.223	PO(9'-11)
								20.446	Total(Pt) Route 45
29	12'-5½		6.33	2	(See Notes)	20'-6	120	20.224	• • • • • **Route 46** • • • • • Flow (q) from Route 45
24	12'-5½		8.82	2.1570		12'-3½ 32'-9½	0.000855	0.028	PO(12'-3½)
24	12'-5½			1½	(See Notes)	123'-3	120	20.252	
462	12'-5½		8.82	1.6820		9'-11 133'-2	0.002871	0.382	PO(9'-11)
462	12'-5½			2½	(See Notes)	14'-11½	120	20.634	
463	12'-5½		8.82	2.6350		32'-11½ 47'-11	0.000323	0.015	2T(16'-5½)

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.
								20.650	Total(Pt) Route 46
42	12'-5½			1½	(See Notes)	123'-3	120	20.112	• • • • • **Route 47** • • • • •
						19'-9½	0.001812		PO(9'-11)
492	12'-5½		6.88	1.6820		143'-1		0.259	PO(9'-11)
								20.371	Total(Pt) Route 47
480	12'-5½		12.11	2½	(See Notes)	14'-6½	120	20.269	• • • • • **Route 48** • • • • •
						24'-8½	0.002440		Flow (q) from Route 2
491	12'-5½		26.33	2.6350		39'-3		0.096	3E(8'-3)
								20.365	Total(Pt) Route 48

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

Carolina Fire Protection, Inc.

Sprinkler Inspection Certificate

For

Overhills Elementary School
2626 Ray Road
Spring Lake, NC 28390

Tested to NFPA 25 Standards

This Inspection was performed in accordance with applicable NFPA Standards. The subsequent pages of this report provide performance measurements, listed ranges of acceptable results, and complete documentation of the inspection. Whenever discrepancies exist between acceptable performance standards and actual test results, notes and/or recommended solutions have been proposed or provided for immediate review and approval.

Annual Inspection
Inspection Date
Jun 16, 2022

Building: Overhills Elementary School
Contact: Lynn Harris
Title: Manager

Company: Carolina Fire Protection, Inc.
Contact: Jack Eldridge
Title: Inspector

Executive Summary

Generated by: BuildingReports.com

Building Information

Building: Overhills Elementary School
Address: 2626 Ray Road
Address:
City/State/ZIP Code: Spring Lake, NC 28390
Country: United States of America

Contact: Lynn Harris
Phone: 910-814-7840
Fax:
Mobile:
Email: rharris1@harnett.k12.nc.us

Inspection Performed By

Company: Carolina Fire Protection, Inc.
Address: 4055 Hodges Chapel Road
Address:
City/State/ZIP Code: Dunn, North Carolina 28334
Country: United States of America

Inspector: Jack Eldridge
Phone: 910-892-1700
Fax:
Mobile:
Email: jeldridge@carolinafireprotection.com

System Control Unit

System Type	System Location	Protected Area	Devices
Cross Conn. Control			7
Fire Pump			19
Wet Pipe			19

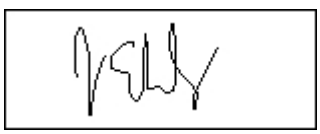
Inspection Summary

Category:	Total Items		Serviced		Passed		Failed/Other	
	Qty	%	Qty	%	Qty	%	Qty	%
Alarm	7	15.56%	7	100.00%	4	57.14%	3	42.86%
Device	10	22.22%	10	100.00%	2	20.00%	8	80.00%
Hose	1	2.22%	1	100.00%	1	100.00%	0	0.00%
Pump	5	11.11%	5	100.00%	3	60.00%	2	40.00%
Sprinkler	4	8.89%	4	100.00%	2	50.00%	2	50.00%
Valve	18	40.00%	18	100.00%	18	100.00%	0	0.00%
Totals	**45**	**100%**	**45**	**100.00%**	**30**	**66.67%**	**15**	**33.33%**

Certification

Company: Carolina Fire Protection, Inc.

