FIRE SPRINKLER SUBMITTAL

"FIRE SPRINKLER"

TRACTOR SUPPLY – LAKE CITY
129 S.W. CHAD PLACE
LAKE CITY, FLORIDA 32025

TRIPLE A FIRE PROTECTION INC.

SPRINKLER CONTRACTOR

TRIPLE "A" FIRE PROTECTION, INC.
P.O. BOX 1037
SEMMES, AL 36575

MATERIAL SUBMITTAL

Tractor Supply – Lake City
129 S.W. Chad Place
Lake City, FL 32025

"FIRE SPRINKLER"

FIRE PROTECTION CONTRACTOR:	TRIPLE "A" FIRE PROTECTION, INC. 8000 WARDS LANE P.O. BOX 1037 SEMMES, ALABAMA 36575 PHONE: 251.649.2034 FAX: 251.649.2037 E-MAIL: joshuaw@aaafp.com
GENERAL CONTRACTOR:	NAME: ADDRESS: CITY: PHONE:
ARCHITECT:	ONYX CREATIVE 25001 Emery Road, Suite 400 Cleveland, Ohio 44128 PHONE: 216.223.3200

TRACTOR SUPPLY – LAKE CITY, FL

MATERIAL SUBMITTAL - INDEX

1-PIPING	BLACK – Wheatland Schedule 10 & 40
2-FITTINGS	THREADED - Anvil GROOVED - Gemlock WELDED - Anvil
3-HANGERS	RING - Anvil ALL THREAD ROD - Anvil UPPER ATTACHMENT - Anvil UNI-STRUT - Hilti
4-VALVES	CHECK VALVE – Tyco ZONE CONTROL ASSEMBLY - Lansdale TRIM VALVES - United BACKFLOW DEVICES - Watts
5-DEVICES	SPRINKLERS – Tyco, Viking
6-MISC	ELECTRIC BELL – Potter BACKFLOW TEST VALVE - Lansdale HEAD CABINET - Tyco SIGNS - Tyco FIRE STOP – Hilti

7-HYDRAULIC CALCULATIONS

8-DRAWINGS

PIPING

Fire Sprinkler Pipe

Schedule 10 and Schedule 40

Submittal Data Sheet

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

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

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

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

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

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

SCHEDULE 10 SPECIFICATIONS

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

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

SCHEDULE 40 SPECIFICATIONS

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

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

SUBMITTAL INFORMATION

PROJECT: _____

CONTRACTOR: _____

DATE: _____

ENGINEER: _____

SPECIFICATION REFERENCE: _____

SYSTEM TYPE: _____

LOCATIONS: _____

COMMENTS: _____

☐ BLACK

☐ HOT-DIP GALVANIZED

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

Wheatland Tube
JMC STEEL GROUP

FITTINGS

ASC Engineered Solutions

Fig. 20XXT Standard Tall Hose

c UL us LISTED FM APPROVED

Fig. 20XXT cULus & FM Approved Brackets

Bracket Fig # & Size	cULus Listed	FM Approved	FlexHead Historical Model Number
BKT-MPO	✓	✓	MPO24BKT2
BKT-MPT	✓	✓	MPT24BKT1
BKT-ADO, 16 in	✓	✓	ADO16BKT3
BKT-ADO, 24 in	✓	✓	ADO24BKT3
BKT-ADO, 30 in		✓	ADO30BKT3
BKT-ADO, 48 in		✓	ADO48BKT3
BKT-UHO3		✓	UHO-3
BKT-TZ		✓	SPO6TZBKT2

Notes: Flexhead Historical Model Numbers may be used to verify cULus Listings & FM Approvals.

Specifications

Assembly Length

24 in 36 in 48 in
60 in 72 in

Outlet Drop Size (NPT per ASME B1.20.1)

½ NPS (DN15) ¾ NPS (DN20)

Inlet Pipe Size (NPT per ASME B1.20.1)

1 NPS (DN25)

Pressure Rating

UL: 175 psi (1,205 kPa)
FM: 175 psi (1,205 kPa)

Minimum Bend Radius

UL: 3.0 in (76.2 mm)
FM: 8.0 in (203.2 mm)

Ambient Temperature

300°F (145°C) Max

Material

304 Stainless Steel

Features

- 100% Leak Tested Fully Welded Design
- Pre-Installed Sprinkler Head option available upon request
- Compliant with NFPA 13, 13R, & 13D
- For Wet, Dry, and Pre-Action Sprinkler Systems

Ordering

Specify figure number, length, outlet size, outlet drop length, and description.

FLEXHEAD
An ASC Engineered Solution

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

Fig. 20XXT Standard Tall Hose

Fig. 20XXT cULus Listing per UL 2443 & FM Approval (Listing) per FM 1637

Outlet Drop Size	Asembly Length	Equivalent Length						Max # of 90° Bends	
		UL	FM					UL	FM
			k = 5.6	k = 8.0	k = 11.2	k = 14.0	k = 16.8		
-	In	ft/m	ft/m	ft/m	ft/m	ft/m	ft/m		
½ NPS DN15	24	11 3.4	18.4 5.6	7.7 2.3	7.6 2.3	-	-	3	1
	36	16 4.9	26.6 8.1	11.5 3.5	11.5 3.5	-	-	3	2
	48	24 7.3	30.3 9.2	15.3 4.6	15.4 4.7	-	-	4	3
	60	29 8.8	35.8 10.9	19.1 5.8	19.3 5.9	-	-	4	4
	72	35 10.7	45.6 13.9	23.0 7.0	23.2 7.1	-	-	4	4
¾ NPS DN20	24	12 3.7	-	7.3 2.2	5.9 1.8	14.7 4.5	7.1 2.2	3	1
	36	18 5.5	-	21.5 6.5	10.4 3.1	21.8 6.6	10.9 3.3	3	2
	48	23 7.0	-	30.5 9.3	14.9 4.5	29.0 8.8	14.8 4.5	4	3
	60	29 8.8	-	39.5 12.0	19.4 5.9	36.1 11.0	18.7 5.7	4	4
	72	32 9.8	-	48.5 14	24.0 7.3	43.2 13.1	22.6 6.9	4	4

1. Equivalent Length of NPS 1 (DN25) Sch 40 Pipe.
2. Equivalent Lengths listed above assume the maximum number of 90° bends.
3. A 90° bend can be achieved with two 45° bends or three 30° bends.
4. UL Equivalent Lengths are listed for installation with sprinklers with a maximum k-factor of 16.8.
5. FM Equivalent Lengths listed above include the Friction Loss of the Sprinkler.
6. UL Listed for "Limited Flexibility".

Fig. 20XXT Standard Tall Hose

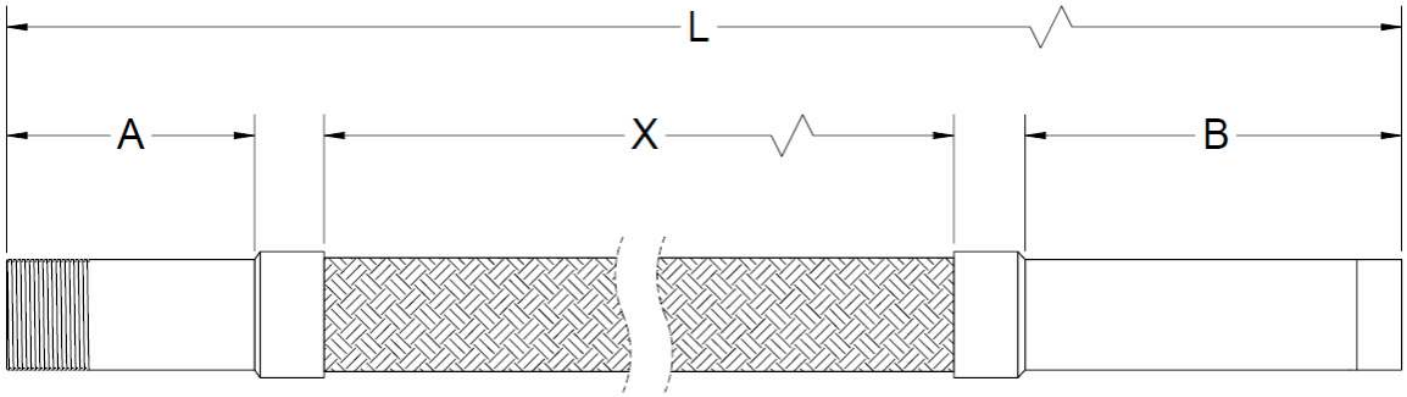


Fig. 20XXT cULus Listing per UL 2443 & FM Approval (Listing) per FM 1637

Asembly Length	True Length (L)		Braid Length (X)		Inlet Nipple Length (A)		Outlet Drop Length (B)		FlexHead Historical Model Number	
in	in	mm	in	mm	in	mm	in	mm	½ NPS Outlet	¾ NPS Outlet
24	24	610	15	381					2024T-50	2024T-75
36	36	914	37	940					2036T-50	2036T-75
48	48	1219	39	991	3.0	76.2	6.3	160.0	2048T-50	2048T-75
60	60	1524	51	1295					2060T-50	2060T-75
72	72	1829	63	1600					2072T-50	2072T-75

Fig. 20XXT Standard Tall Hose

Installation Instructions

Connection to the Branch

1. Apply pipe sealant or tape to the NPT thread.
2. Install into branch outlet. Tighten the assembly by placing the pipe wrench on the pipe nipple section.
3. **Note:** Only place the pipe wrench on the unthreaded portion of the inlet nipple.

Connection to the Sprinkler Head

1. Installation of the sprinkler head into the outlet drop shall be per the sprinkler manufacturer's installation instructions.

Connection to the Bracket

1. Installation of the hose to the bracket shall be per the bracket's installation instructions. The bracket shall be listed for installation with the 20XXT. See Page 1 for Listed and Approved brackets.

Bending the Hose

1. The hose may be bent to ensure the inlet nipple and outlet drop are in the desired locations.
2. The hose should never be bent to a radius less than minimum listed bend radius. The bend radius is defined to the center of the hose.
3. The hose must have at least one 90° bend. A 90° bend can be achieved with two 45° bends or three 30° bends.
4. For best performance, the bends in the hose should be as large and smooth as possible.

General Installation Notes

1. Never apply a wrench to the braided hose.
2. The Fig 20XXT may be installed in any direction from the branch.
3. If installing a sprinkler to a bracket after installation, it is best practice to prevent twisting of the bracket and hose by holding the outlet drop with a wrench.

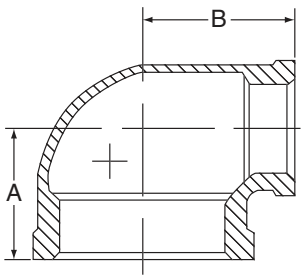
SPF MALLEABLE IRON FITTINGS

Class 150 (Standard)

STANDARDS & SPECIFICATIONS		
Import Malleable Iron Screwed Fittings (Class 150)		
Dimensional:	Fittings:	ASME B16.3
	Unions:	ASME B 16.39
	Bushings/Plugs:	ASME B 16.14
Material:	ASTM A-197	
Galvanizing:	ASTM A-153	(Hot Dip Galvanizing)
Threading:*	ASME B 1.20.1	
Pressure Rating:	Fittings:	ASME B 16.3
	Unions:	ASME B 16.39
	Bushings/Plugs:	ASME B 16.14
Pressure Testing:	All malleable iron fittings are tested for through wall porosity using an air under water process.	
Agency Approvals:	All malleable iron fittings and unions are UL Listed and FM Approved.	

*British Standard threading per BS 21 available upon request.

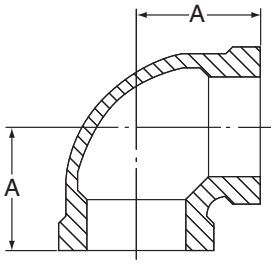
90° REDUCING ELBOW



Size	A	B	Weight
in	*in*	*in*	*lbs*
¼ x ⅛	0.74	0.76	0.08
⅜ x ⅛	0.81	0.85	0.11
⅜ x ¼	0.88	0.90	0.13
½ x ¼	0.97	0.98	0.16
½ x ⅜	1.04	1.03	0.19
¾ x ⅜	1.12	1.13	0.26
¾ x ½	1.20	1.22	0.29
1 x ⅜	1.18	1.26	0.35
1 x ½	1.26	1.36	0.42
1 x ¾	1.37	1.45	0.47
1 ¼ x ½	1.34	1.53	0.54
1 ¼ x ¾	1.45	1.62	0.62
1 ¼ x 1	1.58	1.67	0.73
1 ½ x ½	1.38	1.65	0.65
1 ½ x ¾	1.52	1.75	0.74
1 ½ x 1	1.65	1.80	0.88
1 ½ x 1 ¼	1.82	1.88	1.03
2 x ½	1.50	1.89	0.93
2 x ¾	1.60	1.97	1.04
2 x 1	1.73	2.02	1.28
2 x 1 ¼	1.90	2.10	1.36
2 x 1 ½	2.02	2.16	1.51
2 ½ x 1 ½	2.16	2.51	2.20
2 ½ x 2	2.39	2.60	2.55
3 x 2	2.52	2.89	3.35
3 x 2 ½	2.83	2.99	4.12
4 x 2	2.72	3.43	5.01
4 x 3	3.30	3.60	6.65

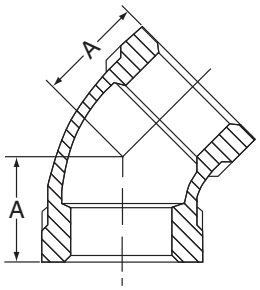
Class 150 (Standard)

90° ELBOW



Size	A	Weight
in	*in*	*lbs*
⅛	0.69	0.06
¼	0.81	0.10
⅜	0.95	0.15
½	1.12	0.22
¾	1.31	0.36
1	1.50	0.57
1 ¼	1.75	0.87
1 ½	1.94	1.16
2	2.25	1.81
2 ½	2.70	3.23
3	3.08	4.82
4	3.79	8.41
6	5.13	19.96

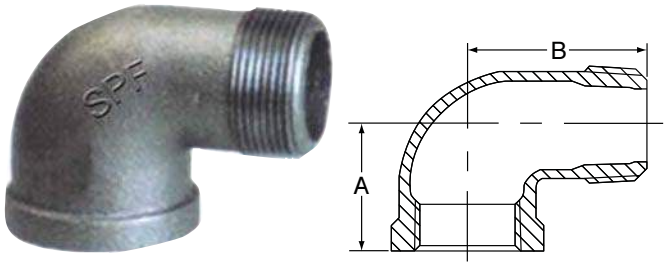
45° ELBOW



Size	A	Weight
in	*in*	*lbs*
⅛	0.63	0.06
¼	0.73	0.11
⅜	0.80	0.14
½	0.88	0.20
¾	0.98	0.32
1	1.12	0.50
1 ¼	1.29	0.76
1 ½	1.43	1.00
2	1.68	1.61
2 ½	1.95	2.77
3	2.17	4.03
4	2.61	6.92
6	3.46	16.31

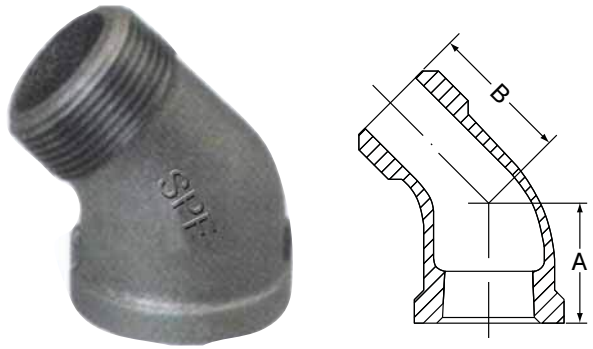
Class 150 (Standard)

90° STREET ELBOW



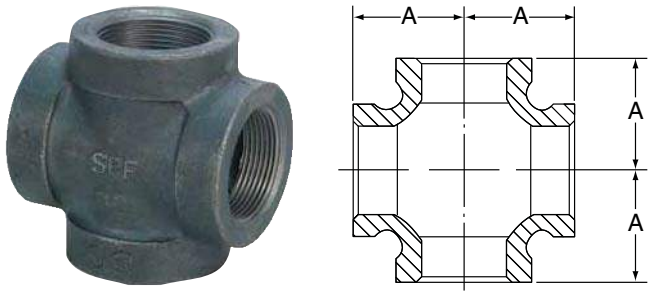
Size	A	B	Weight
in	in	in	lbs
⅛	0.69	1.00	0.05
¼	0.81	1.19	0.09
⅜	0.95	1.44	0.15
½	1.12	1.63	0.20
¾	1.31	1.89	0.34
1	1.50	2.14	0.58
1 ¼	1.75	2.45	0.84
1 ½	1.94	2.69	1.12
2	2.25	3.26	1.85
2 ½	2.70	3.86	3.28
3	3.08	4.51	5.00
4	3.79	5.69	9.18

45° STREET ELBOW



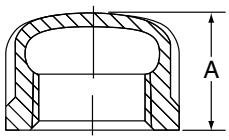
Size	A	B	Weight
in	in	in	lbs
⅛	0.63	0.83	0.05
¼	0.73	0.94	0.08
⅜	0.80	1.03	0.12
½	0.88	1.15	0.18
¾	0.98	1.29	0.27
1	1.12	1.47	0.44
1 ¼	1.29	1.71	0.70
1 ½	1.43	1.88	0.92
2	1.68	2.22	1.50

CROSS

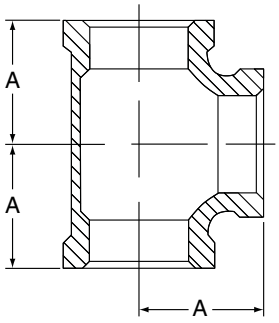


Size	A	Weight
in	in	lbs
¼	0.81	0.17
⅜	0.95	0.26
½	1.12	0.38
¾	1.31	0.61
1	1.50	0.95
1 ¼	1.75	1.42
1 ½	1.94	1.86
2	2.25	2.83

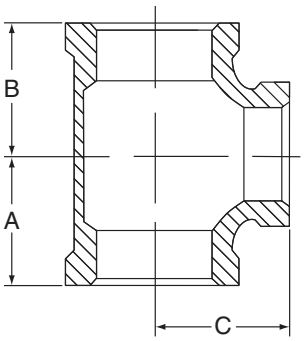
Class 150 (Standard)

CAP	Size	A	Weight
	in	*in*	*lbs*
 	⅛ ▲	0.53	0.03
	¼ ▲	0.63	0.05
	⅜ ▲	0.74	0.07
	½	0.87	0.11
	¾	0.97	0.18
	1	1.16	0.30
	1 ¼	1.28	0.44
	1 ½	1.33	0.55
	2	1.45	0.85
	2 ½	1.70	1.49
	3	1.80	2.20
	3 ½	1.90	3.02
	4	2.08	3.79
	6	2.55	8.77

▲ Supplied in Steel only (Black and Galvanized).

TEE	Size	A	Weight
	in	*in*	*lbs*
 	⅛	0.69	0.09
	¼	0.81	0.14
	⅜	0.95	0.21
	½	1.12	0.31
	¾	1.31	0.50
	1	1.50	0.79
	1 ¼	1.75	1.19
	1 ½	1.94	1.57
	2	2.25	2.43
	2 ½	2.70	4.33
	3	3.08	6.37
	4	3.79	11.03
	6	5.13	25.98

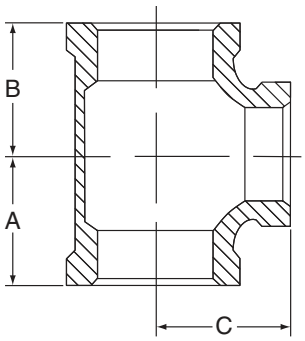
Class 150 (Standard)

REDUCING TEE	Size			A	B	C	Weight
	in			in	in	in	lbs
	½	½	¼	0.97	0.97	0.98	0.24
			⅜	1.04	1.04	1.03	0.27
			¾	1.22	1.22	1.20	0.37
			1	1.36	1.36	1.26	0.49
	¾	½	½	1.20	1.12	1.22	0.38
			¾	1.31	1.22	1.31	0.45
		¾	¼	1.05	1.05	1.08	0.36
			⅜	1.12	1.12	1.13	0.39
			½	1.20	1.20	1.22	0.43
			1	1.45	1.45	1.37	0.62
	1	¼	1	1.50	1.18	1.50	0.63
		½	½	1.26	1.12	1.36	0.48
			¾	1.37	1.22	1.45	0.56
			1	1.50	1.36	1.50	0.67
		¾	½	1.26	1.20	1.36	0.53
			¾	1.37	1.31	1.45	0.61
			1	1.50	1.45	1.50	0.71
		1	⅜	1.18	1.18	1.27	0.57
			½	1.26	1.26	1.36	0.62
			¾	1.37	1.37	1.45	0.69
			1 ¼	1.67	1.67	1.58	0.94
			1 ½	1.80	1.80	1.65	1.07
			2	2.02	2.02	1.73	1.45
	1 ¼	½	1	1.58	1.36	1.67	0.82
			1 ¼	1.75	1.53	1.75	0.95
		¾	¾	1.45	1.31	1.62	0.75
			1	1.58	1.45	1.67	0.87
			1 ¼	1.75	1.62	1.75	1.00
		1	½	1.34	1.26	1.53	0.74
			¾	1.45	1.37	1.62	0.82
			1	1.58	1.50	1.67	0.94
			1 ¼	1.75	1.67	1.75	1.08
		1 ¼	⅜	1.26	1.26	1.44	0.78
			½	1.34	1.34	1.53	0.84
			¾	1.45	1.45	1.62	0.92
			1	1.58	1.58	1.67	1.04
			1 ½	1.88	1.88	1.82	1.34
			2	2.10	2.10	1.90	1.65

CONTINUED ON NEXT PAGE.

Class 150 (Standard)

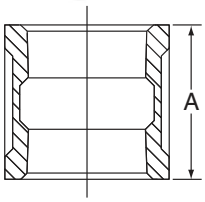
REDUCING TEE

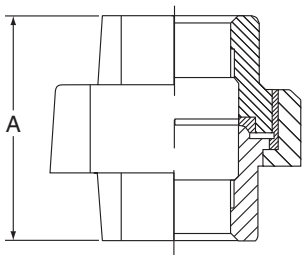


Size			A	B	C	Weight
in			in	in	in	lbs
1 ½	½	1 ½	1.94	1.66	1.94	1.24
	¾	¾	1.50	1.26	1.69	0.86
		1 ½	1.94	1.75	1.94	1.29
	1	1	1.65	1.50	1.80	1.08
		1 ¼	1.82	1.67	1.88	1.23
		1 ½	1.94	1.80	1.94	1.35
	1 ¼	¾	1.52	1.45	1.75	1.04
		1	1.65	1.58	1.80	1.17
		1 ¼	1.82	1.75	1.88	1.32
		1 ½	1.94	1.88	1.94	1.45
		2	2.10	2.10	1.90	1.82
	1 ½	½	1.41	1.41	1.66	1.04
		¾	1.52	1.52	1.75	1.14
		1	1.65	1.65	1.80	1.27
		1 ¼	1.82	1.82	1.88	1.43
		2	2.16	2.16	2.02	1.89
2	½	2	2.25	1.88	2.25	1.89
	¾	2	2.25	1.97	2.25	1.93
	1	1	1.81	1.75	1.87	1.39
		2	2.25	2.02	2.25	2.00
	1 ¼	1 ¼	1.90	1.75	2.10	1.64
		1 ½	2.02	1.88	2.16	1.80
		2	2.25	2.10	2.25	2.09
	1 ½	1	1.73	1.65	2.02	1.57
		1 ¼	1.90	1.82	2.10	1.71
		1 ½	2.02	1.94	2.16	1.88
		2	2.25	2.16	2.25	2.21
	2	½	1.49	1.49	1.88	1.53
		¾	1.60	1.60	1.97	1.63
		1	1.73	1.73	2.02	1.78
		1 ¼	1.90	1.90	2.10	1.97
		1 ½	2.02	2.02	2.16	2.12
		2 ½	2.60	2.60	2.39	3.15
2 ½	2 ½	¾	1.74	1.74	2.32	2.67
		1	1.87	1.87	2.37	2.84
		1 ¼	2.04	2.04	2.45	3.09
		1 ½	2.16	2.16	2.51	3.29
		2	2.39	2.39	2.60	3.65
3	2	2	2.52	2.25	2.89	3.88
	3	¾	1.87	1.87	2.61	3.72
		1	2.00	2.00	2.66	3.96
		1 ¼	2.17	2.17	2.74	4.23
		1 ½	2.29	2.29	2.80	4.45
		2	2.52	2.52	2.89	4.90
		2 ½	2.83	2.83	2.99	5.69
4	4	2	2.74	2.74	3.41	7.52
		2 ½	3.05	3.05	3.51	8.51
		3	3.30	3.30	3.60	9.25

Class 150 (Standard)

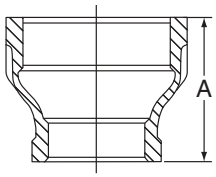
FLOOR FLANGE	Size	Dia. Flange	Dia. of Bolt Circle	Dia. of Bolt Holes	Weight
	in	*in*	*in*	*in*	*lbs*
	¾	3.37	2.36	.28	0.49
	1	3.78	2.80	.28	0.63
	1 ¼	4.19	3.17	.28	0.87
	1 ½	4.59	3.50	.31	1.10
	2	5.18	4.01	.31	1.57

COUPLING	Size	A	Weight
	in	*in*	*lbs*
	⅛	0.96	0.05
	¼	1.06	0.08
	⅜	1.16	0.12
	½	1.34	0.17
	¾	1.52	0.27
	1	1.67	0.43
	1 ¼	1.93	0.65
	1 ½	2.15	0.86
	2	2.53	1.35
	2 ½	2.88	2.33
	3	3.18	3.36
	4	3.69	5.59

UNIONS (BRASS SEAT)	Size	A	Weight
	in	*in*	*lbs*
	⅛	1.26	0.16
	¼	1.46	0.23
	⅜	1.61	0.33
	½	1.73	0.41
	¾	1.95	0.60
	1	2.07	0.89
	1 ¼	2.26	1.25
	1 ½	2.42	1.76
	2	2.75	2.44
	2 ½	3.23	3.52
	3	3.50	4.34

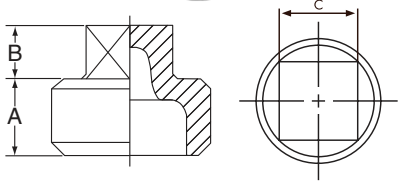
Class 150 (Standard)

REDUCING COUPLINGS



Size	A	Weight
in	*in*	*lbs*
¼ x ⅛	1.00	0.07
⅜ x ⅛	1.13	0.09
⅜ x ¼	1.13	0.10
½ x ⅛	1.25	0.13
½ x ¼	1.25	0.13
½ x ⅜	1.25	0.14
¾ x ⅛	1.44	0.18
¾ x ¼	1.44	0.20
¾ x ⅜	1.44	0.21
¾ x ½	1.44	0.22
1 x ½	1.69	0.34
1 x ¾	1.69	0.36
1 ¼ x ½	2.06	0.47
1 ¼ x ¾	2.06	0.51
1 ¼ x 1	2.06	0.57
1 ½ x ½	2.31	0.62
1 ½ x ¾	2.31	0.66
1 ½ x 1	2.31	0.73
1 ½ x 1 ¼	2.31	0.80
2 x ½	2.81	0.94
2 x ¾	2.81	0.99
2 x 1	2.81	1.03
2 x 1 ¼	2.81	1.17
2 x 1 ½	2.81	1.25
2 ½ x 1 ¼	3.25	1.81
2 ½ x 1 ½	3.25	1.90
2 ½ x 2	3.25	2.04
3 x 1	3.69	2.48
3 x 1 ¼	3.69	2.55
3 x 1 ½	3.69	2.67
3 x 2	3.69	2.78
3 x 2 ½	3.69	3.23
4 x 2	4.38	4.43
4 x 2 ½	4.38	4.87
4 x 3	4.38	5.29

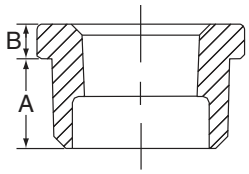
PLUGS

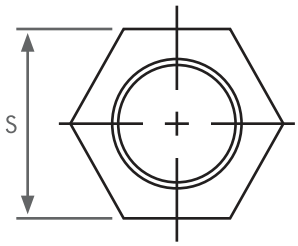


	Size	A	B	C	Weight
	in	*in*	*in*	*in*	*lbs*
Solid	¼	0.44	0.28	0.38	0.04
Solid	⅜	0.48	0.31	0.44	0.06
Cored	½	0.56	0.38	0.56	0.08
Cored	¾	0.63	0.44	0.63	0.13
Cored	1	0.75	0.50	0.81	0.20
Cored	1 ¼	0.80	0.56	0.94	0.32
Cored	1 ½	0.83	0.62	1.13	0.43
Cored	2	0.88	0.68	1.31	0.67
Cored	2 ½	1.07	0.74	1.50	1.11
Cored	3	1.13	0.80	1.69	1.53
Bar Plug	4	1.22	1.00	–	2.71
Bar Plug	6	1.40	1.25	–	4.00

Class 150 (Standard)

HEX BUSHING



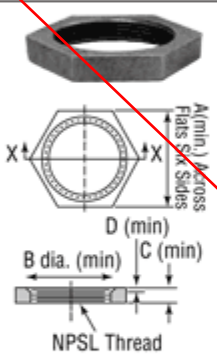


Size	A	B	S	Weight	Hex
in	*in*	*in*	*in*	*lbs*	
¾ x ½	0.63	0.22	1.15	0.11	outside
1 x ⅛	0.75	0.30	1.12	0.18	inside
1 x ¼	0.75	0.30	1.12	0.21	inside
1 x ⅜	0.75	0.30	1.12	0.20	inside
1 x ½	0.75	0.25	1.42	0.22	outside
1 x ¾	0.75	0.25	1.42	0.18	outside
1 ¼ x ¼	0.80	0.34	1.12	0.30	inside
1 ¼ x ⅜	0.80	0.34	1.12	0.28	inside
1 ¼ x ½	0.80	0.34	1.34	0.32	inside
1 ¼ x ¾	0.80	0.28	1.76	0.37	outside
1 ¼ x 1	0.80	0.28	1.76	0.30	outside
1 ½ x ¼	0.83	0.37	1.12	0.38	inside
1 ½ x ⅜	0.83	0.37	1.12	0.38	inside
1 ½ x ½	0.83	0.37	1.34	0.40	inside
1 ½ x ¾	0.83	0.37	1.63	0.45	inside
1 ½ x 1	0.83	0.31	2.00	0.46	outside
1 ½ x 1 ¼	0.83	0.31	2.00	0.31	outside
2 x ¼	0.88	0.41	1.12	0.54	inside
2 x ½	0.88	0.41	1.34	0.56	inside
2 x ¾	0.88	0.41	1.63	0.61	inside
2 x 1	0.88	0.41	1.95	0.65	inside
2 x 1 ¼	0.88	0.34	2.48	0.80	outside
2 x 1 ½	0.88	0.34	2.48	0.66	outside
2 ½ x ¾	1.07	0.44	1.63	0.98	inside
2 ½ x 1	1.07	0.44	1.95	1.04	inside
2 ½ x 1 ¼	1.07	0.44	2.39	1.10	inside
2 ½ x 1 ½	1.07	0.44	2.68	1.38	outside
2 ½ x 2	1.07	0.37	2.98	0.97	outside
3 x 1	1.13	0.48	1.95	1.48	inside
3 x 1 ¼	1.13	0.48	2.39	1.57	inside
3 x 1 ½	1.13	0.48	2.68	1.62	inside
3 x 2	1.13	0.48	3.28	2.10	outside
3 x 2 ½	1.13	0.40	3.86	1.84	outside
3 ½ x 3	1.18	0.43	4.62	2.10	outside
4 x ¾	1.22	0.67	1.63	2.48	inside
4 x 1	1.22	0.60	1.95	2.60	inside
4 x 1 ¼	1.22	0.60	2.39	2.74	inside
4 x 1 ½	1.22	0.60	2.68	2.81	inside
4 x 2	1.22	0.60	3.28	2.91	inside
4 x 2 ½	1.22	0.60	3.86	2.98	inside
4 x 3	1.22	0.50	4.62	2.93	outside

Malleable Iron

Class 150 (Standard)

FIGURE 1134
Hex Locknut



For additional sizes larger than 2" (50 DN) see Cast Iron page 53.
Not to be used for pressure service.

Size		Minimum Dimensions								Unit Weight		
		A		B		C		D		Black		
NPS	DN	in	mm	in	mm	in	mm	in	mm	lbs	kg	
• ¼	8	.840	21	.660	17	.250	6	.060	2	0.02	0.01	0
• ⅜	10	1.000	25	.770	20	.280	7	.060	2	0.04	0.02	0
• ½	15	1.180	30	.970	25	.310	8	.060	2	0.06	0.03	0
¾	20	1.430	36	1.230	31	.340	9	.060	2	0.08	0.04	0
1	25	1.750	44	1.500	38	.380	10	.060	2	0.14	0.06	0
1¼	32	2.100	53	1.860	47	.420	11	.060	2	0.21	0.10	0
1½	40	2.350	60	2.120	54	.470	12	.060	2	0.24	0.11	0
2	50	2.880	73	2.630	67	.530	13	.090	2	0.40	0.18	0

• Supplied in steel only.

FIGURE 1190
Floor Flange (Ductile Iron)

Structural use only.

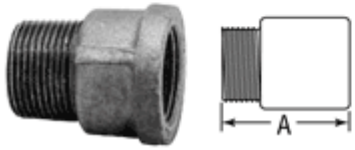
Size		Dia. of Flange		Diameter of Bolt Circle		No. of Holes	Dia. of Holes		Unit Weight		
									Black		
NPS	DN	in	mm	in	mm		in	mm	lbs	kg	lb
¼	8	2 3/16	56	1⅞	48	4	¼	6	0.39	0.18	0.3
⅜	10	3	76	2	51	4	¼	6	0.43	0.20	0.4
½	15	3½	89	2½	64	4	¼	6	0.56	0.25	0.5
¾	20	3½	89	2½	64	4	¼	6	0.60	0.27	0.6
1	25	4	102	3	76	4	¼	6	0.84	0.38	0.8
1¼	32	4	102	3	76	4	¼	6	0.90	0.41	0.9
1½	40	4½	114	3½	89	4	5/16	8	1.20	0.54	1.2
2	50	5½	140	4¼	108	4	5/16	8	2.03	0.92	2.0

FIGURE 1133
Waste Nut

Not to be used for pressure service.

Size		Unit Weight			
		Black		Galv.	
NPS	DN	lbs	kg	lbs	
½	15	0.12	0.05	–	
¾	20	0.15	0.07	0.15	

FIGURE 1138
Extension Piece



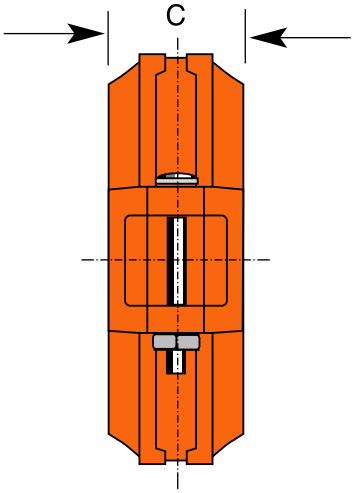
Size		A		Unit Weight		
				Black		Gal
NPS	DN	in	mm	lbs	kg	lbs
½	15	1⅝	41	0.19	0.09	0.19
¾	20	1 15/16	49	0.35	0.16	0.35
1	25	2 1/16	52	0.48	0.22	0.48

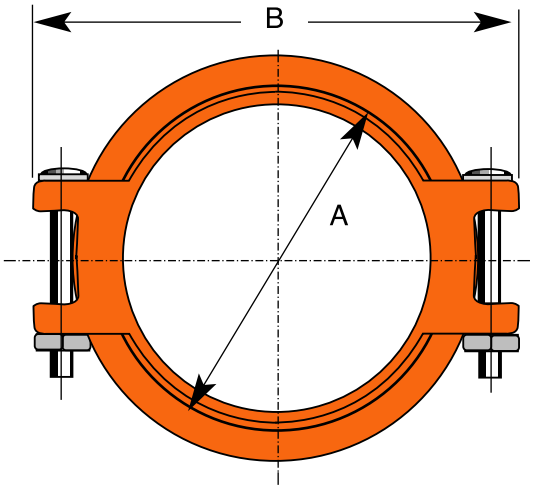
Note: See page 17 for pressure-temperature ratings. Galvanized weights may vary. Please contact your Anvil Representative if you need verification.

60 Cohoes Ave. Green Island, NY 12183 • Ph: (518) 270-2159 • Fax: (518) 270-8384
www.gemlockgrooved.com

RIGID COUPLING - STYLE 5

- Provides joint rigidity, for the support and hanging requirements of ANSI B31.1 Power Piping Code; ANSI B31.9 Building Service Pipe Code and NFPA 13 Sprinkler Systems
- Tongue and groove arrangements in housings do not permit expansion, contraction or deflection
- Available with hot dipped galvanized coatings as optional
- Supplied with pre-lubed gasket





Pipe		Max Working Pressure (psi)*	Allow Pipe End Separation (In.)§	Dimensions (In.)			Approx. Weight Each (lb.)
Nominal Size	Actual SIze (In.)			A	B	C	
1”	1.315	400	0.10	2.188	3.858	1.732	1.2
1¼”	1.660	400	0.10	2.535	3.897	1.732	1.5
1½”	1.900	400	0.10	2.803	3.858	1.732	1.7
2”	2.375	400	0.10	3.283	5.00	1.732	1.9
2½”	2.875	400	0.10	3.842	5.433	1.732	1.9
3”	3.500	400	0.10	4.574	6.535	1.772	2.4
4”	4.500	400	0.16	5.416	7.598	1.889	3.2
5”	5.563	300	0.16	6.771	8.818	1.889	4.5
6”	6.625	300	0.16	7.874	9.921	1.889	5.8
8”	8.625	300	0.19	10.11	12.367	2.362	10.8

c UL us LISTED
FM APPROVED

UL Listed Under File No. EX15592

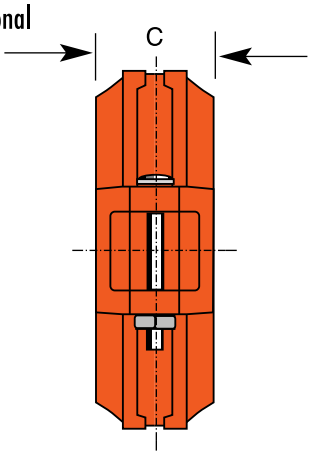
NOTES:
Allowable pipe end separation is for cut groove pipe for roll groove, figures will be one-half of the values listed at time of initial pressurization. – Bolts and Nuts are galvanized. * – Maximum pressure including surges and maximum end loads from all internal and external forces, to which a joint could be subject under normal working conditions. This rating provides a nominal safety factor of 1.5 times working pressure based on standard weight steel pipe. Maximum working pressure may be subjected to a one time field test of 1.5 times the figures indicated. Refer to installations and groove specifications when assembling any grooved product. For dry systems, TRI Seal gaskets are recommended. EPDM gasket is supplied as standard. For other gaskets contact us.

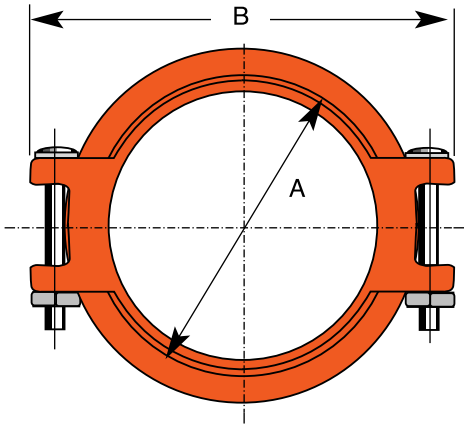
PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Data:	
Notes 1:	
Notes 2:	

60 Cohoes Ave. Green Island, NY 12183 • Ph: (518) 270-2159 • Fax: (518) 270-8384
www.gemlockgrooved.com

FLEXIBLE COUPLING - STYLE 12

- Provides joint flexibility required in some piping systems
- Conforms to the requirements of ANSI B31.1 Power Piping Code; ANSI B31.9 Building Service Pipe Code and NFPA 13 Sprinkler Systems
- Available with hot dipped galvanized coating as optional
- Supplied with pre-lubed gasket





Pipe		Max Working Pressure (psi)*	Allow Pipe End Separation (in.)§	Max Deflection from Center Line §		Dimensions (In.)			Approx. Weight Each (lb.)
Nominal Size	Actual Size (In.)			Per Coup. Deg.	Pipe (In.)	A	B	C	
1”	1.315	400	0.10	5˚-26’	1.14	2.188	3.858	1.73	1.2
1¼”	1.660	400	0.10	4˚-19’	0.90	2.535	3.897	1.732	1.3
1½”	1.900	400	0.10	3˚-46’	0.79	2.803	4.527	1.732	1.5
2”	2.375	400	0.10	3˚-1’	0.62	3.283	5.00	1.732	1.7
2½”	2.875	400	0.10	2˚-29’	0.52	3.842	5.433	1.732	2.0
3”	3.500	400	0.10	2˚-3’	0.43	4.574	6.535	1.772	2.6
4”	4.500	400	0.16	3˚-11’	0.67	5.614	7.598	1.889	4.1
5”	5.563	300	0.16	2˚-35’	0.54	6.771	8.818	1.889	5.7
6”	6.625	300	0.16	2˚-10’	0.46	7.874	9.921	1.889	6.1
8”	8.625	300	0.19	1˚-40’	0.34	10.71	12.637	2.362	11.9
10” *	10.75	300	0.19	0˚-95’	0.13	12.91	16.54	2.52	21.5

*Standard weight coupling

c UL us LISTED FM APPROVED

UL Listed Under File No. EX15592

NOTES:

Allowable pipe end separation is for cut groove pipe for roll groove, figures will be one-half of the values listed at time of initial pressurization. – Bolts and Nuts are galvanized. * – Maximum pressure including surges and maximum end loads from all internal and external forces, to which a joint could be subject under normal working conditions. This rating provides a nominal safety factor of 1.5 times working pressure based on standard weight steel pipe. Maximum working pressure may be subjected to a one time field test of 1.5 times the figures indicated. Refer to installations and groove specifications when assembling any grooved product. For dry systems, TRI Seal gaskets are recommended. EPDM gasket is supplied as standard. For other gaskets contact us.

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

60 Cohoes Ave. Green Island, NY 12183 • Ph: (518) 270-2159 • Fax: (518) 270-8384
www.gemlockgrooved.com

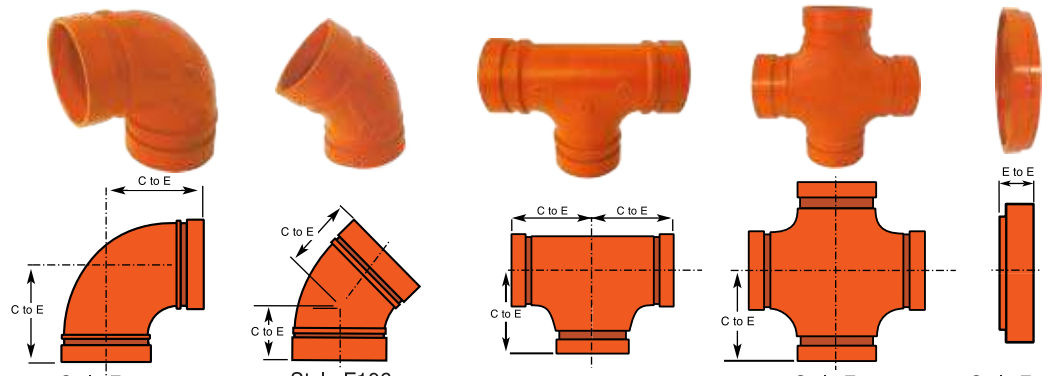
GROOVED FITTINGS - SHORT PATTERN

STYLES F105, F106, F107, F135 & F155

- Sized to improve flow
- Designed to Fire Protection Industry standards for short patterned fittings
- Rated for 300 lbs. operation with a 5 to 1 safety factor
- Made of durable, high-strength ductile iron conforming to ASTM A536; every lot is metallurgically tested for compliance
- Available with hot dipped galvanized coating
- Usage of these fittings with Style 5, Style 12 and Style 25 couplings should be evaluated properly due to bolt pad interference of couplings

FLOW DATA Frictional Resistance (Expressed as equivalent Straight Pipe in Ft.)								
Nominal Size (In.)	90° Elbow		45° Elbow		Tee			
					Branch		Run	
	STD	F105	STD	F106	STD	F107	STD	F107
1	1.7	1.4	0.9	0.9	4.4	4.0	1.7	1.4
1¼	2.3	1.8	1.2	1.0	5.8	4.2	2.3	1.8
1½	2.7	2.5	1.3	1.3	6.7	5.5	2.7	2.5
2	3.4	3.2	1.7	1.6	8.6	8.2	3.4	2.5
2½	4.1	3.9	2.1	2.0	10.3	10.1	4.1	3.9
3	5.1	4.8	2.6	2.4	12.8	12.5	5.1	4.8
4	6.7	6.5	3.4	3.2	16.8	16.0	6.7	6.5
5	8.4	8.4	4.2	4.0	21.0	20.5	8.4	8.2
6	10.1	10.0	5.1	4.8	25.3	24.0	10.1	9.6
8	13.3	13.0	6.7	6.5	33.3	33.0	13.3	13.0

Flow data is based upon the pressure drop of Sch. 40 pipe.



Style F105 Style F106 Style F107 Style F135 Style F155

Pipe		90° Elbow - No.F105		45° Elbow - No.F106		Equal Tee - No.F107		Cross - No.F135		End Cap - No.F155	
Nominal Size (In.)	Actual Size (In.)	C to E (In.)	Approx. Wgt. Ea. (lb.)	C to E (In.)	Approx. Wgt. Ea. (lb.)	C to E (In.)	Approx. Wgt. Ea. (lb.)	C to E (In.)	Approx. Wgt. Ea. (lb.)	E to E (In.)	Approx. Wgt. Ea. (lb.)
1¼	1.660	2.362	0.9	1.732	0.5	2.362	1.0	-	-	.866	0.4
1½	1.900	2.362	1.1	1.732	0.9	2.362	1.5	-	-	.866	0.5
2	2.375	2.755	1.3	2.007	1.1	2.755	1.9	2.755	2.2	.866	0.6
2½	2.875	3.00	2.0	2.007	1.8	3.00	2.6	3.00	3.3	.866	0.7
3	3.500	3.5	2.6	2.519	2.2	3.5	4.2	3.5	5.1	.866	1.1
4	4.500	4.00	5.1	2.992	4.0	4.00	6.6	4.00	7.5	.99	1.8
5	5.563	4.803	6.8	3.543	6.4	4.803	9.0	4.803	13.7	.99	2.9
6	6.625	5.50	12.8	3.74	9.3	5.50	20.9	5.5	19.7	.99	4.2
8	8.625	6.80	22.7	4.881	16.3	6.95	32.9	7.047	34.4	1.181	7.9

UL Listed Under File No. EX15591

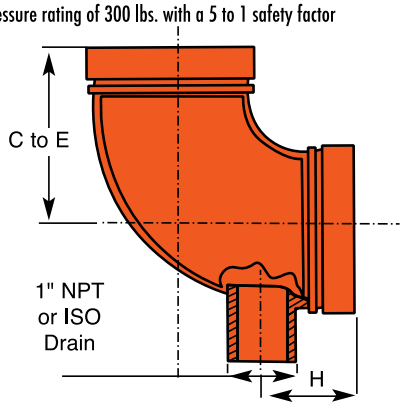
NOTES:
Allowable pipe end separation is for cut groove pipe for roll groove, figures will be one-half of the values listed at time of initial pressurization. – Bolts and Nuts are galvanized. * – Maximum pressure including surges and maximum end loads from all internal and external forces, to which a joint could be subject under normal working conditions. This rating provides a nominal safety factor of 1.5 times working pressure based on standard weight steel pipe. Maximum working pressure may be subjected to a one time field test of 1.5 times the figures indicated. Refer to installations and groove specifications when assembling any grooved product. For dry systems, TRI Seal gaskets are recommended. EPDM gasket is supplied as standard. For other gaskets contact us.