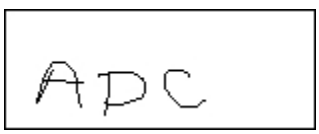
Inspector: Jack Eldridge



Signed: Jun 16, 2022

Building: Overhills Elementary School

Contact: Lynn Harris



Signed: Jun 16, 2022

Discrepancy Report

Generated by: BuildingReports.com

Building: Overhills Elementary School

The Discrepancy Report consolidates each discrepancy listed within the various Testing sections of your Inspection. Discrepancies are listed by Category, and grouped by device type. The description of the problem is provided and where appropriate, code references are listed for your convenience. Any item that was inspected that is subject to a recall or part of a manufacturer's replacement/upgrade program is included.

Device Type	Manufacturer	ModelNumber	Date	Qty
Items listed for Recall or Replacement/Upgrade				
No items found during this inspection.				

ScanID	Location	Problem	Reference
Cross Conn. Control			
Tamper Switch			
1 62796478	Hot Box	Special Note	NFPA25 4.1.5.1
1 62796481	Hot Box	Special Note	NFPA25 4.1.5.1
Fire Pump			
Critical Deficiencies			
Controller			
2 62796487	Controller	Special Note	NFPA25 8.4.1
Diesel Driver			
4 62796493	Diesel Driver		
Non-Critical Deficiencies			
Gauge			
62796489	Pump Room	Date Expired	NFPA25 5.3.2.1
62796490	Pump Room	Date Expired	NFPA25 5.3.2.1
62796491	Pump Room	Date Expired	NFPA25 5.3.2.1
62796492	Pump Room	Date Expired	NFPA25 5.3.2.1
Waterflow Switch			
62796498	Pump Room Riser	Special Note	NFPA25 4.1.5.1
Wet Pipe			
Dry Sprinkler			
62796562	Coolers/ Freezers	Requires Maintenance	NFPA25 5.3.1.1.1.6
Gauge			
62796504	Riser #1	Date Expired	NFPA25 5.3.2.1
62796505	Riser #1	Date Expired	NFPA25 5.3.2.1
62796506	Riser #2	Date Expired	NFPA25 5.3.2.1

ScanID	Location	Problem	Reference
62796507	Riser #2	Date Expired	NFPA25 5.3.2.1
Piping			
1 62796565	5 Year Pipe Assessment		

Code References

NFPA25 4.1.5.1	The property owner or designated representative shall correct or repair deficiencies or impairments that are found during the inspection, test, and maintenance required by this standard.
NFPA25 8.4.1	Any abnormality observed during inspection or testing shall be reported promptly to the property owner or designated representative.
NFPA25 5.3.2.1	Gauges shall be replaced every 5 years or tested every 5 years by comparison with a calibrated gauge.
NFPA25 5.3.1.1.1.6	Dry sprinklers that have been in service for 10 years shall be replaced or representative samples shall be tested and then retested at 10-year intervals.

Proposed Solutions Report

Generated by: BuildingReports.com

Building: Overhills Elementary School

The Proposed Solution Report provides a solution for each discrepancy listed on the Discrepancy Report. Provide a check mark where indicated to approve repairs listed within the report. Items listed as T/M are available for repair on a Time and Materials basis.

ScanID	Location	Solution	Model #	Cost	Fix	Fixed Date
Cross Conn. Control						
Tamper Switch						
62796478	Hot Box	See Notes	OSYSU-2	T/M	☐	12/15/22
62796481	Hot Box	See Notes	OSYSU-2	T/M	☐	12/15/22
Fire Pump						
Critical Deficiencies						
Controller						
62796487	Controller	See Notes	FTA1100-JL12N	T/M	☐	12/15/22
Diesel Driver						
62796493	Diesel Driver	Replace/Repair	JU4H-UF12	T/M	☐	12/15/22
Non-Critical Deficiencies						
Gauge						
62796489	Pump Room	Replace		T/M	☐	12/15/22
62796490	Pump Room	Replace		T/M	☐	12/15/22
62796491	Pump Room	Replace		T/M	☐	12/15/22
62796492	Pump Room	Replace		T/M	☐	12/15/22
Waterflow Switch						
62796498	Pump Room Riser	See Notes	WFDT	T/M	☐	12/15/22
Wet Pipe						
Dry Sprinkler						
62796562	Coolers/ Freezers	Replace/Test		T/M	☐	12/15/22
Gauge						
62796504	Riser #1	Replace		T/M	☐	12/15/22
62796505	Riser #1	Replace		T/M	☐	12/15/22
62796506	Riser #2	Replace		T/M	☐	12/15/22
62796507	Riser #2	Replace		T/M	☐	12/15/22
Piping						
62796565	5 Year Pipe Assessment	5 Year Service		T/M	☐	12/15/22
				PO #: (none)	T/M	

Inspection & Testing

Generated by: BuildingReports.com

Building: Overhills Elementary School

The Inspection & Testing section lists all of the items inspected in your building. Items are grouped by Passed or Failed/Other. Items are listed by Category. Each item includes the services performed, and the time & date at which testing occurred.

Device Type	Location	Service	Time	Date
Passed				
Cross Conn. Control				
Backflow Prevention	Hot Box	Annual	10:45:16 AM	06/16/2022
Backflow Prevention	Hot Box	Annual	10:55:51 AM	06/16/2022
Backflow Prevention	Hot Box	Annual	10:56:41 AM	06/16/2022
Control Valve	Hot Box	Annual	10:59:58 AM	06/16/2022
Control Valve	Hot Box	Annual	11:00:10 AM	06/16/2022
Fire Pump				
Tamper Switch	Pump Room	Annual	2:07:57 PM	06/16/2022
Tamper Switch	Pump Room	Annual	2:08:08 PM	06/16/2022
Jockey Controller	Jockey Pump	Annual	3:11:23 PM	06/16/2022
Jockey Controller	Jockey Controller	Annual	3:11:29 PM	06/16/2022
Pump	Pump	Annual	3:11:36 PM	06/16/2022
Control Valve	Pump Room	Annual	1:46:00 PM	06/16/2022
Control Valve	Pump Room	Annual	1:46:32 PM	06/16/2022
Control Valve	Pump Room Riser	Annual	1:47:04 PM	06/16/2022
Control Valve	City Bypass	Annual	2:07:53 PM	06/16/2022
Control Valve	Pump Room	Annual	2:07:56 PM	06/16/2022
Control Valve	City Bypass	Annual	2:08:06 PM	06/16/2022
Control Valve	Pump Room	Annual	2:08:09 PM	06/16/2022
Wet Pipe				
Waterflow Switch	Riser #2	Annual	2:37:28 PM	06/16/2022
Waterflow Switch	Riser #1	Annual	2:37:40 PM	06/16/2022
Drain	Riser #2	Annual	2:37:31 PM	06/16/2022
Drain	Riser #1	Annual	2:37:42 PM	06/16/2022
Fire Dep't Connection	Pump Room	Annual	2:46:31 PM	06/16/2022
Fast Response	Building	Annual	2:44:22 PM	06/16/2022
Piping	Building	Annual	2:44:21 PM	06/16/2022