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

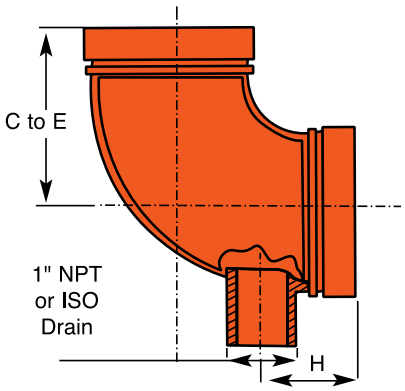
60 Cohoes Ave. Green Island, NY 12183 • Ph: (518) 270-2159 • Fax: (518) 270-8384
www.gemlockgrooved.com

DRAIN ELBOW - STYLE F100D & F105D

- Provides 1" NPT drain required on some fire protection stand pipes
- Smoother flow than fabricated segmented steel elbows
- Made of ductile iron conforming to ASTM A536
- Every lot is metallurgically tested to insure compliance
- Available with hot dipped galvanized coating
- Pressure rating of 300 lbs. with a 5 to 1 safety factor



Drain Elbow-Standard
Style F100D



Drain Elbow-Short Pattern
Style F105D

Drain Elbow-Standard - Style F100D

Pipe		Dimensions (In.)		Approx. Wgt. Ea. (lb.)
Nominal Size (In.)	Actual Size (In.)	C to E	H	
2	2.375	3.25	2.75	3.8
2½	2.875	3.75	2.75	5.2
3	3.500	4.25	2.75	5.3
4	4.500	5.00	2.75	8.8
6	6.625	6.50	2.75	18.7

FLOW DATA
Equivalent Feet of Straight Pipe

Nominal Size (In.)	90° Elbow	
	STD	Short Pattern
2	3.5	3.2
2½	4.3	3.9
3	5.0	4.8
4	6.8	6.5
6	10.0	10.0

Flow data is based upon the pressure drop of Sch. 40 pipe.

Drain Elbow-Short Pattern - Style F105D

Pipe		Dimensions (In.)		Approx. Wgt. Ea. (lb.)
Nominal Size (In.)	Actual Size (In.)	C to E	H	
2	2.375	2.75	2.00	1.0
2½	2.875	3.00	2.00	1.7
3	3.500	3.50	2.00	2.5
4	4.500	4.00	2.00	5.3
6	6.625	5.50	2.00	13.9

UL Listed Under File No. EX15591

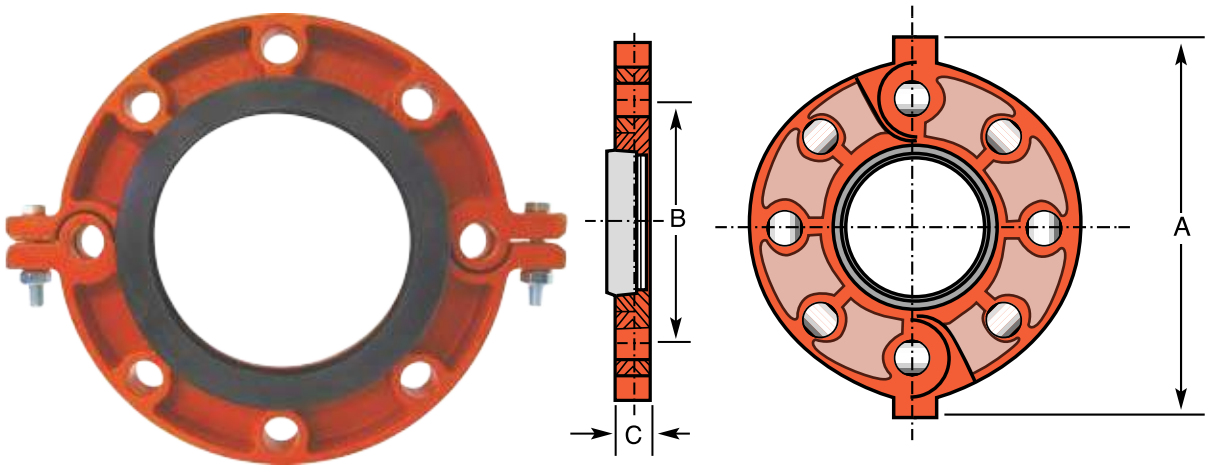
NOTES:
Allowable pipe end separation is for cut groove pipe for roll groove, figures will be one-half of the values listed at time of initial pressurization. □ – Bolts and Nuts are galvanized. * – Maximum pressure including surges and maximum end loads from all internal and external forces, to which a joint could be subject under normal working conditions. This rating provides a nominal safety factor of 1.5 times working pressure based on standard weight steel pipe. Maximum working pressure may be subjected to a one time field test of 1.5 times the figures indicated. Refer to installations and groove specifications when assembling any grooved product. For dry systems, TRI Seal gaskets are recommended. EPDM gasket is supplied as standard. For other gaskets contact us.

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

60 Cohoes Ave. Green Island, NY 12183 • Ph: (518) 270-2159 • Fax: (518) 270-8384
www.gemlockgrooved.com

GROOVED FLANGE

- Designed to connect ANSI Class 125 or 150 flanged components to a grooved piping system
- Made of a ductile iron conforming to ASTM A-536. Every lot is metallurgically examined to insure compliance
- Provided with EPDM rubber gasket as standard, suitable for -30 ˚ F to 150 ˚ F (-34 ˚ C to 110 ˚ C)
- Available with hot dipped galvanized coating as optional



Pipe		Max Working Pressure (psi)*	Number and Bolt Size	Sealing Surface (In.)		Dimensions (In.)			Approx. Wt. Each (lb.)
Nominal Size	Actual Size (In.)			X Min.	Y Max.	A ANSI	B ANSI	C	
2”	2.375	300	4-5/8 x 2½	3.09	2.42	8.110	4.763	0.866	3.0
2½”	2.875	300	4-5/8 x 3	3.58	2.92	9.055	5.511	0.866	4.2
3”	3.500	300	4-5/8 x 3	4.21	3.56	9.527	5.984	0.944	4.4
4”	4.500	300	8-5/8 x 3	5.26	4.57	11.023	7.519	0.944	8.4
5”	5.563	300	8-¾ x 3½	6.41	5.65	12.795	8.503	0.964	9.0
6”	6.625	300	8-¾ x 3½	7.48	6.71	XX.110	X.763	X.866	10.4
8”	8.625	300	8-¾ x 3½	9.58	8.70	16.311	11.751	1.181	19.8

c UL us LISTED
FM APPROVED
UL Listed Under File No. EX15592

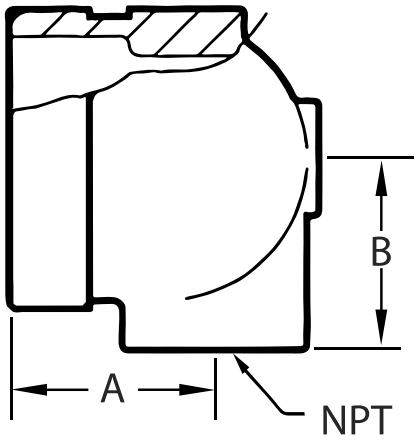
NOTES:
Allowable pipe end separation is for cut groove pipe for roll groove, figures will be one-half of the values listed at time of initial pressurization. – Bolts and Nuts are galvanized. * – Maximum pressure including surges and maximum end loads from all internal and external forces, to which a joint could be subject under normal working conditions. This rating provides a nominal safety factor of 1.5 times working pressure based on standard weight steel pipe. Maximum working pressure may be subjected to a one time field test of 1.5 times the figures indicated. Refer to installations and groove specifications when assembling any grooved product. For dry systems, TRI Seal gaskets are recommended. EPDM gasket is supplied as standard. For other gaskets contact us.

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

60 Cohoes Ave. Green Island, NY 12183 • Ph: (518) 270-2159 • Fax: (518) 270-8384
www.gemlockgrooved.com

90º ADAPTER ELL

- Transitions From Grooved to Threaded Connection
- Direct Connection to Sprinkler Heads
- Available in Rust Inhibitive Black Paint & Galvanized Finish
- UL/FM Rated for 500psi.



Nominal Size Inch	Max. Work Press. psi	Dimensions in.	
		A	B
1¼ x ½	500	1.77	1.20
1¼ x ¾	500	1.77	1.20
1¼ x 1	500	1.91	1.24
1½ x ½	500	1.77	1.32
1½ x ¾	500	1.77	1.32
1½ x 1	500	1.91	1.32
2 x ½	500	1.75	1.57
2 x ¾	500	1.77	1.57
2 x 1	500	1.91	1.63
2½ x ½	500	1.75	1.75
2½ x ¾	500	1.75	1.75
2½ x 1	500	1.91	1.81

c UL us LISTED
FM APPROVED

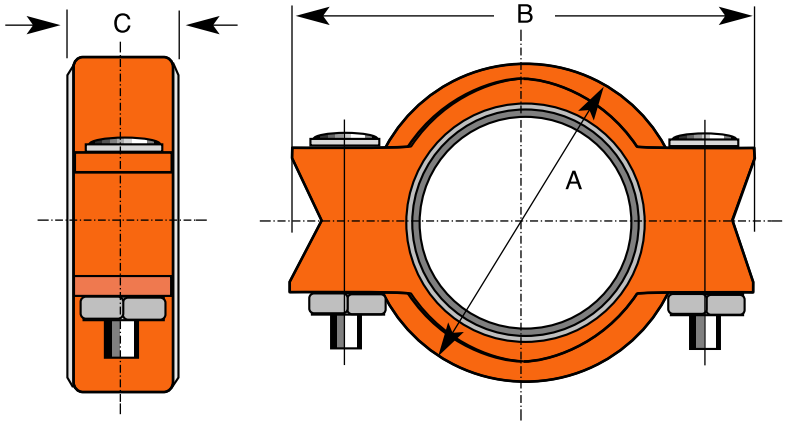
UL Listed Under File No. EX15591

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

60 Cohoes Ave. Green Island, NY 12183 • Ph: (518) 270-2159 • Fax: (518) 270-8384
www.gemlockgrooved.com

REDUCING COUPLING - STYLE 25

- Replaces two couplings and in-line reducer (concentric or eccentric)
- Available with hot dipped galvanized coating as optional



HEAD LOSS

Size (In.)	Flow Reducing		Flow Expanding	
	C_L Value	Equivalent Pipe Length(Smaller Dia.)	C_L Value	Equivalent Pipe Length(Smaller Dia.)
6" x 4"	0.16	4.5 ft	0.08	2.3 ft
5" x 4"	0.14	3.0 ft	0.14	3.3 ft
4" x 3"	0.37	6.0 ft	0.15	2.5 ft
3" x 2½"	0.30	3.8 ft	0.19	2.5 ft
3" x 2"	0.50	5.5 ft	0.30	3.5 ft
2½" x 2"	0.18	1.9 ft	0.09	1.0 ft
2" x 1½"	0.25	1.9 ft	0.23	2.0 ft

In above table, $C_L = \frac{2GH_L}{V^2}$

H_L = Head Loss in feet

V = Velocity in smaller pipe in feet/sec.

G = Acceleration due to gravity = 32.2 feet/sec.

c UL us LISTED FM APPROVED

UL Listed Under File No. EX15592

Pipe Nominal Size	Max Working Pressure (psi)*	Allow Pipe End Separation (in.)§	Max Deflection from Center Line §		Dimensions (In.)			Approx. Weight Each (lb.)
			Per Coup. Deg.	Pipe (In.)	A	B	C	
1½" x 1¼"	300	0.12	1°-53'	0.40	2.88	4.55	1.77	2.2
2" x 1¼"	300	0.12	1°-53'	0.40	3.543	5.079	1.85	2.2
2" x 1½"	300	0.12	1°-33'	0.40	3.543	5.079	1.85	2.0
2½" x 2"	300	0.12	1°-33'	0.32	3.976	5.394	1.89	3.1
3" x 2"	300	0.12	1°-17'	0.26	4.724	6.45	1.89	4.0
3" x 2½"	300	0.12	1°-17'	0.26	4.72	6.457	1.89	3.7
4" x 2"	300	0.25	2°-38'	0.55	5.906	7.677	1.929	6.4
4" x 2½"	300	0.25	2°-38'	0.55	5.906	7.677	1.929	6.2
4" x 3"	300	0.25	2°-38'	0.55	5.906	7.677	1.929	5.5
5" x 4"	300	0.25	2°-5'	0.44	6.969	8.74	1.909	10.8
6" x 4"	300	0.25	1°-44'	0.38	7.992	9.252	1.969	11.0
8" x 6"	300	0.25	1°-15'	0.26	10.394	12.32	2.362	18.5

NOTES:
Allowable pipe end separation is for cut groove pipe for roll groove, figures will be one-half of the values listed at time of initial pressurization. – Bolts and Nuts are galvanized. * – Maximum pressure including surges and maximum end loads from all internal and external forces, to which a joint could be subject under normal working conditions. This rating provides a nominal safety factor of 1.5 times working pressure based on standard weight steel pipe. Maximum working pressure may be subjected to a one time field test of 1.5 times the figures indicated. Refer to installations and groove specifications when assembling any grooved product. EPDM gasket is supplied as standard.

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

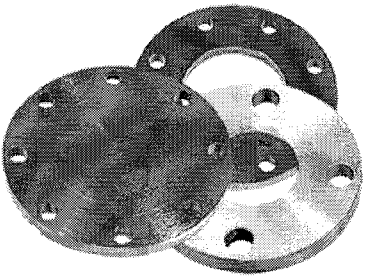
Print Friendly View

FLANGES Steel Welding Flange

ANVILSTAR™ Fire Products Division of Anvil International

MERIT.

Steel Welding Flanges are manufactured to comply with the American Water Works Association C207, Table 1, Class D specification for steel plate flanges. In those sizes not covered by AWWA C207, design data was extracted from the specification and employed for sizes 3" and smaller. All sizes manufactured are UL Listed and FM Approved for 175 psi at ambient temperature up to and including 12" sizes, while sizes over 12" are rated for 150 psi at ambient temperature. National Steel Plate Flanges have the same diameter and bolt hole drilling as class 125 cast iron flanges per ANSI, B16.1. For size 24" and smaller, National Steel Plate Flanges also match ANSI B16.5, 150-pound class. Steel plate flanges, aside from lower initial cost, are generally considered to be easier to install during make-up and final installation.



APPROVED

For Listing/Approval Details and Limitations, visit our website at www.anvilstar.com or contact an AnvilStar™ Sales Representative

Available Slip-On, Reducing and Blind.

- Pressure rating at ambient temperature for sizes 2"-12" – 175 psi.
- Flanges have the same diameter and drilling as Class 125 cast-iron flanges (ANSI 16.1).
- Priced significantly lower than forged steel welding flanges.
- UL Listed and FM Approved.
- Conform to AWWA C207 Class D.

NATIONAL STEEL FLANGES
(National Fittings Listings: UL HKOK – EX5222, FM Approval Guide Chapter 1 - Pipe Fittings)

PFB	Steel Flange	2, 2½, 3, 4, 5, 6, 8, 10 & 12	175
PFS	Slip-On Flange (Ring Type)	2, 2½, 3, 4, 5, 6, 8, 10 & 12	
PFR	Reducing Flange	4 x 2, 4 x 2½, 4 x 3, 6 x 3, 6 x 4, 8 x 4, 8 x 6	

Welded Outlet Fittings

For Fire Protection & Other Low Pressure Piping Systems

SPF Welded Outlet Fittings offer the user a high strength, low cost forged threaded and grooved line of fittings specifically designed and manufactured to be installed on proprietary thin wall flow pipe, Schedule 5, 10, and 40 standard wall pipes.

SPF Welded Outlets are forged steel welding outlet fittings. The material used in manufacture meets the chemical and physical requirements of ASTM A 53. SPF Welded Outlet Fittings employ a low weld volume design to provide either a partial or full penetration weld employing a single pass with minimum burn-through and pipe distortion. Threads comply with ANSI B1.20.1. The SPF Welded Outlets are UL Listed and FM Approved for use conforming to the requirements of NFPA 13. SPF Welded Outlet Fittings are rated for 300 psi when used in fire sprinkler system applications.

c UL us LISTED FM APPROVED

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

SPF WELDED OUTLET FITTINGS

Outlet Model	Outlet Pipe Size	Header Pipe Size	Rated Pressure
	In.	*In.*	*psig*
MTM-40	½, ¾, 1	½ - 8 (Sch.10, 40)	300
	1¼, 1½, 2, 2½, 3, 4	½ - 4 (Sch. 5, DynaFlow)	
	2	4, 6 (EZ-Flow)	
GR-40	1 - 8	1¼ - 8 (Sch.10, 40)	300
	2½ - 8	2½ - 8 (Sch. 5, DynaFlow)	

1) Size-on size (i.e. 2 x 2) SPF Welded Outlet Fittings are not FM Approved.
2) FM rated working pressure when welded on Sch. 5 or lightwall pipe is 175 psi.
3) Refer to the UL and FM websites for the most current pressure ratings.

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

HANGERS

Figure: 69 Adjustable Swivel Ring, Tapped per NFPA Standards

[Submittal Sheet] [zoom in]

Fig. 69 Adjustable Swivel Ring, Tapped Per NFPA Standards

Size Range: ½" through 8"
Material: Carbon steel
Finish: ❑ Galvanized
Service: Recommended for suspension of non-insulated **stationary** pipe line.
Maximum Temperature: 650° F
Approvals: Complies with Federal Specification A-A-1192A (Type 10) *WW-H-171-E (Type 10)* and MSS-SP-69 (Type 10).
UL Listed and FM Approved (Sizes ¾" - 8").
Features:

- Threads are countersunk so that they cannot become burred or damaged.
- Knurled swivel nut provides vertical adjustment after piping is in place.
- Captured swivel nut in the ½" through 3" sizes.

Ordering: Specify size, figure number and name.

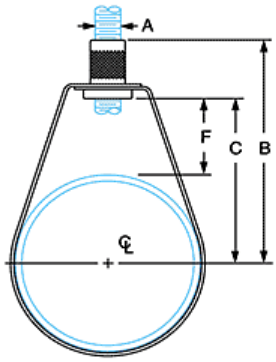


Fig. 69: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	Rod Size A	B	C	F
½	300	0.10	⅜	2 7/8	2	1 9/16
¾		0.10		2 3/4	1 7/8	1 15/16
1		0.10		2 9/16	1 11/16	1
1 ¼		0.10		2 5/8	1 3/4	⅞
1 ½		0.10		2 3/4	1 7/8	
2		0.11		3 1/4	2 3/8	1 1/8
2 ½	525	0.20		4	2 3/4	1 5/16
3		0.20		3 13/16	2 15/16	1 3/16
4	650	0.30		4 11/16	3 13/16	1 9/16
5	1,000	0.54	½	5 5/16	4 3/8	
6		0.65		6 11/16	5 9/16	2 1/4
8		1.00		8	7	2 11/16

<top>

Fig. 146 — Continuous Threaded Rod

Size Range: ¼" through 1½" Stocked in six, ten, and twelve foot lengths. Other even foot lengths can be furnished to order.

Material: Carbon steel; rod threaded complete length.

Finish: ❑ Plain or ❑ Galvanized.

Maximum Temperature: 650° F.

Ordering: Specify rod diameter and length, figure number, name and finish.

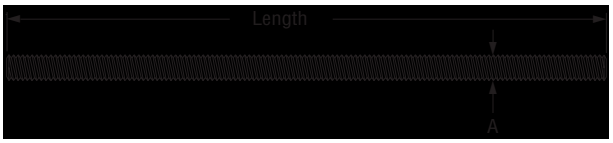


Fig. 146: Loads (lbs) • Weights (lbs) Dimensions (in)

Rod Size A	Threads per Inch	Max Load 650° F	Weight per Ft.
¼	20	240	0.12
⅜	16	730	0.30
½	13	1,350	0.53
⅝	11	2,160	0.84
¾	10	3,230	1.20
⅞	9	4,480	1.70
1	8	5,900	2.30
1¼	7	9,500	3.60
1½	6	13,800	5.10

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

Pipe Hanger Submittal Sheet

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

Figure: 92 Universal C-type Clamp (Standard Throat)

[Submittal Sheet] [zoom in]

Fig. 92 Universal C-type Clamp (Standard Throat)

Size Range: 3/8 and 1/2"

Material: Ductile iron, hardened steel cup point set screw and locknut.

Finish: ❑ Plain or ❑ Galvanized

Service: Recommended for use under roof installations with bar joist type construction, or for attachment to the top or bottom flange of structural shapes where the vertical hanger rod is required to be offset from the edge of the flange and where the thickness of joist or flange does not exceed 3/4".

Approvals: Complies with Federal Specification A-A-1192A (Type 19 & 23) *WW-H-171-E (Type 23)* and MSS-SP-69 (Type 19 & 23).
UL, ULC Listed and FM Approved.

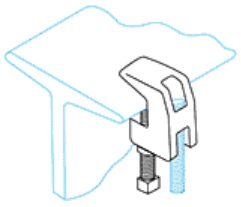
How to size: Size of clamp is determined by size of rod to be used.

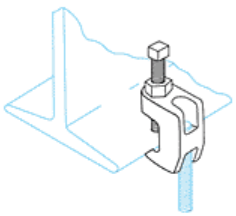
Installation: Follow recommended set screw torque values per MSS-SP-69
(See table on page PH-212)

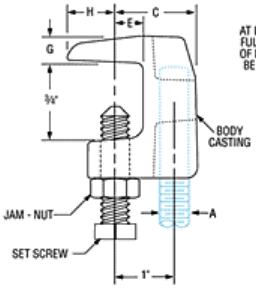
Features:

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

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







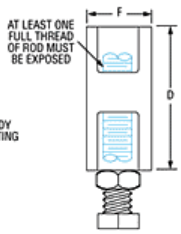


Fig. 92: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Set Screw Size	Max Loads ■		Weight	C	D	E	F	G	H
		Top	Bottom							
3/8	3/8	500	250	0.34	1 5/16	1 9/16	9/16	13/16	3/8	1/2
1/2	1/2	950	760	0.63	1 3/8	1 13/16	1/2	1 1/16	7/16	23/32

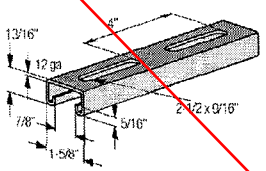
■ Maximum temperature of 450° F

<top>

6.1 Hilti Strut

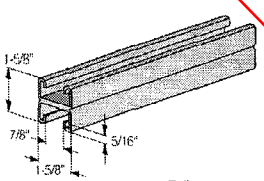
6.1.4 Ordering Information

12 Gauge Hilti Strut



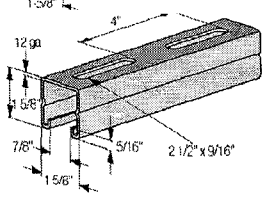
HS-13/16" 12 gauge

Item No.	Description	Hole Configuration	Bundle Qty	Weight/Piece (lb)
00309919	HS-1316-12/PG 10'	Full Slot	50	12.2
00309920	HS-1316-12/PG 20'	Full Slot	50	24.3
00312949	HS-1316-12/PGS 10'	Solid	50	15.4



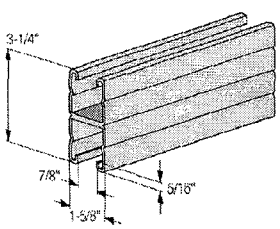
HS-13/16" 12 gauge back-to-back

Item No.	Description	Hole Configuration	Bundle Qty	Weight/Piece (lb)
00247902	MS-21D 10'	1-9/16" x 9/16"	25	23.0



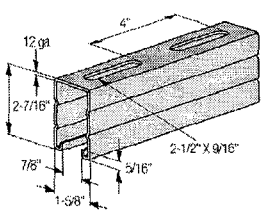
HS-1 5/8" 12 gauge

Item No.	Description	Hole Configuration	Bundle Qty	Weight/Piece (lb)
00309935	HS-158-12/PG 2'	Full Slot	50	3.6
00309936	HS-158-12/PG 4'	Full Slot	50	7.2
00309937	HS-158-12/PG 6'	Full Slot	50	10.8
00309938	HS-158-12/PG 10'	Full Slot	50	18.0
00338906	HS-158-12/PG 10'	2-5/8" x 11/16"	50	18.0
00309939	HS-158-12/PG 20'	Full Slot	50	36.0
00309949	HS-158-12/PGS 10'	Solid	50	18.5
00309950	HS-158-12/PGS 20'	Solid	50	37.0
00373441	HS-158-12/GR E-Coat 10'	Full Slot	50	18.0
00373442	HS-158-12/GR E-coat 20'	Full Slot	50	36.0



HS-1 5/8" 12 gauge back-to-back

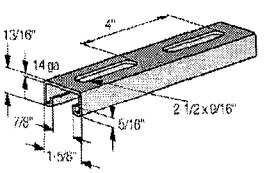
Item No.	Description	Hole Configuration	Bundle Qty	Weight/Piece (lb)
00247903	MS-41D 10'	1-9/16" x 9/16"	25	35.9



HS-2 7/16" 12 gauge

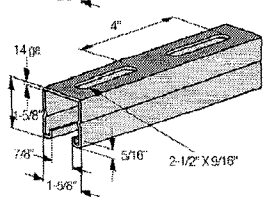
Item No.	Description	Hole Configuration	Bundle Qty	Weight/Piece (lb)
00309965	HS-2716-12/PG 10'	Full Slot	40	24.5
00309966	HS-2716-12/PG 20'	Full Slot	40	49.0

14 Gauge Hilti Strut



HS-13/16" 14 gauge

Item No.	Description	Hole Configuration	Bundle Qty	Weight/Piece (lb)
00309911	HS-1316-14/PG 10'	Full Slot	50	8.7
00309912	HS-1316-14/PG 20'	Full Slot	50	17.4
00373434	HS-1316-14/GR E-coat 10'	Full Slot	50	8.7



HS-1 5/8" 14 gauge

Item No.	Description	Hole Configuration	Bundle Qty	Weight/Piece (lb)
00309927	HS-158-14/PG 10'	Full Slot	50	13.6
00309928	HS-158-14/PG 20'	Full Slot	50	27.2

VALVES

LANSDALE® VALVE
MANUFACTURING CORP.

COMMERCIAL RISER ASSEMBLY

LVCRBV - WITH BALL VALVE
LVCRTD - WITH TEST & DRAIN

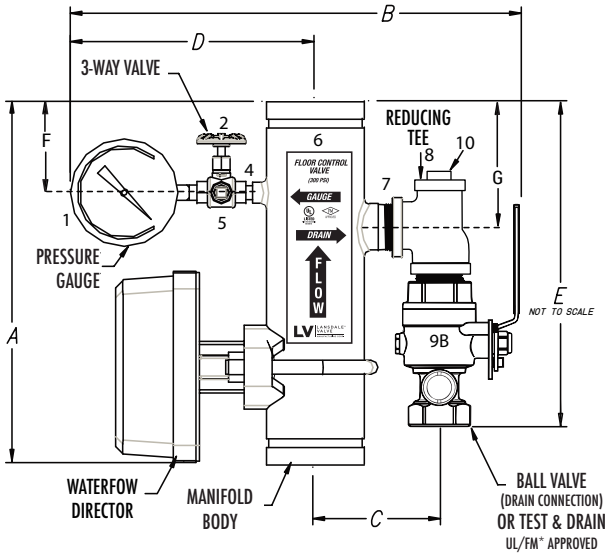
c UL us LISTED
EX15837

FM APPROVED

FEATURES:

- Test and drain with optional PRV, available nominal K-Factor: 2.8, 4.2, 5.6, 8.0, 11.2, 14.0 (available on 1-1/4" - 2" size units only), and 25.2 (available on 1-1/2" and 2" size units only)

MADE IN THE USA



BODY SIZE	1½"	2"	2½"	3"	4"	5"	6"	8"
BALL VALVE SIZE Model LVCRBV	1"	1"	1¼"	1¼"	2"	2"	2"	2"
TEST & DRAIN SIZE Model LVCRTD	1"	1"	1¼"	1¼"	2"	2"	2"	2"

NOMINAL SIZE	1½"	2"	2½"	3"	4"	5"	6"	8"
A	13"	13"	13"	13"	13"	13"	13"	13"
B (BALL VALVE)	7⅞"	13"	13¾"	15 ¾"	19½"	20⅝"	20"	22¾"
B (TEST & DRAIN)	13¼"	13½"	14¼"	16¼"	19"	20⅛"	20¾"	23½"
C	4"	5¼"	5"	5½"	7"	7½"	8¼"	9¼"
D	9⅞"	9¼"	9½"	9½"	10⅜"	10⅞"	11"	12"
E (BALL VALVE)	9½"	5 ⅝"	7 ⅛"	9⅞"	12 ⅛"	13½"	13½"	12⅛"
E (TEST & DRAIN)	11½"	10"	10¼"	12 ¼"	14¾"	14 ½"	14 ½"	14⅝"
F	3⅞"	3½"	3½"	3½"	3½"	3½"	3½"	3½"
G	4½"	4½"	4½"	4½"	4½"	4½"	4½"	4½"
H	3½"	3½"	3½"	3½"	3½"	3½"	3½"	3½"

**NOTE: All tolerances (with exception of the grooves) plus or minus ¼ of an inch. All welds to be ¼" fillet surface prep of body-SSPC-SP-7 finished with 2.5 mils., Bengal Red TGIC/Acrylic epoxy powder coat, electro statically applied.

**NOTE: Standard Test & Drain orifice 5.6K, optional orifice's available upon request: 4.2K, 14.0K, 25.2K

NO.	DESCRIPTION	QTY.
1	Lansdale Air/Water 3-1/2" Dia. 0-300 PSI UL/FM Approved	1
2	1/4" 3-Way Valve	1
3	Water Flow Switch with retard UL/FM Approved	1
4	1/4" x 2 Black Nipple	1
5	1/4" Black CI Plug	1
6	Commercial Riser Body Sch 40 A53 steel pipe	1
7	Black Nipple 1" x Close	1
8	Galvanized Reducing Tee	1
9A	Ball Valve 300 PSI, 600 WOG UL/FM Approved	1
9B	Lansdale Valve & Manufacturing or equal Test & Drain UL/FM Approved	1
10	Galvanized Plug	1

PROJECT	APPROVAL STAMP
PROJECT:	☐ APPROVED
ADDRESS:	☐ APPROVED AS NOTED
ENGINEER:	☐ NOT APPROVED
SUBMITTAL DATA:	REMARKS:
NOTES 1:	
NOTES 2:	

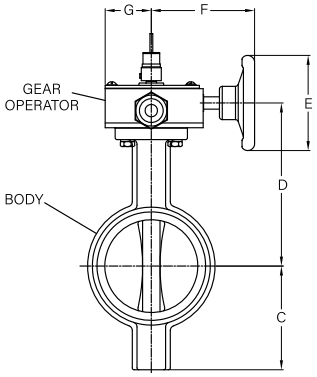
LANSDALE® VALVE
MANUFACTURING CORP.

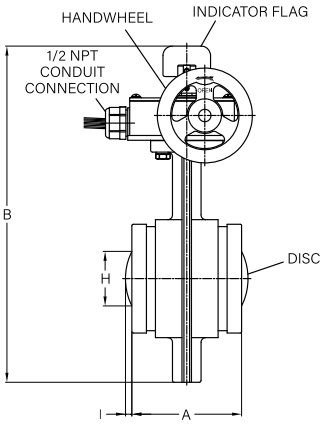
GROOVED BUTTERFLY VALVE

MODEL LVBG1 2” – 8”
MODEL LVBG3 10” – 12”

EX15837

LISTING No. 7770-2326:0500





DESCRIPTION:

The Lansdale grooved butterfly valve is an NFPA compliant valve designed and manufactured for the Fire Protection industry and used as a control or isolation valve within the fire protection system.

FEATURES:

- Model LVBG1 Rated 300 PSI
- Model LVBG3 Rated 175 PSI
- Indoor/Outdoor use
- Prewired double tamper switches/Normally Open
- Available Normally Closed
- Eliminates water hammer
- Slow open/slow close
- Flag type position indicator
- DI body encapsulated with a resistant durable polymer coating to ensure a long service life
- Disc is EPDM coated with SS stem

INSTALLATION:

See Lansdale’s Installation & Maintenance Manual for electrical schematics.

DIMENSIONAL DATA (In.)

NOMINAL VALVE SIZE (In.) (DN)	PIPE OD	A	B	C	D	E	F	G	H	I	WT (Lbs.)
2	2.37	3.8	10.63	2.85	4.90	4.92	4.28	1.99	0	0	9.6
2-1/2	2.88	3.8	11.72	3.35	5.5	4.92	4.28	1.99	0	0	11.24
3	3.5	3.8	12.22	3.58	5.76	4.92	4.28	1.99	0	0	12.57
4	4.5	4.54	13.92	4.29	6.75	4.92	4.28	1.99	0	0	15.65
5	5.56	5.21	16.0	5.16	7.93	5.91	5.79	2.44	0	0	25.8
6	6.63	5.21	17.01	5.71	8.44	5.91	5.79	2.44	0	0	29.32
8	8.63	5.8	19.02	6.69	9.29	8.86	5.79	2.44	5.07	0.95	49.6
10	10.75	6.26	22.46	7.68	11.1	8.86	8.19	2.91	7.21	1.65	73.41
12	12.75	6.5	25.39	9.5	12.2	8.86	8.19	2.91	9.96	2.7	89.29

MATERIAL LIST

NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	Body	Nylon-11 Coated	ASTM A536
2	Disc	EPDM Encapasulated	ASTM A536
3	Stem	Ductile Iron	ASTM A536
4	Signal & Gearbox	Ductile Iron	AISI410
5	Handwheel	Ductile Iron	ASTM A536
6	O-ring	EPDM	ASTM A536

PROJECT	APPROVAL STAMP
PROJECT:	☐ APPROVED
ADDRESS:	☐ APPROVED AS NOTED
ENGINEER:	☐ NOT APPROVED
SUBMITTAL DATA:	REMARKS:
NOTES 1:	
NOTES 2:	

LANSDALE® VALVE MANUFACTURING CORP.

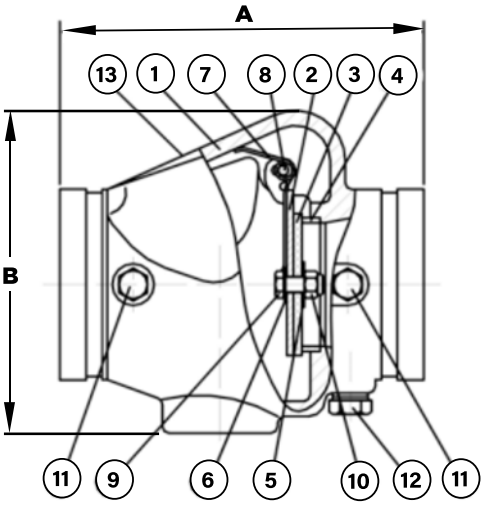
RISER CHECK (BODY ONLY) (SHOT GUN RISER)

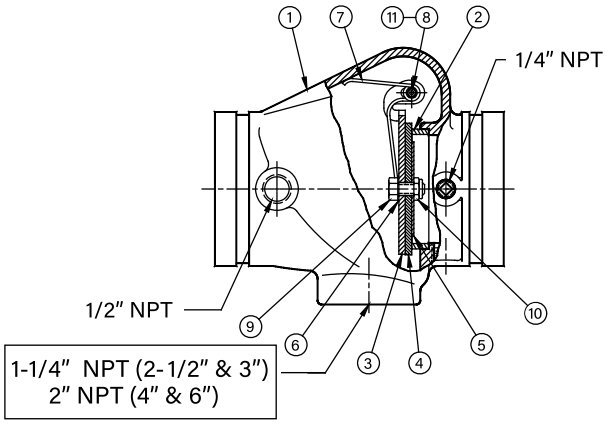
MODEL LVRCGGV (BODY ONLY)

EX26984

FEATURES:

Lansdale Valve & Manufacturing's Riser Check Valve (Body only) is intended for use in wet pipe fire protection systems, as well as preaction systems where there is no need for a mechanical alarm. This Riser Check body comes complete with two, 1/4" NPT tapped holes that are plugged and ready to accept the installation of pressure gauges and a 1-1/4" or 2" NPT tapped hole (depending on size) for a main drain. The use of a waterflow switch can provide an electronic alarm. Grooved end connections provide fast and economical installation of a UL/FM Approved coupling, such as Gemlock. When installed vertically the direction of flow arrow should point upward. For horizontal installation, the hinge pin must be located at the top. If used in preaction system the valve must be installed vertically. Rated for 350 PSI.





SIZE (In.)	A (In.)	B (In.)	C (In.)	D (In.)	E (In.)
2	6.7	5	3-1/4	9-1/2	2-1/2
2-1/2	7.2	5	3-1/4	9-1/2	3
3	7.8	5	3-1/4	9-1/2	3-1/2
4	8.6	7	4-1/4	13-1/2	4-1/4
6	10.6	8	6	14-1/2	4-3/4
8	12.8	8	6	14-1/2	4-3/4

NUMBER	DESCRIPTION
1	Valve Body Ductile Iron A536 GR65-45-12
2	Seat Bronze C83600 or C93200, ASTM-B505
3	Clapper Ductile Iron A536 GR65-45-12
4	Facing Seal **EPDM Rubber
5	Clamping Ring Stainless Steel 304, ASTM-A240
6	Gasket**EPDM Rubber
7	Spring Stainless Steel A276 GR302
8	Hinge Pin Stainless Steel A276 GR304
9	Bolt Stainless Steel 304, ASTM-F593
10	Locknut** Stainless Steel 303, ASTM-F594
11	Plug, 1/2" NPT Steel

DIMENSIONS											
SIZE (In.)	1-1/4	1-1/2	2	2.5	3	4	5	6	8	10	12
A	6.3	6.3	6.7	7.2	7.8	8.6	10.5	10.6	12.8	17.0	19.5
B	2.5	2.5	2.5	3.0	3.5	4.0	4.5	5.5	6.5	8.0	8.5

PROJECT	APPROVAL STAMP
PROJECT:	☐ APPROVED
ADDRESS:	☐ APPROVED AS NOTED
ENGINEER:	☐ NOT APPROVED
SUBMITTAL DATA:	REMARKS:
NOTES 1:	
NOTES 2:	

LANSDALE® VALVE MANUFACTURING CORP.

RISER PAK

MODEL LVRPAK

FEATURES:

- Preassembled for ease of installation
- Can be supplied with test and drain or ball valve as required
- Butterfly valve has built in tamper switch
- Easily Field Service
- Test and drain with optional PRV, available nominal K-Factor: 2.8, 4.2, 5.6, 8.0, 11.2, 14.0 (available on 1-1/4" - 2" size units only), and 25.2 (available on 1-1/2" and 2"size units only)

SIZE (In.))	OVERALL LENGTH (In.)	OVERALL DEPTH (In.)
2	24.3	12
2-1/2	24.8	13.3
3	25.2	14
4	27.2	16
6	30.3	19.5
8	32.2	21.5

PRESSURE DROP EXPRESSED IN EQUIVALENT LENGTHS OF Sch 10 PIPE	
SIZE (In.)	C=120
2	16.6
2-1/2	14.0
3	16.3
4	20.1
6	21.8
8	23.9

PROJECT	APPROVAL STAMP
PROJECT:	☐ APPROVED
ADDRESS:	☐ APPROVED AS NOTED
ENGINEER:	☐ NOT APPROVED
SUBMITTAL DATA:	REMARKS:
NOTES 1:	
NOTES 2:	

Model CV-1F Grooved End Swing Check Valves 2 thru 12 Inch (DN50 thru DN300)

General Description

The TYCO Model CV-1F Grooved End Swing Check Valves are compact and rugged swing-type units that allow water flow in one direction and prevent flow in the opposite direction. A resilient elastomer seal facing on the spring-loaded clapper ensures a leak-tight seal and non-sticking operation. The Model CV-1F Check Valves are designed to minimize water hammer caused by flow reversal.

The Model CV-1F Grooved End Swing Check Valves are furnished with grooved ends and can be installed using GRINNELL Grooved Couplings or GRINNELL Figure 71 Flange Adapters. The Model CV-1F Check Valves have been designed with a removable cover for ease of field maintenance. These valves can be installed horizontally (with cover in the upward position) or vertically with the flow in the upward direction (Ref. Figure 4).

A Maintenance Check Valve Kit (TFP1555) is available to allow the maintenance procedure of back-flushing through the fire department connection without removing the Model CV-1F Grooved End Swing Check Valve from the pipe line.

The Model CV-1F Grooved End Swing Check Valves are a redesign for the Central Figure 590F and GRINNELL Figure 590F.

NOTICE

The TYCO Model CV-1F Grooved End Swing Check Valves described herein must be installed and maintained in compliance with this document and with the applicable standards of the National Fire Protection Association (NFPA), in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

Never remove any piping component nor correct or modify any piping deficiencies without first de-pressurizing and draining the system. Failure to do so may result in serious personal injury, property damage, and/or impaired device performance.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Technical Data

Approvals
UL and C-UL Listed
FM Approved

Sizes
2 thru 12 Inch (DN50 thru DN300)

Maximum Working Pressure
300 psi (20,7 bar)

Valve Assembly Finish
Red, non-lead paint

UL c UL FM APPROVED

For Fire Protection pressure rating, listing and approval information, contact your Tyco Representative.

Installation

The Model CV-1F Grooved End Swing Check Valves are to be installed in accordance with this section:

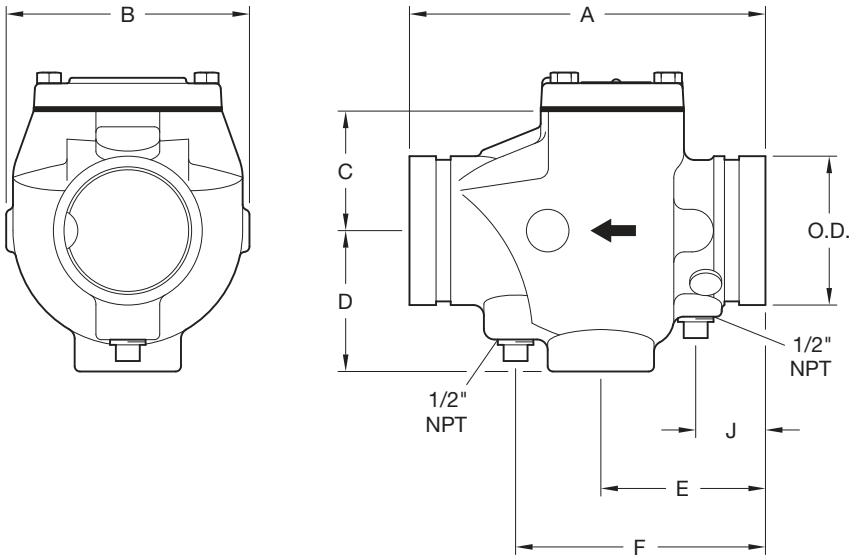
Step 1. The arrow cast on the body must point in the direction of the flow.

Step 2. Valves installed vertically must be positioned with the flow in the upward direction.

Step 3. Valves installed horizontally must be positioned with the cover facing up (Ref. Figure 4).

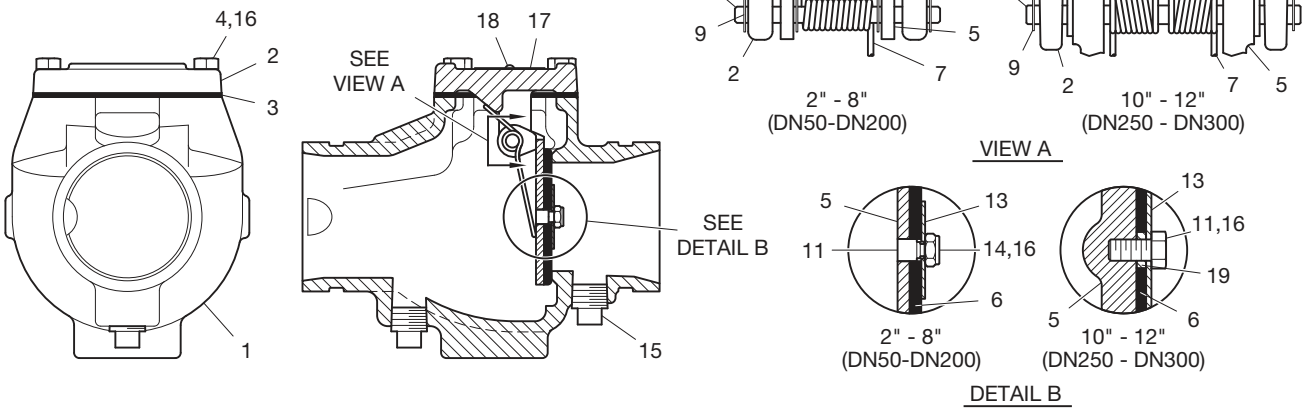
Step 4. Grooved end pipe couplings used with the Model CV-1F Grooved End Swing Check Valves must be installed in accordance with manufacturer's instructions.