Device Type	Location	Service	Time	Date
Check Valve	Riser #2	Annual	2:37:34 PM	06/16/2022
Check Valve	Riser #1	Annual	2:37:37 PM	06/16/2022
Control Valve	Riser #2	Annual	2:37:33 PM	06/16/2022
Control Valve	Riser #1	Annual	2:37:36 PM	06/16/2022
Inspector's Test	Riser #2	Annual	2:37:29 PM	06/16/2022
Inspector's Test	Riser #1	Annual	2:37:41 PM	06/16/2022
Failed/Other				
Cross Conn. Control				
1 Tamper Switch	Hot Box	Annual	10:59:21 AM	06/16/2022
1 Tamper Switch	Hot Box	Annual	11:01:03 AM	06/16/2022
Fire Pump				
Waterflow Switch	Pump Room Riser	Annual	2:34:07 PM	06/16/2022
Gauge	Pump Room	Annual	2:07:13 PM	06/16/2022
Gauge	Pump Room	Annual	2:08:11 PM	06/16/2022
Gauge	Pump Room	Annual	3:11:31 PM	06/16/2022
Gauge	Pump Room	Annual	3:11:46 PM	06/16/2022
2 Controller	Controller	Annual	4:23:21 PM	06/16/2022
4 Diesel Driver	Diesel Driver	Annual	4:23:14 PM	06/16/2022
Wet Pipe				
Gauge	Riser #2	Annual	2:37:25 PM	06/16/2022
Gauge	Riser #2	Annual	2:37:27 PM	06/16/2022
Gauge	Riser #1	Annual	2:37:38 PM	06/16/2022
Gauge	Riser #1	Annual	2:37:38 PM	06/16/2022
Dry Sprinkler	Coolers/ Freezers	Inspected from Floor	2:44:23 PM	06/16/2022
1 Piping	5 Year Pipe Assessment	5 Year Service	2:44:20 PM	06/16/2022

Wet Pipe Fire Sprinkler Systems

Generated by: BuildingReports.com

Building: Overhills Elementary School

This section lists out all the devices and components that have been associated with a Wet Pipe System and provides details as to type of component, pressure readings, response time, etc. If a component has an OK checkbox that is checked, then that component was actually tested. However, for Pass/Fail test results, see the Inspection and Testing section.

Alarms

Waterflow Switch

Type	Manufacturer	Model #	Sec	Size	Zone/Address	OK	ScanID
Vane	Potter	VSR		4	1	☑	62796568
Vane	Potter	VSR		4	1	☑	62796503

Components

Check Valve

Type	Location	Internal Date	Size	OK	ScanID
Grooved	Riser #2	01/01/2016	4"	☑	62796515
Grooved	Riser #1	01/01/2016	4"	☑	62796500

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
Butterfly	Victaulic	705W	Riser #2	4"	Open	Supervised	☑	62796514

Description

Main Control

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
Butterfly	Victaulic	705W	Riser #1	4"	Open	Supervised	☑	62796510

Description

Main Control

Inspector's Test

Manufacturer	Model #	Pressure psi	Valve Trip Time sec	Water Flow Time sec	OK	ScanID
Globe					☑	62796566

Location

Riser #2

Inspector's Test

Manufacturer	Model #	Pressure psi	Valve Trip Time sec	Water Flow Time sec	OK	ScanID
Globe					☑	62796567

Location

Riser #1

Devices

Drain

Current Inspection

Type	Location	Size	Supply psi	Restored psi	Residual psi	Sec	OK	ScanID
Main	Riser #2	2"	155	155	115		☑	62796511

Current Inspection

Type	Location	Size	Supply psi	Restored psi	Residual psi	Sec	OK	ScanID
Main	Riser #1	2"	155	155	115		☑	62796509

Dry Sprinkler

Qty	Type	Size	KFactor	Finish	Temperature	OK	ScanID
3	Pendant	1		Chrome	155	☐	62796562

Location	Description
Coolers/ Freezers	

Fast Response

Qty	Type	Size	KFactor	Finish	Temperature	OK	ScanID
						☑	62796563

Location	Description
Building	

Fire Dep't Connection

Location	Type	BallDrip	Rotating Swivels	Size	OK	ScanID
Pump Room	Wall		Yes	4"	☑	62796561

Gauge

Location	Service Date
Riser #2	01/01/2016

Type	Manufacturer	Model #	Static psi	Fill Type	Size	OK	ScanID
Supply Pressure			155		1/4	☐	62796506

Gauge

Location	Service Date
Riser #2	01/01/2016

Type	Manufacturer	Model #	Static psi	Fill Type	Size	OK	ScanID
System Pressure			155		1/4	☐	62796507

Gauge

Location	Service Date
Riser #1	01/01/2016

Type	Manufacturer	Model #	Static psi	Fill Type	Size	OK	ScanID
System Pressure			155		1/4	☐	62796504

Gauge

Location	Service Date
Riser #1	01/01/2016

Type	Manufacturer	Model #	Static psi	Fill Type	Size	OK	ScanID
Supply Pressure			155		1/4	☐	62796505

Piping

Location	Type	Size	Internal Date

Building	Steel		01/01/2016		
Hangers	**Braces**	**Fittings**	**Identified**	**Antifreeze**	**ScanID**
Normal	Normal				62796564

Piping

Location	**Type**	**Size**	**Internal Date**		
5 Year Pipe Assessment			01/01/2016		
Hangers	**Braces**	**Fittings**	**Identified**	**Antifreeze**	**ScanID**
					62796565

Backflow Test & Maintenance Report

Generated by: BuildingReports.com

Building: Overhills Elementary School

This section lists out all the devices and components that have been associated with a Cross Connection Control System and provides details as to type of component, pressure readings, response time, etc. If a component has an OK checkbox that is checked, then that component was actually tested. However, for Pass/Fail test results, see the Inspection and Testing section.

Alarms

Tamper Switch

Type	Description	Location	Number of Turns	Zone /Address	OK	ScanID
OS&Y		Hot Box		1	☐	62796481
OS&Y		Hot Box		1	☐	62796478

Components

Backflow Prevention

Manufacturer	Model #	Size	Type	Service Type	Install Date
Ames	4000SS	4"	Reduced Pressure	Potable	01/01/2003
ScanID	**Water Purveyor**	**Location**		**Meter Account #**	**Serial Number**
62796475		Hot Box			118359

Initial Test			
Check Valve 1	**Check Valve 2**	**Relief Valve**	**Pressure Vacuum Breaker**
6.2	2.0 70Psi	2.4	

Held At	Repairs or Notes

Final Test			
Check Valve 1	**Check Valve 2**	**Relief Valve**	**Pressure Vacuum Breaker**

Held At	Condition of Control Valve 1	Condition of Control Valve 2
		Closed Tight

Backflow Prevention

Manufacturer	Model #	Size	Type	Service Type	Install Date
Ames	4000B	0.75"	Reduced Pressure	Fire Line Bypass	01/01/2003
ScanID	**Water Purveyor**	**Location**		**Meter Account #**	**Serial Number**
62796477		Hot Box		Bypass 34651264	09514

Initial Test			
Check Valve 1	**Check Valve 2**	**Relief Valve**	**Pressure Vacuum Breaker**
8.0	1.6 70Psi	2.2	

Held At	Repairs or Notes

Final Test

Check Valve 1	Check Valve 2	Relief Valve	Pressure Vacuum Breaker

Held At	Condition of Control Valve 1	Condition of Control Valve 2
		Closed Tight

Backflow Prevention

Manufacturer	Model #	Size	Type	Service Type	Install Date
Ames	5000SS	6"	Reduced Press. Det.	Fire Line	01/01/2003

ScanID	Water Purveyor	Location	Meter Account #	Serial Number
62796480		Hot Box	Bypass 34651264	104110

Initial Test

Check Valve 1	Check Valve 2	Relief Valve	Pressure Vacuum Breaker
6.8	2.6 70Psi	2.0	

Held At	Repairs or Notes

Final Test

Check Valve 1	Check Valve 2	Relief Valve	Pressure Vacuum Breaker

Held At	Condition of Control Valve 1	Condition of Control Valve 2
		Closed Tight

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
OS&Y	Kennedy		Hot Box	6"	Open	Sealed	☑	62796479

Description
Suction

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
OS&Y	Kennedy		Hot Box	6"	Open	Sealed	☑	62796482

Description
Discharge

Fire Pump Testing

Generated by: BuildingReports.com

Building: Overhills Elementary School

This section lists out all the devices and components that have been associated with a Fire Pump and provides details as to type of component, pressure readings, response time, etc. If a component has an OK checkbox that is checked, then that component was actually tested. However, for Pass/Fail test results, see the Inspection and Testing section.