Note: *Valves should be installed a reasonable distance downstream from pumps, elbows, expanders, reducers, or other similar devices to extend the valve life. Standard piping practices call for a minimum of five (5) times the pipe diameter for general use.*



Nominal Pipe Size		Nominal Dimensions Inches (mm)							Cover Bolt Torq., Lbs.-ft. (Nm)	Approx. Weight, Lbs. (kg)
ANSI Inches (DN)	O.D. Inches (mm)	A	B	C	D	E	F	J		
2 (50)	2.375 (60,3)	6.75 (171,5)	1.96 (49,8)	1.96 (49,8)	2.57 (65,3)	3.25 (82,3)	4.75 (120,7)	1.62 (41,5)	18 (25)	9.0 (4,5)
2-1/2 (65)	2.875 (73,0)	8.00 (203,2)	5.38 (136,7)	2.63 (66,7)	3.09 (78,5)	3.87 (98,3)	5.87 (149,1)	1.63 (41,7)	39 (54)	10.0 (4,5)
76,1 (65)	– (76,1)	8.00 (203,2)	5.38 (136,7)	2.63 (66,7)	3.09 (78,5)	3.87 (98,3)	5.87 (149,1)	1.63 (41,7)	39 (54)	10.0 (4,5)
3 (80)	3.500 (88,9)	8.37 (212,6)	5.72 (145,3)	2.81 (71,4)	3.31 (84,1)	3.87 (98,3)	5.87 (149,1)	1.63 (41,7)	39 (54)	11.0 (5,0)
4 (100)	4.500 (114,3)	9.63 (244,6)	6.68 (169,7)	3.80 (96,5)	3.63 (92,2)	4.53 (115,4)	7.13 (181,1)	1.84 (46,7)	50 (69)	25.0 (11,3)
139,7 (125)	– (139,7)	10.50 (266,7)	7.40 (188,0)	4.46 (113,3)	4.13 (104,9)	4.90 (124,5)	7.50 (190,5)	1.75 (44,5)	39 (54)	29.0 (13,2)
5 (125)	5.563 (141,3)	10.50 (266,7)	7.40 (188,0)	4.46 (113,3)	4.13 (104,9)	4.90 (124,5)	7.50 (190,5)	1.75 (44,5)	39 (54)	29.0 (13,2)
165,1 (150)	– (165,1)	11.50 (292,1)	8.00 (203,2)	4.62 (117,3)	4.50 (114,3)	5.00 (127,0)	7.60 (193,0)	1.85 (47,0)	60 (82)	47.0 (21,3)
6 (150)	6.625 (168,3)	11.50 (292,1)	8.00 (203,2)	4.62 (117,3)	4.50 (114,3)	5.00 (127,0)	7.60 (193,0)	1.85 (47,0)	60 (82)	47.0 (21,3)
8 (200)	8.625 (219,1)	14.00 (355,6)	10.14 (257,8)	6.67 (169,4)	5.52 (140,2)	5.46 (138,7)	8.46 (214,9)	2.13 (54,1)	120 (164)	66.0 (29,9)
10 (250)	10.750 (273,1)	18.00 (457,2)	12.38 (314,5)	8.62 (218,9)	6.41 (162,8)	7.50 (190,5)	10.50 (266,7)	3.00 (76,2)	130 (178)	109.7 (49,4)
12 (300)	12.750 (323,9)	21.00 (533,4)	14.28 (362,7)	9.93 (252,2)	7.27 (184,7)	7.62 (193,5)	10.62 (269,7)	2.75 (69,9)	130 (178)	151.0 (68,0)

FIGURE 1
MODEL CV-1F CHECK VALVES
NOMINAL DIMENSIONS



Detail	Part	Material	Qty.
1	Body	Ductile Iron	1
2	Cover	Ductile Iron	1
3	Cover Gasket	Nitrile Rubber	1
4	Hex Cap Screw	Steel, Zinc Plated	AR
5	Clapper 2″-8″ (DN50-200)	Stainless Steel	1
	Clapper 10″-12″ (DN250-300)	Ductile Iron	

Detail	Part	Material	Qty.
6	Clapper Facing	EPDM Grade "E"	1
7	Spring	Stainless Steel	1
8	Hinge Shaft	Stainless Steel	1
9	Retaining Ring	Stainless Steel	AR
11	Retention Bolt	Stainless Steel	1
13	Retaining Disc	Stainless Steel	1

Detail	Part	Material	Qty.
14	Locknut	Stainless Steel	1
15	Plug-1/2″-14 NPT	Cast Iron	2
16	Adhesive	Thread Sealer	AR
17	Nameplate	Aluminum	1
18	Rivet	Steel	2
19	Spacer	Stainless Steel	1

FIGURE 2
MODEL CV-1F CHECK VALVES
ASSEMBLY

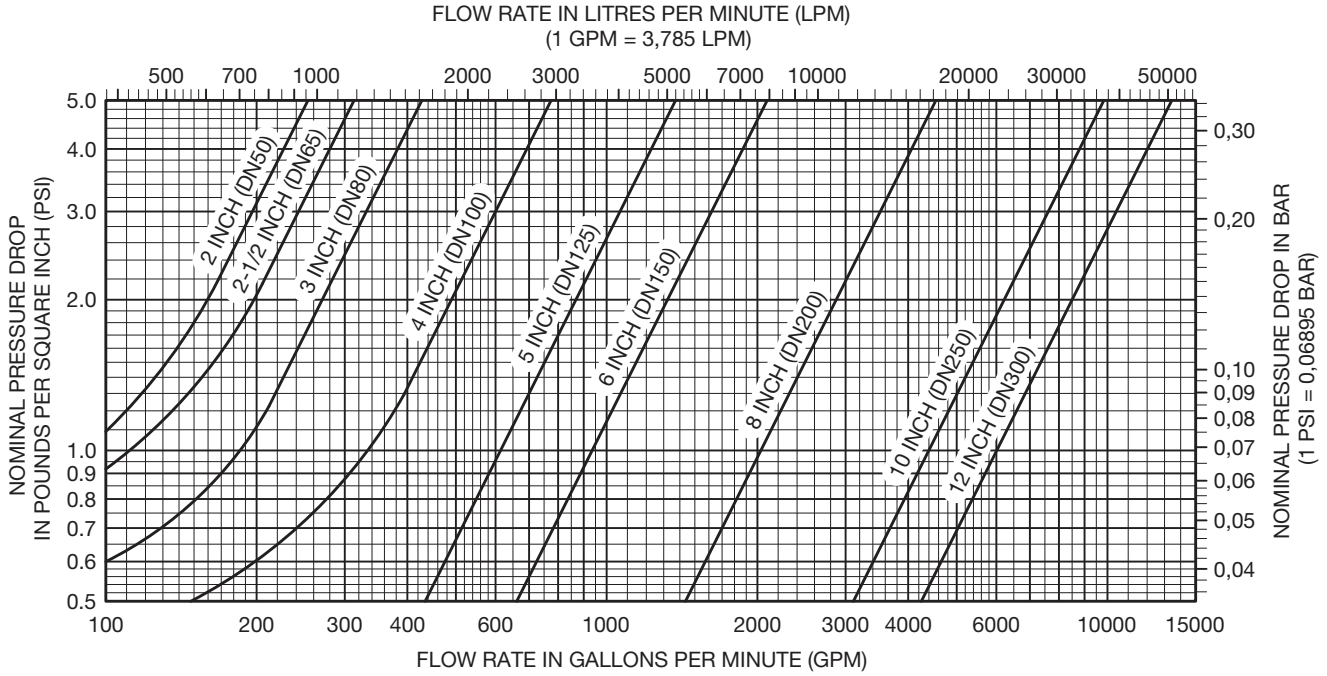


FIGURE 3
MODEL CV-1F CHECK VALVES
PRESSURE LOSS DATA

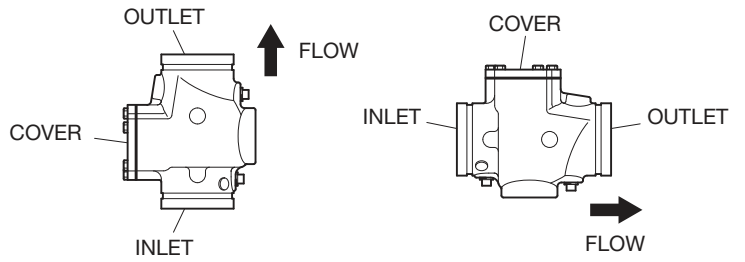


FIGURE 4
MODEL CV-1F CHECK VALVES
INSTALLATION

Care and Maintenance

The TYCO Model CV-1F Grooved End Swing Check Valves must be maintained and serviced in accordance with this section.

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

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

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

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

Limited Warranty

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

Ordering Procedure

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

Model CV-1F Check Valves
Specify: size (specify) and P/N (specify):

2 Inch (DN50) . . . . . .P/N 59-590-0-020

2-1/2 Inch (DN65) . . . . . .P/N 59-590-0-025
76,1 mm (DN65) . . . . . .P/N 59-590-0-076

3 Inch (DN80) . . . . . .P/N 59-590-0-030

4 Inch (DN100) . . . . . .P/N 59-590-0-040

5 Inch (DN125) . . . . . .P/N 59-590-0-050
139,7 mm (DN125) . . . . . .P/N 59-590-0-139

6 Inch (DN150) . . . . . .P/N 59-590-0-060
165,1 mm (DN150) . . . . . .P/N 59-590-0-165

8 Inch (DN200) . . . . . .P/N 59-590-0-080

10 Inch (DN250) . . . . . .P/N 59-590-0-100

12 Inch (DN300) . . . . . .P/N 59-590-0-120

tyco Fire Protection Products

UNITED BRASS WORKS, INC

714 S. Main St.. Randleman, N.C. 27317
Phone: 800/334-3035 Fax: 800/498-4696

Model 80 Ball Valve

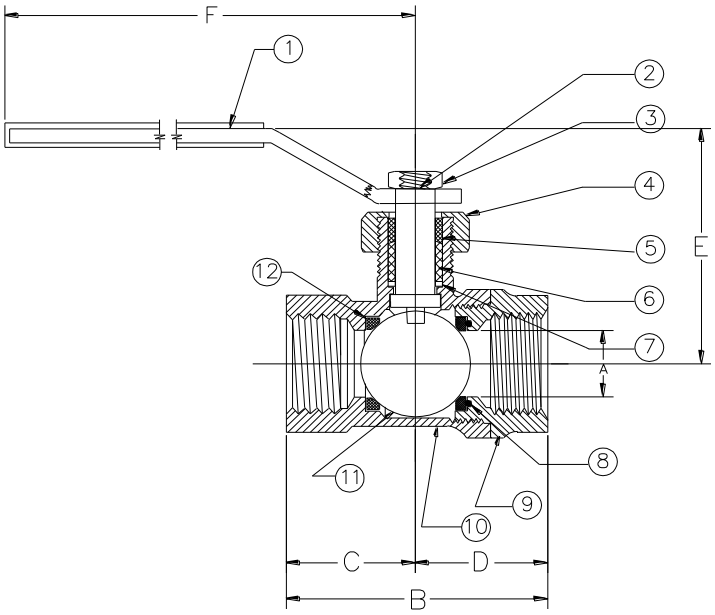
Double Female

(Complies with MSS-SP110-92)

200 lbs. WSP @ 406 ° Max
400 lbs. WOG * 100% Pressure Tested
Threaded Ends * Blowout Proof Stem
¼" - ½" Full Flow
¾" - 2" Large Port Diameters
CRN OCO7135.2
Contains Lead. Not Intended for Use in Potable Water Systems

MATERIAL LIST

NO.	DESCRIPTION	MATERIAL
1	Lever	Plated Steel w/ vinyl grip
2	Stem	Brass
3	Jam Nut	Plated Steel
4	Packing Nut	Brass
5	Packing Sleeve	Brass
6	Packing	Graphite Non-Asb.
7	Bevel Washer	Steel
8	O-Ring	Buna
9	Tail Piece (¼" – ½") Tail Piece (3/4" - 2")	Brass Bronze
10	Body	Bronze
11	Ball	Chrome Plated Brass
12	Nest	PTFE



SIZE	A	B	C	D	E	F	SHIP WT. (lbs.)	QUAN. PER CTN.
¼"	0.38	1.86	0.92	0.94	1.58	3.31	0.52	12
3/8"	0.38	1.86	0.92	0.94	1.58	3.31	0.52	12
½"	0.50	2.17	1.06	1.11	2.28	4.23	0.78	12
¾"	0.63	2.05	1.20	1.31	2.38	4.23	0.98	12
1"	0.81	3 .27	1.67	1.59	2.55	4.23	1.59	6
1 ¼"	1.00	3.48	1.72	1.77	3.19	5.47	2.47	4
1 ½"	1.25	3.97	1.95	2.02	3.38	5.47	3.50	4
2"	1.50	4.41	2.14	2.27	3.56	5.47	5.00	2

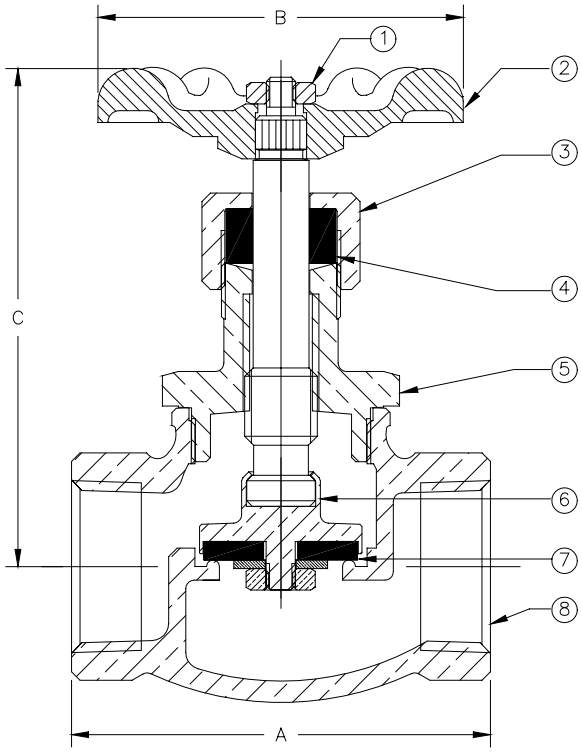
UNITED BRASS WORKS, INC.

714 S. Main St., Randleman, NC 27317

Tel: 800-334-3035 Fax: 800-498-4696 www.ubw.com

Model 125S Globe Valve

Soft Disc
200 WOG @ 180 ° Max
100% Pressure Tested
Threaded Ends • Integral Seat
Rising Stem
Swivel Disc Holder



MATERIAL LIST

NO.	DESCRIPTION	MATERIAL
1	Hex Nut	Steel
2	Handwheel	Aluminum
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	¼"	3/8"	½"	¾"	1"	1 ¼"	1 ½"	2"
A	1.75	1.84	2.22	2.47	2.97	3.56	4.06	4.69
B	1.75	1.75	2.03	2.38	2.75	3.00	3.72	3.72
C (closed)	2.88	3.13	3.38	3.50	4.25	4.75	5.50	5.50
Ship Wt. (lbs.)	0.44	0.56	0.80	1.00	1.81	2.57	3.69	5.88
Qty. Unit Pack	12	12	12	6	6	4	2	2
Qty. Per Case	60	60	72	60	36	24	12	12

For Non-Health Hazard Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

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

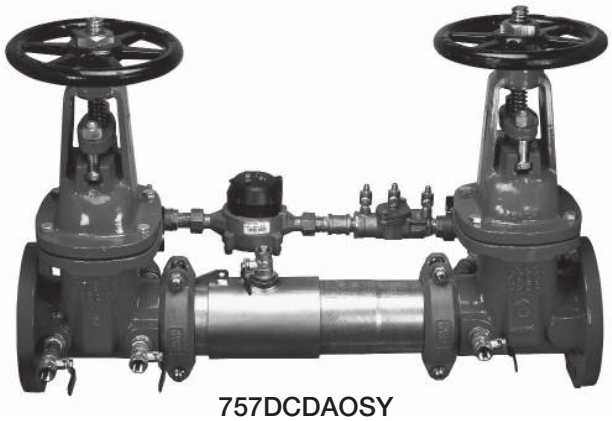
Approval _____ Representative _____

Series 757DCDA, 757NDCDA

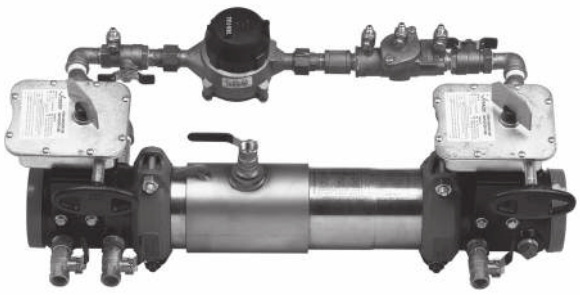
Double Check Detector Assemblies

Sizes: 2½" – 10" (65 – 250 mm)

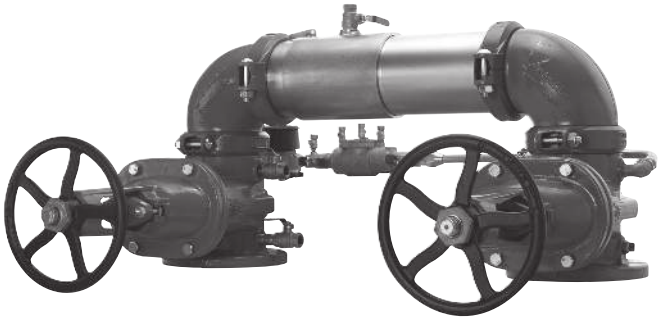
Series 757DCDA, 757NDCDA Double Check Detector Assemblies are used to prevent backflow of non-health hazard pollutants that are objectionable but not toxic, from entering the potable water supply system. The 757DCDA, 757NDCDA may be installed under continuous pressure service and may be subjected to backpressure and backsiphonage. Series 757DCDA, 757NDCDA is used primarily on fire line sprinkler systems when it is necessary to monitor unauthorized use of water.



757DCDAOSY



757DCDABFG



757NDCDAOSY

Features

- Extremely compact design
- 70% Lighter than traditional designs
- 304 (Schedule 40) stainless steel housing & sleeve
- Groove fittings allow integral pipeline adjustment
- Patented tri-link spring check provides lowest pressure loss
- Unmatched ease of serviceability
- Available with grooved butterfly valve shutoffs
- May be used for horizontal, vertical or N pattern installations
- Replaceable check disc rubber

Specifications

The Double Check Detector Assembly shall consist of two independent tri-link check modules within a single housing, sleeve access port, four test cocks and two drip tight shutoff valves. Tri-link checks shall be removable and serviceable, without the use of special tools. The housing shall be constructed of 304 Schedule 40 stainless steel pipe with groove end connections. Tri-link checks shall have reversible elastomer discs and in operation shall produce drip tight closure against reverse flow caused by backpressure or backsiphonage. The bypass assembly shall consist of a meter, which registers in either gallon or cubic measurement, a double check backflow assembly and required test cocks. Assembly shall be a Watts Regulator Company Series 757DCDA, 757NDCDA.

WATTS®

Available Models

Suffix:

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

BFG – UL/FM grooved gear operated butterfly valves with 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

Materials

Housing & Sleeve: 304 (Schedule 40) Stainless Steel
Elastomers: EPDM, Silicone and Buna-N
Tri-link Checks: Noryl®, Stainless Steel
Check Discs: Reversible Silicone or EPDM
Test Cocks: Bronze Body Nickel Plated
Pins & Fasteners: 300 Series Stainless Steel
Springs: Stainless Steel

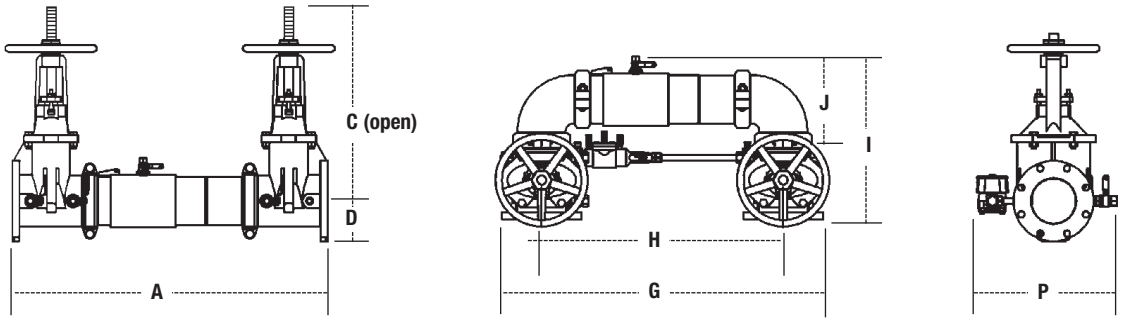
Pressure — Temperature

Temperature Range: 33°F – 110°F (0.5°C – 43°C)
Maximum Working Pressure: 175psi (12.1 bar)

Approvals

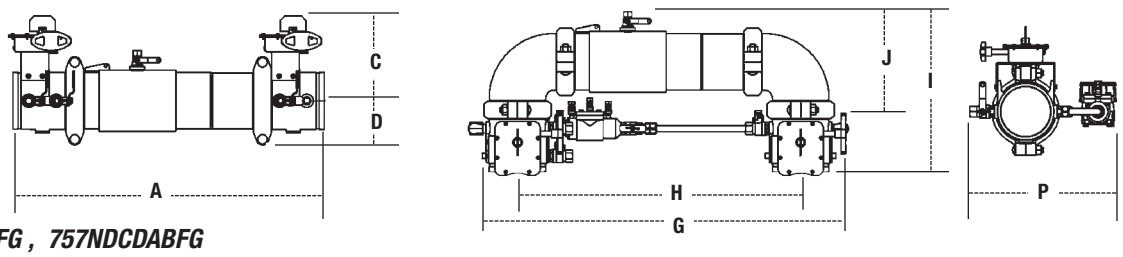
1048 C B64.5 US FM Approved C UL US CLASSIFIED (BFG & OSY only)

Dimensions — Weight



757DCDA , 757NDCDA

SIZE (DN)		DIMENSIONS																WEIGHT			
		A		C (OSY)		D		G		H		I		J		P		757DCDA		757NDCDA	
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*	*lbs.*	*kgs.*
2½	65	31	787	16⅜	416	3½	89	29 1/16	738	22	559	15½	393	8 13/16	223	13 3/16	335	139	63	147	67
3	80	31 11/16	805	18⅞	479	3 11/16	94	30¼	768	22¾	578	17⅛	435	9 3/16	233	14½	368	159	72	172	78
4	100	33 11/16	856	22¾	578	4	102	33	838	24	610	18½	470	9 15/16	252	15 3/16	386	175	79	198	90
6	150	43½	1105	30⅛	765	5½	140	44¾	1137	33¾	857	23 3/16	589	13 1/16	332	19	483	309	140	350	159
8	200	50	1270	37¾	959	6 11/16	170	54⅛	1375	40⅝	1032	27 7/16	697	15 11/16	399	21 3/16	538	494	224	569	258
10	250	57½	1460	45¾	1162	8 3/16	208	66	1676	50	1270	32½	826	17 5/16	440	24	610	795	361	965	438



757DCDABFG , 757NDCDABFG

SIZE (DN)		DIMENSIONS																WEIGHT			
		A		C		D		G		H		I		J		P		757DCDABFG		757NDCDA BFG	
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*	*lbs.*	*kgs.*
2½	65	28	711	8	203	3½	89	29⅞	759	22	559	14 15/16	379	8 13/16	223	13	330	70	32	78	35
3	80	28½	724	8 5/16	211	3 11/16	94	30 11/16	779	22¾	578	15 7/16	392	9 3/16	233	13½	343	68	31	81	37
4	100	29 3/16	741	8 15/16	227	3 11/16	94	31 15/16	811	24	610	16¼	412	9 15/16	252	14	356	75	34	98	44
6	150	36½	927	10	254	5	127	43 3/16	1097	33¾	857	19 11/16	500	13 1/16	332	14½	368	131	59	171	78
8	200	43	1092	12¼	311	6½	165	51 1/16	1297	40⅝	1032	23 3/16	592	15 11/16	399	18 3/16	462	275	125	351	159

Noryl® is a registered trademark of General Electric Company.

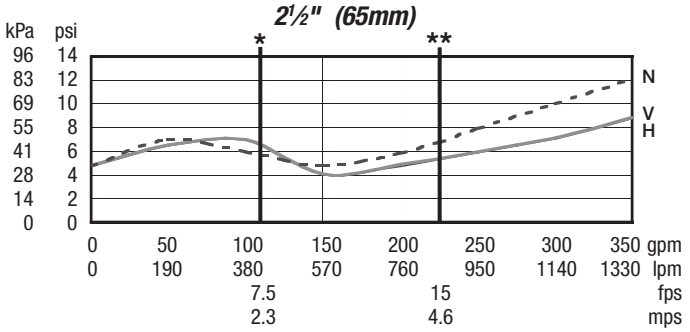
Capacity

Series 757DCDA, 757NDCDA flow curves as tested by Underwriters Laboratory per UL 1469, 1996.
Flow characteristics collected using butterfly shutoff valves

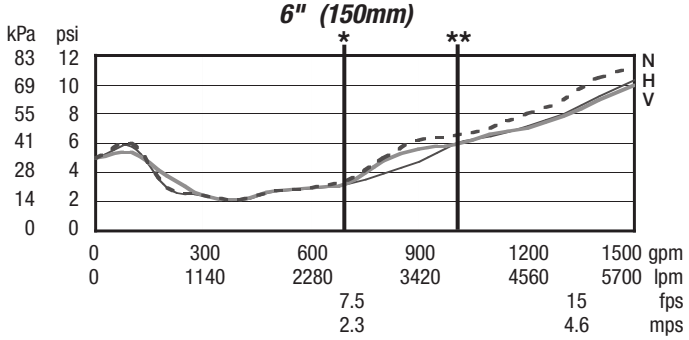
*** = Rated flow ** = UL Rated flow**

——— Horizontal ——— Vertical ------ N - Pattern

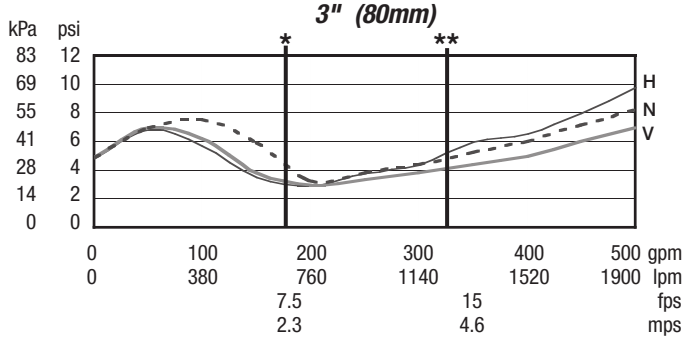
2½" (65mm)



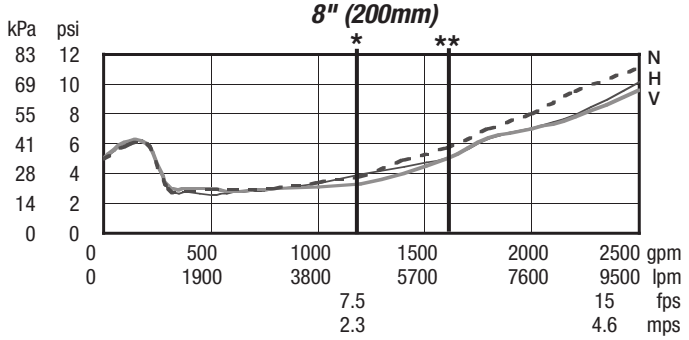
6" (150mm)



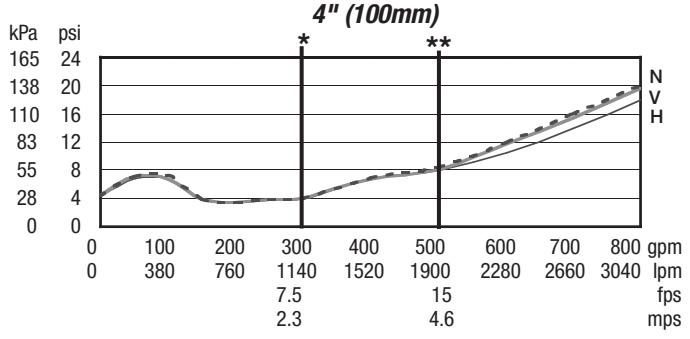
3" (80mm)



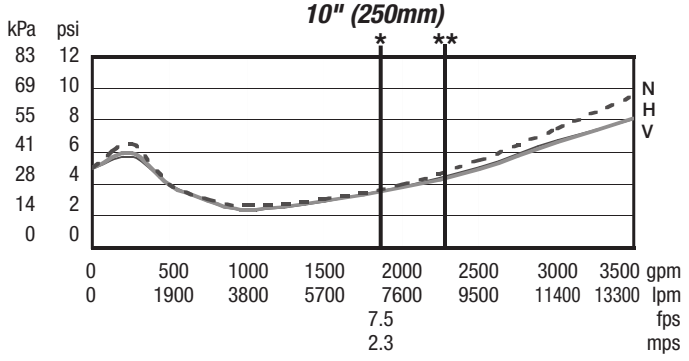
8" (200mm)



4" (100mm)



10" (250mm)



DEVICES

TECHNICAL DATA

STANDARD RESPONSE DRY PENDENT STANDARD ORIFICE SPRINKLERS

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.

1. DESCRIPTION

Viking Standard Response Dry Pendent Sprinklers are thermosensitive spray sprinklers suitable for use in areas subject to freezing. The sprinklers are designed for dry systems and preaction systems where it is necessary to prevent water or condensation from entering the drop nipple before sprinkler operation. They may also be installed in spaces subject to freezing and supplied from a wet system in an adjacent heated area. Viking Standard Response Dry Pendent Sprinklers are available in various finishes and temperature ratings to meet design requirements.

The special Polyester and Electroless Nickel PTFE (ENT) coatings have been investigated for installation in corrosive environments and are listed/approved as indicated in the approval charts.

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

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Classes 2013 and 2015

NYC Approved: MEA 89-92-E, Volume 37

LPCB Approved: Ref. No. 096e/06

China Approval: Approved according to China GB Standard

NOTE: Other International approval certificates are available upon request.

Refer to Approval Chart 1 and Design Criteria for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Available since 1991.
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 size: 1” NPT or 25 mm BSP
Nominal K-Factor: 5.6 U.S. (80.6 metric**) for all listed and approved lengths.
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Covered by the following U.S. Patents: 8,636,075 and 10,220,231

* cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB Approvals ONLY is 5 psi (0.35 bar).

**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.

Material Standards:
Frame Casting: Brass UNS-C84400
Deflector: Brass UNS-C26000
Bulb: Glass, nominal 5 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Compression Screw: Brass UNS-C36000
Pip Cap: Brass UNS-C31400 or UNS-C31600
Pip Cap Adapter: Brass UNS-C36000
Seat (for Sprinklers VK151, VK155, and VK159 only): Copper UNS-C21000
Orifice: Copper UNS-C22000 or UNS-C11000 (Copper UNS-C21000 for Sprinklers VK151, VK155, and VK159)
Gasket (for Sprinklers VK151, VK155, and VK159 only): Buna-N
Tube: ERW Hydraulic Steel Tube
Barrel End and Threads (for Sprinklers VK150, VK154, and VK158): QM Brass
Support (Internal): Stainless Steel UNS-S30400

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.

Barrel: Steel Pipe UNS-G10260, Electrodeposited Epoxy Base finish
Sleeve (for Adjustable Standard style only): Brass UNS-C26000 or UNS-C26800

Escutcheon Materials:
Adjustable Standard Dry Escutcheons: Brass UNS-C26000 or UNS-C26800
Recessed Dry Escutcheons: Cold Rolled Steel UNS-G10080
ENT Coated Adjustable and Recessed Escutcheons: Stainless Steel UNS-S30400

Ordering Information: (Also refer to the current Viking price list.)
Order Standard Response Dry Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish, the appropriate suffix for the temperature rating, and then the suffix for the length ("A" dimension) to sprinkler base part number. Order in a specific length noted as the "A" dimension (see Figures 3 through 5). The "A" dimension is the distance from the face of the fitting (tee) to the desired finished surface of the ceiling.
These sprinklers are listed and approved in lengths from 1-1/2" to 45-1/2" (38.1 to 1,156 mm) for the adjustable standard style, 3" to 47" (76.2 to 1,194 mm) for the plain barrel style, and 3-1/4" to 47-1/2" (82.5 to 1,207 mm) for the adjustable recessed style.
Lengths exceeding the standard lengths are available, with no approvals, on a "made-to-order" basis: Recessed Dry Pendent up to 65-1/2" (1,664 mm). Adjustable Standard Dry Pendent up to 63-1/2" (1,613 mm). Plain Barrel Dry Pendent up to 65" (1,651 mm). Contact the manufacturer for more information.
Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, and ENT = JN
Temperature Suffix (°F/°C): 155°/68° = B, 175°/79° = D, 200°/93° = E, 286°/141° = G
For example, sprinkler VK154 with 1" NPT Threads, a Chrome finish and a 155 °F/68 °C temperature rating, and "A" length of 10" = Part No. 07740UFB10.

Available Finishes And Temperature Ratings:

Refer to Table 1.

Accessories: (Also refer to the Viking website.)

Sprinkler Wrenches:
A. Standard Wrench: Part No. 07297W/B (available since 1991)
B. Wrench for recessed sprinklers: Part No. 07565W/B† (available since 1991)
†A ½" ratchet is required (not available from Viking).

Sprinkler Guard: Chrome, with no listings or approvals, for installation on dry pendent sprinklers manufactured after May 1994 only (Part No. 08954).

Replacement Escutcheons:
A. Adjustable Standard Dry Escutcheon: Base Part No. 07741
B. Recessed Dry Escutcheon Cup: Base Part No. 05459A

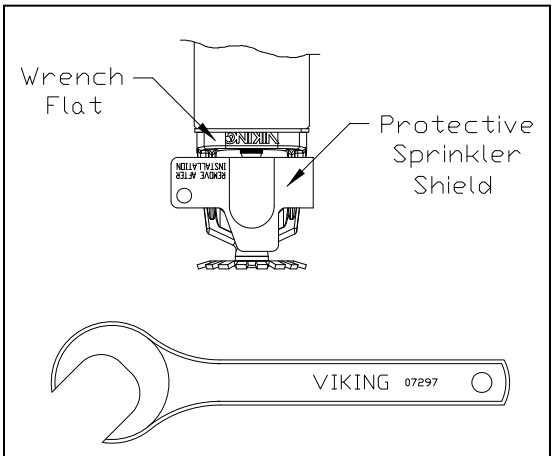


Figure 1: Standard Sprinkler Wrench 07297W/B

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the internal parts to open the waterway. 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

The Viking Standard Response Dry Pendent Sprinkler is 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.

VIKING®	TECHNICAL DATA	STANDARD RESPONSE DRY PENDENT STANDARD ORIFICE SPRINKLERS

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.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Bulb Color
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, and ENT
Corrosion-Resistant Coating[3,4]: White Polyester and ENT in all temperature ratings

Footnotes

[1] The sprinkler temperature rating is stamped on the deflector.

[2] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

[3] The corrosion-resistant Polyester and ENT coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Note: These coatings are NOT corrosion proof. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. Polyester and ENT coatings are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and ENT coatings.

[4] When installed in some corrosive environments, the Polyester finish may change color. This natural discoloration over time is not in itself an indication of corrosion and should not be treated as such. All sprinklers installed in corrosive environments should be replaced or tested as described in NFPA 25 on a more frequent basis.

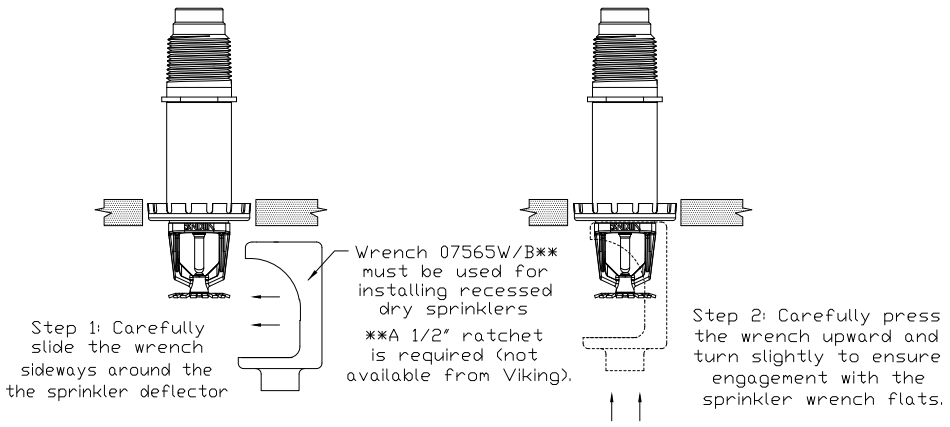


Figure 2: Wrench 07565W/B for Adjustable Recessed Dry Pendent Sprinklers

VIKING®

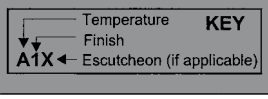
TECHNICAL DATA

STANDARD RESPONSE DRY PENDENT STANDARD ORIFICE SPRINKLERS

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.

Approval Chart 1 (UL)

Standard Response Standard Orifice Dry Pendent Sprinklers
Maximum 175 PSI (12 bar) WWP



Sprinkler Base Part No.[1]	SIN	Style	Thread Size		Nominal K-Factor[2]		Order Length Increment		Listings and Approvals[4] (Refer also to Design Criteria below.)			
			NPT	BSPT	U.S.	metric[3]	Inches	mm	cULus[5]	NYC[6]	China Approval	LPCB
07740U	VK154	Adjustable Standard	1”	--	5.6	--	1/2”	12.7	A1, A6	A1	--	--
07854U			--	25 mm	--	80.6	1/2”	12.7	A1, A6	--	--	--
09341	VK155		--	25 mm	--	80.6	1/2”	12.7	--	--	--	A2
06530U	VK158	Adjustable Recessed	1”	--	5.6	--	1/4”	6.35	B3, B7	B3	--	--
07853U			--	25 mm	--	80.6	1/4”	6.35	B3, B7	--	--	--
20374U[8]			--	25 mm	--	80.6	1/4”	6.35	C9	--	C9	--
09342	VK159		--	25 mm	--	80.6	1/4”	6.35	--	--	--	B3
07852U	VK150	Plain Barrel	1”	--	5.6	--	1/2”	12.7	A4, A8	A5	--	--
07855U			--	25 mm	--	80.6	1/2”	12.7	A4, A8	--	--	--
09343	VK151		--	25 mm	--	80.6	1/2”	12.7	--	--	--	A5

Approved Temperature Ratings

A - 155 °F (68 °C), 175 °F (79°C), 200 °F (93 °C), and 286 °F (141 °C)
B - 155 °F (68 °C), 175 °F (79°C), and 200 °F (93 °C)
C - 155 °F (68 °C)

Approved Finishes and “A” Dimensions

1 - Chrome or White Polyester[7] sprinkler with a Chrome or White Polyester Sleeve and Escutcheon with “A” dimensions 1-1/2” to 45-1/2” (38.1 mm to 1,156 mm)
2 - Chrome with “A” dimensions 1-1/2” to 45-1/2” (38.1 mm to 1,156 mm)
3 - Chrome or White Polyester[7] with “A” dimensions 3-1/4” to 47-1/2” (82.5 to 1,207 mm)
4 - Chrome, White Polyester[7], or Brass with “A” dimensions 3” to 47” (76.2 to 1,194 mm)
5 - Chrome or Brass with “A” dimensions 3” to 47” (76.2 mm to 1,194 mm)
6 - ENT[7] sprinkler with an ENT[7] Sleeve and Escutcheon with “A” dimensions 1-1/2” to 45-1/2” (38.1 mm to 1,156 mm)
7 - ENT[7] with “A” dimensions 3-1/4” to 47-1/2” (82.5 to 1,207 mm)
8 - ENT[7] with “A” dimensions 3” to 47” (76.2 to 1,194 mm)
9 - Chrome with “A” dimensions 3-1/4” to 47-1/2” (82.5 to 1,207 mm)

Footnotes

[1] Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
[2] K-Factor applies for standard lengths (“A” Dimensions indicated above).
[3] 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.
[4] 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.
[5] Listed by Underwriter’s Laboratories for use in the U.S. and Canada.
[6] Accepted for use, City of New York Department of Buildings, MEA 89-92-E, Vol. 37.
[7] cULus Listed as corrosion resistant.
[8] Approved according to China GB Standard.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

NOTE: When using CPVC fittings with Viking dry sprinklers, use only new Nibco Model 5012-S-BI tees. When selecting other CPVC fittings, contact Viking Technical Services.

cULus Listing Requirements:

Standard Dry Pendent Sprinklers are cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray pendent sprinklers.

- Designed for use in Light, Ordinary, and Extra Hazard occupancies.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13.
- Minimum spacing allowed is 6 ft. (1.8 m) unless baffles are installed in accordance with NFPA 13.
- Locate no less than 4” (102 mm) from walls.
- 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 standard spray pendent sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to 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, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

TECHNICAL DATA

STANDARD RESPONSE DRY PENDENT STANDARD ORIFICE SPRINKLERS

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.

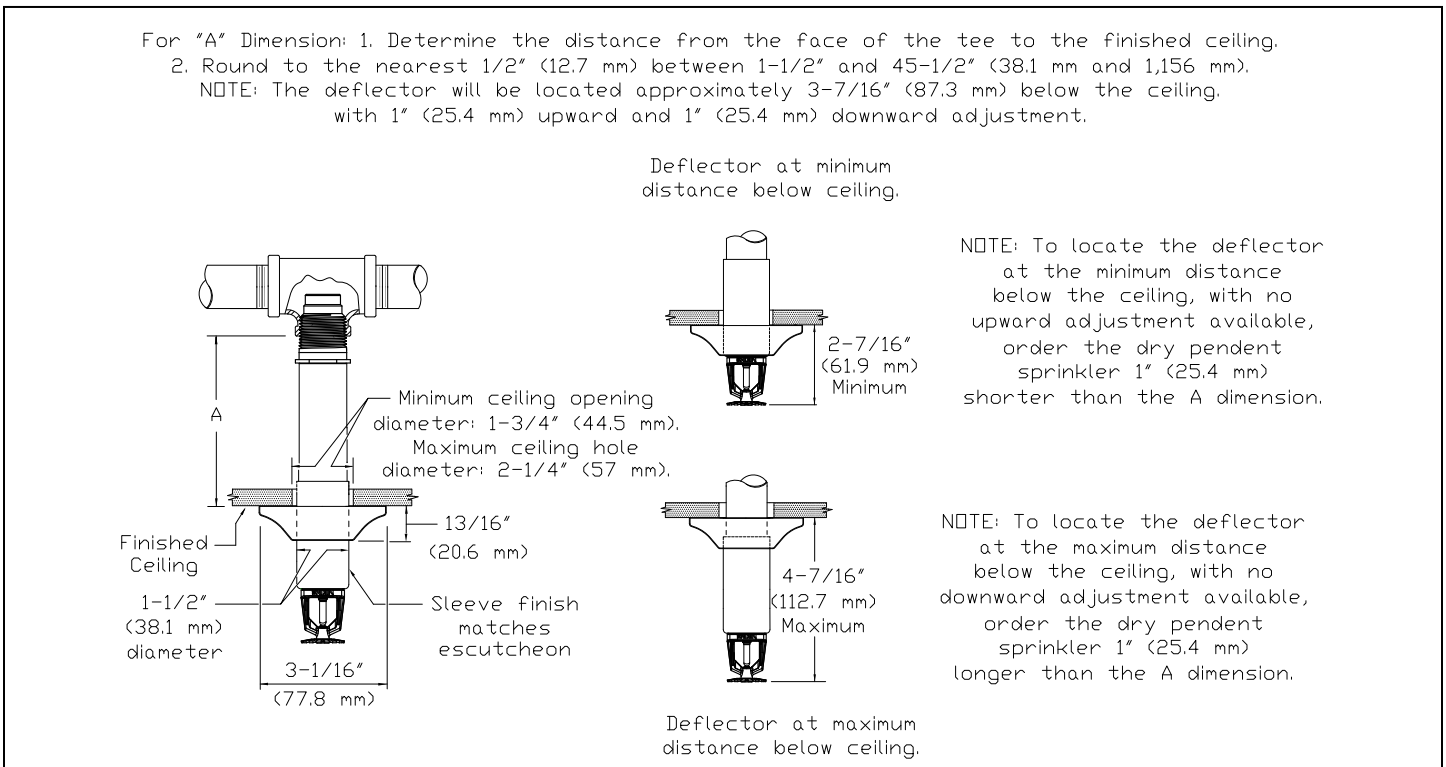


Figure 3: **Adjustable Standard Dry Pendent Sprinkler**

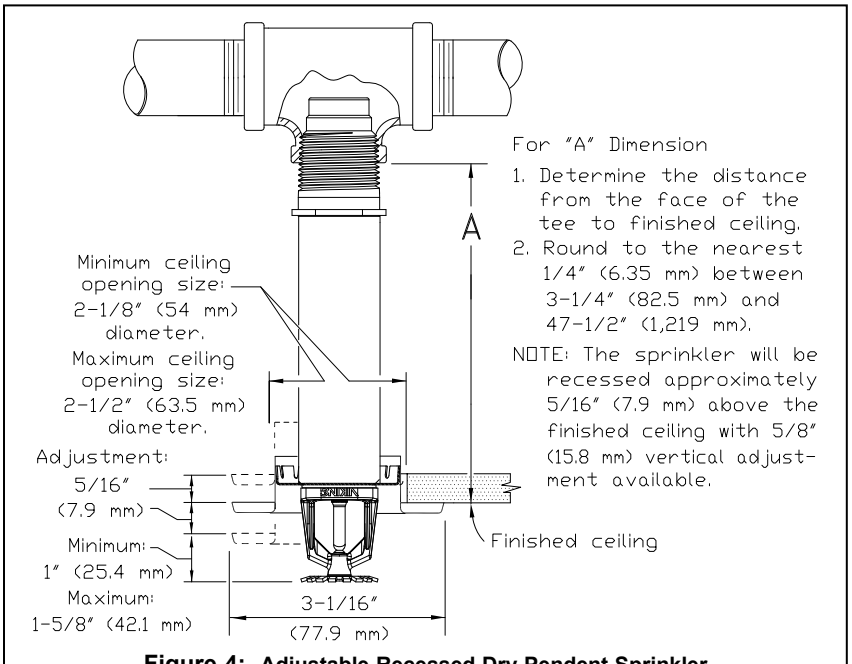


Figure 4: **Adjustable Recessed Dry Pendent Sprinkler**

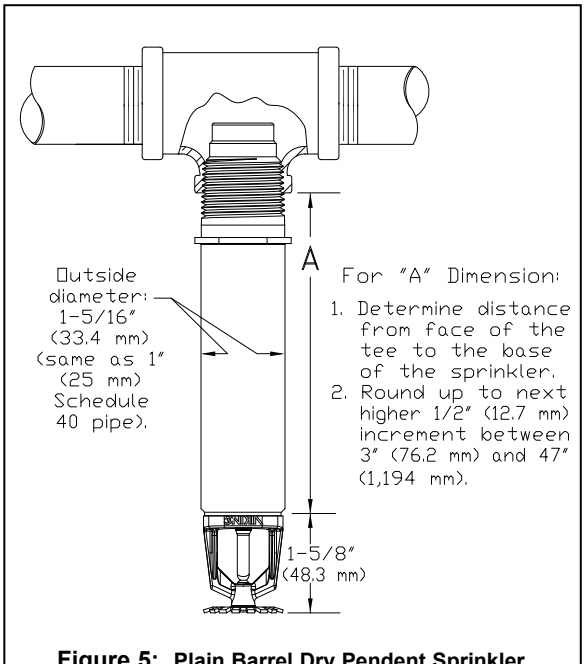


Figure 5: **Plain Barrel Dry Pendent Sprinkler**

VIKING®

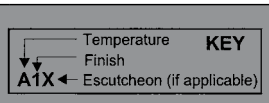
TECHNICAL DATA

STANDARD RESPONSE DRY PENDENT STANDARD ORIFICE SPRINKLERS

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.

Approval Chart 2 (FM)

Standard Response Standard Orifice Dry Pendent Sprinklers
Maximum 175 PSI (12 bar) WWP



Sprinkler Base Part No.[1]	SIN	Style	Thread Size		Nominal K-Factor[2]		Order Length Increment		FM Approvals[4] (Refer also to Design Criteria below.)
			NPT	BSP	U.S.	metric[3]	Inches	mm	
07740U	VK154	Adjustable Standard	1”	--	5.6	--	1/2”	12.7	A1
07854U			--	25 mm	--	80.6	1/2”	12.7	A1
06530U	VK158	Adjustable Recessed	1”	--	5.6	--	1/4”	6.35	B2
07853U			--	25 mm	--	80.6	1/4”	6.35	B2
20374U[6]				25 mm	--	80.6	1/4”	6.35	C4
07852U	VK150	Plain Barrel	1”	--	5.6	--	1/2”	12.7	A3
07855U			--	25 mm	--	80.6	1/2”	12.7	A3

Approved Temperature Ratings

A - 155 °F (68 °C), 175 °F (79°C), 200 °F (93 °C), and 286 °F (141 °C)
B - 155 °F (68 °C), 175 °F (79°C), and 200 °F (93 °C)
C - 155 °F (68 °C)

Approved Finishes and “A” Dimensions

1 - Brass, Chrome, White Polyester, or ENT[5] sprinkler with a Brass, Chrome, White Polyester, or ENT[5] Sleeve and Escutcheon with “A” dimensions 1-1/2” to 45-1/2” (38.1 to 1,156 mm)
2 - Brass, Chrome, White Polyester, or ENT[5] with “A” dimensions 3-1/4” to 47-1/2” (82.5 to 1,207 mm)
3 - Brass, Chrome, White Polyester, or ENT[5] with “A” dimensions 3” to 47” (76.2 to 1,194 mm)
4 - Chrome with “A” dimensions 3-1/4” to 47-1/2” (82.5 to 1,207 mm)

Footnotes

[1] Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
[2] K-Factor applies for standard lengths (“A” Dimensions indicated above).
[3] 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.
[4] This chart shows the FM Approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.
[5] FM Approved as corrosion resistant.
[6] Approved according to China GB Standard.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

NOTE: When using CPVC fittings with Viking dry sprinklers, use only new Nibco Model 5012-S-BI tees. When selecting other CPVC fittings, contact Viking Technical Services.

FM Approval Requirements:

Standard Dry Pendent Sprinklers in the Approval Chart above are FM Approved as standard response **Non-storage** standard spray sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including 2-0) and Technical Advisory Bulletins. FM Global Loss Prevention Data Sheets and Technical Advisory Bulletins contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

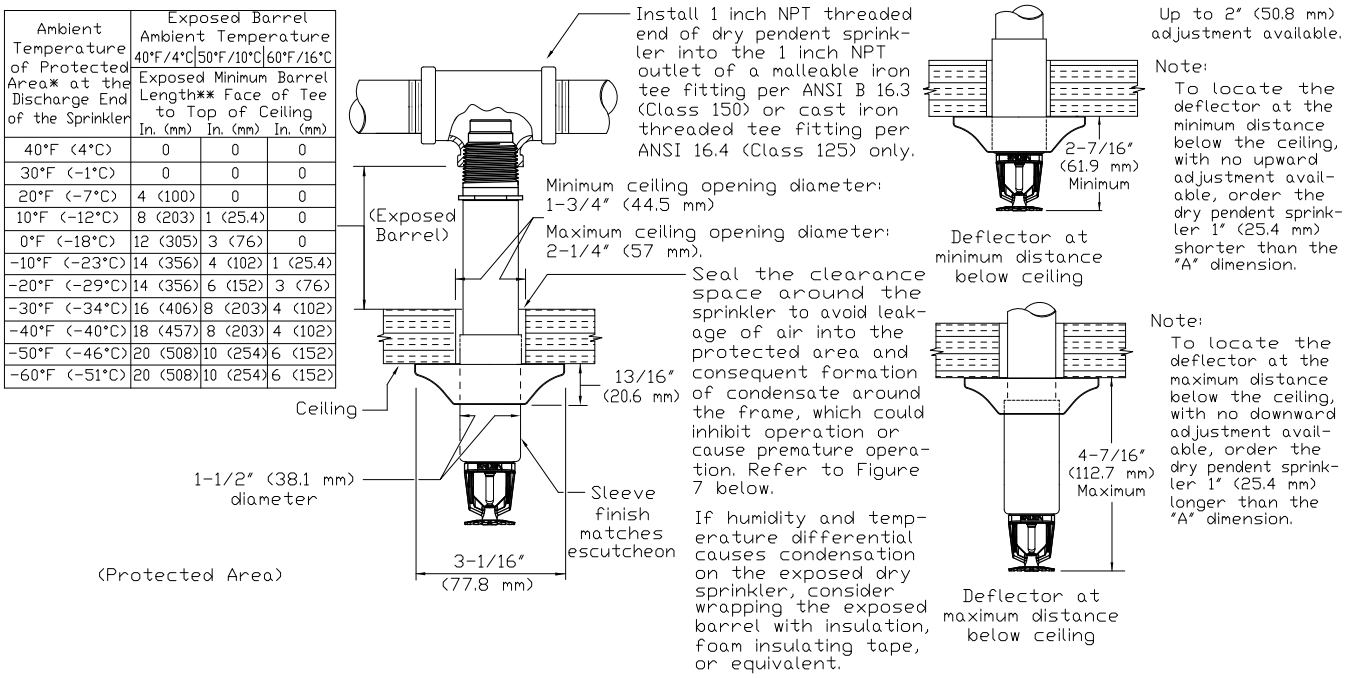
IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards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

TECHNICAL DATA

STANDARD RESPONSE DRY PENDENT STANDARD ORIFICE SPRINKLERS

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.

Ambient Temperature of Protected Area* at the Discharge End of the Sprinkler	Exposed Barrel Ambient Temperature 40°F/4°C	50°F/10°C	60°F/16°C
	Exposed Minimum Barrel Length** Face of Tee 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 (203)	1 (25.4)	0
0°F (-18°C)	12 (305)	3 (76)	0
-10°F (-23°C)	14 (356)	4 (102)	1 (25.4)
-20°F (-29°C)	14 (356)	6 (152)	3 (76)
-30°F (-34°C)	16 (406)	8 (203)	4 (102)
-40°F (-40°C)	18 (457)	8 (203)	4 (102)
-50°F (-46°C)	20 (508)	10 (254)	6 (152)
-60°F (-51°C)	20 (508)	10 (254)	6 (152)



*The protected area refers to the area below the ceiling.
The ambient temperature is the temperature at the discharge end of the sprinkler.
For protected area temperatures that occur between the values listed, use the next cooler temperature.

**The minimum required barrel length is not the same as the "A" dimension. Refer to Figures 3-5 for the "A" dimension.
NOTE: Exposed minimum barrel lengths are inclusive up to 30 mph wind velocities.

Figure 6: **Dry Pendent Sprinkler Required Minimum Barrel Length Based on Ambient Temperature in the Protected Area (Adjustable Standard Dry Pendent Sprinkler is shown)**

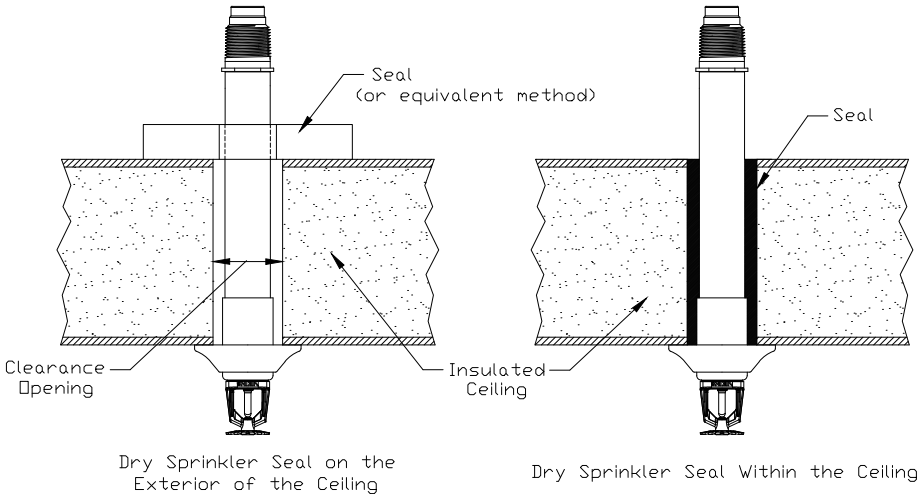


Figure 7: **Dry Sprinkler Seal (Adjustable Standard Dry Pendent Sprinkler is Shown)**

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

General Handling and Storage:

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

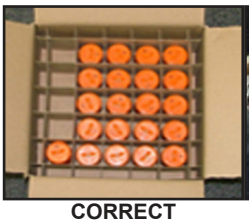
Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

  Maximum Torque:
  1/2" NPT: 14 ft-lbs. (19.0 N-m)
  3/4" NPT: 20 ft-lbs. (27.1 N-m)
  1" NPT: 30 ft-lbs. (40.7 N-m)

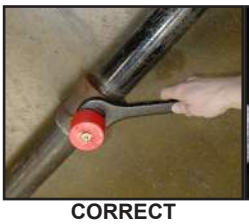
CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)

CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)

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

⚠ WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

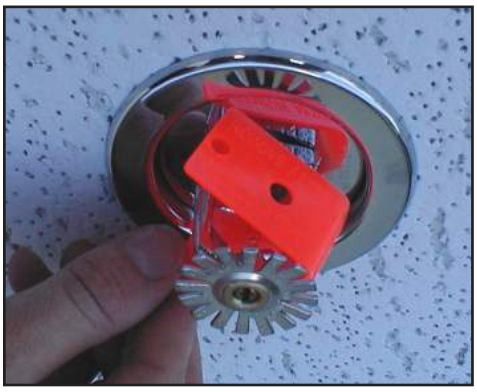


Figure 1: Sprinkler shield being removed from a pendent sprinkler.

Figure 2: Sprinkler cap being removed from a pendent sprinkler.

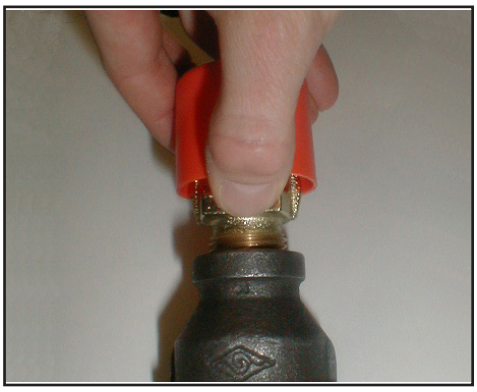


Figure 3: Sprinkler cap being removed from and upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.

WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

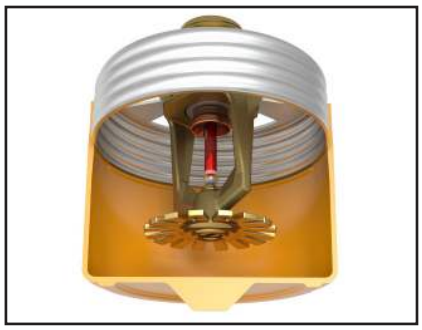
*** Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.**

BULLETIN

CARE AND HANDLING OF SPRINKLERS

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

CAUTION CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter Assembly with Protective Cap

Concealed Sprinkler and Adapter Assembly (Protective Cap Removed)

Cover Plate Assembly (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
  -- Use original shipping containers.
  -- Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers MUST receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating MUST be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature[1]	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

[1] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

⚠WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

VIKING	TECHNICAL DATA	SPRINKLER OVERVIEW

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

1. DESCRIPTION

Viking fire sprinklers consist of a threaded frame with a specific waterway or orifice size and a deflector for distributing water in a specified pattern. A closed or sealed sprinkler refers to a complete assembly, including the thermosensitive operating element. An open sprinkler does not use an operating element and is open at all times. The distribution of water is intended to extinguish a fire or to control its spread.

Viking sprinklers are available in several models and styles. Refer to specific sprinkler technical data pages for available styles, finishes, temperature ratings, thread sizes, and nominal K-Factors for the particular model selected.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.

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

3. TECHNICAL DATA

Pressure Ratings:

Maximum allowable water working pressure is 175 psig (12 Bar) unless rated and specified for high water working pressure [250 psig (17.2 bar)].

Sprinkler Identification:

Viking sprinklers are identified and marked with the word “Viking”, the sprinkler identification number (SIN) consisting of “VK” plus a three digit number*, the model letter, and the year of manufacture.

Available Finishes:

Viking sprinklers are available in several decorative finishes. Some models are available with corrosion-resistant coatings or are fabricated from non-corrosive material. Refer to the sprinkler technical data page for additional information.

Available Temperature Ratings:

Viking sprinklers are available in several temperature ratings that relate to a specific temperature classification. Applicable installation rules mandate the use and limitations of each temperature classification. In selecting the appropriate temperature classification, the maximum expected ceiling temperature must be known. When there is doubt as to the maximum temperature at the sprinkler location, a maximum-reading thermometer should be used to determine the temperature under conditions that would show the highest readings to be expected. In addition, recognized installation rules may require a higher temperature classification, depending upon sprinkler location, occupancy classification, commodity classification, storage height, and other hazards. In all cases, the maximum expected ceiling temperature dictates the lowest allowable temperature classification. Sprinklers located immediately adjacent to a heat source may require a higher temperature rating.

K-Factors:

Viking sprinklers are available in several orifice sizes with related K-Factors. The orifice is a tapered waterway and, therefore, the K-Factor given is nominal. Nominal U.S. K-Factors are provided in accordance with the 1999 edition of NFPA 13, Section 3-2.3. Refer to the specific data page for appropriate K-Factor information.

Available Styles:

Viking sprinklers are available for installation in several positions as indicated by a stamping on the deflector. The deflector style dictates the appropriate installation position of the sprinkler; it breaks the solid stream of water issuing from the sprinkler orifice to form a specific spray pattern. The following list indicates the various styles and identification of Viking sprinklers.

UPRIGHT SPRINKLER: A sprinkler intended to be installed with the deflector above the frame so water flows upward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked “SSU” (Standard Sprinkler Upright) or “UPRIGHT” on the deflector.

PENDENT SPRINKLER: A sprinkler intended to be oriented with the deflector below the frame so water flows downward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked “SSP” (Standard Sprinkler Pendent) or “PENDENT” on the deflector.

Viking Technical Data may be found on The Viking Corporation’s Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

CONVENTIONAL SPRINKLER: An “old style” sprinkler intended to be installed with the deflector in either the upright or pendent position. The deflector provides a spherical type pattern with 40 to 60 percent of the water initially directed downward and a proportion directed upward. Must be installed in accordance with installation rules for conventional or old style sprinklers. DO NOT USE AS A REPLACEMENT FOR STANDARD SPRAY SPRINKLERS. Marked “C U/P” (Conventional Upright/Pendent) on the deflector.

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

VERTICAL SIDEWALL (VSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The deflector provides a water spray pattern outward in a quarter-spherical pattern and can be installed in the upright or pendent position with the flow arrow in the direction of discharge. Marked “SIDEWALL” on the deflector with an arrow and the word “FLOW”. (Note: Some vertical sidewall sprinklers can only be installed in the upright or pendent position—in this case, the sprinkler will also be marked “UPRIGHT” or “PENDENT”.)

HORIZONTAL SIDEWALL (HSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The special deflector provides a water spray pattern outward in a quarter-spherical pattern. Most of the water is directed away from the nearby wall with a small portion directed at the wall behind the sprinkler. The top of the deflector is oriented parallel with the ceiling or roof. The flow arrows point in the direction of discharge. Marked “SIDEWALL” and “TOP” with an arrow and the word “FLOW”.

EXTENDED COVERAGE (EC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listings. Maximum area of coverage, minimum flow rate, orifice size, and nominal K-Factor are specified in the individual listings. EC sprinklers are intended for Light-Hazard occupancies with smooth, flat, horizontal ceilings unless otherwise specified. In addition to the above markings, the sprinkler is marked “EC”.

QUICK RESPONSE (QR) SPRINKLER: A spray sprinkler with a fast- actuating operating element. The use of quick response sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction (AHJ) prior to installing.

QUICK RESPONSE EXTENDED COVERAGE (QREC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listing. This is a sprinkler with an operating element that meets the criteria for quick response. QREC sprinklers are only intended for Light Hazard occupancies. The sprinkler is marked “QREC”.

FLUSH SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The unit is mounted flush with the ceiling or wall, with the fusible link exposed. Upon actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked “SSP”, “PEND”, or “SIDEWALL” and “TOP”.

CONCEALED SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The sprinkler is hidden from view by a cover plate installed flush with the ceiling or wall. During fire conditions, the cover plate detaches, and upon sprinkler actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked “SSP”, “PEND”, or “SIDEWALL” and “TOP”.

RECESSED SPRINKLER: A spray sprinkler assembly intended for installation with a concealed piping system. The assembly consists of a sprinkler installed in a decorative adjustable recessed escutcheon that minimizes the protrusion of the sprinkler beyond the ceiling or wall without adversely affecting the sprinkler distribution or sensitivity. Refer to the appropriate technical data page for allowable sprinkler models, temperature ratings, and occupancy classifications. DO NOT RECESS ANY SPRINKLER NOT LISTED FOR USE WITH THE ESCUTCHEON.

CORROSION-RESISTANT SPRINKLER: A special service sprinkler with non-corrosive protective coatings, or that is fabricated from non-corrosive material, for use in atmospheres that would normally corrode sprinklers.

DRY SPRINKLER: A special-service sprinkler intended for installation on dry pipe systems or wet pipe systems where the sprinkler is subject to freezing temperatures. The unit consists of a sprinkler permanently secured to an extension nipple with a sealed inlet end to prevent water from entering the nipple until the sprinkler operates. The unit MUST be installed in a tee fitting. Dry upright sprinklers are marked with the “B” dimension [distance from the face of the fitting (tee) to the top of the deflector]. Dry pendent and sidewall sprinklers are marked with the “A” dimension [the distance from the face of fitting (tee) to the finished surface of the ceiling or wall].

LARGE DROP SPRINKLER: A type of special application sprinkler used to provide fire control of specific high-challenge fire hazards. Large drop sprinklers are designed to produce an umbrella-shaped spray pattern downward with a higher percentage of “large” water droplets than standard spray sprinklers. The sprinkler has an extra-large orifice with a nominal K-Factor of 11.2. Marked “HIGH CHALLENGE” and “UPRIGHT”.

EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER: A sprinkler intended to provide fire suppression of specific high-challenge fire hazards through the use of a fast response fusible link, 14.0, 16.8, or 25.2 nominal K-Factor, and special deflector. ESFR sprinklers are designed to produce high-momentum water droplets in a hemispherical pattern below the deflector. This permits penetration of the fire plume and direct wetting of the burning fuel surface while cooling the atmosphere early in the development of a high-challenge fire. Marked “ESFR” and “UPRIGHT” or “PEND”.

INTERMEDIATE LEVEL/RACK STORAGE SPRINKLER: A standard spray sprinkler assembly designed to protect its operating element from the spray of sprinklers installed at higher elevations. The assembly consists of a standard or large orifice upright or pendent sprinkler with an integral upright or pendent water shield and guard assembly. Use only those sprinklers that have been tested and listed for use with the assembly. Refer to the technical data page for allowable sprinkler models.

RESIDENTIAL SPRINKLER: A sprinkler intended for use in the following occupancies: one- and two-family dwellings with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; and where allowed by the Authority Having Jurisdiction in residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13.

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

Residential sprinklers have a unique distribution pattern and utilize a “fast response” heat sensitive operating element. They enhance survivability in the room of fire origin and are designed to provide a life safety environment for a minimum of ten minutes. For this reason, residential sprinklers must not be used to replace standard sprinklers unless tested for and approved by the Authority Having Jurisdiction. In addition to standard markings, the unit is identified as “RESIDENTIAL SPRINKLER” or “RES”.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

Refer to the appropriate sprinkler technical data page(s).

6. INSPECTIONS, TESTS AND MAINTENANCE

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

7. AVAILABILITY

Viking sprinklers 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.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers and the appropriate sprinkler general care, installation, and maintenance guide. 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. The sprinkler technical data page may contain installation requirements specific for the sprinkler model selected. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.

TECHNICAL DATA

SPRINKLER GENERAL CARE, INSTALLATION, AND MAINTENANCE GUIDE

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.

1. DESCRIPTION - STANDARD RESPONSE, QUICK RESPONSE, EXTENDED COVERAGE, AND DRY SPRINKLERS

Viking thermosensitive spray sprinklers consist of a small frame and either a glass bulb or a fusible operating element. Available styles include pendent, flush pendent, concealed pendent, upright, horizontal sidewall, vertical sidewall, or conventional, depending on the particular sprinkler model selected.

Viking sprinklers are available with various finishes, temperature ratings, responses, and K-Factors to meet design requirements†. Used in conjunction with one of the corrosion-resistant coatings (for frame style sprinklers), the units provide protection against many corrosive environments. In addition, the special Polyester or Teflon® coatings can be used in decorative applications where colors are desired.

† Refer to the sprinkler technical data page for available styles, finishes, temperature ratings, responses, and nominal K-Factors for specific sprinkler models.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.

3. TECHNICAL DATA

Specifications:

Refer to the appropriate sprinkler technical data sheet.

Material Standards:

Refer to the appropriate sprinkler technical data sheet.

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

4. INSTALLATION

NOTE: Take care not to over-tighten the sprinkler and/or damage its operating parts!

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)

A. Care and Handling (also refer to Bulletin - Care and Handling of Sprinklers, Form No. F_091699.)

Sprinklers must be handled with care. They must be stored in a cool, dry place in their original shipping container. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed (refer to the temperature chart on the sprinkler technical data page). Never install any glass-bulb sprinkler if the bulb is cracked or if there is a loss of liquid from the bulb. A small air bubble should be present in the glass bulb. Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed immediately. (Note: Installing glass bulb sprinklers in direct sunlight (ultraviolet light) may affect the color of the dye used to color code the bulb. This color change does not affect the integrity of the bulb.)

Sprinklers must be protected from mechanical damage during storage, transport, handling, and after installation. Sprinklers subject to mechanical damage must be protected with an approved sprinkler guard.

Use only sprinklers listed as corrosion resistant when subject to corrosive environments. When installing corrosion-resistant sprinklers, take care not to damage the corrosion-resistant coating. Use only the special wrench designed for installing coated or recessed Viking sprinklers (any other wrench may damage the unit).

Concealed sprinklers must be installed in neutral or negative pressure plenums only!

Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they could be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.

Wet pipe systems must be provided with adequate heat. Sprinklers supplied from dry systems in areas subject to freezing must be listed dry sprinklers, upright, or horizontal sidewall sprinklers installed so that water is not trapped. For dry systems, pendent sprinklers and sidewall sprinklers installed on return bends are permitted, where the sprinklers, return bend, and branch line piping are in an area maintained at or above 40 °F (4 °C).

B. Installation Instructions - Standard Spray Sprinklers

Viking sprinklers are manufactured and tested to meet the rigid requirements of approving agencies. They are designed to be installed in accordance with recognized installation standards. Deviation from the standards or any alteration to sprinklers or cover plate assemblies after they leave the factory including, but not limited to: painting, plating, coating, or modification, may render them inoperative and will automatically nullify the approvals and any guarantee made by The Viking Corporation.

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.

Before installation, be sure to have the appropriate sprinkler model and style, with the correct K-Factor, temperature rating, and response characteristics. Sprinklers must be installed after the piping is in place to prevent mechanical damage. Keep sprinklers with protective caps or bulb shields contained within the caps or shields during installation and testing, and any time the sprinkler is shipped or handled.

1a. For frame-style sprinklers, install escutcheon (if used), which is designed to thread onto the external threads of the sprinkler. Refer to the appropriate sprinkler data page to determine approved escutcheons for use with specific sprinkler models.

1b. For flush and concealed style sprinklers: Cut the sprinkler nipple so that the ½" or 3/4" (15 mm or 20 mm)* NPT outlet of the reducing coupling is at the desired location, and centered in the opening* in the ceiling or wall.
*Size depends on the sprinkler model used. Refer to the sprinkler technical data page.

2. Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler only, taking care not to allow a build-up of compound in the sprinkler inlet. **NOTE:** Sprinklers with protective caps or bulb shields must have the caps or shields kept on them when applying pipe-joint compound or tape. *Exception: For domed concealed sprinklers, remove the protective cap for installation, and then place it back on the sprinkler temporarily..*

3. Refer to the appropriate sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used. DO NOT use the deflector or fusible element to start or thread the sprinkler into a fitting.
   a. Install the sprinkler onto the piping using the special sprinkler wrench only, taking care not to over-tighten or damage the sprinkler.
   b. For flush and concealed style sprinklers: the internal diameter of the special sprinkler installation wrench is designed for use with the sprinkler contained in the protective cap. *Exception: For domed concealed sprinklers, remove the protective cap for installation, and then place it back on the sprinkler temporarily.* Thread the flush or concealed sprinkler into the ½" or 3/4" (15 mm or 20 mm)* NPT outlet of the coupling by turning it clockwise with the special sprinkler wrench. *Thread size depends on the particular sprinkler model used. Refer to the sprinkler technical data page.

C. Installation Instructions - Dry Sprinklers

WARNING: Viking dry sprinklers are to be installed in the 1" outlet (for dry and preaction systems), or run of malleable, ductile iron, or Nibco CPVC* threaded tee fittings (for wet systems) that meet the dimensional requirements of ANSI B16.3 (Class 150), or cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125), even at branch line ends. The threaded end of the dry sprinkler is designed to allow the seal to penetrate and extend into the fitting to a predetermined depth. This prevents condensation from accumulating and freezing over the sprinkler seal. ***NOTE: When using CPVC fittings with Viking dry sprinklers, use only new Nibco Model 5012-S-BI. When selecting other CPVC fittings, contact Viking Technical Services.**

1. **DO NOT** install the dry sprinkler into a threaded elbow, coupling, or any other fitting that could interfere with thread penetration. Such installation would damage the brass seal.
2. **DO NOT** install dry sprinklers into couplings or fittings that would allow condensation to accumulate above the seal when the sprinkler is located in an area subject to freezing.
3. **NEVER** try to modify dry sprinklers. They are manufactured for specific "A" or "B" dimensions and cannot be modified.

The dry sprinkler must be installed after the piping is in place to prevent mechanical damage. Before installation, be sure to have the correct sprinkler model and style, with the appropriate "A" or "B" dimension(s), temperature rating, orifice size, and response characteristics. Keep sprinklers with protective caps or bulb shields contained within the caps or shields during installation and testing, and any time the sprinkler is shipped or handled. *Exception:* For concealed and adjustable recessed dry sprinklers, the protective caps and shields are removed for installation.

To install the dry sprinkler, refer to the instructions below and the appropriate sprinkler technical data page for illustrated instructions.

Dry upright sprinklers must be installed above the piping, in the upright position only. When installing dry upright or plain barrel style vertical sidewall sprinklers on piping located close to the ceiling, it may be necessary to lower the sprinkler into the fitting from above the ceiling. When installing dry upright or plain barrel vertical sidewall sprinklers from below the ceiling, verify that the opening in the ceiling is a minimum 1-1/2" (38.1 mm) in diameter.

For dry upright or plain barrel vertical sidewall sprinklers in the upright position: First, install the escutcheon (if used) over the threaded end of the sprinkler barrel. Slide the escutcheon past the external threads. NOTE: When installing the dry upright or plain barrel vertical sidewall sprinkler from above the ceiling, it will be necessary to install the escutcheon after lowering the threaded end of the sprinkler through the ceiling penetration.

A. **For all dry sprinklers:** Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler barrel only, taking care not to allow a build-up of compound or tape over the brass inlet and seal. **NOTE:** Sprinklers with protective caps or bulb shields must be contained within the caps or shields before applying pipe-joint compound or tape.

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.

B. Refer to the appropriate sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.
C. Install the dry sprinkler on the piping using the special dry sprinkler wrench only, while taking care not to damage the sprinkler. **NOTE:** Thread the sprinkler into the fitting hand tight, plus 1/2 turn with the dry sprinkler wrench.
D. *For adjustable standard and adjustable recessed dry pendent and sidewall sprinklers: Escutcheons can be installed after the sprinklers have been installed onto the piping. Refer to the appropriate sprinkler technical data page for escutcheon installation instructions and illustrations.*

D. Installation Instructions - Testing

4. After installation, the entire sprinkler system must be tested. The test must be conducted to comply with the installation standards. Viking *high pressure* sprinklers may be hydrostatically tested at a maximum of 300 psi (20.7 bar) for limited periods of time (two hours), for the purpose of acceptance by the Authority Having Jurisdiction.
   a. Make sure the sprinkler is properly tightened. If a thread leak occurs, normally the sprinkler must be removed, new pipe-joint compound or tape applied, and then reinstalled. This is due to the fact that when the joint seal is damaged, the sealing compound or tape is washed out of the joint. Air testing [do not exceed 40 psi (2.76 bar)] the sprinkler piping prior to testing with water may be considered in areas where leakage during testing must be prevented. Refer to the Installation Standards and the Authority Having Jurisdiction.
   b. **Remove plastic protective sprinkler caps or bulb shields AFTER the wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.** To remove the bulb shields, simply pull the ends of the shields apart where they are snapped together. To remove caps from frame style sprinklers, turn the caps slightly and pull them off the sprinklers. **SPRINKLER CAPS OR BULB SHIELDS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!** Retain a protective cap or shield in the spare sprinkler cabinet.
5. For flush style sprinklers: the ceiling ring can now be installed onto the sprinkler body. Align the ceiling ring with the sprinkler body and thread or push it on (depends on sprinkler model) until the outer flange touches the surface of the ceiling. Note the maximum adjustment is 1/4" (6.35 mm). DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler drop nipple as required.
6. For concealed sprinklers: the cover assembly can now be attached.
   a. Remove the cover from the protective box, taking care not to damage the cover plate assembly.
   b. Gently place the base of the cover plate assembly over the sprinkler protruding through the opening in the ceiling.
   c. Push the cover plate assembly onto the sprinkler until the unfinished brass flange of the cover plate base (or the cover adapter, if used) touches the surface of the ceiling.
   d. Refer to the applicable technical data sheet to determin the maximum adjustment available for concealed sprinklers. DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler drop nipple.

NOTE: If it is necessary to remove the entire sprinkler unit, the system must be taken out of service. See section 6. INSPECTIONS, TESTS AND MAINTENANCE and follow all warnings and instructions.

5. OPERATION

Refer to the appropriate sprinkler technical data page(s). During fire conditions, the operating element fuses or shatters (depending on the type of sprinkler), releasing the pip cap and sealing assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. 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. The sprinkler technical data page may contain installation requirements specific for the sprinkler model selected. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.

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.

6. INSPECTIONS, TESTS AND MAINTENANCE

NOTICE: Refer to NFPA 25 for Inspection, Testing and Maintenance requirements. **NOTICE:** The owner is responsible for having the fire-protection system and devices inspected, tested, and maintained in proper operating condition in accordance with this guide, and applicable NFPA standards. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

A. Sprinklers must be inspected on a regular basis for corrosion, mechanical damage, obstructions, paint, etc. Frequency of inspections may vary due to corrosive atmospheres, water supplies, and activity around the sprinkler unit.

B. Sprinklers or cover plate assemblies that have been field painted, caulked, or mechanically damaged must be replaced immediately. Sprinklers showing signs of corrosion shall be tested and/or replaced immediately as required. Installation standards require sprinklers to be tested and, if necessary, replaced after a specified term of service. Refer to NFPA 25 and the Authority Having Jurisdiction for the specified period of time after which testing and/or replacement is required. Never attempt to repair or reassemble a sprinkler. Sprinklers and cover assemblies that have operated cannot be reassembled or re-used, but must be replaced. When replacement is necessary, use only new sprinklers and cover assemblies with identical performance characteristics.

C. The sprinkler discharge pattern is critical for proper fire protection. Therefore, nothing should be hung from, attached to, or otherwise obstruct the discharge pattern. All obstructions must be immediately removed or, if necessary, additional sprinklers installed.

D. When replacing existing sprinklers, the system must be removed from service. Refer to the appropriate system description and/or valve instructions. Prior to removing the system from service, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected area.

1. Remove the system from service, drain all water, and relieve all pressure on the piping.

2a. For frame-style sprinklers, use the special sprinkler wrench to remove the old sprinkler by turning it counterclockwise to unthread it from the piping.

2b. For flush and concealed style sprinklers: Remove the ceiling ring or cover plate assembly before unthreading the sprinkler body from the piping. Ceiling rings and cover plates can be removed either by gently unthreading them or pulling them off the sprinkler body (depends on the sprinkler model used). After the ceiling ring or cover plate assembly has been removed from the sprinkler body, place the plastic protective cap (from the spare sprinkler cabinet) over the sprinkler to be removed and then fit the sprinkler wrench over the cap. Then use the wrench to unthread the sprinkler from the piping. *Exception: Domed concealed sprinklers are removed without the plastic cap.*

3. Install the new sprinkler unit by following the instructions in section 4. INSTALLATION. Care must be taken to ensure that the replacement sprinkler is the proper model and style, with the correct K-Factor, temperature rating, and response characteristics. A fully stocked spare sprinkler cabinet should be provided for this purpose. For flush or concealed sprinklers: stock of spare ceiling rings or cover plates should also be available in the spare sprinkler cabinet.

E. Place the system back in service and secure all valves. Check for and repair all leaks. Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary. Sprinklers that have been exposed to corrosive products of combustion or high ambient temperatures, but have not operated, should be replaced. Refer to the Authority Having Jurisdiction for minimum replacement requirements.

7. AVAILABILITY

Viking sprinklers 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.

BULLETIN

REGULATORY AND HEALTH WARNINGS

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

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herin as they relate to legally mandated jurisdictional regions.

⚠ WARNING

STATE OF CALIFORNIA, USA

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titaninum dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to **www.P65Warnings.ca.gov**

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at **www.vikinggroupinc.com** or contact Viking directly.

VIKING®	TECHNICAL DATA	MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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 Microfast® Quick Response Pendent Sprinkler VK302 is a small thermosensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive environments and are Listed and Approved as indicated in the Approval Charts.

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

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Class Series 2000

VdS Approved: Certificates G414009, G414010, G4040095, and 4880045

LPCB Approved: Certificate 096e/06

CE: Standard EN 12259-1,Declaration of Performance DOP_Sprinklers_LPCB_5-2-19, DOP_VK302ENT_29-1-20 & DOP_VK302-57C_30-9-20

China Approval: Approved according to China GB standard

MED Certified: Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Minimum Operating Pressure: 7 psi (0.5 bar)
Rated to 175 psi (12 bar) water working pressure
Factory tested hydrostatically to 500 psi (34.5 bar)
Thread size: 1/2” NPT, 15 mm BSP
Nominal K-Factor: 5.6 U.S. (80.6 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-1/4” (58 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:
Frame Casting: Brass UNS-C84400 or QM Brass
Deflector: Phosphor Bronze UNS-C51000 or Copper UNS-C19500
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)
Order Quick Response Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

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

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN
Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, 286 °F (141 °C) = G
For example, sprinkler VK302 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 12979AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the current Viking price list.)

Sprinkler Wrenches:

A. Standard Wrench: Part No. 21475M/B.
B. Wrench for Recessed Pendent Sprinklers: Part No. 13655W/B** (available since 2006)
C. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool*** Part No. 15915 (available since 2010)

**A ½" ratchet is required (not available from Viking).

***Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)
B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the 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

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is 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.

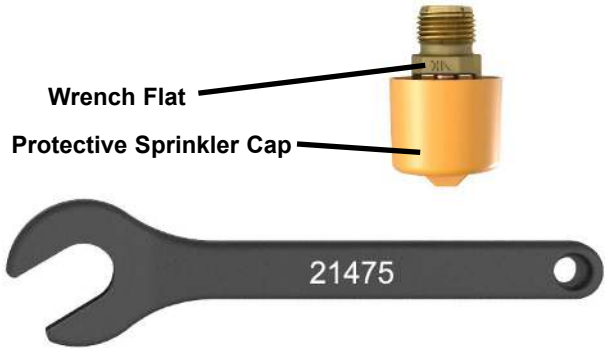


Figure 1:
Standard Sprinkler Wrench 21475M/B

VIKING®

TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT

Corrosion-Resistant Coatings[3]: White Polyester, and Black Polyester. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

[1] The sprinkler temperature rating is stamped on the deflector.

[2] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

[3] The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. 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 coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated.

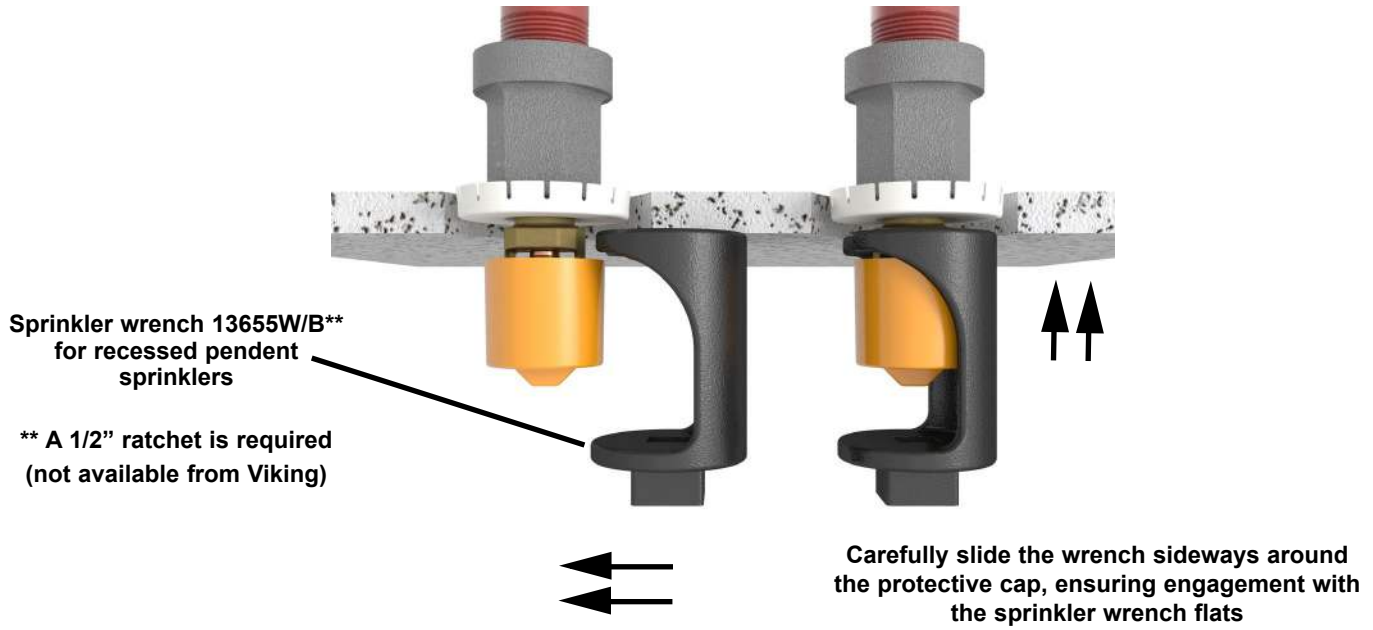


Figure 2: Wrench 13655W/B for Recessed Pendent Sprinklers

VIKING®

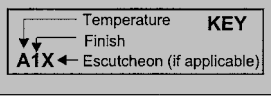
TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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 1 (UL)

The Viking Microfast® Quick Response Pendent Sprinkler VK302
Maximum 175 PSI (12 Bar) WWP



Base Part Number[1]	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals[3] (Refer also to Design Criteria.)					
			NPT	BSP	U.S.	metric[2]	Inches	mm	cULus[4]	VdS	LPCB	CE[7]	MED[8]	China Approval
12979	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2, C2X	A1	A1Z, B1Y	D1Z, C1Y, D2, A1Z, B1Y	D1	--
21354[9]	VK302	Pendent	--	15 mm	5.6	80.6	2-1/4	58	D3	--	--	--	--	D3
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)														
06662B	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2, C2X	--	--	--	--	--
18021	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y	A1	A1Z, B1Y	D1Z, C1Y, D2	D1	--

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
C - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester[5,6], Black Polyester[5,6]
2 - ENT[5]
3 - Chrome

Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon
Y - Standard surface-mounted escutcheon or recessed with the Viking Micromatic® Model E-1, E-2, or E-3 Recessed Escutcheon
Z - Standard surface-mounted escutcheon

Footnotes

[1] Base part number shown. For complete part number, refer to Viking's current price 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 table shows the listings and approvals available at the time of printing. Other approvals may be in process.
[4] Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
[5] cULus Listed as corrosion-resistant.
[6] Other colors are available on request with the same Listings and Approvals as the standard colors.
[7] CE: Standard EN 12259-1,Declaration of Performance DOP_Sprinklers_LPCB_5-2-19, DOP_VK302ENT_29-1-20 & DOP_VK302-57C_30-9-20.
[8] MED Certified, Standard EN 12259-1, EC-0832-MED-1003.
[9] Approved according to China GB Standard.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

cULus Listing Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is cULus Listed as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to 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, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

VIKING®

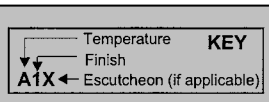
TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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 2 (FM)

The Viking Microfast® Quick Response Pendent Sprinkler VK302
Maximum 175 PSI (12 Bar) WWP



Base Part Number[1]	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		FM Approvals[3] (Refer also to Design Criteria.)
			NPT	BSP	U.S.	metric[2]	Inches	mm	
12979	VK302	Pendent	1/2”	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2X, C2
21354[6]	VK302	Pendent	--	15 mm	5.6	80.6	2-1/4	58	C3
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)									
06662B	VK302	Pendent	1/2”	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2X, C2
18021	VK302	Pendent	1/2”	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester[4], and Black Polyester[4]
2 - ENT[5]
3 - Chrome

Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon
Y - Standard surface-mounted escutcheon or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon
Z - Standard surface-mounted escutcheon

Footnotes

[1] Base part number shown. For complete part number, refer to Viking’s current price 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 table shows the FM Approvals available at the time of printing. Other approvals may be in process.

[4] Other colors are available on request with the same Approvals as the standard colors.

[5] FM approved as corrosion resistant.

[6] Approved according to China GB Standard.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is FM Approved as quick response **Non-storage** pendent sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to 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.

TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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

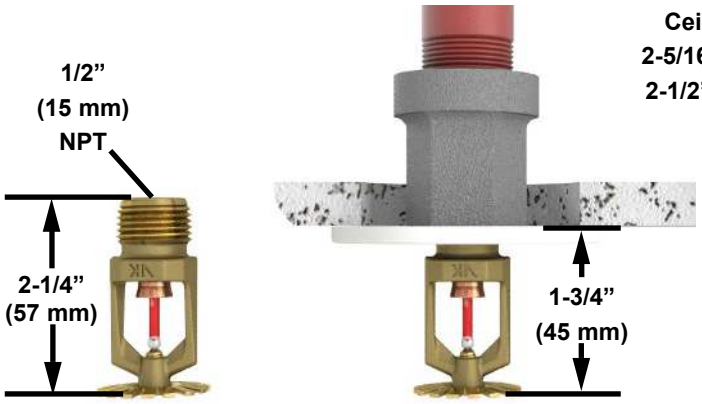


Figure 3: Sprinkler Dimensions with a Standard Escutcheon

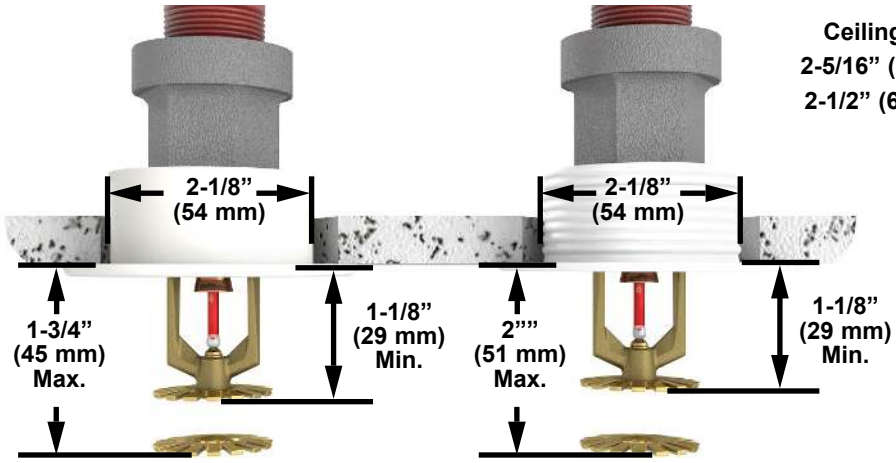


Figure 4: Sprinkler Dimensions with the Model E-1 and E-2 Recessed Escutcheons

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

General Handling and Storage:

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

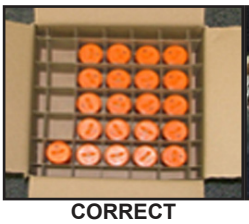
Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

  Maximum Torque:
  1/2" NPT: 14 ft-lbs. (19.0 N-m)
  3/4" NPT: 20 ft-lbs. (27.1 N-m)
  1" NPT: 30 ft-lbs. (40.7 N-m)

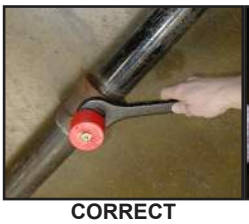
CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)

CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)

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

⚠ WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

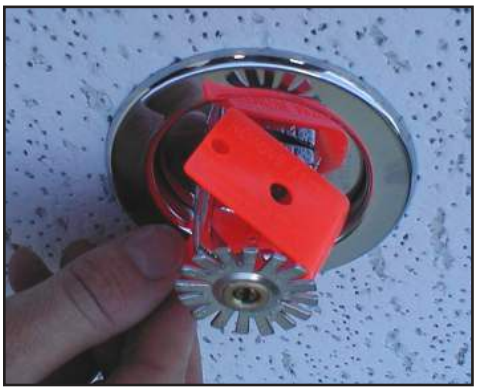


Figure 1: Sprinkler shield being removed from a pendent sprinkler.

Figure 2: Sprinkler cap being removed from a pendent sprinkler.

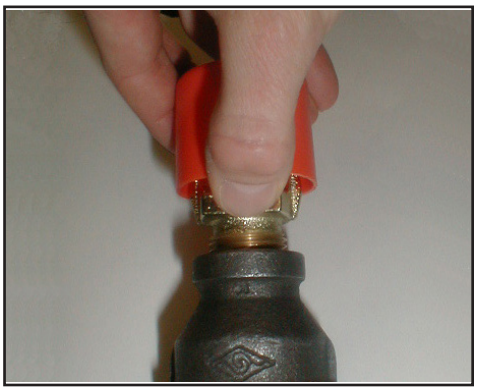


Figure 3: Sprinkler cap being removed from and upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.

WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

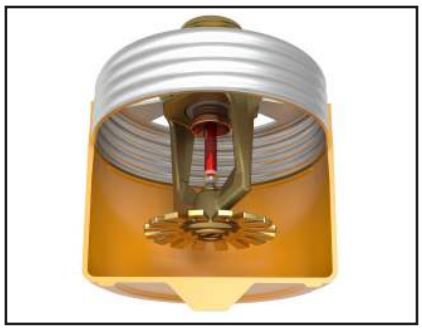
*** Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.**

BULLETIN

CARE AND HANDLING OF SPRINKLERS

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

CAUTION CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter Assembly with Protective Cap

Concealed Sprinkler and Adapter Assembly (Protective Cap Removed)

Cover Plate Assembly (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
  -- Use original shipping containers.
  -- Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers MUST receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating MUST be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature[1]	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

[1] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

⚠WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

BULLETIN

REGULATORY AND HEALTH WARNINGS

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

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herin as they relate to legally mandated jurisdictional regions.

⚠ WARNING

STATE OF CALIFORNIA, USA

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titaninum dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to **www.P65Warnings.ca.gov**

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at **www.vikinggroupinc.com** or contact Viking directly.

VIKING®

TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK350 (K8.0)

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 Microfast® Quick Response Upright Sprinkler VK350 is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes, temperature ratings, and K-Factors to meet design requirements. The special Polyester, and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive environments and are listed/approved as indicated in the Approval Charts.

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

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Class Series 2000

VdS Approved: Certificates G414017, G414018, G4980020, and G4060054

LPCB Approved: Certificate 096e/03

CE: Standard EN 12259-1,DOP Sprinklers_VdS_23-5-13, DOP Sprinklers_LPCB_5-2-19 & DOP_VK350ENT_6-11-19

China Approval: Approved according to China GB standard

MED Certified: Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003

NOTE: Other International approval certificates are available upon request.

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)*
Maximum Working Pressure: 175 psi (12 bar) wwp.
Factory tested hydrostatically to 500 psi (34.5 bar)
Testing: U.S.A. Patent No. 4,831,870
Thread size: 1/2” NPT, 15 mm BSPT, 3/4” NPT, or 20 mm BSPT
Nominal K-Factor: 8.0 U.S. (115.2 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-5/16” (59 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400
Deflector: Copper UNS-C19500
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Upright Sprinkler VK350 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.
Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN
Temperature Suffix (°F/°C): 135°/57° = A, 155°/68° = B, 175°/79° = D, 200°/93° = E, and 286°/141° = G

VIKING®

TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK350 (K8.0)

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

For example, sprinkler VK350 with a 1/2" thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 18259AB
Available Finishes And Temperature Ratings: Refer to Table 1.
Accessories: (Also refer to the Viking website.)
Sprinkler Wrench: Standard Wrench: Part No. 21475M/B (available since 2017)
Sprinkler Cabinets:
A. Six-head capacity: Part No. 01724A (available since 1971)
B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION
Refer to appropriate NFPA Installation Standards.

5. OPERATION
During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the 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
The Viking Microfast® Quick Response Upright Sprinkler VK350 is 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: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT
Corrosion-Resistant Coatings[3]: White Polyester, Black Polyester and ENT. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

[1] The sprinkler temperature rating is stamped on the deflector.
[2] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
[3] The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated on pages 51c-e. 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 coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, ENT, and PTFE coatings. For ENT coated automatic sprinklers, the waterway is coated.