Controller

Manufacturer	Model #	Location	Install Date	Serial Number
FireTrol	FTA1100-JL12N	Controller	01/01/2003	471533-07RE

AC Power	Time Meter	Start psi	Stop psi	Battery Supervised	Generator Backup
Normal Phase					

Diesel Driver

Manufacturer	Model #	Location	Install Date	Serial Number
Clarke	JU4H-UF12	Diesel Driver	01/01/2003	PE4045D734587

	Fuel	Oil	Water	Timing Min/Sec		Speed	Oil	AF	Water	Oil
				Crank	Run	rpm	psi	deg	deg	deg
	3/4	Normal	Normal							

Jockey Controller

Manufacturer	Model #	Location	Install Date	Serial Number
Goulds		Jockey Pump	01/01/2003	

AC Power	Time Meter	Start psi	Stop psi	Battery Supervised	Generator Backup

Jockey Controller

Manufacturer	Model #	Location	Install Date	Serial Number
Peerless	269853903 FTA	Jockey Controller	01/01/2003	

AC Power	Time Meter	Start psi	Stop psi	Battery Supervised	Generator Backup
Normal Phase		145	155		

Pump

Manufacturer	Model Number	Location	Install Date	ScanID
Peerless	5AEF11	Pump	01/01/2003	62796483

Serial Number	Type	Orientation	Aligned?	Water Supply	Impeller Size
746233	Pump Primary	Horizontal Split Case		Municipal	9.42

Pump Tests

Discharge Device	Date	Disch. PSI	Suct. PSI	GPM	RPM	% Rated Flow	Oil Pressure	Water Temperature
Other	06/16/2022	138	56		2530			

Amps A	Amps B	Amps C	Volts A-B	Volts B-C	Volts A-C

Discharge Device	Date	Disch. PSI	Suct. PSI	GPM	RPM	% Rated Flow	Oil Pressure	Water Temperature