Figure 1: Sprinkler Wrench

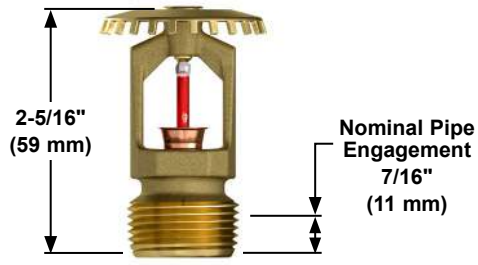


Figure 2: Sprinkler Dimensions

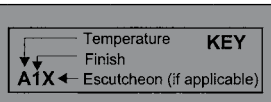
TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK350 (K8.0)

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 1 (UL)

Microfast® Quick Response Upright Sprinkler VK350
Maximum 175 PSI (12 bar) WWP



Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals[3] (Refer also to Design Criteria.)					
		NPT	BSPT	U.S.	metric[2]	Inches	mm	cULus[4]	VdS	LPCB	CE	MED[10]	China Approval
18257	VK350	3/4”	--	8.0	115.2	2-5/16	59	A1, B2	A1	A1	B2, B4[7]	B1	--
18278	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B2	A1	A1	B2, B4[7]	B1	--
18259[9]	VK350	1/2”	15 mm	8.0	115.2	2-5/16	59	A1, B2	A1	--	B2, B4[7]	--	--
20237[11]	VK350	--	20 mm	8.0	115.2	2-5/16	59	C3	--	--	--	--	C3
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)													
06665B	VK350	3/4”	--	8.0	115.2	2-5/16	59	A1, B2	A1	A1	B1[7]	B1	--
14817	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B2	A1	A1	B1[7]	B1	--
06764B[9]	VK350	1/2”	15 mm	8.0	115.2	2-5/16	59	A1, B2	A1	--	A1[8]	--	--

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
C - 155 °F (68 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester[5,6], and Black Polyester[5,6]
2 - ENT[5]
3 - Chrome
4 - Brass, Chrome, White Polyester[5,6], and Black Polyester[5,6], and ENT

Footnotes

1. Base part number is shown. For complete part number, refer to Viking’s current price 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 table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
4. Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
5. cULus Listed as corrosion resistant.
6. Other colors are available on request with the same Listings and Approvals as the standard colors.
7. CE: Standard EN 12259-1, Declaration of Performance DOP Sprinklers_LPCB_5-2-19 & DOP_VK350ENT_6-11-19.
8. CE: Standard EN 12259-1, Declaration of Performance DOP Sprinklers_VdS_23-5-13.
9. The 1/2” NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.
10. MED Certified, Standard EN 12259-1, EC-certificate 0832-MED-1003.
11. Approved according to China GB Standard.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1)

cULus Listing Requirements:

The Microfast® Quick Response Upright Sprinkler VK350 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to 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, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

VIKING®

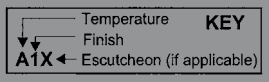
TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK350 (K8.0)

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 2 (FM)

Microfast® Quick Response Upright Sprinkler VK350
Maximum 175 PSI (12 bar) WWP



Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals[3] (Refer also to Design Criteria below.)
		NPT	BSPT	U.S.	metric[2]	Inches	mm	
18257	VK350	3/4"	--	8.0	115.2	2-5/16	59	A1, B2
18278	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B2
18259[5]	VK350	1/2"	--	8.0	115.2	2-5/16	59	A1, B2
20237[7]	VK350	--	20 mm	8.0	115.2	2-5/16	59	C3
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)								
06665B	VK350	3/4"	--	8.0	115.2	2-5/16	59	A1, B2
14817	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B2
06764B[5]	VK350	1/2"	15 mm	8.0	115.2	2-5/16	59	A1, B2

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
C - 155 °F (68 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester[4], and Black Polyester[4]
2 - ENT[6]
3 - Chrome

Footnotes

1. Base part number is shown. For complete part number, refer to Viking's current price 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 table shows the FM Approvals available at the time of printing. Check with the manufacturer for any additional approvals.
4. Other colors are available on request with the same Approvals as the standard colors.
5. The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.
6. FM approved as corrosion resistant.
7. Approved according to China GB Standard.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Microfast® Quick Response Upright Sprinkler VK350 is FM Approved as a quick response **Non-Storage** upright sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to 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.

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

General Handling and Storage:

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

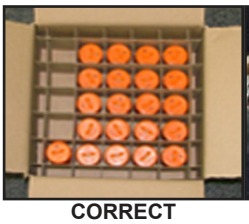
Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

  Maximum Torque:
  1/2" NPT: 14 ft-lbs. (19.0 N-m)
  3/4" NPT: 20 ft-lbs. (27.1 N-m)
  1" NPT: 30 ft-lbs. (40.7 N-m)

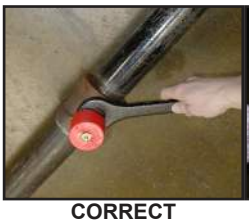
CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)

CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)

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

⚠ WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

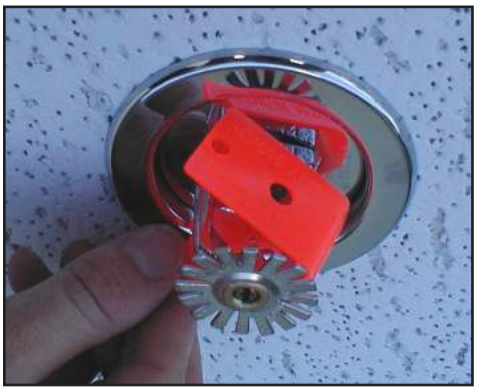


Figure 1: Sprinkler shield being removed from a pendent sprinkler.

Figure 2: Sprinkler cap being removed from a pendent sprinkler.

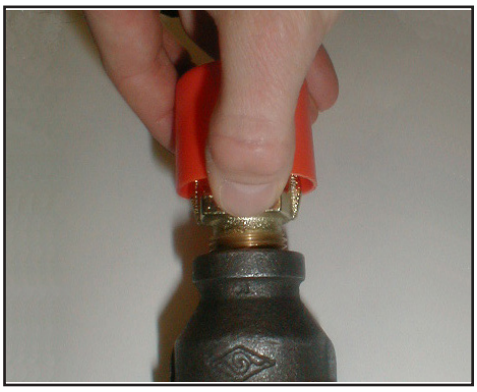


Figure 3: Sprinkler cap being removed from and upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.

WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

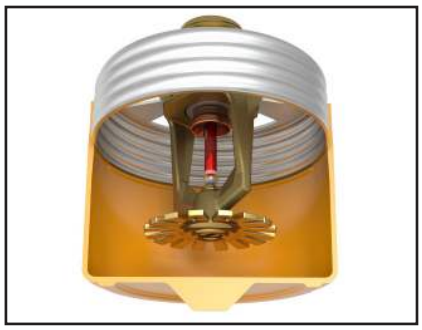
*** Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.**

BULLETIN

CARE AND HANDLING OF SPRINKLERS

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

CAUTION CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter Assembly with Protective Cap

Concealed Sprinkler and Adapter Assembly (Protective Cap Removed)

Cover Plate Assembly (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
  -- Use original shipping containers.
  -- Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

VIKING	BULLETIN	CARE AND HANDLING OF SPRINKLERS

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

USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers MUST receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating MUST be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature[1]	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

[1] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

⚠WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

BULLETIN

REGULATORY AND HEALTH WARNINGS

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

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herin as they relate to legally mandated jurisdictional regions.

⚠ WARNING

STATE OF CALIFORNIA, USA

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titaninum dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to **www.P65Warnings.ca.gov**

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at **www.vikinggroupinc.com** or contact Viking directly.

Series DS-3 Dry-Type Sprinklers 11.2K Horizontal Sidewall Standard Response, Extended Coverage

General Description

TYCO Series DS-3 Dry-Type Sprinklers, 11.2K Horizontal Sidewall, Standard Response, Extended Coverage, Ordinary Hazard (ECOH) are decorative glass bulb automatic sprinklers. They are intended for use in applications where the sprinklers and/or a portion of the connecting piping may be exposed to freezing temperatures; for example, horizontal piping extensions through a wall to protect an unheated area of a building.

Series DS-3 Extended Coverage Ordinary Hazard Horizontal Sidewall, Dry-Type Sprinklers are designed for extended coverage use in ordinary hazard occupancies (ECOH) per NFPA 13.

Series DS-3 Dry-Type Sprinklers provide protection of coverage areas up to 16 ft x 20 ft (320 ft^2) as compared to standard coverage horizontal sidewall sprinklers having a maximum coverage area of 10 ft x 10 ft (100 ft^2) for ordinary hazard occupancies.

NOTICE

Series DS-3 Dry-Type Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Series DS-3 Dry-Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section. Installation of Series DS-3 Dry-Type Sprinklers in a recessed installation will void all sprinkler warranties, as well as void the sprinkler's laboratory Approvals.

IMPORTANT

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

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

Sprinkler Identification Number (SIN)

TY5339

Technical Data

Approvals
UL and C-UL Listed

Refer to Table A and the Design Criteria section

Maximum Working Pressure
175 psi (12,1 bar)

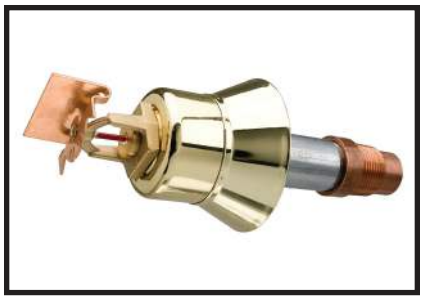
Inlet Thread Connections
1 Inch NPT
ISO 7-R 1

Discharge Coefficient
Refer to Table B

Temperature Ratings
155°F (68°C) and 200°F (93°C)

Finishes
Sprinkler: Refer to Table E

Escutcheon: Refer to Table E



Physical Characteristics

Inlet	Copper
Plug	Copper
Yoke	Stainless Steel
Casing	Galvanized Carbon Steel
Insert	Bronze
Bulb Seat	Bronze
Bulb	Glass (3 mm)
Compression Screw	Bronze
Deflector	Bronze
Frame	Bronze
Guide Tube	Stainless Steel
Water Tube	Stainless Steel
Spring	Stainless Steel
Sealing Assembly	Beryllium Nickel w/TEFLON
Pin	Stainless Steel
Button Spring	Stainless Steel
Helper Spring	Stainless Steel
Escutcheon	Carbon Steel

Operation

When TYCO Series DS-3 Dry-Type Sprinklers, 11.2K Horizontal Sidewall, Standard Response, Extended Coverage, Ordinary Hazard (ECOH) are in service, water is prevented from entering the assembly by the Plug with Sealing Assembly (Ref. Figure 1) in the Inlet of the sprinkler.

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, and the Bulb Seat is released.

The compressed Spring is then able to expand and push the Water Tube as well as the Guide Tube outward. This action simultaneously pulls inward on the Yoke, withdrawing the Plug with Sealing Assembly from the Inlet allowing the sprinkler to activate and flow water.

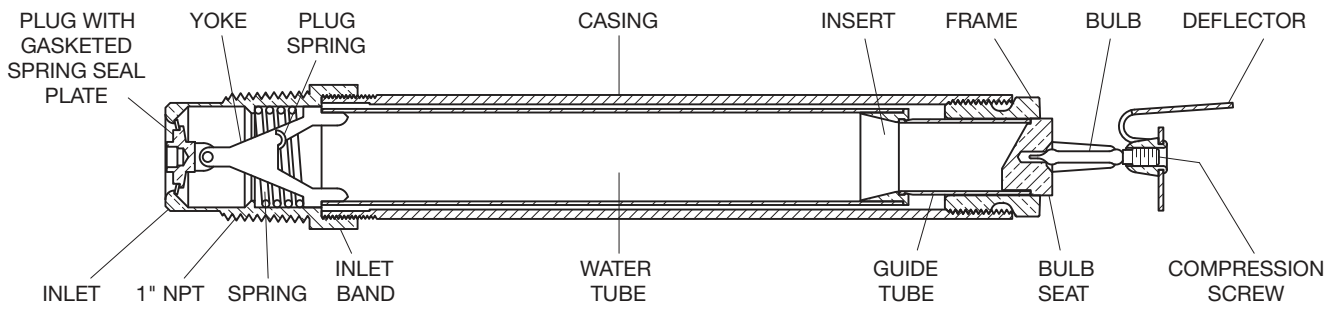


FIGURE 1
SERIES DS-3 HORIZONTAL SIDEWALL DRY-TYPE SPRINKLER TY5339 (ECOH) ASSEMBLY

Temperature Rating	Bulb Color Code	SPRINKLER FINISH		
		Natural Brass	Chrome Plated	White Polyester
155°F (68°C)	Red	1, 2		
200°F (93°C)	Green			

Notes:
1. Listed by Underwriters Laboratories, Inc. (maximum order length of 48 inches)
2. Listed by Underwriters Laboratories for use in Canada (maximum order length of 48 inches).

TABLE A
SERIES DS-3 HORIZONTAL SIDEWALL DRY-TYPE SPRINKLERS EXTENDED COVERAGE, ORDINARY HAZARD (TY5339) LABORATORY LISTINGS AND APPROVALS

Length, Inches (mm)	K-factor, gpm/psi½ (lpm/bar½)
2-1/2 to 14-3/4 (63 mm to 375 mm)	11.2 (161,3)
15 to 18-3/4 (381 mm to 476 mm)	10.9 (157,0)
19 to 23 (483 mm to 584 mm)	10.8 (155,5)
23-1/4 to 26-3/4 (591 mm to 679 mm)	10.7 (154,1)
27-1/4 to 31-1/4 (692 mm to 794 mm)	10.6 (152,6)
31-1/2 to 35-1/4 (800 mm to 895 mm)	10.5 (151,2)
35-1/2 to 39-1/2 (902 mm to 1003 mm)	10.4 (149,8)
39-3/4 to 43-1/2 (1010 mm to 1105 mm)	10.3 (148,3)
43-3/4 to 48 (111 mm to 1219 mm)	10.2 (146,9)

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

TABLE B
DISCHARGE COEFFICIENTS

Design Criteria

The TYCO Series DS-3 Dry-Type Sprinklers, 11.2K Horizontal Sidewall, Standard Response, Extended Coverage, Ordinary Hazard (ECOH) are for use in ordinary hazard occupancies with noncombustible unobstructed construction and with a ceiling slope not exceeding 2 inches per foot (9.2°), using the design criteria provided in Table C, as well as any additional requirements specified in NFPA 13 for Extended Coverage Sidewall Spray Sprinklers.

A 36 in. (914 mm) clearance must be maintained between the top of the sprinkler deflector and any miscellaneous storage.

Series DS-3 Dry-Type Sprinklers may be installed on sloped ceilings in loading docks with a maximum roof slope of 4 inches per foot (18.4°) as shown in Figure 8 and using the design criteria provided in Table C.

Sprinkler Fittings
Install 1 inch NPT Series DS-3 Dry-Type Sprinklers in the 1 inch NPT outlet or run of the following fittings:

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

Do not install Series DS-3 Dry-Type Sprinklers into elbow fittings. The Inlet of the sprinkler can contact the interior of the elbow.

The unused outlet of the threaded tee is plugged as shown in Figure 6.

Series DS-3 Dry-Type Sprinklers can also be installed in the 1 inch NPT outlet of a GRINNELL Figure 730 Mechanical Tee. However, the use of the Figure 730 Tee for this arrangement is limited to wet pipe systems.

Application	Coverage Area[1] W x L, ft x ft (m x m)	Minimum Flow[2], gpm (lpm)	Minimum Pressure[2], psi (bar)	Top of Deflector-to-Ceiling Distance[3], Inches (mm)	Temperature Rating	Minimum Spacing[4], ft (m)
Series DS-3 (TY5339) Horizontal Sidewall Dry-Type Sprinkler (ECOH) OH Group 1 (0.15 gpm/sq.ft) Standard Response	16 x 16 (4,9 x 4,4)	38 (144)	11.5 (0,79)	6 to 12 (150 to 300)	155°F, 200°F (68°C, 93°C)	8 (2,4)
	16 x 18 (4,9 x 5,5)	43 (163)	14.7 (1,01)			
	16 x 20 (4,9 x 6,1)	48 (182)	18.4 (1,27)			
Series DS-3 (TY5339) Horizontal Sidewall Dry-Type Sprinkler (ECOH) OH Group 2 (0.20 gpm/sq.ft) Standard Response	16 x 16 (4,9 x 4,4)	51 (193)	20.7 (1,43)			
	16 x 18 (4,9 x 5,5)	58 (220)	26.8 (1,85)			
	16 x 20 (4,9 x 6,1)	64 (242)	32.7 (2,25)			

Notes:
1. Backwall (where sprinkler is located) by sidewall (length of throw).
2. Requirement is based on minimum flow in GPM from each sprinkler. The indicated residual pressures are based on the nominal K-factor of 11.2.
3. The centerline of the sprinkler waterway is located below the deflector as shown in Figures 2, 3, and 4.
4. Minimum spacing is for lateral distance between sprinklers located along a single wall. Otherwise adjacent sprinklers (that is, sidewall sprinklers on an adjacent wall, on an opposite wall, or pendent sprinklers) must be located outside of the maximum listed protection area of the extended coverage sidewall sprinkler being utilized.

TABLE C
SERIES DS-3 EXTENDED COVERAGE HORIZONTAL SIDEWALL DRY-TYPE SPRINKLERS
UL AND C-UL LISTING COVERAGE AND FLOW RATE CRITERIA

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

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

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

The configuration shown in Figure 7 is only applicable for wet pipe systems where the sprinkler fitting and water-filled pipe above the sprinkler fitting are not subject to freezing and where the length of the Dry-Type Sprinkler has the minimum exposure length depicted in Figure 10. Refer to the Exposure Length section.

For wet pipe system installations of 1 inch NPT Series DS-3 Dry-Type Sprinklers connected to CPVC piping, use only the following TYCO CPVC fittings:

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

For dry pipe system installations, use only the side outlet of maximum 2-1/2 inch reducing tee when locating Series DS-3 Dry-Type Sprinklers directly below the branch line. Otherwise, use the configuration shown in Figure 6 to assure complete water drainage from above Series DS-3 Dry-Type Sprinklers and the branch line. Failure to do so may result in pipe freezing and water damage.

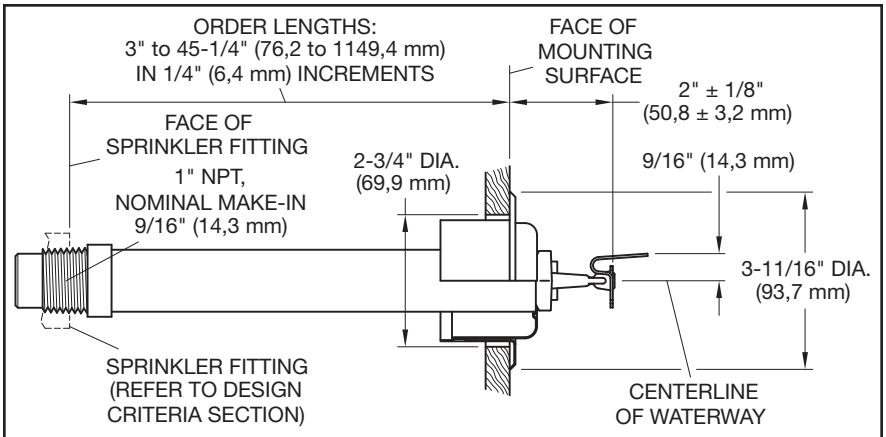


FIGURE 2
SERIES DS-3 ECOH HORIZONTAL SIDEWALL DRY-TYPE SPRINKLER WITH FLUSH ESCUTCHEON (TY5339)

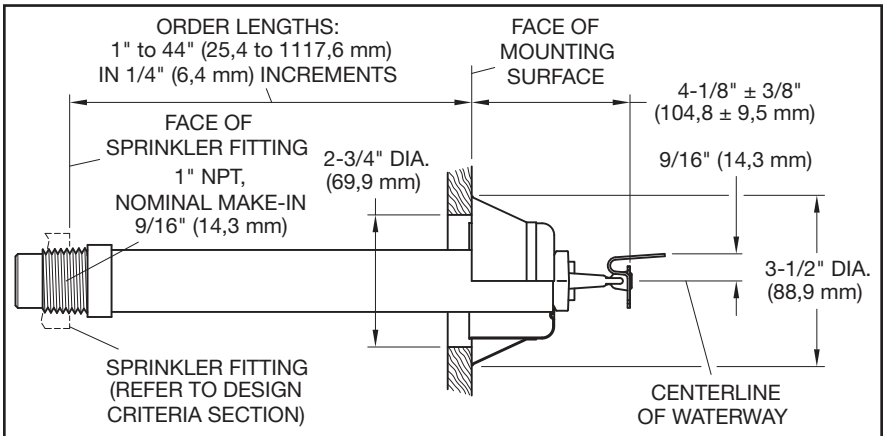


FIGURE 3
SERIES DS-3 ECOH HORIZONTAL SIDEWALL DRY-TYPE SPRINKLER WITH DEEP ESCUTCHEON (TY5339)

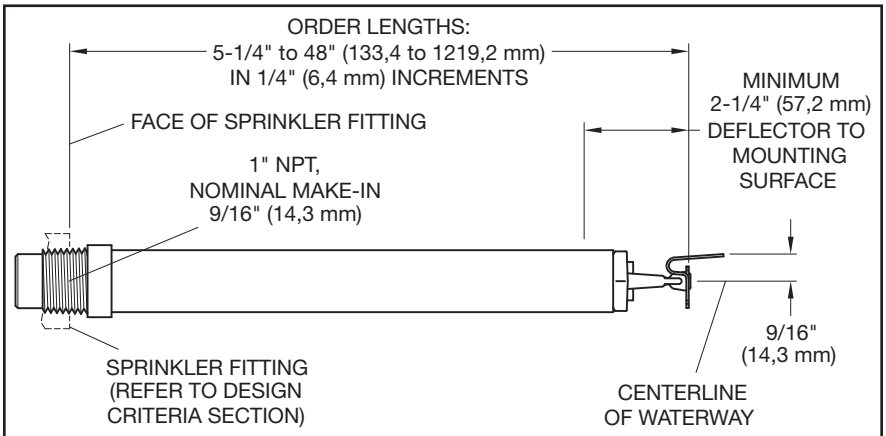


FIGURE 4
SERIES DS-3 ECOH HORIZONTAL SIDEWALL DRY-TYPE SPRINKLER WITHOUT ESCUTCHEON (TY5339)

NOTICE

Do not install Series DS-3 Dry-Type Sprinklers into any other type fitting without first consulting the Technical Services Department. Failure to use the appropriate fitting may result in one of the following:

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

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

Exposure Length
When using Dry Sprinklers in wet pipe sprinkler systems to protect areas subject to freezing temperatures, use Table D to determine a sprinkler's appropriate exposed barrel length to prevent water from freezing in the connecting pipes due to conduction. The exposed barrel length measurement must be taken from the face of the sprinkler fitting to the surface of the structure or insulation that is exposed to the heated area. Refer to Figure 7 for an example.

For protected area temperatures between those given above, the minimum recommended length from the face of the fitting to the outside of the protected area may be determined by interpolating between the indicated values.

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

Use of the Model DSB-2 Dry Sprinkler Boot, described in Technical Data Sheet TFP591 and shown in Figure 9, can provide the recommended seal.

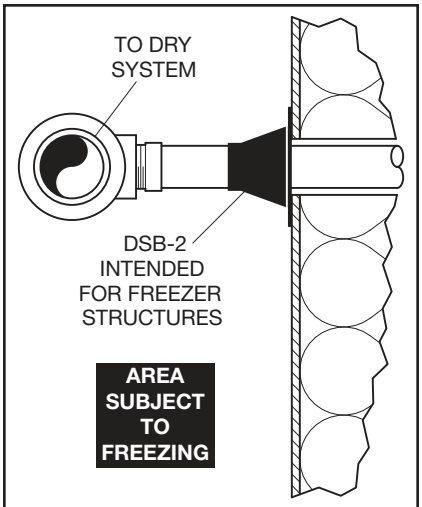


FIGURE 5
SPRINKLER FITTING
UNHEATED AREA

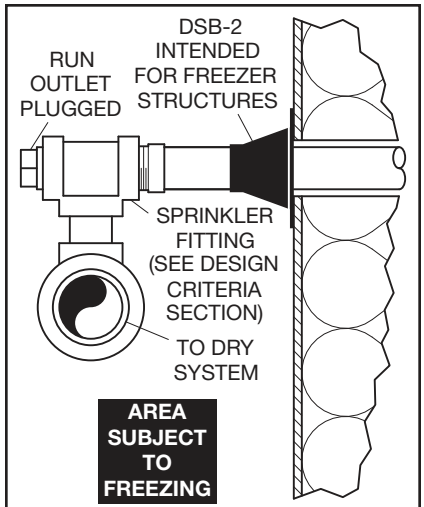


FIGURE 6
SPRINKLER FITTING
UNHEATED AREA

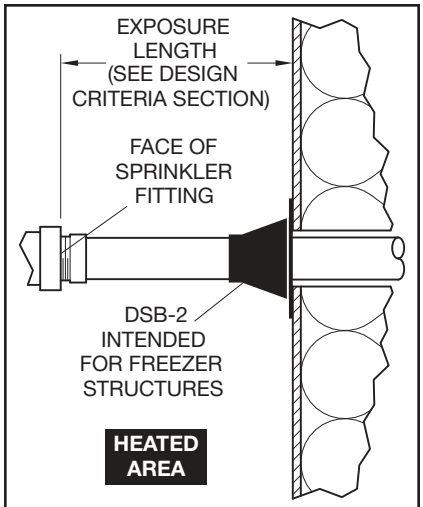


FIGURE 7
SPRINKLER FITTING
HEATED AREA

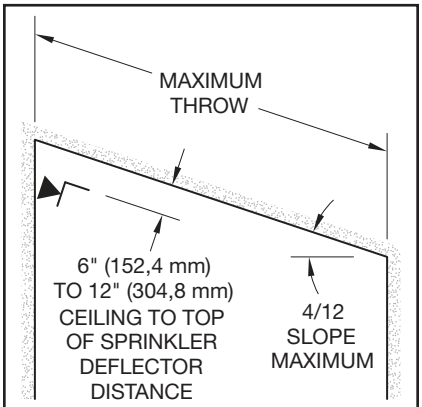


FIGURE 8
SPRINKLER PLACEMENT
UNDER SLOPED CEILINGS
IN LOADING DOCKS

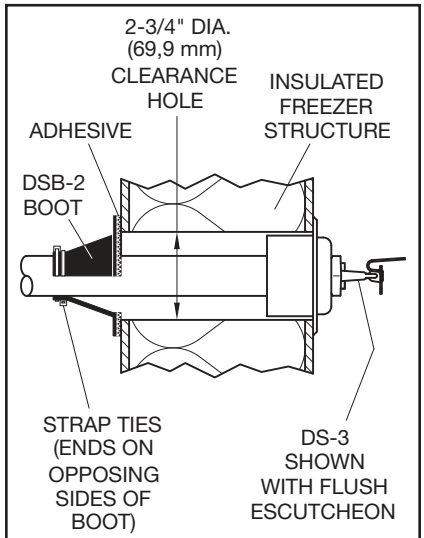


FIGURE 9
MODEL DSB-2 DRY SPRINKLER
BOOT WITH SERIES DS-3
DRY-TYPE PENDENT SPRINKLER

Installation

TYCO Series DS-3 Dry-Type Sprinklers, 11.2K Horizontal Sidewall, Standard Response, Extended Coverage, Ordinary Hazard (ECOH) must be installed in accordance with this section.

General Instructions
Series DS-3 Dry-Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section. Refer to the Design Criteria section for other important requirements regarding piping design and sealing of the clearance space around the Sprinkler Casing. With reference to Figure 10, do not grasp the sprinkler by the deflector. Failure to follow this instruction may impair performance of the device.

Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) rating to 1/8 in. (3,2 mm) for the 360°F (182°C) rating.

A leak-tight 1 inch NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 20 to 30 lb-ft (26,8 to 40,2 N·m). Higher levels of torque may distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in an escutcheon plate by under or over-tightening the Sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Step 1. Install horizontal sidewall sprinklers with the center line of waterway parallel to the ceiling and perpendicular to the back wall surface. The word "TOP" on the deflector must face upwards toward the ceiling.

Step 2. With a non-hardening pipe-thread sealant such as TEFLON applied to the Inlet threads, hand-tighten the sprinkler into the sprinkler fitting. Do not grasp the sprinkler by the deflector (Ref. Figure 10).

Step 3. Wrench-tighten the sprinkler using either:

- a pipe wrench on the Inlet Band or the Casing (Ref. Figure 1)
- the W-Type 8 Sprinkler Wrench on the Wrench Flat (Ref. Figure 11)

Apply the Wrench Recess of the W-Type 8 Sprinkler Wrench to the Wrench Flat.

FIGURE 10
DO NOT GRASP DEFLECTOR

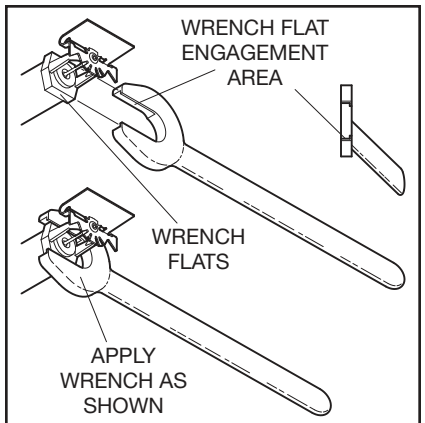


FIGURE 11
W-TYPE 8 SPRINKLER WRENCH

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

Step 4. After applying a wall finish, slide on the outer piece of the escutcheon until it comes in contact with the mounting surface.

For Deep Escutcheons, slide the outer skirt over the inner cup to make firm contact with the mounting surface.

Care and Maintenance

TYCO Series DS-3 Dry-Type Sprinklers, 11.2K Horizontal Sidewall, Standard Response, Extended Coverage, Ordinary Hazard (ECOH) must be maintained and serviced in accordance with this section.

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

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, may delay the time to sprinkler operation in a fire situation.

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

Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers – before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (Refer to Installation Section.)

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (e.g., NFPA 25), in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

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

P/N* 61 — XXX — X — XXX

ESCUTCHEON TYPE	
161	Flush Escutcheon (1 in. NPT), 155°F (68°C)
163	Flush Escutcheon (1 in. NPT), 200°F (93°C)
171	Deep Escutcheon (1 in. NPT), 155°F (68°C)
173	Deep Escutcheon (1 in. NPT), 200°F (93°C)
151	Without Escutcheon (1 in. NPT), 155°F (68°C)
153	Without Escutcheon (1 in. NPT), 200°F (93°C)

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

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

Notes:
1. Does not apply to assemblies without escutcheon.
2. Dry-Type Sprinklers are furnished based upon "Order Length" as measured per Figures 2, 3 & 4.
3. After the measurement is taken, round it to the nearest 1/4 inch increment.

* Use Prefix "I" for ISO 7-R1 Connection (e.g., I-61-161-1-055).

TABLE E
SERIES DS-3 HORIZONTAL SIDEWALL, DRY-TYPE SPRINKLERS (ECOH)
PART NUMBER SELECTION

Limited Warranty

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

Ordering Procedure

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

Dry-Type Sprinklers
When ordering Series DS-3 Dry-Type Sprinklers, 11.2K Horizontal Sidewall, Standard Response, Extended Coverage, Ordinary Hazard (ECOH), specify the following information:

- SIN TY5339
- Order Length:
  Dry-Type Sprinklers are furnished based upon Order Length as measured from the face of the wall to the face of the sprinkler fitting (Ref. Figures 2, 3 & 4). After the measurement is taken, round it to the nearest 1/4 inch increment.
- Inlet Thread Connections:
  1 Inch NPT
  (Standard)

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

Sprinkler Wrench
Specify W-Type 8 Sprinkler Wrench, P/N 56-892-1-001

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

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

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

Johnson Controls

MISC

POTTER
The Symbol of Protection

BELLS

PBA-AC & MBA-DC

UL, ULC, and FM Approved
Sizes Available: 6" (150mm), 8" (200mm) and 10" (250mm)
Voltages Available: 24VAC
120VAC
12VDC (10.2 to 15.6) Polarized
24VDC (20.4 to 31.2) Polarized
Service Use: Fire Alarm
General Signaling
Burglar Alarm
Environment: Indoor or outdoor use (See Note 1)
-40° to 150°F (-40° to 66°C)
(Outdoor use requires weatherproof backbox.)
Termination: AC Bells - 4 No. 18 AWG stranded wires
DC Bells - Terminal strip
Finish: Red powder coating
Optional: Model BBK-1 weatherproof backbox
Model BBX-1 deep weatherproof backbox

These vibrating type bells are designed for use as fire, burglar or general signaling devices. They have low power consumption and high decibel ratings. The unit mounts on a standard 4" (101mm) square electrical box for indoor use or on a model BBK-1 weatherproof backbox or BBX-1 deep weatherproof backbox for outdoor applications. Weatherproof backbox model BBK-1, Stock No. 1500001.

Notes:
1. Minimum dB ratings are calculated from integrated sound pressure measurements made at Underwriters Laboratories as specified in UL Standard 464. UL temperature range is -30° to 150°F (-34° to 66°C).
2. Typical dB ratings are calculated from measurements made with a conventional sound level meter and are indicative of output levels in an actual installation.
3. ULC only applies to MBA DC bells.

Size inches (mm)	Voltage	Model Number	Stock Number	Current (Max.)	Typical dB at 10 ft. (3m) (2)	Minimum dB at 10 ft. (3m) (1)
6 (150)	12VDC	MBA126	1750070	.12A	85	76
8 (200)	12VDC	MBA128	1750080	.12A	90	77
10 (250)	12VDC	MBA1210	1750060	.12A	92	78
6 (150)	24VDC	MBA246	1750100	.06A	87	77
8 (200)	24VDC	MBA248	1750110	.06A	91	79
10 (250)	24VDC	MBA2410	1750090	.06A	94	80
6 (150)	24VAC	PBA246	1806024*	.17A	91	78
8 (200)	24VAC	PBA248	1808024*	.17A	94	77
10 (250)	24VAC	PBA2410	1810024*	.17A	94	78
6 (150)	120VAC	PBA1206	1806120*	.05A	92	83
8 (200)	120VAC	PBA1208	1808120*	.05A	99	84
10 (250)	120VAC	PBA12010	1810120*	.05A	99	86

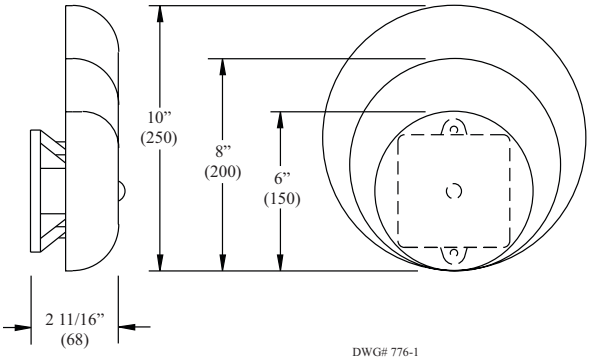
All DC bells are polarized and have built-in transient protection.
* Does not have ULC listing.

⚠ WARNING

In outdoor or wet installations, bell must be mounted with weatherproof backbox, BBK-1 or BBX-1. Standard electrical boxes will not provide a weatherproof enclosure. If the bell and/or assembly is exposed to moisture, it may fail or create an electrical hazard.

Potter Electric Signal Company, LLC • 2081 Craig Road, St. Louis, MO, 63146-4161 • Phone: 800-325-3936/Canada 888-882-1833 • www.pottersignal.com

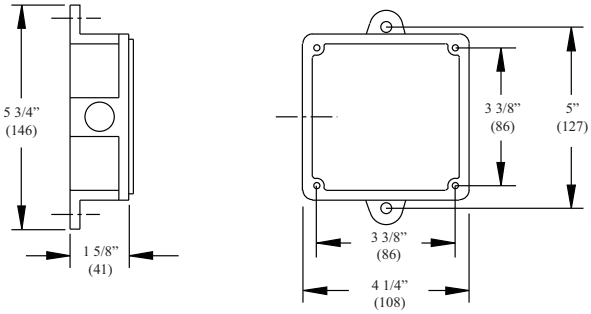
Bells Dimensions Inches (mm)
Fig. 1



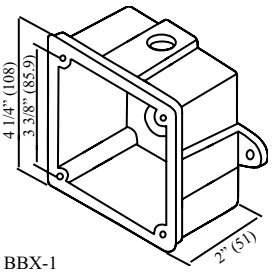
DWG# 776-1

Weatherproof Backbox Dimensions Inches (mm)
Fig. 2

Box has one threaded 1/2" conduit entrance

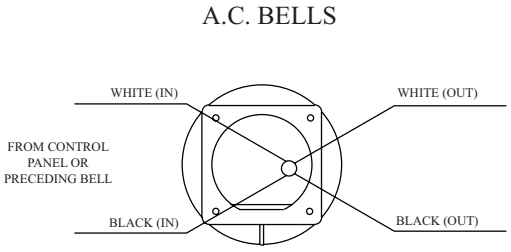


DWG# 776-2



BBX-1

Wiring (rear view)
Fig. 3

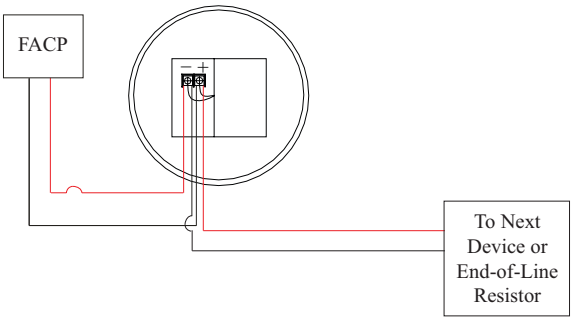


CAUTION:
WHEN ELECTRICAL SUPERVISION IS REQUIRED USE IN AND OUT LEADS AS SHOWN.

NOTES:

1. WHEN USING AC BELLS, TERMINATE EACH EXTRA WIRE SEPARATELY AFTER LAST BELL.
2. END-OF-LINE RESISTOR IS NOT REQUIRED ON AC BELLS.

DWG# 776-3



Installation

1. The bell shall be installed in accordance with NFPA 13, 72, or local AHJ. The top of the device shall be no less than 90" AFF and not less than 6" below the ceiling.
2. Remove the gong.
3. Connect wiring (see Fig. 3).
4. Mount bell mechanism to backbox (bell mechanism must be mounted with the striker pointing down).
5. Reinstall the gong (be sure that the gong positioning pin, in the mechanism housing, is in the hole in the gong).
6. Test all bells for proper operation and observe that they can be heard where required (bells must be heard in all areas as designated by the authority having jurisdiction).

⚠ WARNING

Failure to install striker down will prevent bell from operating.

LANSDALE
VALVE & MANUFACTURING

1040 Broadway Westville, NJ 08093 / Phone: (800) 908-0523 / Fax: (856) 456-9223 / www.gemfiresprinkler.com

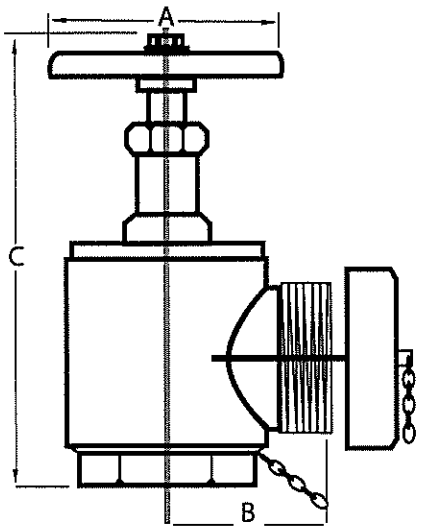
THREADED ANGLE HOSE VALVE

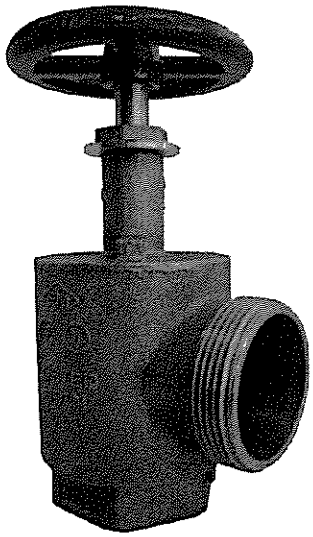
c UL us LISTED FM APPROVED

Angle Hose Valves feature all brass construction with cast bodies for rigidity and light weight. Rated to 300 lbs. These valves can be used with a Fire Hose Rack Assembly or as a Fire Department Connection outlet.

Sizes Available:

1½" FNPT x MNST Hose Valve
1½" FNPT x FNST Hose Valve
2½" FNPT x MNST Hose Valve
2½" FNPT x FNST Hose Valve
2½" FNPT x MPHX Hose Valve
2½" FNPT x MTEMPE Hose Valve
2½" FNPT x MNYCC Hose Valve
2½" FNPT x MNYFD Hose Valve





SPECIFICATIONS	
1½" VALVE	**2½" VALVE**
A=4"	A=5"
B=2¼"	B=3 3/16"
C=8" (OPEN	C=9¼" (CLOSED)
C=7" (CLOSED)	C=11" (OPEN)
Weight: 4 lbs	Weight: 9 lbs
Working Pressure: 300 lbs.	Working Pressure: 300 lbs.

PROJECT	APPROVAL STAMP
PROJECT:	☐ APPROVED
ADDRESS:	☐ APPROVED AS NOTED
ENGINEER:	☐ NOT APPROVED
SUBMITTAL DATA:	REMARKS:
NOTES 1:	
NOTES 2:	

Model AD-2 Automatic Drain Valve 1/2 Inch NPT, 175 psi (12,1 bar) For Use With Dry Standpipes and F.D. Connections

General Description

The Model AD-2 Automatic Drain Valves (Ref. Figure 1) are designed to automatically drain water from fire protection equipment supply connections that are to be maintained normally dry. The AD-2 is used to drain any water that may leak past the control valve at a hose station or that could be trapped between a fire department connection and a check valve.

The AD-2 is installed vertically and utilized with an open drain. Its 1/2 inch NPT male inlet permits direct connection to the low point to be drained.

The Model AD-2 Automatic Drain Valve is a redesignation of the Gem Model F789.

NOTICE

The Model AD-2 Automatic Drain 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 performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Technical Data

Approvals
UL Listed
FM Approved

Maximum Working Pressure
175 psi (12,1 bar)

Physical Characteristics

Body	Bronze
Inlet	Steel
Ball	Stainless Steel or Brass
Spring	Beryllium Copper

Operation

The AD-2 utilizes a spring loaded ball mechanism to maintain the Valve open under normal conditions. As the Inlet is pressurized, the Ball is automatically forced downward and the Valve is closed at a pressure of approximately 7 psi (0,48 bar). In the closed condition, a limited amount of water continues to flow out through the two Bleed Orifices: 1 to 2 GPM at 100 psi (0,38 to 0,75 LPM at 6,9 bar). On decreasing pressure, the Spring automatically reopens the Valve at a pressure of 5 psi (0,34 bar) or greater.

Installation

The Model AD-2 Automatic Drain Valve is to be installed vertically with the arrow on the Body pointing directly downward. An automatic drain valve is to be located at the low point of each trapped section of piping that is to be kept normally dry, and drainage arrangements, as appropriate, should be provided.

Care and Maintenance

The following inspection procedure must be performed as indicated, in addition to any specific requirements of the NFPA. Any impairments must be immediately corrected.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

NOTICE

No attempt is to be made to disassemble, repair or clean an impaired AD-2 Automatic Drain Valve. The complete assembly must be replaced if there is any indication of malfunction.

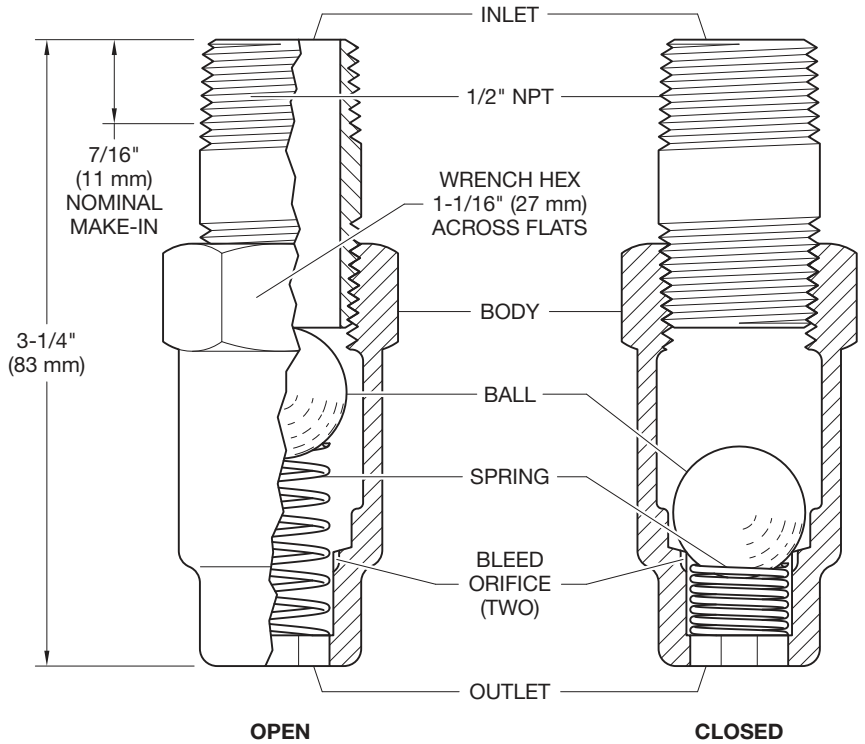


FIGURE 1
MODEL AD-2 AUTOMATIC DRAIN VALVE

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

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

Inspection Procedure
It is recommended that Model AD-2 Automatic Drain Valve installations be inspected monthly, or more frequently as may be necessary in applications where condensate must be continuously removed. Verify that each Valve is in working order and not obstructed with scale, dirt, or other deposits. If the Valve must be removed for inspection, only wrench on the Inlet.

Each automatic drain valve should also be checked for proper drainage whenever the associated fire protection equipment supply connection is flow (pressure) tested.

Limited Warranty

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

Ordering Procedure

Orders must include the description and Part Number (P/N). Contact your local distributor for availability.

Model AD-2 Automatic Drain Valve
Specify: Model AD-2 Automatic Drain Valve, P/N 52-789-1-004

tyco Fire Protection Products

tyco / Fire & Building Products

Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500

Identification Signs For Sprinkler Systems and Devices NFPA 13 Signing Requirements

General Description

Identification Signs (Ref. Figure 1) are designed to provide information to the end user about the sprinkler system and its components. They are available with a variety of wording combinations to meet the signing requirements of NFPA 13.

The five basic types of Identification Signs are as follows:

Type A- Control Valve Sign

Type B- Multi-Purpose Text Signs (See Below)

Type D- Fire Alarm Sign

Type E- Hydraulic Calculation Sign

Type B- Identification Signs are available with the following text options:

AIR CONTROL
AIR LINE
ALARM TEST
ANTIFREEZE SYSTEM
AUXILIARY DRAIN
CONTROL VALVE
DRAIN
DRAIN VALVE
INSPECTORS TEST
MAIN CONTROL
MAIN DRAIN

WARNINGS

The Identification Signs 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 these devices.***

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

Technical Data

Material & Finish
18 gauge aluminum with mylar facing.

	Width x Height	
	Inches	**(mm)**
Type A	9 x 7	(229 x 178)
Type B	6 x 2	(152 x 51)
Type C	7¾ x 1¼	(197 x 32)
Type D	9 x 7	(229 x 178)
Type E	5 x 7	(127 x 178)

Installation

The Identification Signs are provided with 1⁄8 Inch (3,2 mm) diameter or larger holes (or slots) in the corners for easy attachment using standard hardware chain, wire, plastic lock ties, or light gauge metal strap (not included).

Care and Maintenance

The following inspection procedure must be performed as indicated, in addition to any specific requirements of the NFPA, and any impairments must be immediately corrected.

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

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

INSPECTION PROCEDURE

Annual visual inspections are recommended to ensure that Identification Signs are properly located.

SIGN- TYPE A, P/N 2300A

SIGN- TYPE D

RECTANGULAR 6-1/2" X 8-1/2", P/N 2316
OR
ROUND 7-1/4" DIAMETER, P/N 2329

SIGN- TYPE B,
AVAILABLE WITH THE
FOLLOWING TEXT OPTIONS

"AIR CONTROL" . . . . . P/N 2328
"AIR LINE" . . . . . P/N 2302
"ALARM TEST" . . . . . P/N 2304A
"ANTIFREEZE SYSTEM" . . . . . P/N 2306
"AUXILIARY DRAIN" . . . . . P/N 2307
"CONTROL VALVE" . . . . . P/N 2310
"DRAIN" . . . . . P/N 2311
"DRAIN VALVE" . . . . . P/N 2327
"INSPECTORS TEST" . . . . . P/N 2313
"MAIN CONTROL" . . . . . P/N 2319
"MAIN DRAIN" . . . . . P/N 2320

SIGN- TYPE E, P/N 2317

FIGURE 1
IDENTIFICATION SIGNS

Limited Warranty

Products manufactured by Tyco Fire & Building Products (TFBP) 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 TFBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFBP 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 TFBP to be defective shall be either repaired or replaced, at TFBP's sole option. TFBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFBP 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 TFBP 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 TFBP was informed about the possibility of such damages, and in no event shall TFBP's liability exceed an amount equal to the sales price.

The foregoing warranty is made in lieu of any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

Ordering Procedure

Orders must include the description and Part Number (P/N). Contact your local distributor for availability.

Hardware for hanging is not supplied with the Sign. It must be ordered separately.

Identification Signs, (Types A, C, D, or E)
Specify: Type (A, C, D, or E) Identification Sign, P/N (specify).

Identification Signs (Type B)
Specify: Type B Identification Sign inscribed (specify, e.g. "AIR CONTROL"), P/N (specify).

Type A . . . . . P/N 2300A
Type D (Round). . . . . P/N 2329
Type D (Rectangle). . . . . P/N 2316
Type E . . . . . P/N 2317

Type B
"AIR CONTROL" . . . . . P/N 2328
"AIR LINE". . . . . P/N 2302
"ALARM TEST". . . . . P/N 2304A
"ANTIFREEZE SYSTEM" . . . . . P/N 2306
"AUXILIARY DRAIN". . . . . P/N 2307
"CONTROL VALVE" . . . . . P/N 2310
"DRAIN" . . . . . P/N 2311
"DRAIN VALVE" . . . . . P/N 2327
"INSPECTORS TEST" . . . . . P/N 2313
"MAIN CONTROL" . . . . . P/N 2319
"MAIN DRAIN" . . . . . P/N 2320

tyco / Fire & Building Products

Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500

Sprinkler Cabinets
3, 6, & 12 Sprinklers, 1/2 or 3/4 Inch NPT
6 ESFR Sprinklers, 3/4 or 1 Inch NPT

General Description

Tyco® Sprinkler Cabinets are constructed of metal enclosures with hinged covers designed to provide on-site storage of an emergency supply of sprinklers and a sprinkler wrench.

NFPA 13 requires a representative number of each type of sprinkler used in a sprinkler system to be stored in a cabinet on-site to allow for immediate removal and replacement of sprinklers that may have operated or become damaged.

Sprinkler Cabinets are manufactured of heavy gauge steel with knock-outs to accommodate NPT threaded sprinklers and are painted an attractive red enamel.

WARNINGS

The Sprinkler Cabinets 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 these devices.***

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

Technical Data

Material
Carbon Steel

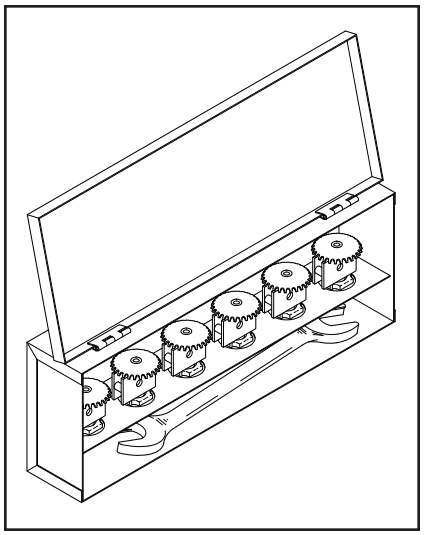
Weights

3 Sprinkler Cabinet . . . . . 1.5 Lbs. (0,68 kg)

6 Sprinkler Cabinet . . . . . 2.3 Lbs. (1,04 kg)

12 Sprinkler Cabinet . . . . . 4.0 Lbs. (1,81 kg)

6 ESFR Sprinkler Cabinet . . . . . 3.3 Lbs. (1,36 kg)



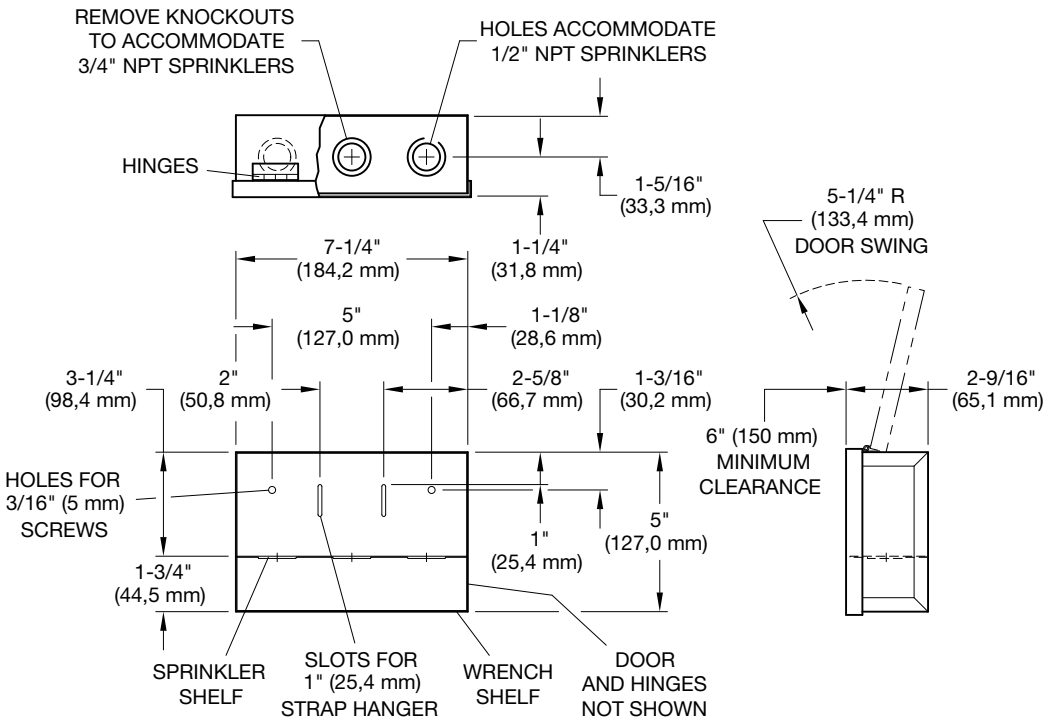


FIGURE 1
3 SPRINKLER CABINET

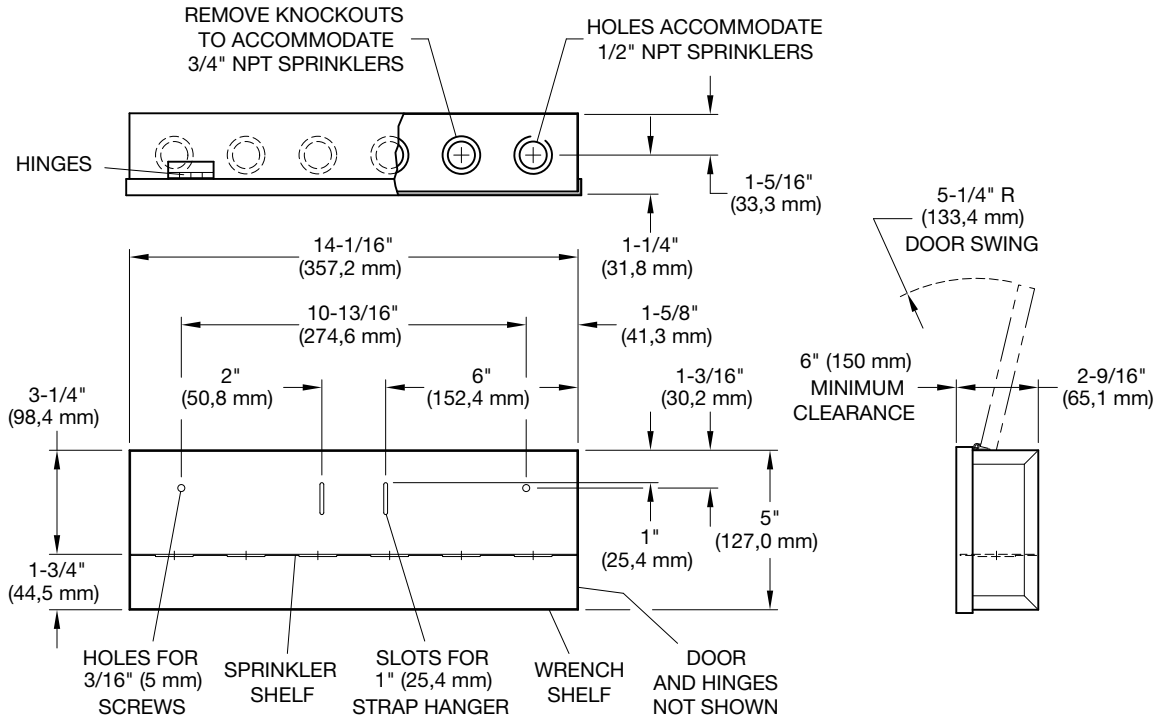


FIGURE 2
6 SPRINKLER CABINET

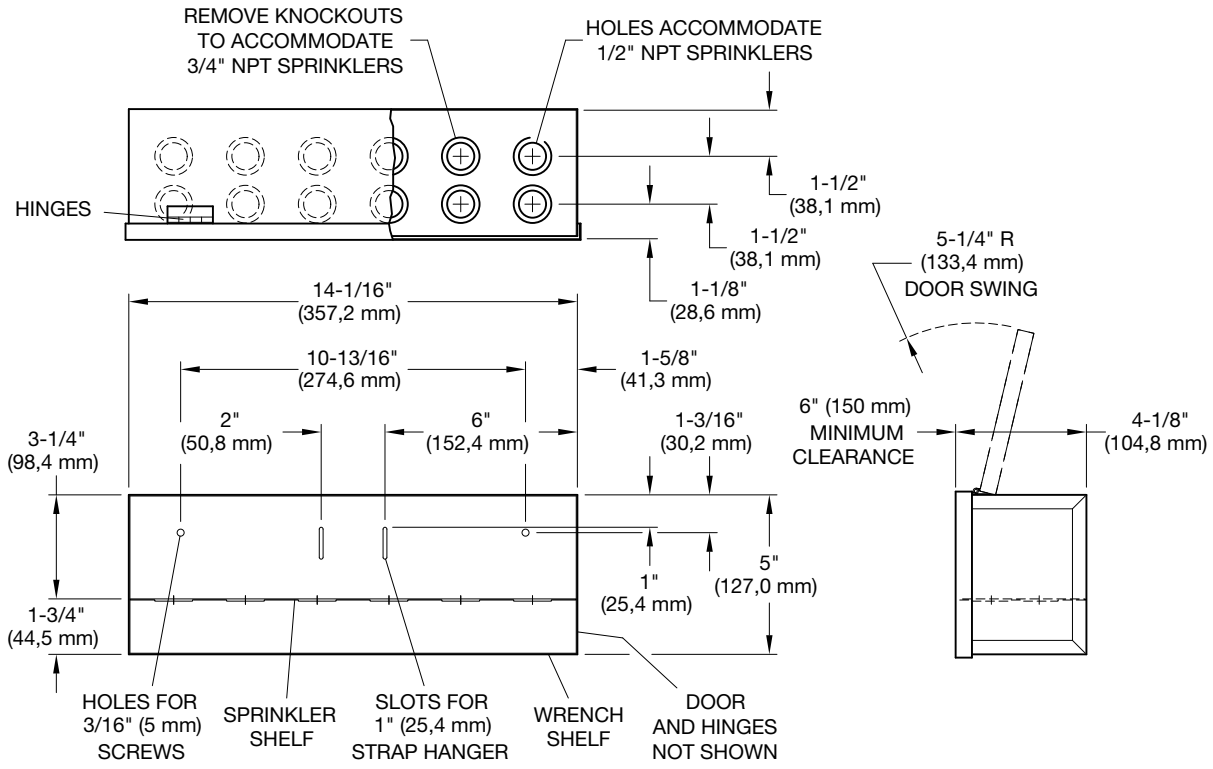


FIGURE 3
12 SPRINKLER CABINET

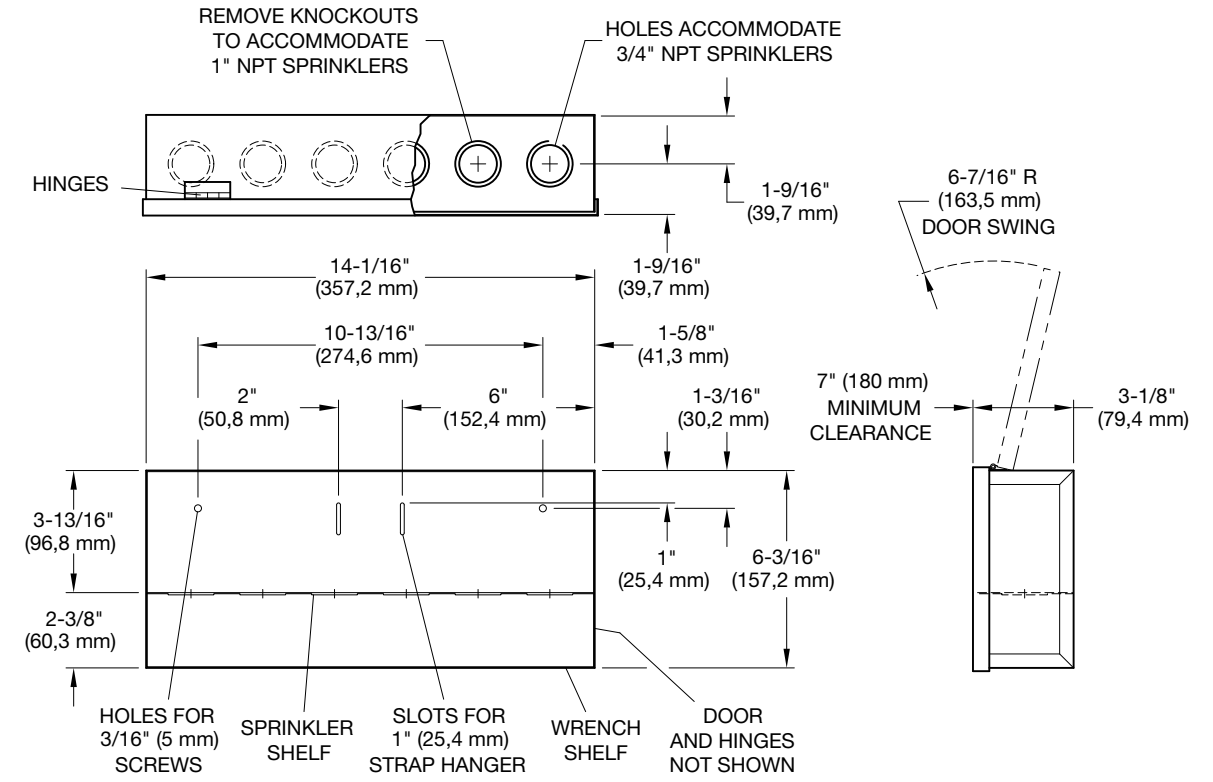


FIGURE 4
6 ESFR SPRINKLER CABINET

Installation

Sprinkler Cabinets are designed with two 3/16 Inch (4,7 mm) diameter holes for wall mounting or direct attachment to the system riser with a strap-type hanger. The Sprinkler Cabinet should be installed at or near the system control valve and must be stocked with an adequate supply of spare sprinklers and a sprinkler wrench.

The stock of spare sprinklers should include sprinklers of each type and temperature rating as are installed in the sprinkler system, in the following quantities:

Sprinklers In System	Spare Sprinklers Required
Under 300	6
300-1000	12
Over 1000	24

The 3, 6, and 12 Sprinkler Cabinets are designed to accept both 1/2 & 3/4 Inch NPT threaded sprinklers, whereas the 6 ESFR Sprinkler Cabinets are designed to accept both 3/4 & 1 Inch NPT threaded sprinklers. As necessary, insert a screwdriver blade from the front top of the shelf and under the near bottom part of the knockout annular ring. Press the screwdriver handle down to remove the knockout ring.

Care and Maintenance

The Sprinkler Cabinet, wrench, and stock of spare sprinklers should be inspected at least quarterly. The following items should be checked:

- The Sprinkler Cabinet should be readily accessible, and not exposed to a corrosive atmosphere or temperatures in excess of 100°F (38°C).
- The stock of spare sprinklers should include an adequate number of each type and temperature rating.
- The stock of sprinklers must be in good condition.
- A sprinkler wrench of the appropriate type must be included in the Sprinkler Cabinet.

Limited Warranty

Products manufactured by Tyco Fire & Building Products (TFBP) 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 TFBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFBP 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 TFBP to be defective shall be either repaired or replaced, at TFBP's sole option. TFBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFBP 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 TFBP 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 TFBP was informed about the possibility of such damages, and in no event shall TFBP's liability exceed an amount equal to the sales price.

The foregoing warranty is made in lieu of any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

Ordering Procedure

When placing an order, indicate the full product name. Contact your local distributor for availability.

Sprinkler Cabinet:
Specify: (Description), P/N (specify).

3 Sprinkler Cabinet. . . . . P/N 1177
6 Sprinkler Cabinet. . . . . P/N 1119
12 Sprinkler Cabinet. . . . . P/N 1124
6 ESFR Sprinkler Cabinet . . . . . P/N 1111

HYDRAULIC CALCULATIONS

CALCULATION SUMMARY

Project Name : TRACTOR SUPPLY - LAKE CITY, FL

Project Location: 129 SW. CHAD PLACE

Contract No. : C25-16229

City: LAKE CITY, FLORIDA 32025

Design Areas

Design Area Name	Calc. Mode (Model)	Occupancy	Area of Application	Total Water	Pressure @ Source	Min. Density	Min. Pressure	Min. Flow	Calculated Heads	Hose Streams	Margin To Source
			(ft^2)	(gpm)	(psi)	(gpm/ft^2)	(psi)	(gpm)	#	(gpm)	(psi)
1	Demand (HW)	OH2	1506.5	571.7	Required 61	0.2	10	25.3	12	250	46.8
1.1	Demand (HW)	OH2	1506.5	568.4	Required 59.9	0.2	10	25.3	12	250	47.9
1.2	Demand (HW)	OH2	1506.5	566.5	Required 58.9	0.2	10	25.3	12	250	49
2	Demand (HW)	OH2	1406.5	545.1	Required 61.9	0.2	20.9	51.2	7	250	46.1

File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Date 7/29/2025

HYDRAULIC CALCULATIONS
for

Job Information

Project Name : TRACTOR SUPPLY - LAKE CITY, FL

Contract No. : C25-16229

City: LAKE CITY, FLORIDA 32025

Project Location: 129 SW. CHAD PLACE

Date: 7/29/2025

Contractor Information

Name of Contractor: TRIPLE "A" FIRE PROTECTION

Address: P.O. BOX 1037

City: SEMMES, ALABAMA 36575

Phone Number: 251.649.2034

E-mail: joshuaw@aaafp.com

Name of Designer: JOSHUA WIGGINS

Authority Having Jurisdiction: FIRE MARSHAL

Design

Remote Area Name	1
Remote Area Location	SALES AREA
Occupancy Classification	OH2
Density (gpm/ft²)	0.2
Area of Application (ft²)	1506.5
Coverage per Sprinkler (ft²)	126.5
Number of Calculated Sprinklers	12
In-Rack Demand (gpm)	0
Special Heads	
Hose Streams (gpm)	250
Total Water Required (incl. Hose Streams) (gpm)	571.7
Required Pressure at Source (psi)	61
Type of System	Wet
Volume - Entire System (gal)	959.4 gal

Water Supply Information

Date	7/24/2024
Location	SW CHAD PLACE
Source	W1

Notes

Hydraulic Analysis for : 1

Calculation Info

Calculation Mode	Demand
Hydraulic Model	Hazen-Williams
Fluid Name	Water @ 60F (15.6C)
Fluid Weight, (lb/ft³)	N/A for Hazen-Williams calculation.
Fluid Dynamic Viscosity, (lb·s/ft²)	N/A for Hazen-Williams calculation.

Water Supply Parameters

Supply 1 : W1

Flow (gpm)	Pressure (psi)
0	110
1300	100

Supply Analysis

Node at Source	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)	Available Pressure (psi)	Total Demand (gpm)	Required Pressure (psi)
W1	110	100	1300	107.8	571.7	61

Hoses

Inside Hose Flow / Standpipe Demand (gpm)	0
Outside Hose Flow (gpm)	250
Additional Outside Hose Flow (gpm)	
Other (custom defined) Hose Flow (gpm)	0
Total Hose Flow (gpm)	250

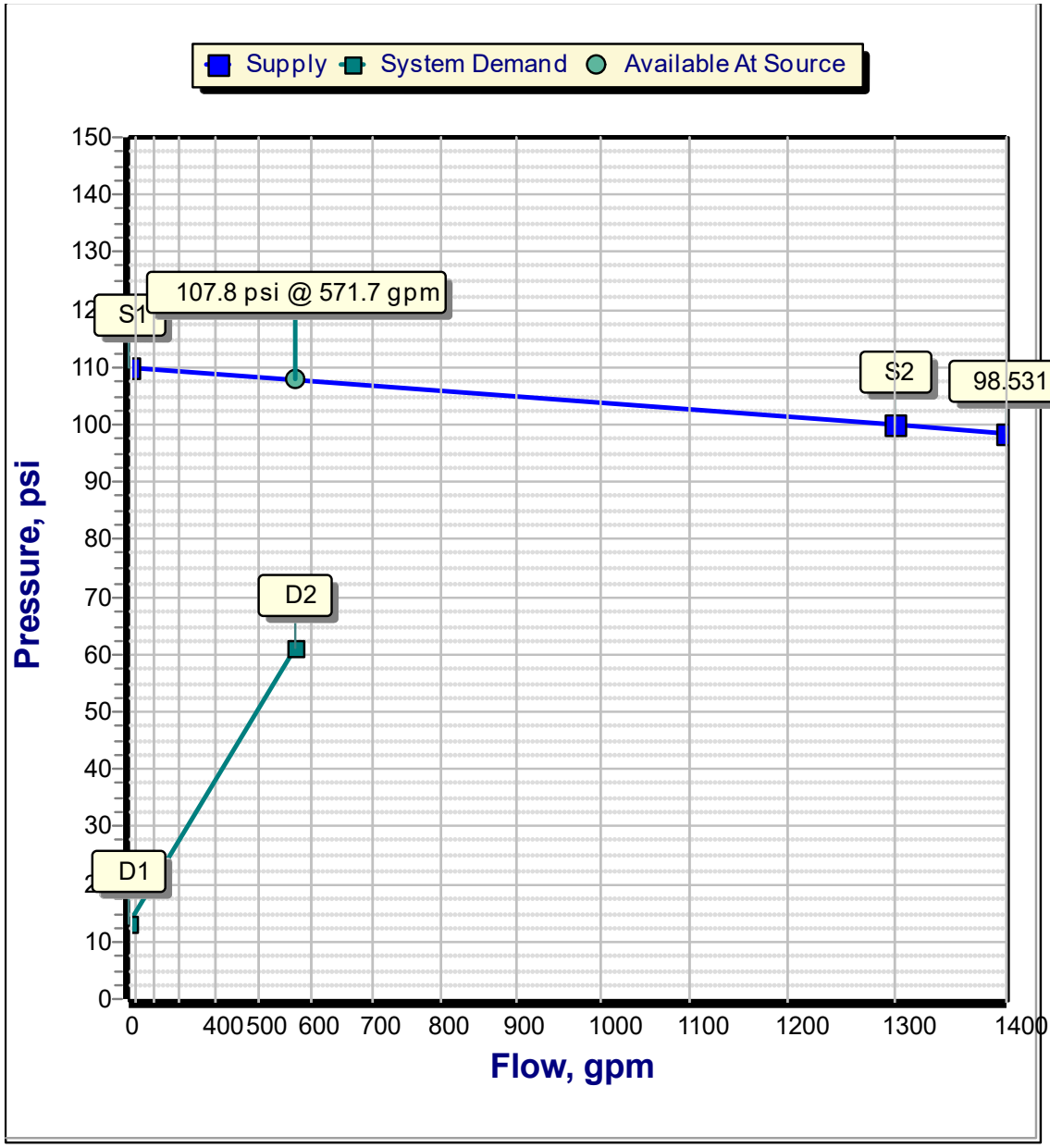
Sprinklers

Ovehead Sprinkler Flow (gpm)	321.7
InRack Sprinkler Flow (gpm)	0
Other (custom defined) Sprinkler Flow (gpm)	0
Total Sprinkler Flow (gpm)	321.7

Other

Required Margin of Safety (psi)	0
BOR - Pressure (psi)	52.1
BOR - Flow (gpm)	321.7
Demand w/o System Pump(s)	N/A

Hydraulic Analysis for : 1



File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Hydraulic Analysis for : 1

Graph Labels

Label	Description	Values	
		Flow (gpm)	Pressure (psi)
S1	Supply point #1 - Static	0	110
S2	Supply point #2 - Residual	1300	100
D1	Elevation Pressure	0	13
D2	System Demand	571.7	61

Curve Intersections & Safety Margins

Curve Name	Intersection		Safety Margin	
	Pressure (psi)	Flow (gpm)	Pressure (psi)	@ Flow (gpm)
Supply	105.8	816.2	46.8	571.7

Open Heads

Head Ref.	Head Type	Coverage	K-Factor	Required			Calculated		
				Density	Flow	Pressure	Density	Flow	Pressure
		(ft²)	(gpm/psi½)	(gpm/ft²)	(gpm)	(psi)	(gpm/ft²)	(gpm)	(psi)
S1	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.203	25.7	10.3
S10	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.213	26.9	11.3
S13	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.227	28.8	12.9
S14	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.221	28	12.2
S15	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.222	28.1	12.3
S16	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.227	28.8	12.9
S2	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.2	25.3	10
S3	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.201	25.5	10.1
S4	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.209	26.4	10.9
S7	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.208	26.3	10.8
S8	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.205	25.9	10.5
S9	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.206	26.1	10.6

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
004 15.46	Node NODE				34.1 -11.3	
006 15.46	Node NODE				34.1 -11.3	
007 15.46	Node NODE				34.3 -11.3	
008 15.46	Node NODE				34.5 -11.3	
009 15.46	Node NODE				34.9 -11.3	
010 15.46	Node NODE				35.3 -11.3	
011 15.46	Node NODE				35.8 -11.3	
012 15.46	Node NODE				36.4 -11.3	
014 15.46	Node NODE				37.1 -11.3	
015 15.46	Node NODE				38.7 -11.3	
016 15.46	Node NODE				38.6 -11.3	
019 15.46	Node NODE				38.6 -11.3	
022 15.46	Node NODE				38.6 -11.3	
053 19.03	Node NODE				34.3 -13	
055 19.03	Node NODE				34.1 -13	
057 19.03	Node NODE				33.9 -13	
059 19.03	Node NODE				33.3 -13	
061 19.03	Node NODE				32.4 -13	
063 19.03	Node NODE				30.9 -13	
065 19.03	Node NODE				28.9 -13	
067 19.03	Node NODE				25.8 -13	
069 19.03	Node NODE				21.2 -13	
071 19.03	Node NODE				14.8 -13	
073 19.03	Node NODE				12.2 -13	
075 19.03	Node NODE				11.5 -13	

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
291 -8	Node NODE				57.7 0	
294 -8	Node NODE				56.5 0	
296 -8	Node NODE				60.1 0	
301 -8	Node NODE				60.1 0	
BFP-I 3	Node NODE				54.7 -5.3	
BFP-O 3	Node NODE				52.5 -5.3	
BFV-I 3.81	Node NODE				50.5 -5.7	
BFV-O 4.13	Node NODE				49.1 -5.8	
BOR 1	Node NODE				52.1 -4.3	
CKV-I 5.49	Node NODE				48.3 -6.5	
CKV-O 6.18	Node NODE				46.5 -6.8	
GTV1-I -8	Node NODE				61 0	
GTV1-O -8	Node NODE				61 0	
GTV2-I -8	Node NODE				60.1 0	
GTV2-O -8	Node NODE				60 0	
H1 -8	Outside Hose HOSE		250		60 0	250
S1 19.01	Overhead Sprinkler HEAD	8 Open	25.7 0.4	126.5 0.203	10.3 -13	10 25.3
S10 18.16	Overhead Sprinkler HEAD	8 Open	26.9 1.6	126.5 0.213	11.3 -12.5	10 25.3
S13 19.01	Overhead Sprinkler HEAD	8 Open	28.8 3.5	126.5 0.227	12.9 -13	10 25.3
S14 18.72	Overhead Sprinkler HEAD	8 Open	28 2.7	126.5 0.221	12.2 -12.8	10 25.3
S15 18.44	Overhead Sprinkler HEAD	8 Open	28.1 2.8	126.5 0.222	12.3 -12.7	10 25.3
S16 18.16	Overhead Sprinkler HEAD	8 Open	28.8 3.5	126.5 0.227	12.9 -12.5	10 25.3
S2 18.72	Overhead Sprinkler HEAD	8 Open	25.3 0	126.5 0.2	10 -12.8	10 25.3
S3 18.44	Overhead Sprinkler HEAD	8 Open	25.5 0.2	126.5 0.201	10.1 -12.7	10 25.3
S4 18.16	Overhead Sprinkler HEAD	8 Open	26.4 1.1	126.5 0.209	10.9 -12.5	10 25.3

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
S7 19.01	Overhead Sprinkler HEAD	8 Open	26.3 1	126.5 0.208	10.8 -13	10 25.3
S8 18.72	Overhead Sprinkler HEAD	8 Open	25.9 0.6	126.5 0.205	10.5 -12.8	10 25.3
S9 18.44	Overhead Sprinkler HEAD	8 Open	26.1 0.8	126.5 0.206	10.6 -12.7	10 25.3
W1 -8	Supply SUPPLY		-571.7		61 0	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
S2	18.72	8	25.3	1.25		12.17	120	10	
S1	19.01	8	22.6	1.442		0	0.0344	-0.1	
						12.17		0.4	
S1	19.01	8	25.7	1.25	1x(us.Tee-Br)=7.43	1.06	120	10.3	
075	19.03		48.2	1.442		7.43	0.1405	0.0	
						8.49		1.2	
075	19.03		0	1.5		10.35	120	11.5	
073	19.03		48.2	1.68		0	0.0668	0	
						10.35		0.7	
073	19.03		51.1	1.5		10.35	120	12.2	
071	19.03		99.3	1.68		0	0.2546	0	
						10.35		2.6	
071	19.03		61.5	1.5		10.35	120	14.8	
069	19.03		160.9	1.68		0	0.6218	0	
						10.35		6.4	
069	19.03		-28.8	1.5		10.51	120	21.2	
067	19.03		132.1	1.68		0	0.4317	0	
						10.51		4.5	
067	19.03		-25.7	1.5		10.67	120	25.8	
065	19.03		106.4	1.68		0	0.2892	0	
						10.67		3.1	
065	19.03		-20.2	1.5		10.67	120	28.9	
063	19.03		86.2	1.68		0	0.1957	0	
						10.67		2.1	
063	19.03		-16.3	1.5		10.67	120	30.9	
061	19.03		69.8	1.68		0	0.1326	0	
						10.67		1.4	
061	19.03		-13.9	1.5		10.51	120	32.4	
059	19.03		55.9	1.68		0	0.0878	0	
						10.51		0.9	
059	19.03		-11.5	1.5		10.35	120	33.3	
057	19.03		44.4	1.68		0	0.0574	0	
						10.35		0.6	
057	19.03		-15.4	1.5		10.35	120	33.9	
055	19.03		29	1.68		0	0.0261	0	
						10.35		0.3	
055	19.03		-14.5	1.5	1x(us.Tee-Br)=9.84	10.35	120	34.1	
053	19.03		14.5	1.68		9.84	0.0073	0	
						20.2		0.1	
053	19.03		0	1.25	1x(us.Tee-Br)=7.43	154.69	120	34.3	
022	15.46		14.5	1.442	2x(us.90)=7.43	14.86	0.0153	1.5	
						169.55		2.6	
022	15.46		0	3		13.71	120	38.6	
019	15.46		14.5	3.26		0	0.0003	0	
						13.71		0	
019	15.46		14.5	3		8.18	120	38.6	
016	15.46		29	3.26		0	0.001	0	
						8.18		0	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
016	15.46		15.4	3	1x(us.Tee-Br)=20.16	5.27	120	38.6	
015	15.46		44.4	3.26		20.16	0.0023	0	
						25.43		0.1	
015	15.46		277.3	3	2x(us.90)=18.82	19.43	120	38.7	
CKV-O	6.18		321.7	3.26		18.82	0.0889	4	
						38.25		3.4	
CKV-O	6.18		0	3		0.7		46.5	CV-1 FR
CKV-I	5.49		321.7	0		0	2.0856	0.3	Check
						0.7		1.5	***
CKV-I	5.49		0	3		1.35	120	48.3	
BFV-O	4.13		321.7	3.26		0	0.0889	0.6	
						1.35		0.1	
BFV-O	4.13		0	3		0.32		49.1	BFV-N
BFV-I	3.81		321.7	0		0	3.8279	0.1	***
						0.32		1.2	
BFV-I	3.81		0	3		2.81	120	50.5	
BOR	1		321.7	3.26		0	0.0889	1.2	
						2.81		0.3	
BOR	1		0	6	2x(us.90)=48.39	14.42	140	52.1	
294	-8		321.7	6.4		48.39	0.0025	3.9	
						62.8		0.2	
294	-8		0	6	2x(us.90)=43.14	360.31	150	56.5	
291	-8		321.7	6.09		43.14	0.0028	0	
						403.45		1.1	
291	-8		0	6	1x(us.90)=24.19	14.5	140	57.7	
BFP-O	3		321.7	6.4		24.19	0.0025	-4.8	
						38.69		0.1	
BFP-O	3		0	6		0.5		52.5	Watts 757
BFP-I	3		321.7	0		0	4.4238	0	DCDA
						0.5		2.2	***
BFP-I	3		0	6	2x(us.90)=48.39	15	140	54.7	
296	-8		321.7	6.4		48.39	0.0025	4.8	
						63.39		0.2	
296	-8		0	6		4	150	60.1	
301	-8		321.7	6.09		0	0.0028	0	
						4		0.0	
301	-8		250	6	1x(us.Tee-Br)=46.22	56.5	150	60.1	
GTV1-O	-8		571.7	6.09		46.22	0.0081	0	
						102.72		0.8	
GTV1-O	-8		0	6		0.88		61	Gate A2360
GTV1-I	-8		571.7	0		0	0.0125	0	***
						0.88		0.0	
GTV1-I	-8		0	6		1.72	150	61	
W1	-8		571.7	6.09		0	0.0081	0	
						1.72		0.0	
W1								61	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 2									
S2	18.72	8	25.3	1.25		12.17	120	10	
S3	18.44	8	2.7	1.442		0	0.0007	0.1	
						12.17		0	
S3	18.44	8	25.5	1.25		12.17	120	10.1	
S4	18.16	8	28.2	1.442		0	0.0521	0.1	
						12.17		0.6	
S4	18.16	8	26.4	1.25	1x(us.Tee-Br)=7.43	116.12	120	10.9	
004	15.46		54.6	1.442		7.43	0.1771	1.2	
						123.55		21.9	
004	15.46		0	3		10.35	120	34.1	
006	15.46		54.6	3.26		0	0.0033	0	
						10.35		0.0	
006	15.46		54.1	3		10.35	120	34.1	
007	15.46		108.8	3.26		0	0.0119	0	
						10.35		0.1	
007	15.46		52.1	3		10.35	120	34.3	
008	15.46		160.9	3.26		0	0.0246	0	
						10.35		0.3	
008	15.46		28.8	3		10.51	120	34.5	
009	15.46		189.6	3.26		0	0.0334	0	
						10.51		0.4	
009	15.46		25.7	3		10.67	120	34.9	
010	15.46		215.3	3.26		0	0.0423	0	
						10.67		0.5	
010	15.46		20.2	3		10.67	120	35.3	
011	15.46		235.6	3.26		0	0.0499	0	
						10.67		0.5	
011	15.46		16.3	3		10.67	120	35.8	
012	15.46		251.9	3.26		0	0.0565	0	
						10.67		0.6	
012	15.46		13.9	3		10.51	120	36.4	
014	15.46		265.8	3.26		0	0.0624	0	
						10.51		0.7	
014	15.46		11.5	3	1x(us.Tee-Br)=20.16	2.91	120	37.1	
015	15.46		277.3	3.26		20.16	0.0675	0	
						23.07		1.6	
015								38.7	
Path No: 3									
S8	18.72	8	25.9	1.25		12.17	120	10.5	
S7	19.01	8	24.8	1.442		0	0.041	-0.1	
						12.17		0.5	
S7	19.01	8	26.3	1.25	1x(us.Tee-Br)=7.43	1.06	120	10.8	
073	19.03		51.1	1.442		7.43	0.1566	0.0	
						8.49		1.3	
073								12.2	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 4									
S8	18.72	8	25.9	1.25		12.17	120	10.5	
S9	18.44	8	1.1	1.442		0	0.0001	0.1	
						12.17		0	
S9	18.44	8	26.1	1.25		12.17	120	10.6	
S10	18.16	8	27.2	1.442		0	0.0486	0.1	
						12.17		0.6	
S10	18.16	8	26.9	1.25	1x(us.Tee-Br)=7.43	116.12	120	11.3	
006	15.46		54.1	1.442		7.43	0.174	1.2	
						123.55		21.5	
006								34.1	
Path No: 5									
S14	18.72	8	28	1.25		12.17	120	12.2	
S13	19.01	8	32.8	1.442		0	0.0686	-0.1	
						12.17		0.8	
S13	19.01	8	28.8	1.25	1x(us.Tee-Br)=7.43	1.06	120	12.9	
071	19.03		61.5	1.442		7.43	0.2206	0.0	
						8.49		1.9	
071								14.8	
Path No: 6									
S15	18.44	8	28.1	1.25		12.17	120	12.3	
S16	18.16	8	23.3	1.442		0	0.0366	0.1	
						12.17		0.4	
S16	18.16	8	28.8	1.25	1x(us.Tee-Br)=7.43	116.12	120	12.9	
007	15.46		52.1	1.442		7.43	0.1621	1.2	
						123.55		20	
007								34.3	
Path No: 7									
S15	18.44	8	28.1	1.25		12.17	120	12.3	
S14	18.72	8	4.8	1.442		0	0.0019	-0.1	
						12.17		0.0	
S14								12.2	
Path No: 8									
H1	-8		250	6		8.27	150	60	
GTV2-O	-8		250	6.09		0	0.0018	0	
						8.27		0.0	
GTV2-O	-8		0	6		0.88		60	Gate A2360
GTV2-I	-8		250	0		0	0.0035	0	* * *
						0.88		0	
GTV2-I	-8		0	6	1x(us.Tee-Br)=46.22	0.86	150	60.1	
301	-8		250	6.09		46.22	0.0018	0	
						47.08		0.1	
301								60.1	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 9									
069	19.03		0	1.25	2x(us.Tee-Br)=14.86	169.69	120	21.2	
008	15.46		28.8	1.442	8x(us.90)=29.73	44.59	0.054	1.5	
						214.28		11.6	
008								34.5	
Path No: 10									
067	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	25.8	
009	15.46		25.7	1.442		14.86	0.0438	1.5	
						168.55		7.4	
009								34.9	
Path No: 11									
065	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	28.9	
010	15.46		20.2	1.442		14.86	0.0281	1.5	
						168.55		4.7	
010								35.3	
Path No: 12									
063	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	30.9	
011	15.46		16.3	1.442		14.86	0.0189	1.5	
						168.55		3.2	
011								35.8	
Path No: 13									
061	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	32.4	
012	15.46		13.9	1.442		14.86	0.0141	1.5	
						168.55		2.4	
012								36.4	
Path No: 14									
059	19.03		0	1.25	2x(us.Tee-Br)=14.86	169.69	120	33.3	
014	15.46		11.5	1.442	8x(us.90)=29.73	44.59	0.0099	1.5	
						214.28		2.1	
014								37.1	
Path No: 15									
057	19.03		0	1.25	2x(us.Tee-Br)=14.86	155.87	120	33.9	
016	15.46		15.4	1.442	2x(us.90)=7.43	22.3	0.0169	1.5	
						178.16		3	
016								38.6	
Path No: 16									
055	19.03		0	1.25	2x(us.Tee-Br)=14.86	158.04	120	34.1	
019	15.46		14.5	1.442	2x(us.90)=7.43	22.3	0.0152	1.5	
						180.34		2.7	
019								38.6	

PIPE INFORMATION

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

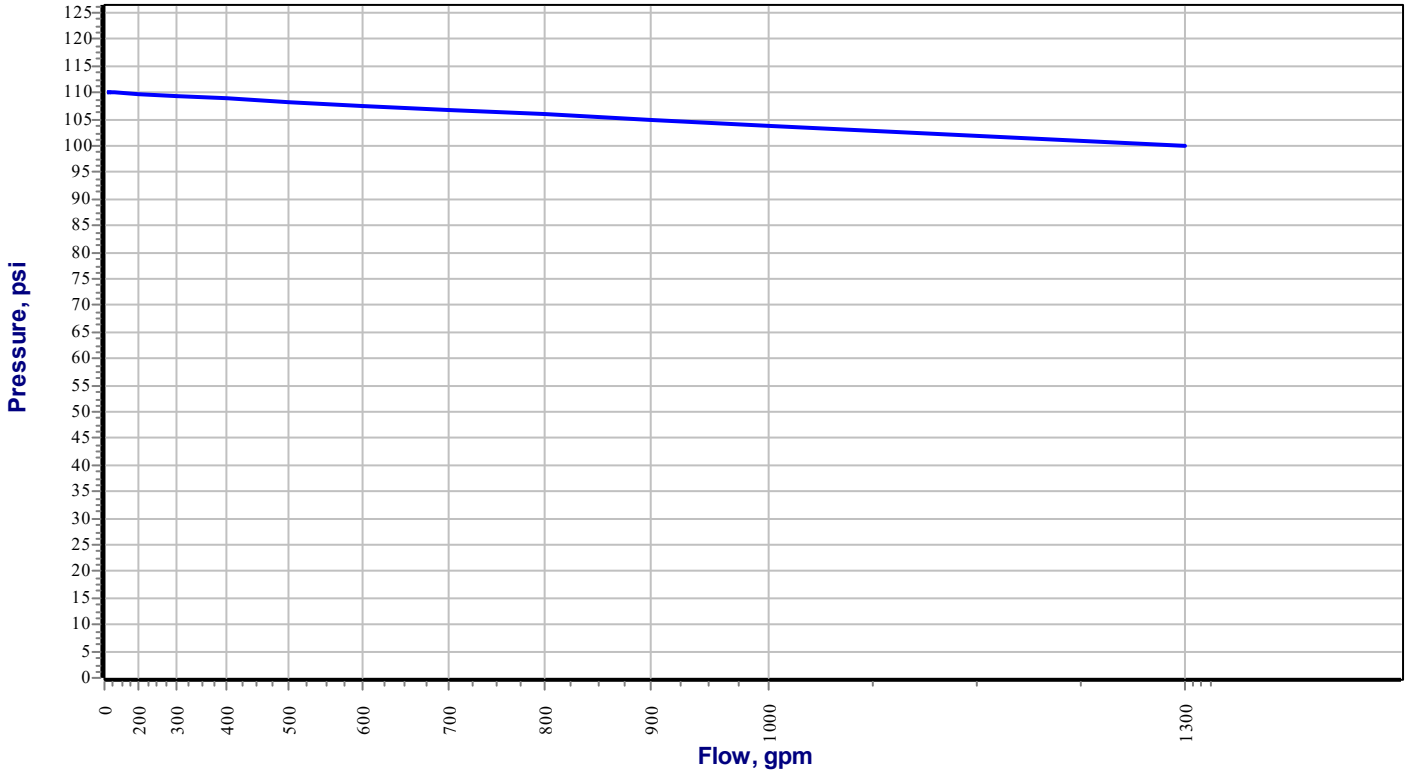
* Pressures are balanced to a high degree of accuracy. Values may vary by 0.1 psi due to display rounding.