Other	06/16/2022	92	20	776	2509	103%		

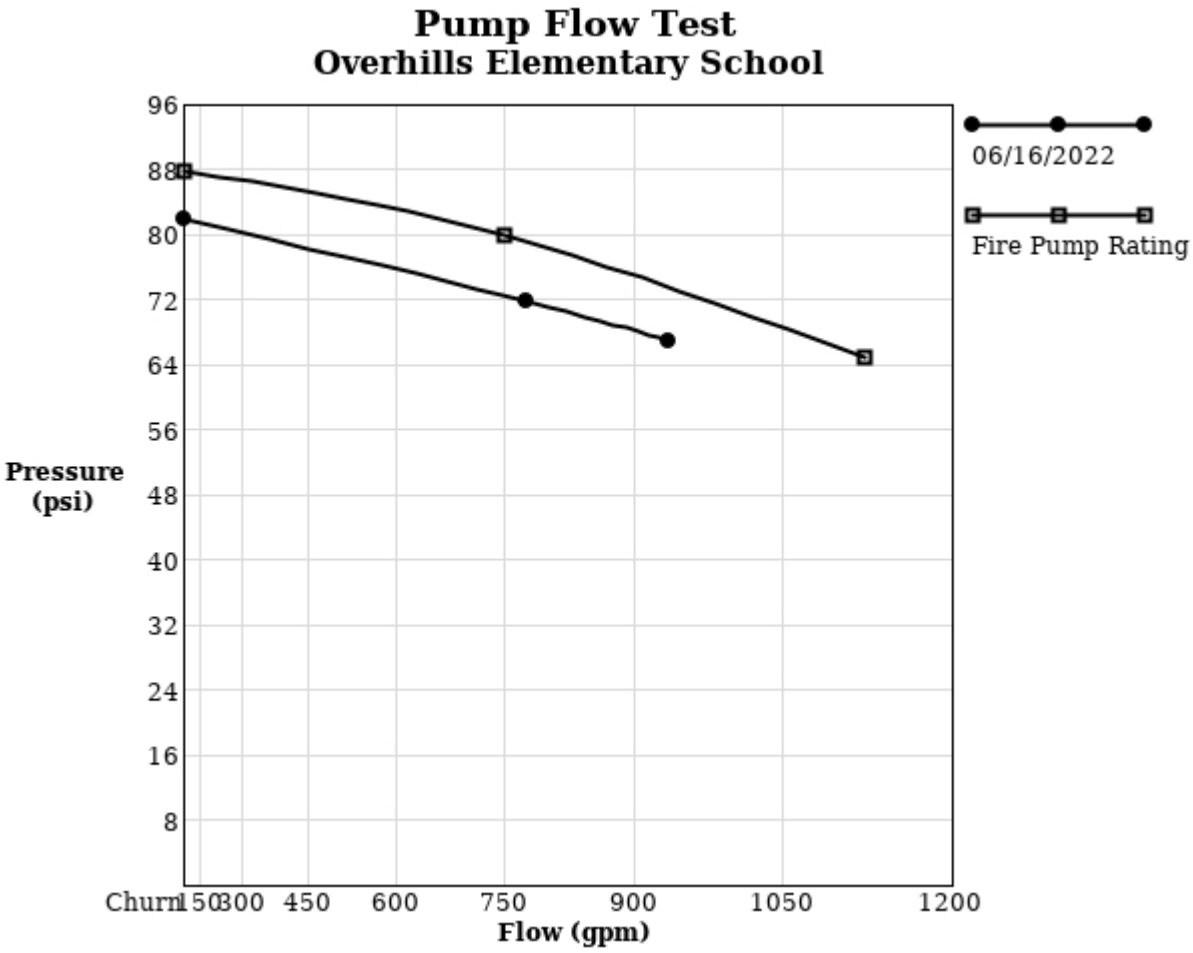
Amps A	Amps B	Amps C	Volts A-B	Volts B-C	Volts A-C

Discharge Device	Date	Disch. PSI	Suct. PSI	GPM	RPM	% Rated Flow	Oil Pressure	Water Temperature
Other	06/16/2022	84	17	936	2511	125%		

Amps A	Amps B	Amps C	Volts A-B	Volts B-C	Volts A-C

Fire Pump Rating

			Amps			Volts		
Net Pressure	Gallons Per Minute	Rotations Per Minute	A	B	C	A-B	B-C	A-C
88		2600						
80	750	2600						
65	1125	2600						



Alarms

Tamper Switch

Type	Description	Location	Number of Turns	Zone /Address	OK	ScanID
OS&Y	Supervisory	Pump Room		1	☑	62796484

OS&Y	Supervisory	Pump Room		1	☑	62796494

Waterflow Switch

Type	Manufacturer	Model #	Sec	Size	Zone/Address	OK	ScanID
Vane	System Sensor	WFDT		1”	1	☐	62796498

Components

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
OS&Y	LansDale		Pump Room	1.25"	Open	Sealed	☑	62796502
Description								
Jockey Suction								

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
OS&Y	LansDale		Pump Room	1.25"	Open	Sealed	☑	62796497
Description								
Jockey Discharge								

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
OS&Y	LansDale		Pump Room Riser	1"	Open	Sealed	☑	62796499
Description								
Main Control								

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
Butterfly	Globe		City Bypass	6"	Open	Supervised	☑	62796486
Description								
Bypass								

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
OS&Y	Mueller		Pump Room	6"	Open	Supervised	☑	62796485
Description								
Suction								

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
Butterfly	Globe		City Bypass	6"	Open	Supervised	☑	62796496
Description								
Bypass								