* Maximum Velocity of 23.28 ft/s occurs in the following pipe(s): (069-071)

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

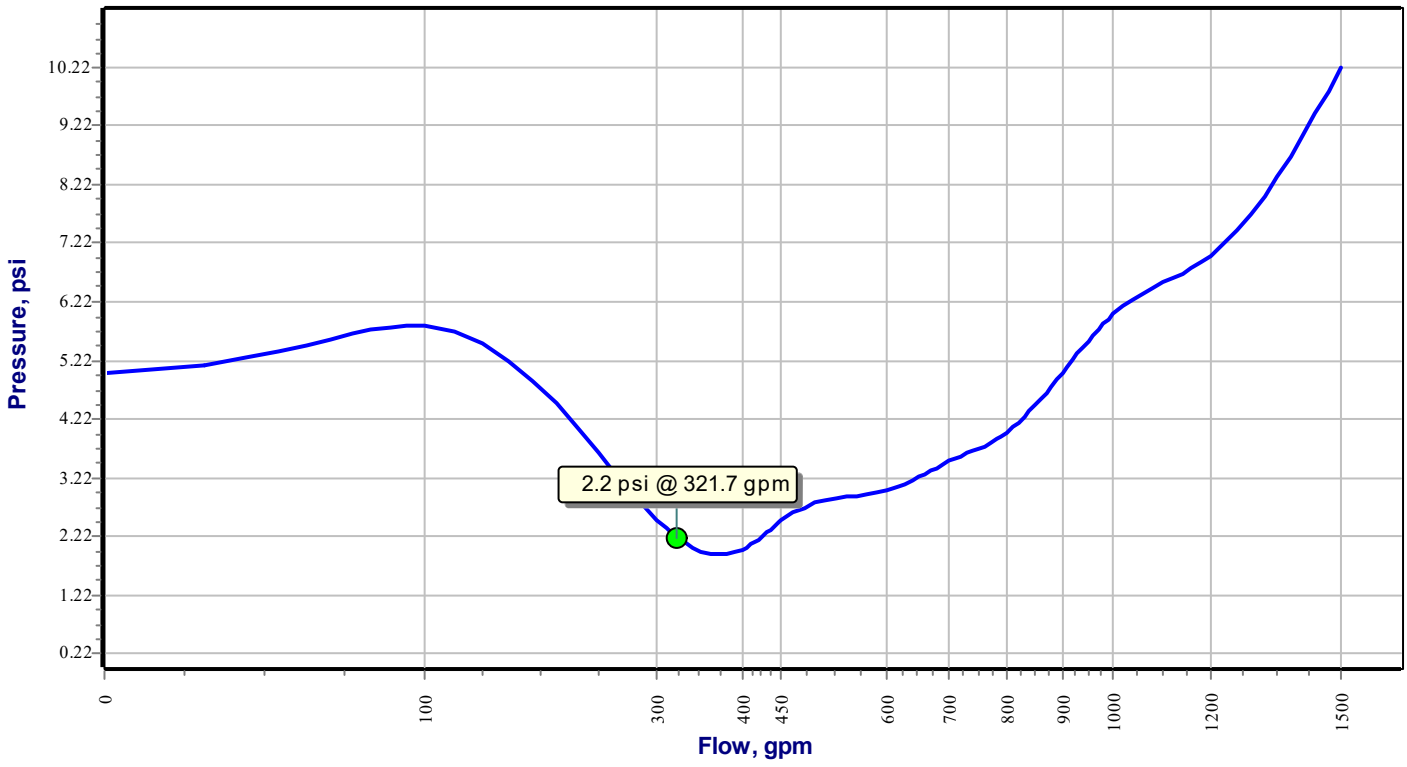
Pressure vs. Flow Function

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



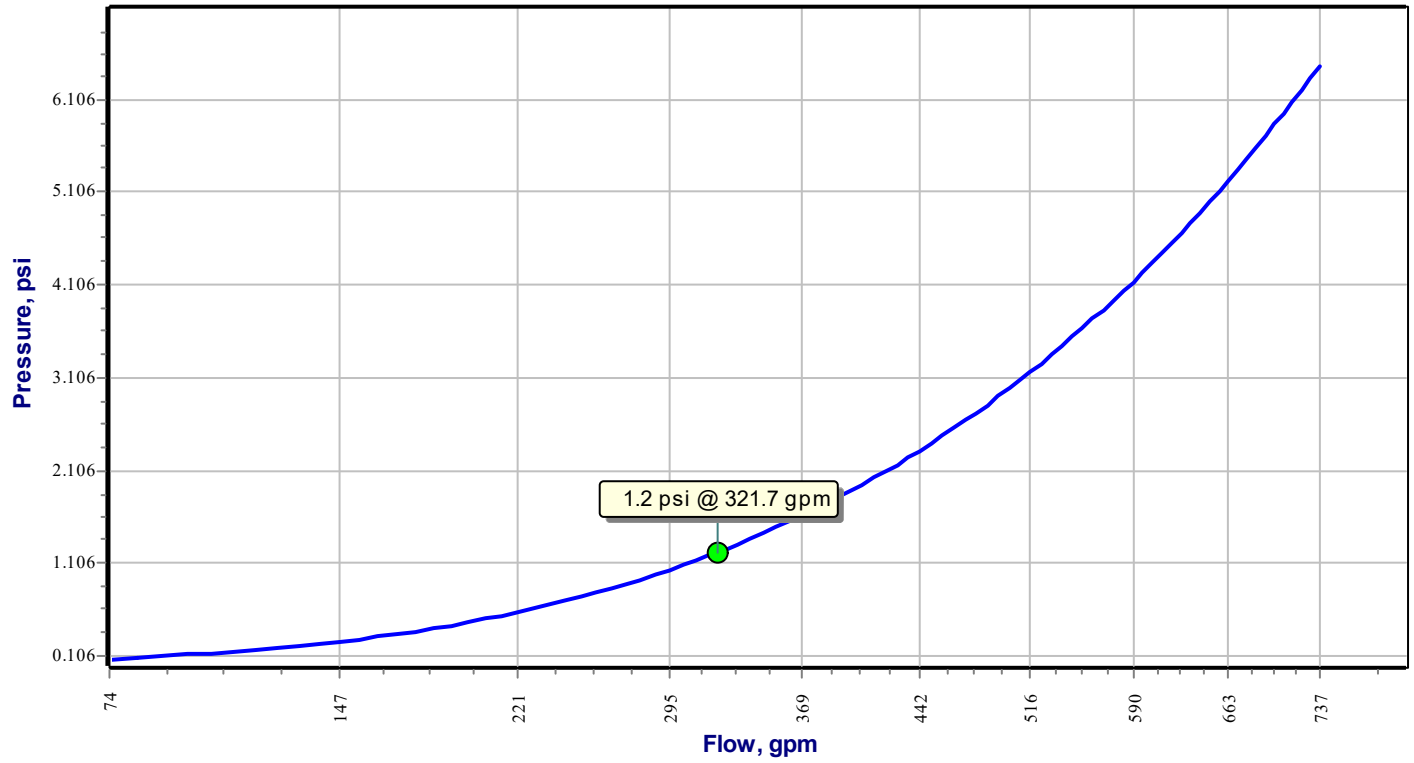
Pressure Loss Function

Design Area: 1; BFP Ref.: 466 (Watts 757 DCDA, Size = 6); Inlet Node: BFP-I; Outlet Node: BFP-O

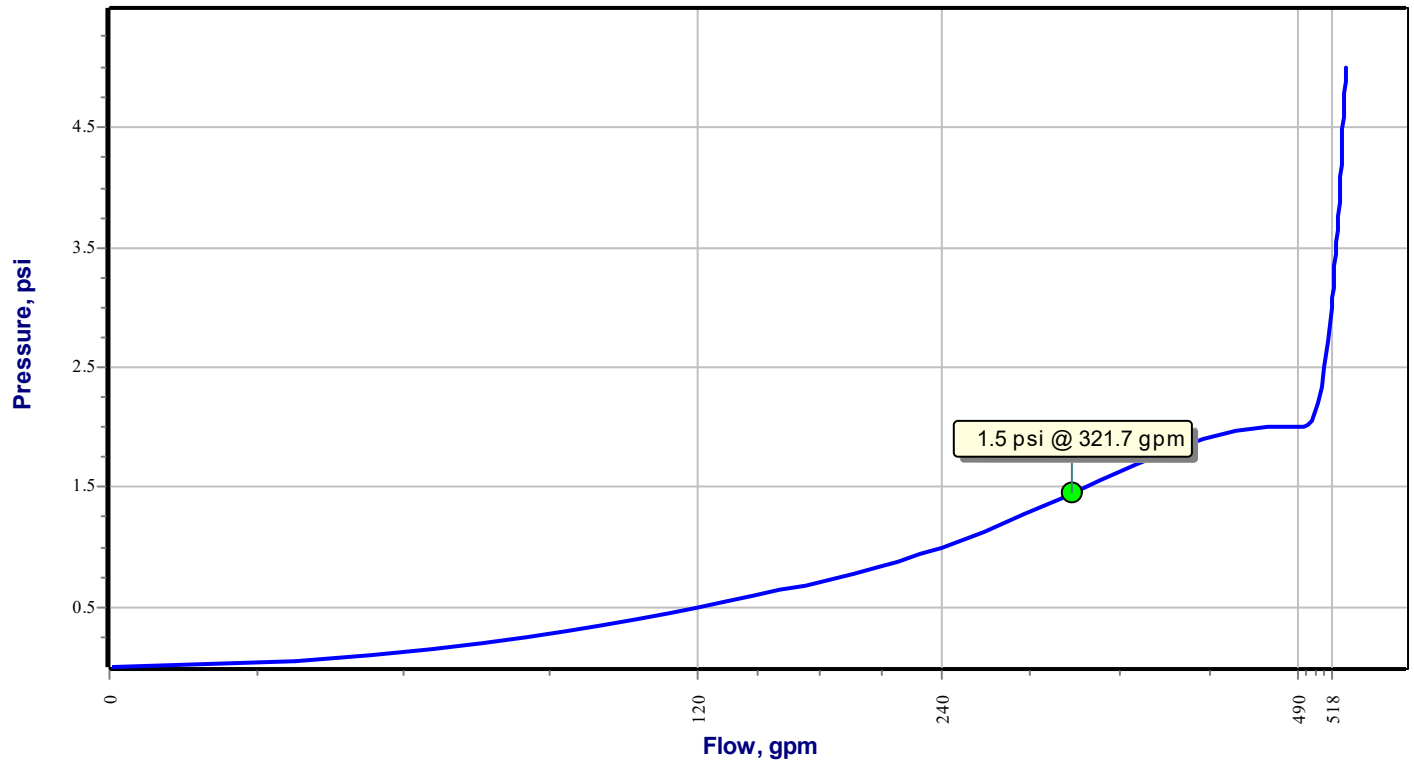


File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Pressure Loss Function
Design Area: 1; Valve Ref.: 464 (BFV-N, Size = 3); Inlet Node: BFV-I; Outlet Node: BFV-O

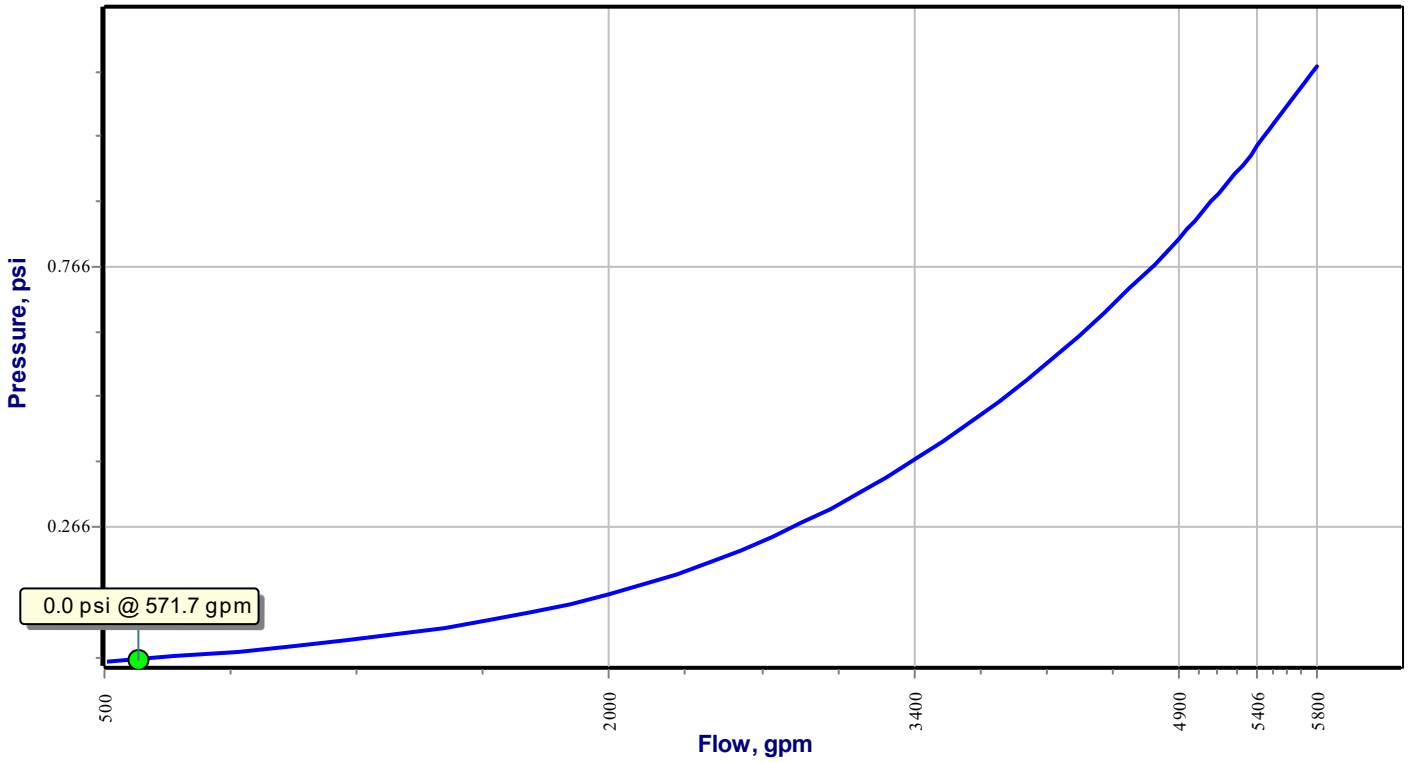


Pressure Loss Function
Design Area: 1; Valve Ref.: 465 (CV-1 FR Check, Size = 3); Inlet Node: CKV-I; Outlet Node: CKV-O

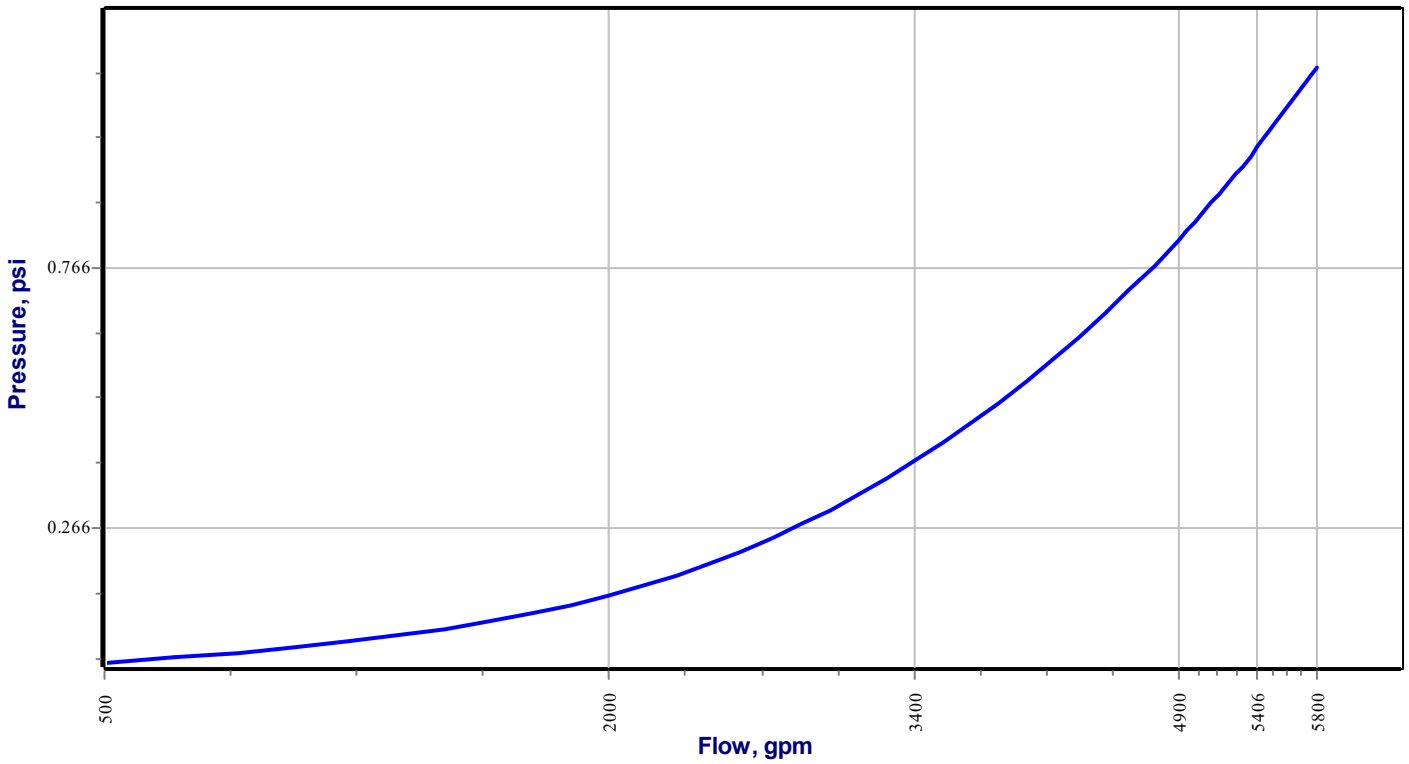


File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Pressure Loss Function
Design Area: 1; Valve Ref.: 468 (Gate A2360, Size = 6); Inlet Node: GTV1-I; Outlet Node: GTV1-O



Pressure Loss Function
Design Area: 1; Valve Ref.: 469 (Gate A2360, Size = 6); Inlet Node: GTV2-I; Outlet Node: GTV2-O



File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

HYDRAULIC CALCULATIONS
for

Job Information

Project Name : TRACTOR SUPPLY - LAKE CITY, FL

Contract No. : C25-16229

City: LAKE CITY, FLORIDA 32025

Project Location: 129 SW. CHAD PLACE

Date: 7/29/2025

Contractor Information

Name of Contractor: TRIPLE "A" FIRE PROTECTION

Address: P.O. BOX 1037

City: SEMMES, ALABAMA 36575

Phone Number: 251.649.2034

E-mail: joshuaw@aaafp.com

Name of Designer: JOSHUA WIGGINS

Authority Having Jurisdiction: FIRE MARSHAL

Design

Remote Area Name	1.1
Remote Area Location	SALES AREA - PROOF
Occupancy Classification	OH2
Density (gpm/ft²)	0.2
Area of Application (ft²)	1506.5
Coverage per Sprinkler (ft²)	126.5
Number of Calculated Sprinklers	12
In-Rack Demand (gpm)	0
Special Heads	
Hose Streams (gpm)	250
Total Water Required (incl. Hose Streams) (gpm)	568.4
Required Pressure at Source (psi)	59.9
Type of System	Wet
Volume - Entire System (gal)	959.4 gal

Water Supply Information

Date	7/24/2024
Location	SW CHAD PLACE
Source	W1

Notes

Hydraulic Analysis for : 1.1

Calculation Info

Calculation Mode	Demand
Hydraulic Model	Hazen-Williams
Fluid Name	Water @ 60F (15.6C)
Fluid Weight, (lb/ft³)	N/A for Hazen-Williams calculation.
Fluid Dynamic Viscosity, (lb·s/ft²)	N/A for Hazen-Williams calculation.

Water Supply Parameters

Supply 1 : W1

Flow (gpm)	Pressure (psi)
0	110
1300	100

Supply Analysis

Node at Source	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)	Available Pressure (psi)	Total Demand (gpm)	Required Pressure (psi)
W1	110	100	1300	107.8	568.4	59.9

Hoses

Inside Hose Flow / Standpipe Demand (gpm)	0
Outside Hose Flow (gpm)	250
Additional Outside Hose Flow (gpm)	
Other (custom defined) Hose Flow (gpm)	0
Total Hose Flow (gpm)	250

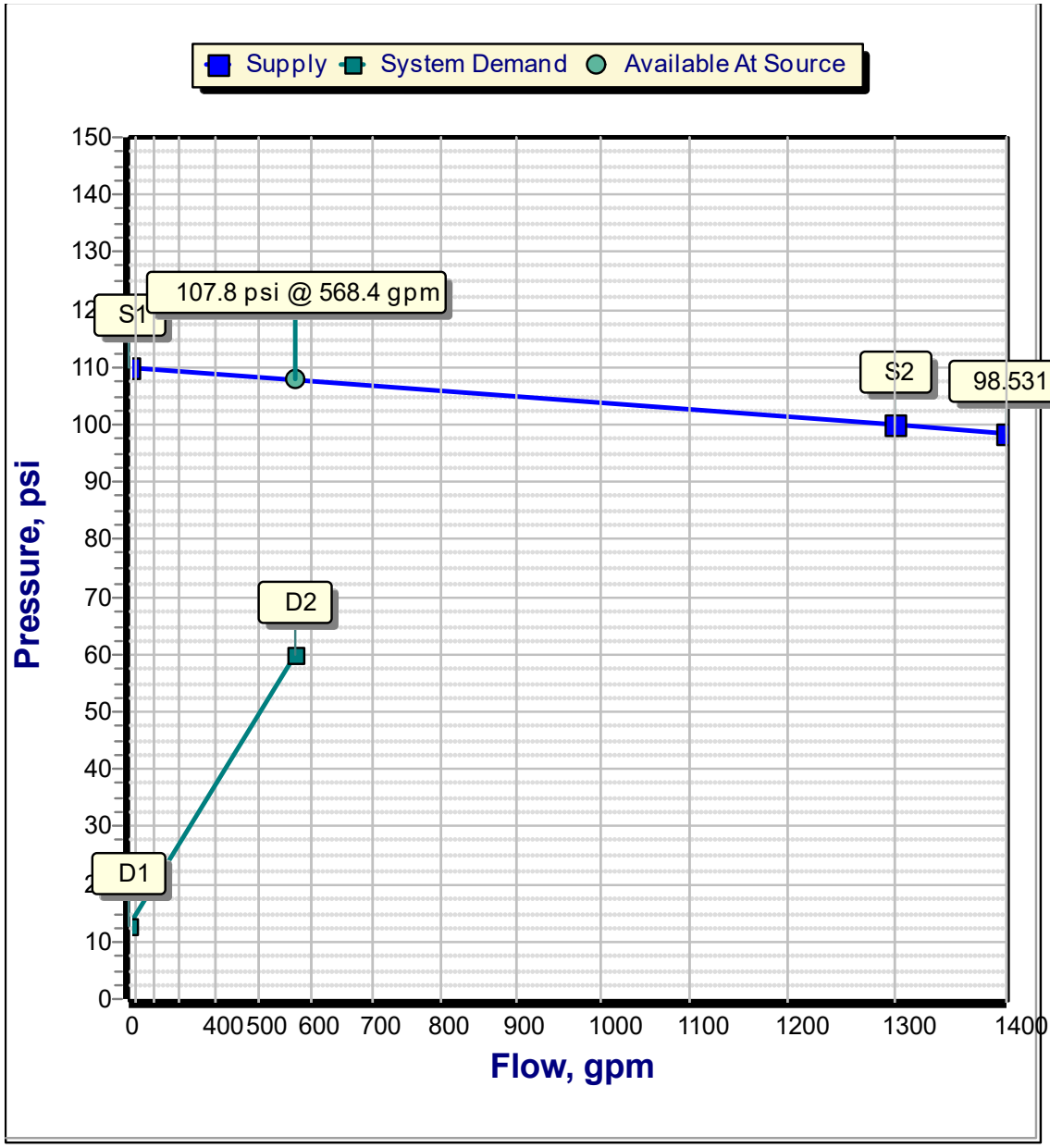
Sprinklers

Ovehead Sprinkler Flow (gpm)	318.4
InRack Sprinkler Flow (gpm)	0
Other (custom defined) Sprinkler Flow (gpm)	0
Total Sprinkler Flow (gpm)	318.4

Other

Required Margin of Safety (psi)	0
BOR - Pressure (psi)	51
BOR - Flow (gpm)	318.4
Demand w/o System Pump(s)	N/A

Hydraulic Analysis for : 1.1



File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Hydraulic Analysis for : 1.1

Graph Labels

Label	Description	Values	
		Flow (gpm)	Pressure (psi)
S1	Supply point #1 - Static	0	110
S2	Supply point #2 - Residual	1300	100
D1	Elevation Pressure	0	12.8
D2	System Demand	568.4	59.9

Curve Intersections & Safety Margins

Curve Name	Intersection		Safety Margin	
	Pressure (psi)	Flow (gpm)	Pressure (psi)	@ Flow (gpm)
Supply	105.7	820.8	47.9	568.4

Open Heads

Head Ref.	Head Type	Coverage	K-Factor	Required			Calculated		
				Density	Flow	Pressure	Density	Flow	Pressure
		(ft²)	(gpm/psi½)	(gpm/ft²)	(gpm)	(psi)	(gpm/ft²)	(gpm)	(psi)
S10	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.205	25.9	10.5
S11	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.213	26.9	11.3
S14	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.22	27.9	12.1
S15	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.216	27.3	11.6
S16	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.217	27.4	11.8
S17	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.223	28.2	12.5
S2	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.202	25.6	10.2
S3	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.2	25.3	10
S4	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.202	25.5	10.2
S5	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.21	26.5	11
S8	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.206	26.1	10.6
S9	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.204	25.7	10.4

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
004 15.46	Node NODE				33.1 -11.3	
006 15.46	Node NODE				33.1 -11.3	
007 15.46	Node NODE				33.3 -11.3	
008 15.46	Node NODE				33.5 -11.3	
009 15.46	Node NODE				33.9 -11.3	
010 15.46	Node NODE				34.4 -11.3	
011 15.46	Node NODE				34.9 -11.3	
012 15.46	Node NODE				35.5 -11.3	
014 15.46	Node NODE				36.1 -11.3	
015 15.46	Node NODE				37.7 -11.3	
016 15.46	Node NODE				37.6 -11.3	
019 15.46	Node NODE				37.6 -11.3	
022 15.46	Node NODE				37.6 -11.3	
053 19.03	Node NODE				33.5 -13	
055 19.03	Node NODE				33.4 -13	
057 19.03	Node NODE				33.1 -13	
059 19.03	Node NODE				32.5 -13	
061 19.03	Node NODE				31.7 -13	
063 19.03	Node NODE				30.4 -13	
065 19.03	Node NODE				28.5 -13	
067 19.03	Node NODE				25.7 -13	
069 19.03	Node NODE				21.6 -13	
071 19.03	Node NODE				15.9 -13	
073 19.03	Node NODE				13.4 -13	
075 19.03	Node NODE				12.8 -13	

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
291 -8	Node NODE				56.5 0	
294 -8	Node NODE				55.4 0	
296 -8	Node NODE				59 0	
301 -8	Node NODE				59.1 0	
BFP-I 3	Node NODE				53.6 -5.3	
BFP-O 3	Node NODE				51.4 -5.3	
BFV-I 3.81	Node NODE				49.4 -5.7	
BFV-O 4.13	Node NODE				48 -5.8	
BOR 1	Node NODE				51 -4.3	
CKV-I 5.49	Node NODE				47.2 -6.5	
CKV-O 6.18	Node NODE				45.5 -6.8	
GTV1-I -8	Node NODE				59.9 0	
GTV1-O -8	Node NODE				59.9 0	
GTV2-I -8	Node NODE				59 0	
GTV2-O -8	Node NODE				59 0	
H1 -8	Outside Hose HOSE		250		59 0	 250
S10 18.16	Overhead Sprinkler HEAD	8 Open	25.9 0.6	126.5 0.205	10.5 -12.5	10 25.3
S11 17.88	Overhead Sprinkler HEAD	8 Open	26.9 1.6	126.5 0.213	11.3 -12.4	10 25.3
S14 18.72	Overhead Sprinkler HEAD	8 Open	27.9 2.6	126.5 0.22	12.1 -12.8	10 25.3
S15 18.44	Overhead Sprinkler HEAD	8 Open	27.3 2	126.5 0.216	11.6 -12.7	10 25.3
S16 18.16	Overhead Sprinkler HEAD	8 Open	27.4 2.1	126.5 0.217	11.8 -12.5	10 25.3
S17 17.88	Overhead Sprinkler HEAD	8 Open	28.2 2.9	126.5 0.223	12.5 -12.4	10 25.3
S2 18.72	Overhead Sprinkler HEAD	8 Open	25.6 0.3	126.5 0.202	10.2 -12.8	10 25.3
S3 18.44	Overhead Sprinkler HEAD	8 Open	25.3 0	126.5 0.2	10 -12.7	10 25.3
S4 18.16	Overhead Sprinkler HEAD	8 Open	25.5 0.2	126.5 0.202	10.2 -12.5	10 25.3

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
S5 17.88	Overhead Sprinkler HEAD	8 Open	26.5 1.2	126.5 0.21	11 -12.4	10 25.3
S8 18.72	Overhead Sprinkler HEAD	8 Open	26.1 0.8	126.5 0.206	10.6 -12.8	10 25.3
S9 18.44	Overhead Sprinkler HEAD	8 Open	25.7 0.4	126.5 0.204	10.4 -12.7	10 25.3
W1 -8	Supply SUPPLY		-568.4		59.9 0	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
S3	18.44	8	25.3	1.25		12.17	120	10	
S2	18.72	8	20.9	1.442		0	0.0299	-0.1	
						12.17		0.4	
S2	18.72	8	25.6	1.25	1x(us.Tee-Br)=7.43	13.23	120	10.2	
075	19.03		46.5	1.442		7.43	0.1313	-0.1	
						20.66		2.7	
075	19.03		0	1.5		10.35	120	12.8	
073	19.03		46.5	1.68		0	0.0624	0	
						10.35		0.6	
073	19.03		48.6	1.5		10.35	120	13.4	
071	19.03		95.1	1.68		0	0.235	0	
						10.35		2.4	
071	19.03		56.4	1.5		10.35	120	15.9	
069	19.03		151.5	1.68		0	0.5563	0	
						10.35		5.8	
069	19.03		-26.9	1.5		10.51	120	21.6	
067	19.03		124.6	1.68		0	0.3876	0	
						10.51		4.1	
067	19.03		-23.9	1.5		10.67	120	25.7	
065	19.03		100.7	1.68		0	0.2611	0	
						10.67		2.8	
065	19.03		-18.8	1.5		10.67	120	28.5	
063	19.03		81.9	1.68		0	0.178	0	
						10.67		1.9	
063	19.03		-15.2	1.5		10.67	120	30.4	
061	19.03		66.7	1.68		0	0.1217	0	
						10.67		1.3	
061	19.03		-13	1.5		10.51	120	31.7	
059	19.03		53.7	1.68		0	0.0814	0	
						10.51		0.9	
059	19.03		-10.8	1.5		10.35	120	32.5	
057	19.03		42.8	1.68		0	0.0536	0	
						10.35		0.6	
057	19.03		-14.8	1.5		10.35	120	33.1	
055	19.03		28	1.68		0	0.0244	0	
						10.35		0.3	
055	19.03		-14	1.5	1x(us.Tee-Br)=9.84	10.35	120	33.4	
053	19.03		14	1.68		9.84	0.0068	0	
						20.2		0.1	
053	19.03		0	1.25	1x(us.Tee-Br)=7.43	154.69	120	33.5	
022	15.46		14	1.442	2x(us.90)=7.43	14.86	0.0143	1.5	
						169.55		2.4	
022	15.46		0	3		13.71	120	37.6	
019	15.46		14	3.26		0	0.0003	0	
						13.71		0	
019	15.46		14	3		8.18	120	37.6	
016	15.46		28	3.26		0	0.001	0	
						8.18		0	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
016	15.46		14.8	3	1x(us.Tee-Br)=20.16	5.27	120	37.6	
015	15.46		42.8	3.26		20.16	0.0021	0	
						25.43		0.1	
015	15.46		275.6	3	2x(us.90)=18.82	19.43	120	37.7	
CKV-O	6.18		318.4	3.26		18.82	0.0872	4	
						38.25		3.3	
CKV-O	6.18		0	3		0.7		45.5	CV-1 FR
CKV-I	5.49		318.4	0		0	2.0588	0.3	Check
						0.7		1.4	***
CKV-I	5.49		0	3		1.35	120	47.2	
BFV-O	4.13		318.4	3.26		0	0.0872	0.6	
						1.35		0.1	
BFV-O	4.13		0	3		0.32		48	BFV-N
BFV-I	3.81		318.4	0		0	3.749	0.1	***
						0.32		1.2	
BFV-I	3.81		0	3		2.81	120	49.4	
BOR	1		318.4	3.26		0	0.0872	1.2	
						2.81		0.2	
BOR	1		0	6	2x(us.90)=48.39	14.42	140	51	
294	-8		318.4	6.4		48.39	0.0025	3.9	
						62.8		0.2	
294	-8		0	6	2x(us.90)=43.14	360.31	150	55.4	
291	-8		318.4	6.09		43.14	0.0028	0	
						403.45		1.1	
291	-8		0	6	1x(us.90)=24.19	14.5	140	56.5	
BFP-O	3		318.4	6.4		24.19	0.0025	-4.8	
						38.69		0.1	
BFP-O	3		0	6		0.5		51.4	Watts 757
BFP-I	3		318.4	0		0	4.4997	0	DCDA
						0.5		2.2	***
BFP-I	3		0	6	2x(us.90)=48.39	15	140	53.6	
296	-8		318.4	6.4		48.39	0.0025	4.8	
						63.39		0.2	
296	-8		0	6		4	150	59	
301	-8		318.4	6.09		0	0.0028	0	
						4		0.0	
301	-8		250	6	1x(us.Tee-Br)=46.22	56.5	150	59.1	
GTV1-O	-8		568.4	6.09		46.22	0.008	0	
						102.72		0.8	
GTV1-O	-8		0	6		0.88		59.9	Gate A2360
GTV1-I	-8		568.4	0		0	0.0123	0	***
						0.88		0.0	
GTV1-I	-8		0	6		1.72	150	59.9	
W1	-8		568.4	6.09		0	0.008	0	
						1.72		0.0	
W1								59.9	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 2									
S3	18.44	8	25.3	1.25		12.17	120	10	
S4	18.16	8	4.4	1.442		0	0.0017	0.1	
						12.17		0.0	
S4	18.16	8	25.5	1.25		12.17	120	10.2	
S5	17.88	8	29.9	1.442		0	0.0579	0.1	
						12.17		0.7	
S5	17.88	8	26.5	1.25	1x(us.Tee-Br)=7.43	103.95	120	11	
004	15.46		56.4	1.442		7.43	0.1879	1	
						111.38		20.9	
004	15.46		0	3		10.35	120	33.1	
006	15.46		56.4	3.26		0	0.0035	0	
						10.35		0.0	
006	15.46		56	3		10.35	120	33.1	
007	15.46		112.4	3.26		0	0.0127	0	
						10.35		0.1	
007	15.46		54.5	3		10.35	120	33.3	
008	15.46		167	3.26		0	0.0264	0	
						10.35		0.3	
008	15.46		26.9	3		10.51	120	33.5	
009	15.46		193.8	3.26		0	0.0348	0	
						10.51		0.4	
009	15.46		23.9	3		10.67	120	33.9	
010	15.46		217.7	3.26		0	0.0432	0	
						10.67		0.5	
010	15.46		18.8	3		10.67	120	34.4	
011	15.46		236.6	3.26		0	0.0503	0	
						10.67		0.5	
011	15.46		15.2	3		10.67	120	34.9	
012	15.46		251.8	3.26		0	0.0565	0	
						10.67		0.6	
012	15.46		13	3		10.51	120	35.5	
014	15.46		264.8	3.26		0	0.062	0	
						10.51		0.7	
014	15.46		10.8	3	1x(us.Tee-Br)=20.16	2.91	120	36.1	
015	15.46		275.6	3.26		20.16	0.0668	0	
						23.07		1.5	
015								37.7	
Path No: 3									
S9	18.44	8	25.7	1.25		12.17	120	10.4	
S8	18.72	8	22.6	1.442		0	0.0344	-0.1	
						12.17		0.4	
S8	18.72	8	26.1	1.25	1x(us.Tee-Br)=7.43	13.23	120	10.6	
073	19.03		48.6	1.442		7.43	0.1428	-0.1	
						20.66		2.9	
073								13.4	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 4									
S9	18.44	8	25.7	1.25		12.17	120	10.4	
S10	18.16	8	3.2	1.442		0	0.0009	0.1	
						12.17		0.0	
S10	18.16	8	25.9	1.25		12.17	120	10.5	
S11	17.88	8	29.1	1.442		0	0.0552	0.1	
						12.17		0.7	
S11	17.88	8	26.9	1.25	1x(us.Tee-Br)=7.43	103.95	120	11.3	
006	15.46		56	1.442		7.43	0.1855	1	
						111.38		20.7	
006								33.1	
Path No: 5									
S15	18.44	8	27.3	1.25		12.17	120	11.6	
S14	18.72	8	28.5	1.442		0	0.053	-0.1	
						12.17		0.6	
S14	18.72	8	27.9	1.25	1x(us.Tee-Br)=7.43	13.23	120	12.1	
071	19.03		56.4	1.442		7.43	0.1876	-0.1	
						20.66		3.9	
071								15.9	
Path No: 6									
S16	18.16	8	27.4	1.25		12.17	120	11.8	
S17	17.88	8	26.3	1.442		0	0.0456	0.1	
						12.17		0.6	
S17	17.88	8	28.2	1.25	1x(us.Tee-Br)=7.43	103.95	120	12.5	
007	15.46		54.5	1.442		7.43	0.1763	1	
						111.38		19.6	
007								33.3	
Path No: 7									
S16	18.16	8	27.4	1.25		12.17	120	11.8	
S15	18.44	8	1.2	1.442		0	0.0001	-0.1	
						12.17		0	
S15								11.6	
Path No: 8									
H1	-8		250	6		8.27	150	59	
GTV2-O	-8		250	6.09		0	0.0018	0	
						8.27		0.0	
GTV2-O	-8		0	6		0.88		59	Gate A2360
GTV2-I	-8		250	0		0	0.0035	0	* * *
						0.88		0	
GTV2-I	-8		0	6	1x(us.Tee-Br)=46.22	0.86	150	59	
301	-8		250	6.09		46.22	0.0018	0	
						47.08		0.1	
301								59.1	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 9									
069	19.03		0	1.25	2x(us.Tee-Br)=14.86	169.69	120	21.6	
008	15.46		26.9	1.442	8x(us.90)=29.73	44.59	0.0475	1.5	
						214.28		10.2	
008								33.5	
Path No: 10									
067	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	25.7	
009	15.46		23.9	1.442		14.86	0.0384	1.5	
						168.55		6.5	
009								33.9	
Path No: 11									
065	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	28.5	
010	15.46		18.8	1.442		14.86	0.0246	1.5	
						168.55		4.2	
010								34.4	
Path No: 12									
063	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	30.4	
011	15.46		15.2	1.442		14.86	0.0165	1.5	
						168.55		2.8	
011								34.9	
Path No: 13									
061	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	31.7	
012	15.46		13	1.442		14.86	0.0124	1.5	
						168.55		2.1	
012								35.5	
Path No: 14									
059	19.03		0	1.25	2x(us.Tee-Br)=14.86	169.69	120	32.5	
014	15.46		10.8	1.442	8x(us.90)=29.73	44.59	0.0088	1.5	
						214.28		1.9	
014								36.1	
Path No: 15									
057	19.03		0	1.25	2x(us.Tee-Br)=14.86	155.87	120	33.1	
016	15.46		14.8	1.442	2x(us.90)=7.43	22.3	0.0158	1.5	
						178.16		2.8	
016								37.6	
Path No: 16									
055	19.03		0	1.25	2x(us.Tee-Br)=14.86	158.04	120	33.4	
019	15.46		14	1.442	2x(us.90)=7.43	22.3	0.0142	1.5	
						180.34		2.6	
019								37.6	

PIPE INFORMATION

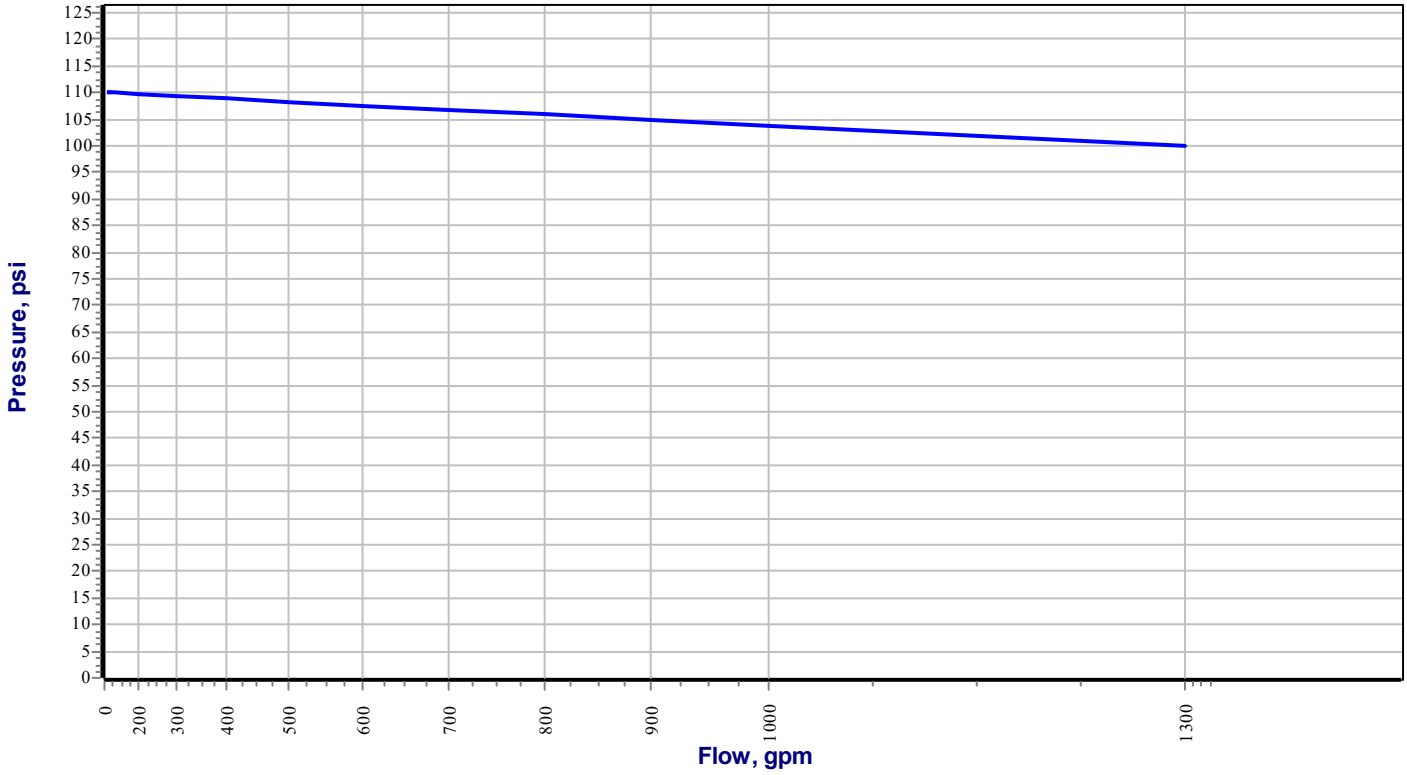
Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	

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

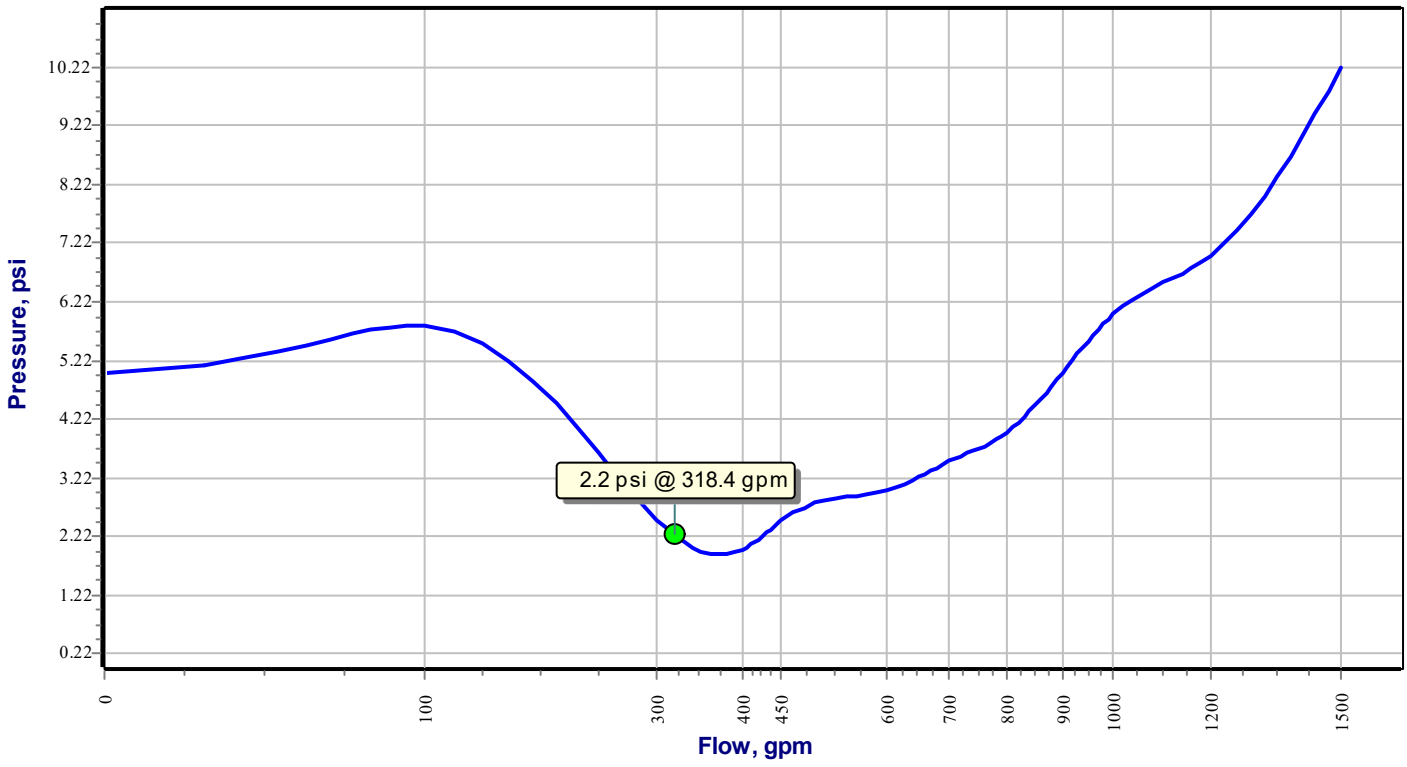
* Maximum Velocity of 21.93 ft/s occurs in the following pipe(s): (069-071)

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

Pressure vs. Flow Function
Design Area: 1.1; Supply Ref.: W1; Supply Name:W1

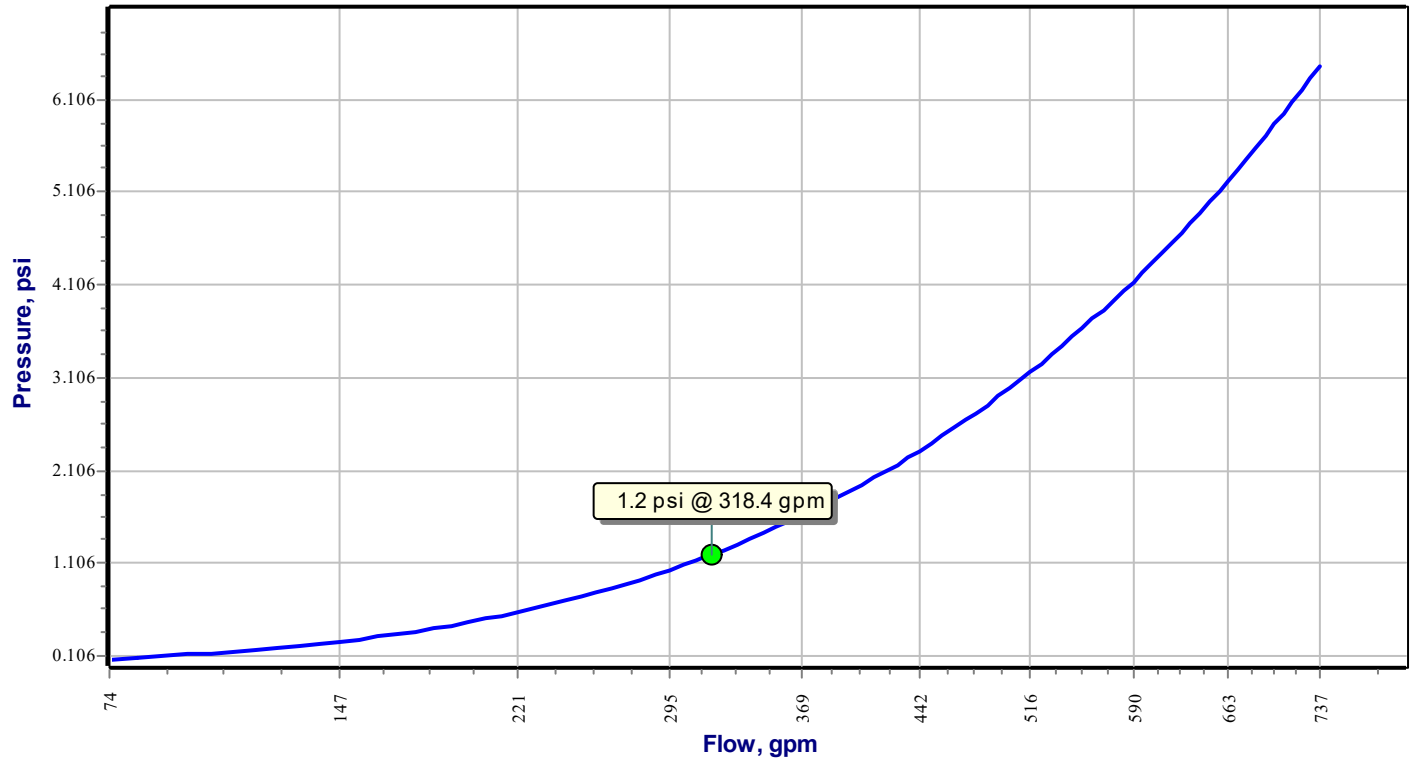


Pressure Loss Function
Design Area: 1.1; BFP Ref.: 466 (Watts 757 DCDA, Size = 6); Inlet Node: BFP-I; Outlet Node: BFP-O

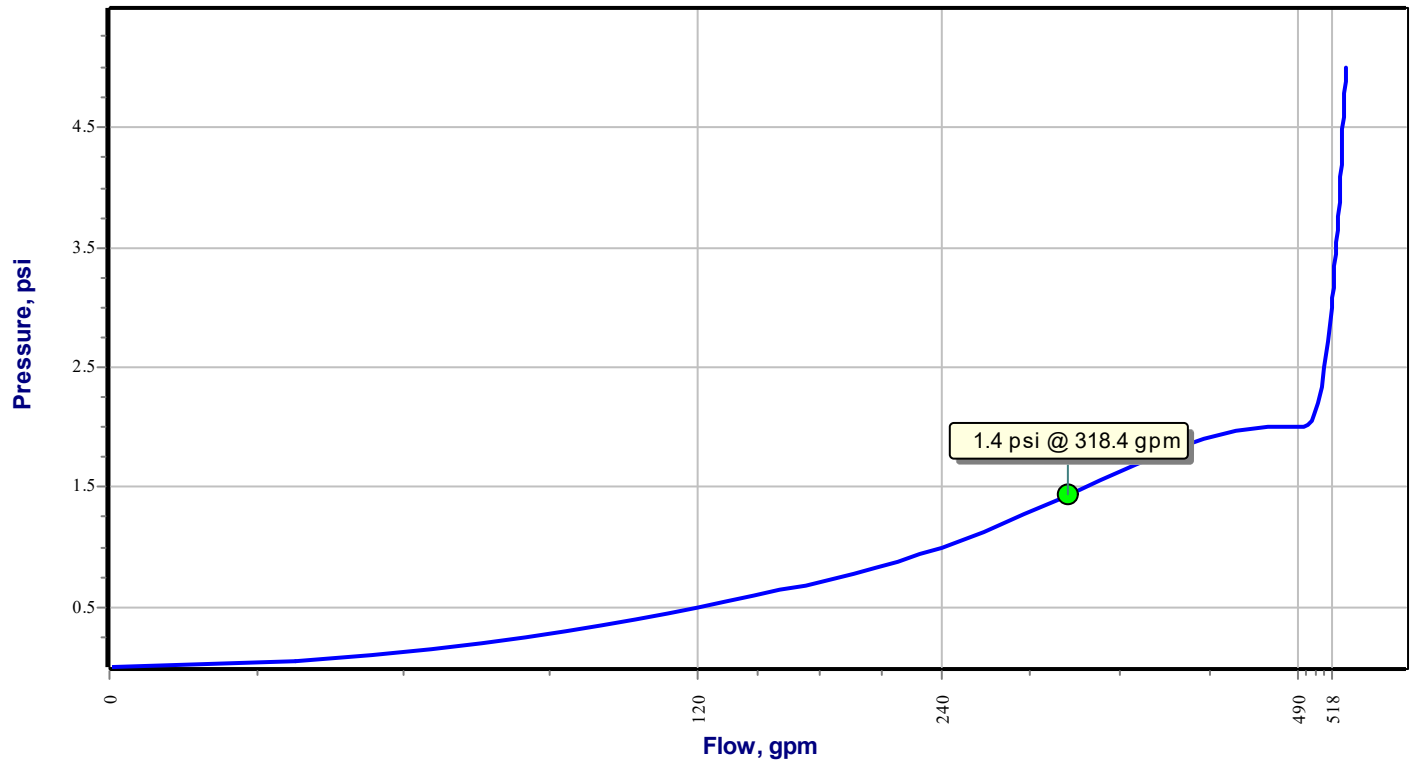


File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Pressure Loss Function
Design Area: 1.1; Valve Ref.: 464 (BFV-N, Size = 3); Inlet Node: BFV-I; Outlet Node: BFV-O