Control Valve

Type	Manufacturer	Model	Location	Size	Position	Status	OK	ScanID
OS&Y	Mueller		Pump Room	6"	Open	Supervised	☑	62796495
Description								
Discharge								

Devices

Gauge

Location	Service Date
Pump Room	01/01/2016

Type	Manufacturer	Model #	Static psi	Fill Type	Size	OK	ScanID
Fire Pump Controller			160		1/4	☐	62796490

Gauge

Location	Service Date
Pump Room	01/01/2016

Type	Manufacturer	Model #	Static psi	Fill Type	Size	OK	ScanID
Discharge			115		1/4	☐	62796492

Gauge

Location	Service Date
Pump Room	01/01/2016

Type	Manufacturer	Model #	Static psi	Fill Type	Size	OK	ScanID
Jockey Pump Controll			160		1/4	☐	62796489

Gauge

Location	Service Date
Pump Room	01/01/2016

Type	Manufacturer	Model #	Static psi	Fill Type	Size	OK	ScanID
Suction			115		1/4	☐	62796491

Notes & Recommendations

Generated by: BuildingReports.com

Building: Overhills Elementary School

The Notes & Recommendations Report details additional inspection notes made by the Inspectors during the course of the building inspection. Notes are grouped by SystemID.

Note	Device Type	Location	Comment	ScanID
Cross Conn. Control				
1	Control Valve	Hot Box	Passed	62796479
	Seals 79345-79348			
2	Control Valve	Hot Box	Passed	62796482
	Seals 79346-79347			
3	Tamper Switch	Hot Box	Special Note	62796478
	Tampers Are Laying On Ground In Hotbox			
4	Tamper Switch	Hot Box	Special Note	62796481
	Tampers Are Laying On Ground In Hotbox			
Fire Pump				
5	Control Valve	Pump Room	Passed	62796485
	Seals 79336-79337			
6	Control Valve	City Bypass	Passed	62796486
	Seals 79342-79351			
7	Control Valve	Pump Room	Passed	62796495
	Seals 79335-79338			
8	Control Valve	City Bypass	Passed	62796496
	Seals 79343-79344-79349			
9	Control Valve	Pump Room	Passed	62796497
	Seal 79334			
10	Control Valve	Pump Room Riser	Passed	62796499
	Seal 79339			
11	Control Valve	Pump Room	Passed	62796502
	Seal 79350			
12	Controller	Controller	Special Note	62796487
	Transducer Appears To Be Bad. Pump Will Not Start In Auto.			
13	Diesel Driver	Diesel Driver		62796493
	Pump Over Heated. Ran For Approximately 8 minutes and Come Back To Pump Room And Engine Was Leaking Water And Steaming. Customer Stated Same Thing Happened The Previous Year. Called Richard Collum He Sated He Thought Was The Pressure Reducer On Coolant Line Or Possibly Water Pump. Topped Reservoir Off With Coolant And Left Normal. Need To Repair Cooling Line Or Go Through Coolant System. Fuel Tank Needs Filling Up. Under 1/2 Full.			
14	Jockey Controller	Jockey Pump	Passed	62796501
	Could Not Read Data Plate			
15	Pump	Pump	Passed	62796483

Note	Device Type	Location	Comment	ScanID
	Used 2- 1-3/4 Hose Monsters with 25’ Hoses.			
16	Waterflow Switch	Pump Room Riser	Special Note	62796498
	Had To Test Switch Manually No ITV. Switch Comes Into FACP As A Supervisory.			
Wet Pipe				
17	Control Valve	Riser #1	Passed	62796510
	Seals 79331-79322			
18	Control Valve	Riser #2	Passed	62796514
	Seals 79332-79341			
19	Fast Response	Building	Passed	62796563
	May Want To Go Ahead And 20 Year Test Sprinkler Heads When Doing Other Work.			
20	Piping	5 Year Pipe Assessment		62796565
	1/2” or 3/4” Brass 155 QR Upright. Grooved Pipe Ladder or Lift Possible Maybe In Gym.			