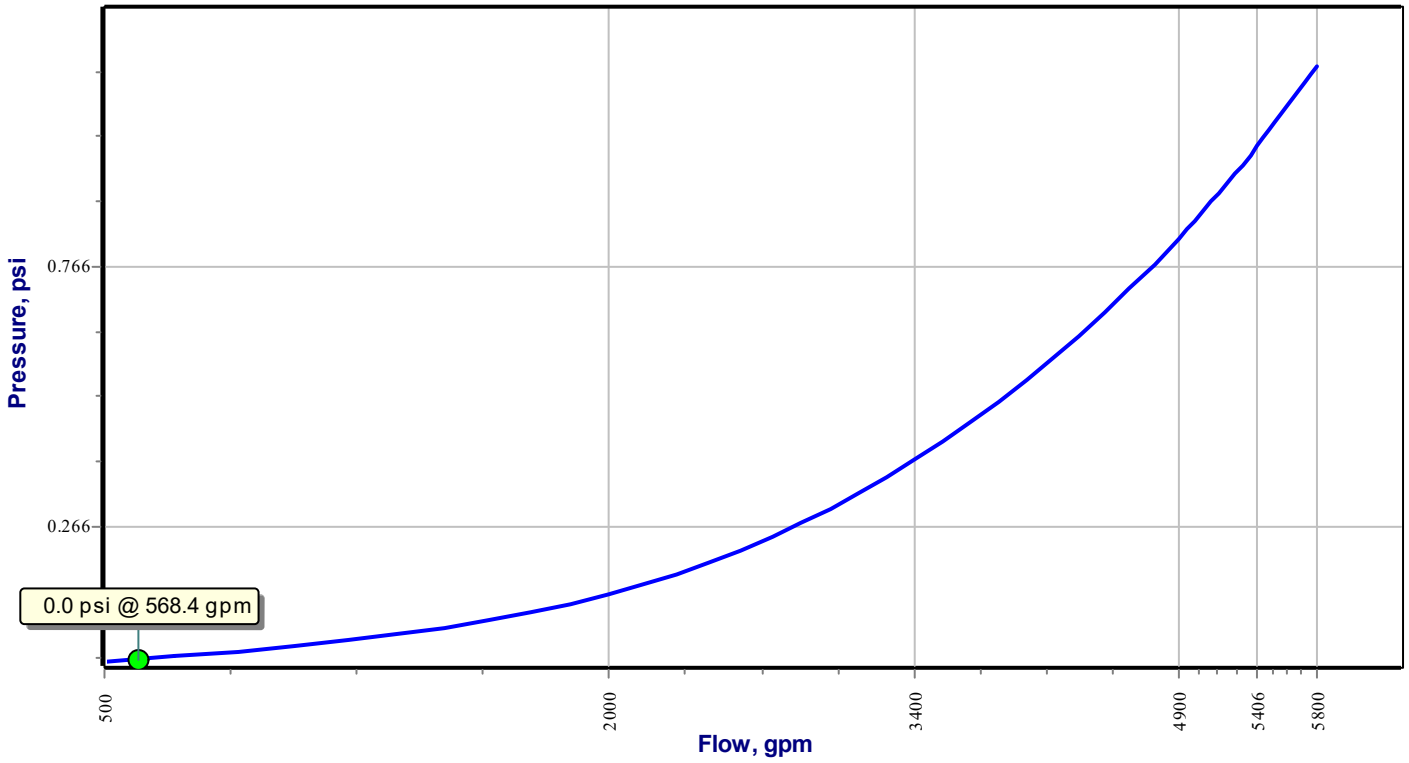
Pressure Loss Function
Design Area: 1.1; Valve Ref.: 465 (CV-1 FR Check, Size = 3); Inlet Node: CKV-I; Outlet Node: CKV-O



File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

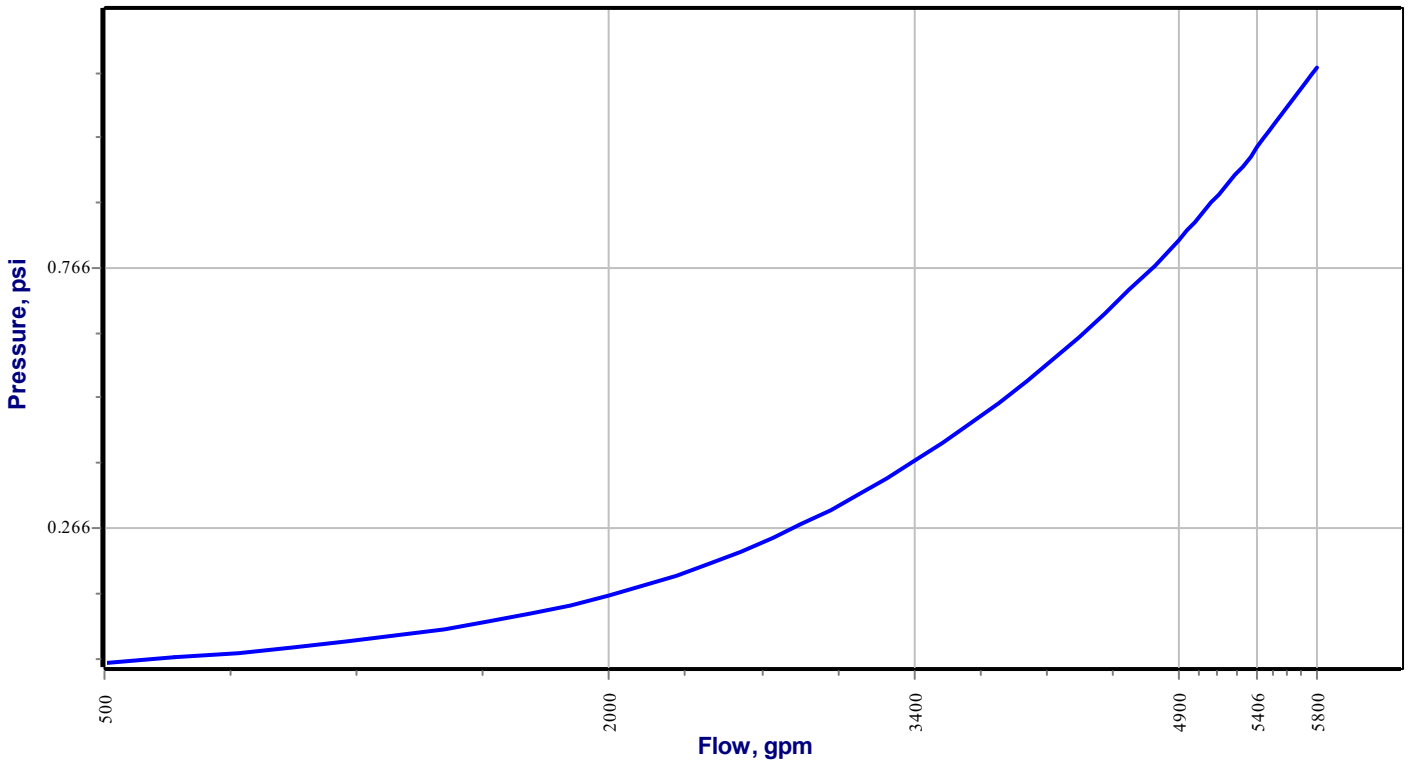
Pressure Loss Function

Design Area: 1.1; Valve Ref.: 468 (Gate A2360, Size = 6); Inlet Node: GTV1-I; Outlet Node: GTV1-O



Pressure Loss Function

Design Area: 1.1; Valve Ref.: 469 (Gate A2360, Size = 6); Inlet Node: GTV2-I; Outlet Node: GTV2-O



HYDRAULIC CALCULATIONS
for

Job Information

Project Name : TRACTOR SUPPLY - LAKE CITY, FL

Contract No. : C25-16229 — City: LAKE CITY, FLORIDA 32025

Project Location: 129 SW. CHAD PLACE — Date: 7/29/2025

Contractor Information

Name of Contractor: TRIPLE "A" FIRE PROTECTION

Address: P.O. BOX 1037 — City: SEMMES, ALABAMA 36575

Phone Number: 251.649.2034 — E-mail: joshuaw@aaafp.com

Name of Designer: JOSHUA WIGGINS

Authority Having Jurisdiction: FIRE MARSHAL

Design

Remote Area Name	1.2
Remote Area Location	SALES AREA - PROOF
Occupancy Classification	OH2
Density (gpm/ft²)	0.2
Area of Application (ft²)	1506.5
Coverage per Sprinkler (ft²)	126.5
Number of Calculated Sprinklers	12
In-Rack Demand (gpm)	0
Special Heads	
Hose Streams (gpm)	250
Total Water Required (incl. Hose Streams) (gpm)	566.5
Required Pressure at Source (psi)	58.9
Type of System	Wet
Volume - Entire System (gal)	959.4 gal

Water Supply Information

Date	7/24/2024
Location	SW CHAD PLACE
Source	W1

Notes

Hydraulic Analysis for : 1.2

Calculation Info

Calculation Mode	Demand
Hydraulic Model	Hazen-Williams
Fluid Name	Water @ 60F (15.6C)
Fluid Weight, (lb/ft³)	N/A for Hazen-Williams calculation.
Fluid Dynamic Viscosity, (lb·s/ft²)	N/A for Hazen-Williams calculation.

Water Supply Parameters

Supply 1 : W1

Flow (gpm)	Pressure (psi)
0	110
1300	100

Supply Analysis

Node at Source	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)	Available Pressure (psi)	Total Demand (gpm)	Required Pressure (psi)
W1	110	100	1300	107.8	566.5	58.9

Hoses

Inside Hose Flow / Standpipe Demand (gpm)	0
Outside Hose Flow (gpm)	250
Additional Outside Hose Flow (gpm)	
Other (custom defined) Hose Flow (gpm)	0
Total Hose Flow (gpm)	250

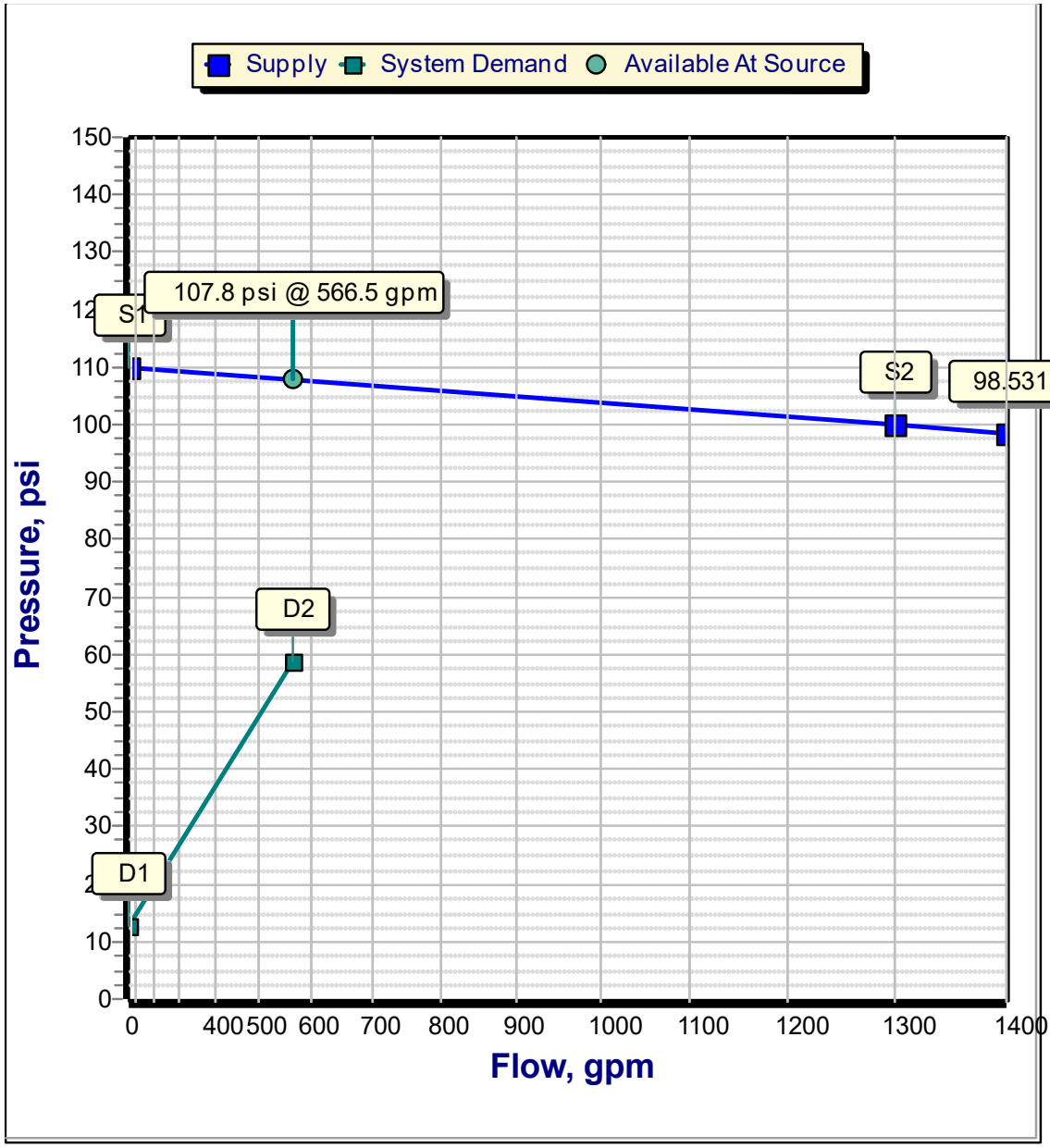
Sprinklers

Ovehead Sprinkler Flow (gpm)	316.5
InRack Sprinkler Flow (gpm)	0
Other (custom defined) Sprinkler Flow (gpm)	0
Total Sprinkler Flow (gpm)	316.5

Other

Required Margin of Safety (psi)	0
BOR - Pressure (psi)	49.9
BOR - Flow (gpm)	316.5
Demand w/o System Pump(s)	N/A

Hydraulic Analysis for : 1.2



File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Hydraulic Analysis for : 1.2

Graph Labels

Label	Description	Values	
		Flow (gpm)	Pressure (psi)
S1	Supply point #1 - Static	0	110
S2	Supply point #2 - Residual	1300	100
D1	Elevation Pressure	0	12.7
D2	System Demand	566.5	58.9

Curve Intersections & Safety Margins

Curve Name	Intersection		Safety Margin	
	Pressure (psi)	Flow (gpm)	Pressure (psi)	@ Flow (gpm)
Supply	105.7	826.9	49	566.5

Open Heads

Head Ref.	Head Type	Coverage	K-Factor	Required			Calculated		
				Density	Flow	Pressure	Density	Flow	Pressure
		(ft²)	(gpm/psi½)	(gpm/ft²)	(gpm)	(psi)	(gpm/ft²)	(gpm)	(psi)
S10	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.203	25.6	10.3
S11	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.204	25.9	10.4
S12	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.213	26.9	11.3
S15	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.216	27.3	11.6
S16	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.212	26.9	11.3
S17	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.214	27	11.4
S18	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.221	28	12.2
S3	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.202	25.5	10.2
S4	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.2	25.3	10
S5	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.202	25.5	10.2
S6	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.211	26.7	11.1
S9	Overhead Sprinkler	126.5	8	0.2	25.3	10	0.205	25.9	10.5

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
004 15.46	Node NODE				32.1 -11.3	
006 15.46	Node NODE				32.1 -11.3	
007 15.46	Node NODE				32.2 -11.3	
008 15.46	Node NODE				32.5 -11.3	
009 15.46	Node NODE				32.9 -11.3	
010 15.46	Node NODE				33.4 -11.3	
011 15.46	Node NODE				33.9 -11.3	
012 15.46	Node NODE				34.5 -11.3	
014 15.46	Node NODE				35.2 -11.3	
015 15.46	Node NODE				36.7 -11.3	
016 15.46	Node NODE				36.7 -11.3	
019 15.46	Node NODE				36.7 -11.3	
022 15.46	Node NODE				36.7 -11.3	
053 19.03	Node NODE				32.7 -13	
055 19.03	Node NODE				32.5 -13	
057 19.03	Node NODE				32.3 -13	
059 19.03	Node NODE				31.8 -13	
061 19.03	Node NODE				31 -13	
063 19.03	Node NODE				29.8 -13	
065 19.03	Node NODE				28 -13	
067 19.03	Node NODE				25.5 -13	
069 19.03	Node NODE				21.9 -13	
071 19.03	Node NODE				16.7 -13	
073 19.03	Node NODE				14.5 -13	
075 19.03	Node NODE				13.9 -13	

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
291 -8	Node NODE				55.5 0	
294 -8	Node NODE				54.4 0	
296 -8	Node NODE				58 0	
301 -8	Node NODE				58 0	
BFP-I 3	Node NODE				52.6 -5.3	
BFP-O 3	Node NODE				50.3 -5.3	
BFV-I 3.81	Node NODE				48.3 -5.7	
BFV-O 4.13	Node NODE				47 -5.8	
BOR 1	Node NODE				49.9 -4.3	
CKV-I 5.49	Node NODE				46.2 -6.5	
CKV-O 6.18	Node NODE				44.5 -6.8	
GTV1-I -8	Node NODE				58.9 0	
GTV1-O -8	Node NODE				58.8 0	
GTV2-I -8	Node NODE				57.9 0	
GTV2-O -8	Node NODE				57.9 0	
H1 -8	Outside Hose HOSE		250		57.9 0	 250
S10 18.16	Overhead Sprinkler HEAD	8 Open	25.6 0.3	126.5 0.203	10.3 -12.5	10 25.3
S11 17.88	Overhead Sprinkler HEAD	8 Open	25.9 0.6	126.5 0.204	10.4 -12.4	10 25.3
S12 17.59	Overhead Sprinkler HEAD	8 Open	26.9 1.6	126.5 0.213	11.3 -12.3	10 25.3
S15 18.44	Overhead Sprinkler HEAD	8 Open	27.3 2	126.5 0.216	11.6 -12.7	10 25.3
S16 18.16	Overhead Sprinkler HEAD	8 Open	26.9 1.6	126.5 0.212	11.3 -12.5	10 25.3
S17 17.88	Overhead Sprinkler HEAD	8 Open	27 1.7	126.5 0.214	11.4 -12.4	10 25.3
S18 17.59	Overhead Sprinkler HEAD	8 Open	28 2.7	126.5 0.221	12.2 -12.3	10 25.3
S3 18.44	Overhead Sprinkler HEAD	8 Open	25.5 0.2	126.5 0.202	10.2 -12.7	10 25.3
S4 18.16	Overhead Sprinkler HEAD	8 Open	25.3 0	126.5 0.2	10 -12.5	10 25.3

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
S5 17.88	Overhead Sprinkler HEAD	8 Open	25.5 0.2	126.5 0.202	10.2 -12.4	10 25.3
S6 17.59	Overhead Sprinkler HEAD	8 Open	26.7 1.4	126.5 0.211	11.1 -12.3	10 25.3
S9 18.44	Overhead Sprinkler HEAD	8 Open	25.9 0.6	126.5 0.205	10.5 -12.7	10 25.3
W1 -8	Supply SUPPLY		-566.5		58.9 0	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
S4	18.16	8	25.3	1.25		12.17	120	10	
S3	18.44	8	19	1.442		0	0.025	-0.1	
						12.17		0.3	
S3	18.44	8	25.5	1.25	1x(us.Tee-Br)=7.43	25.4	120	10.2	
075	19.03		44.5	1.442		7.43	0.1211	-0.3	
						32.83		4	
075	19.03		0	1.5		10.35	120	13.9	
073	19.03		44.5	1.68		0	0.0576	0	
						10.35		0.6	
073	19.03		46.2	1.5		10.35	120	14.5	
071	19.03		90.7	1.68		0	0.2151	0	
						10.35		2.2	
071	19.03		52.1	1.5		10.35	120	16.7	
069	19.03		142.8	1.68		0	0.4989	0	
						10.35		5.2	
069	19.03		-25.1	1.5		10.51	120	21.9	
067	19.03		117.8	1.68		0	0.349	0	
						10.51		3.7	
067	19.03		-22.3	1.5		10.67	120	25.5	
065	19.03		95.5	1.68		0	0.2366	0	
						10.67		2.5	
065	19.03		-17.5	1.5		10.67	120	28	
063	19.03		78	1.68		0	0.1626	0	
						10.67		1.7	
063	19.03		-14.1	1.5		10.67	120	29.8	
061	19.03		63.8	1.68		0	0.1123	0	
						10.67		1.2	
061	19.03		-12.2	1.5		10.51	120	31	
059	19.03		51.7	1.68		0	0.076	0	
						10.51		0.8	
059	19.03		-10.2	1.5		10.35	120	31.8	
057	19.03		41.5	1.68		0	0.0505	0	
						10.35		0.5	
057	19.03		-14.4	1.5		10.35	120	32.3	
055	19.03		27.1	1.68		0	0.023	0	
						10.35		0.2	
055	19.03		-13.5	1.5	1x(us.Tee-Br)=9.84	10.35	120	32.5	
053	19.03		13.6	1.68		9.84	0.0064	0	
						20.2		0.1	
053	19.03		0	1.25	1x(us.Tee-Br)=7.43	154.69	120	32.7	
022	15.46		13.6	1.442	2x(us.90)=7.43	14.86	0.0134	1.5	
						169.55		2.3	
022	15.46		0	3		13.71	120	36.7	
019	15.46		13.6	3.26		0	0.0003	0	
						13.71		0	
019	15.46		13.5	3		8.18	120	36.7	
016	15.46		27.1	3.26		0	0.0009	0	
						8.18		0	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
016	15.46		14.4	3	1x(us.Tee-Br)=20.16	5.27	120	36.7	
015	15.46		41.5	3.26		20.16	0.002	0	
						25.43		0.1	
015	15.46		275	3	2x(us.90)=18.82	19.43	120	36.7	
CKV-O	6.18		316.5	3.26		18.82	0.0862	4	
						38.25		3.3	
CKV-O	6.18		0	3		0.7		44.5	CV-1 FR
CKV-I	5.49		316.5	0		0	2.0426	0.3	Check
						0.7		1.4	***
CKV-I	5.49		0	3		1.35	120	46.2	
BFV-O	4.13		316.5	3.26		0	0.0862	0.6	
						1.35		0.1	
BFV-O	4.13		0	3		0.32		47	BFV-N
BFV-I	3.81		316.5	0		0	3.702	0.1	***
						0.32		1.2	
BFV-I	3.81		0	3		2.81	120	48.3	
BOR	1		316.5	3.26		0	0.0862	1.2	
						2.81		0.2	
BOR	1		0	6	2x(us.90)=48.39	14.42	140	49.9	
294	-8		316.5	6.4		48.39	0.0024	3.9	
						62.8		0.2	
294	-8		0	6	2x(us.90)=43.14	360.31	150	54.4	
291	-8		316.5	6.09		43.14	0.0027	0	
						403.45		1.1	
291	-8		0	6	1x(us.90)=24.19	14.5	140	55.5	
BFP-O	3		316.5	6.4		24.19	0.0024	-4.8	
						38.69		0.1	
BFP-O	3		0	6		0.5		50.3	Watts 757
BFP-I	3		316.5	0		0	4.5472	0	DCDA
						0.5		2.3	***
BFP-I	3		0	6	2x(us.90)=48.39	15	140	52.6	
296	-8		316.5	6.4		48.39	0.0024	4.8	
						63.39		0.2	
296	-8		0	6		4	150	58	
301	-8		316.5	6.09		0	0.0027	0	
						4		0.0	
301	-8		250	6	1x(us.Tee-Br)=46.22	56.5	150	58	
GTV1-O	-8		566.5	6.09		46.22	0.008	0	
						102.72		0.8	
GTV1-O	-8		0	6		0.88		58.8	Gate A2360
GTV1-I	-8		566.5	0		0	0.0123	0	***
						0.88		0.0	
GTV1-I	-8		0	6		1.72	150	58.9	
W1	-8		566.5	6.09		0	0.008	0	
						1.72		0.0	
W1								58.9	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 2									
S4	18.16	8	25.3	1.25		12.17	120	10	
S5	17.88	8	6.3	1.442		0	0.0032	0.1	
						12.17		0.0	
S5	17.88	8	25.5	1.25		12.17	120	10.2	
S6	17.59	8	31.8	1.442		0	0.0651	0.1	
						12.17		0.8	
S6	17.59	8	26.7	1.25	1x(us.Tee-Br)=7.43	91.78	120	11.1	
004	15.46		58.5	1.442		7.43	0.2008	0.9	
						99.22		19.9	
004	15.46		0	3		10.35	120	32.1	
006	15.46		58.5	3.26		0	0.0038	0	
						10.35		0.0	
006	15.46		58.2	3		10.35	120	32.1	
007	15.46		116.6	3.26		0	0.0136	0	
						10.35		0.1	
007	15.46		57	3		10.35	120	32.2	
008	15.46		173.6	3.26		0	0.0284	0	
						10.35		0.3	
008	15.46		25.1	3		10.51	120	32.5	
009	15.46		198.7	3.26		0	0.0364	0	
						10.51		0.4	
009	15.46		22.3	3		10.67	120	32.9	
010	15.46		221	3.26		0	0.0444	0	
						10.67		0.5	
010	15.46		17.5	3		10.67	120	33.4	
011	15.46		238.5	3.26		0	0.0511	0	
						10.67		0.5	
011	15.46		14.1	3		10.67	120	33.9	
012	15.46		252.6	3.26		0	0.0568	0	
						10.67		0.6	
012	15.46		12.2	3		10.51	120	34.5	
014	15.46		264.8	3.26		0	0.062	0	
						10.51		0.7	
014	15.46		10.2	3	1x(us.Tee-Br)=20.16	2.91	120	35.2	
015	15.46		275	3.26		20.16	0.0665	0	
						23.07		1.5	
015								36.7	
Path No: 3									
S10	18.16	8	25.6	1.25		12.17	120	10.3	
S9	18.44	8	20.3	1.442		0	0.0282	-0.1	
						12.17		0.3	
S9	18.44	8	25.9	1.25	1x(us.Tee-Br)=7.43	25.4	120	10.5	
073	19.03		46.2	1.442		7.43	0.1297	-0.3	
						32.83		4.3	
073								14.5	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 4									
S10	18.16	8	25.6	1.25		12.17	120	10.3	
S11	17.88	8	5.4	1.442		0	0.0024	0.1	
						12.17		0.0	
S11	17.88	8	25.9	1.25		12.17	120	10.4	
S12	17.59	8	31.2	1.442		0	0.0628	0.1	
						12.17		0.8	
S12	17.59	8	26.9	1.25	1x(us.Tee-Br)=7.43	91.78	120	11.3	
006	15.46		58.2	1.442		7.43	0.1988	0.9	
						99.22		19.7	
006								32.1	
Path No: 5									
S16	18.16	8	26.9	1.25		12.17	120	11.3	
S15	18.44	8	24.9	1.442		0	0.0412	-0.1	
						12.17		0.5	
S15	18.44	8	27.3	1.25	1x(us.Tee-Br)=7.43	25.4	120	11.6	
071	19.03		52.1	1.442		7.43	0.1624	-0.3	
						32.83		5.3	
071								16.7	
Path No: 6									
S16	18.16	8	26.9	1.25		12.17	120	11.3	
S17	17.88	8	2	1.442		0	0.0004	0.1	
						12.17		0	
S17	17.88	8	27	1.25		12.17	120	11.4	
S18	17.59	8	29	1.442		0	0.0549	0.1	
						12.17		0.7	
S18	17.59	8	28	1.25	1x(us.Tee-Br)=7.43	91.78	120	12.2	
007	15.46		57	1.442		7.43	0.1914	0.9	
						99.22		19	
007								32.2	
Path No: 7									
H1	-8		250	6		8.27	150	57.9	
GTV2-O	-8		250	6.09		0	0.0018	0	
						8.27		0.0	
GTV2-O	-8		0	6		0.88		57.9	Gate A2360
GTV2-I	-8		250	0		0	0.0035	0	***
						0.88		0	
GTV2-I	-8		0	6	1x(us.Tee-Br)=46.22	0.86	150	57.9	
301	-8		250	6.09		46.22	0.0018	0	
						47.08		0.1	
301								58	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 8									
069	19.03		0	1.25	2x(us.Tee-Br)=14.86	169.69	120	21.9	
008	15.46		25.1	1.442	8x(us.90)=29.73	44.59	0.0418	1.5	
						214.28		9	
008								32.5	
Path No: 9									
067	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	25.5	
009	15.46		22.3	1.442		14.86	0.0337	1.5	
						168.55		5.7	
009								32.9	
Path No: 10									
065	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	28	
010	15.46		17.5	1.442		14.86	0.0215	1.5	
						168.55		3.6	
010								33.4	
Path No: 11									
063	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	29.8	
011	15.46		14.1	1.442		14.86	0.0145	1.5	
						168.55		2.4	
011								33.9	
Path No: 12									
061	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	31	
012	15.46		12.2	1.442		14.86	0.0109	1.5	
						168.55		1.8	
012								34.5	
Path No: 13									
059	19.03		0	1.25	2x(us.Tee-Br)=14.86	169.69	120	31.8	
014	15.46		10.2	1.442	8x(us.90)=29.73	44.59	0.0079	1.5	
						214.28		1.7	
014								35.2	
Path No: 14									
057	19.03		0	1.25	2x(us.Tee-Br)=14.86	155.87	120	32.3	
016	15.46		14.4	1.442	2x(us.90)=7.43	22.3	0.0149	1.5	
						178.16		2.7	
016								36.7	
Path No: 15									
055	19.03		0	1.25	2x(us.Tee-Br)=14.86	158.04	120	32.5	
019	15.46		13.5	1.442	2x(us.90)=7.43	22.3	0.0134	1.5	
						180.34		2.4	
019								36.7	

PIPE INFORMATION

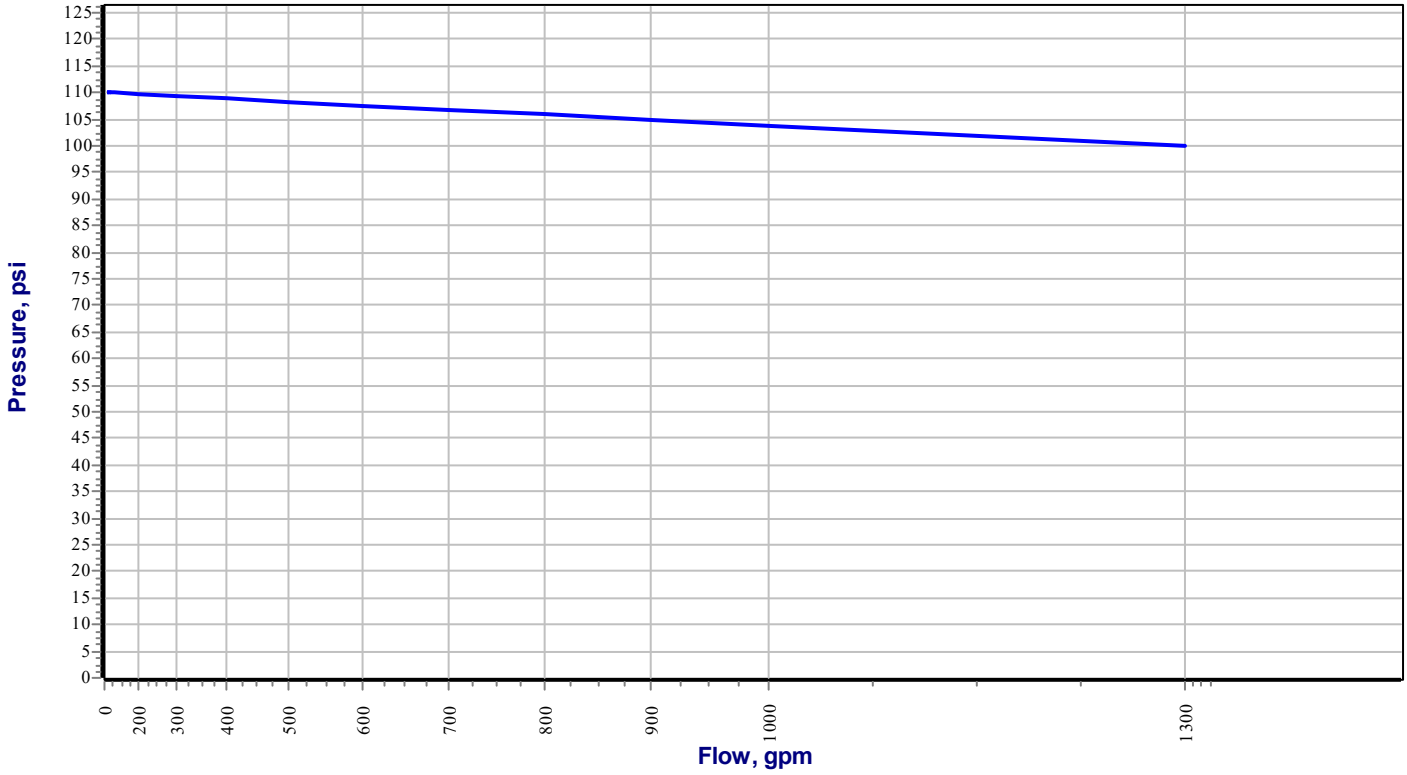
Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	

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

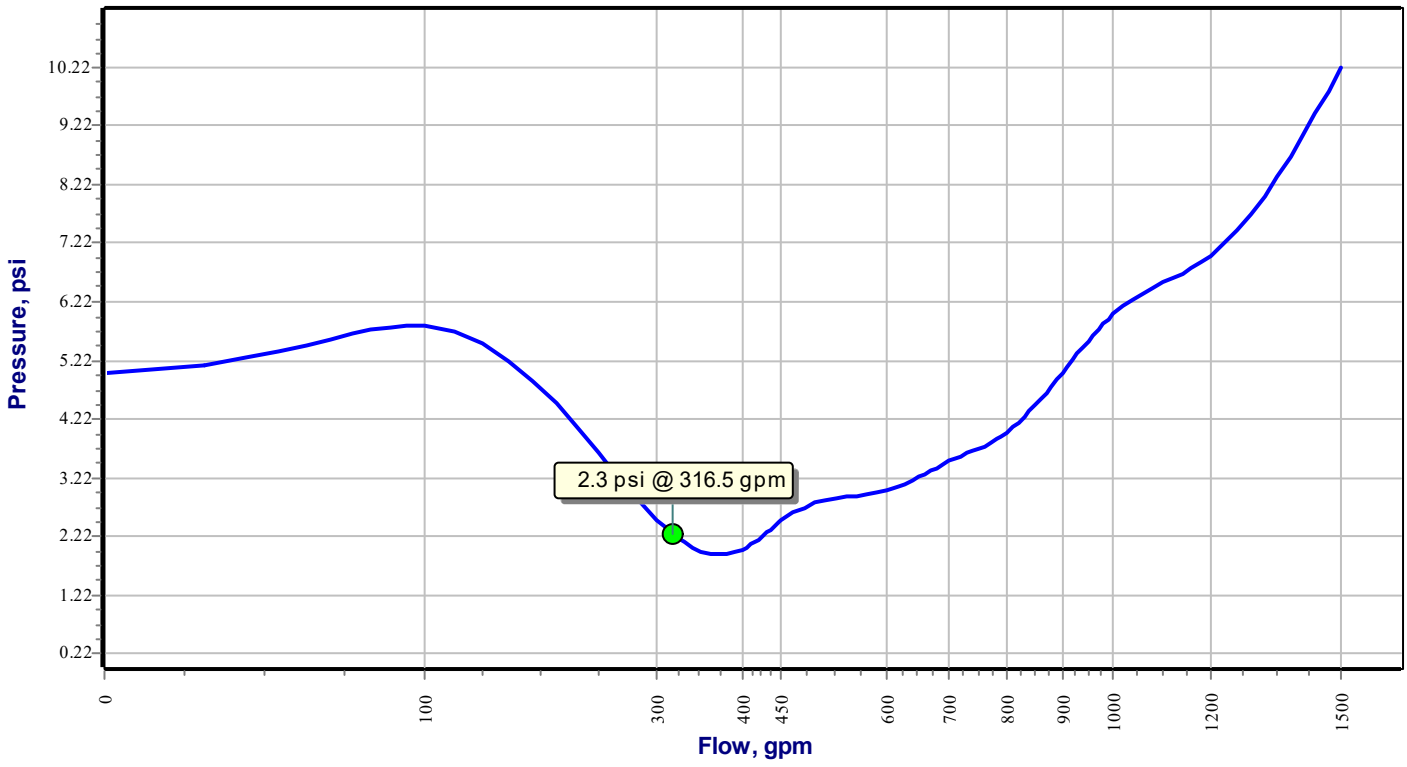
* Maximum Velocity of 20.67 ft/s occurs in the following pipe(s): (069-071)

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

Pressure vs. Flow Function
Design Area: 1.2; Supply Ref.: W1; Supply Name:W1

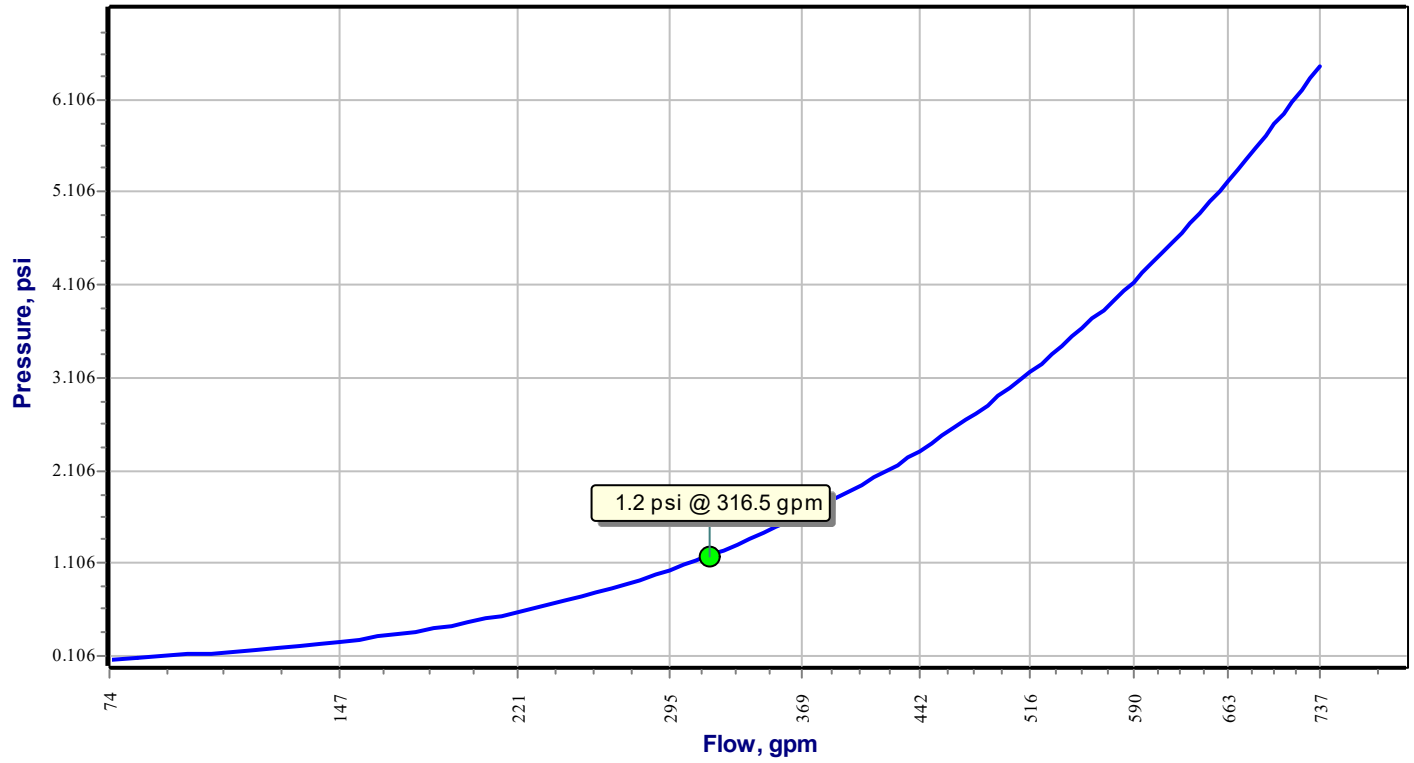


Pressure Loss Function
Design Area: 1.2; BFP Ref.: 466 (Watts 757 DCDA, Size = 6); Inlet Node: BFP-I; Outlet Node: BFP-O

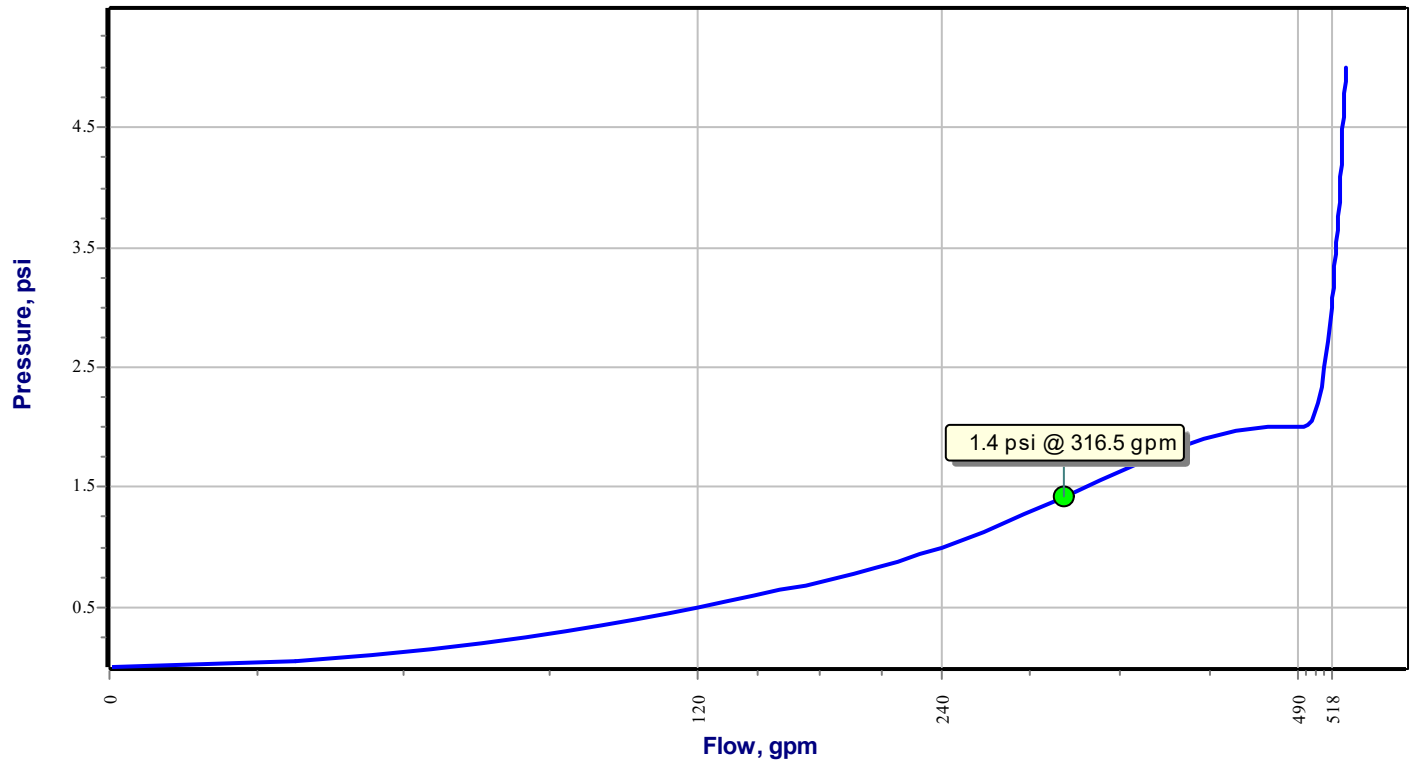


File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Pressure Loss Function
Design Area: 1.2; Valve Ref.: 464 (BFV-N, Size = 3); Inlet Node: BFV-I; Outlet Node: BFV-O



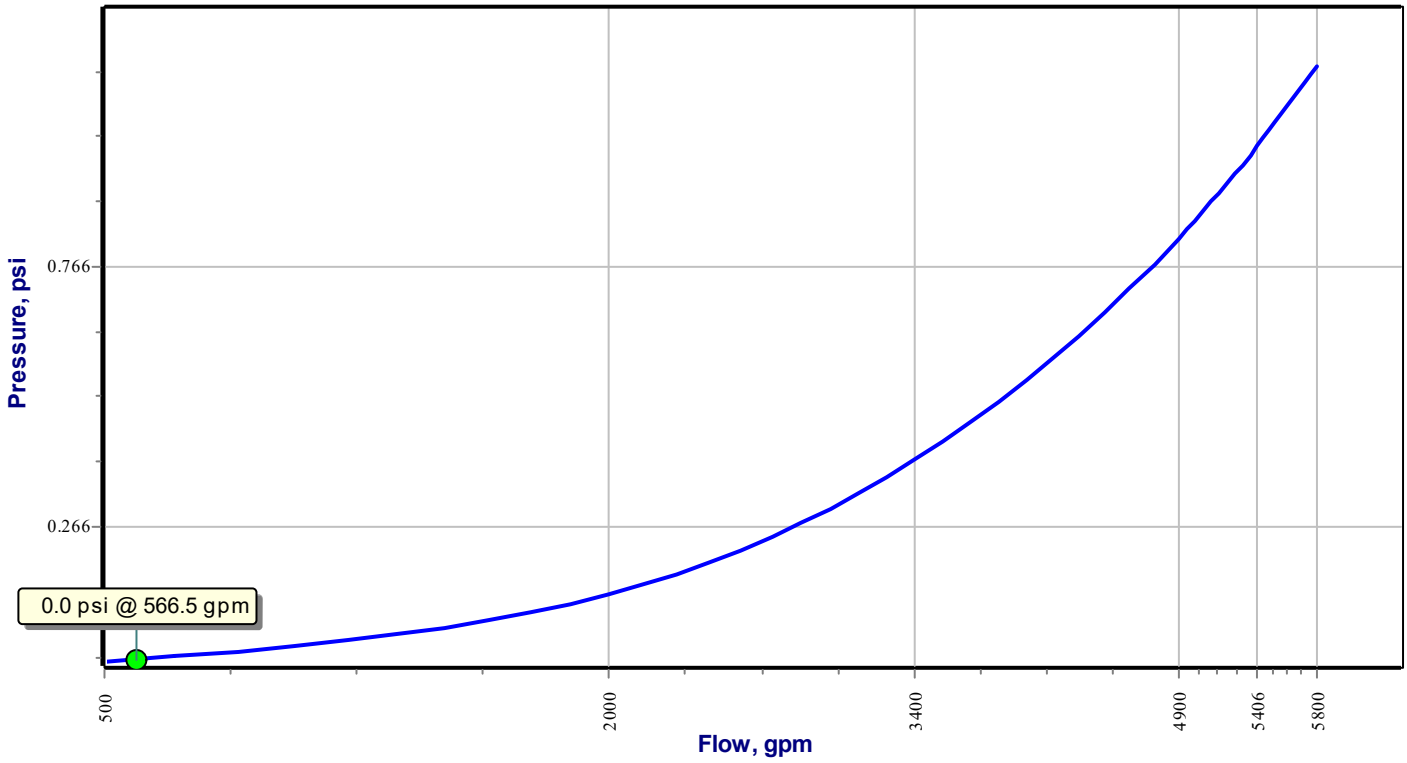
Pressure Loss Function
Design Area: 1.2; Valve Ref.: 465 (CV-1 FR Check, Size = 3); Inlet Node: CKV-I; Outlet Node: CKV-O



File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

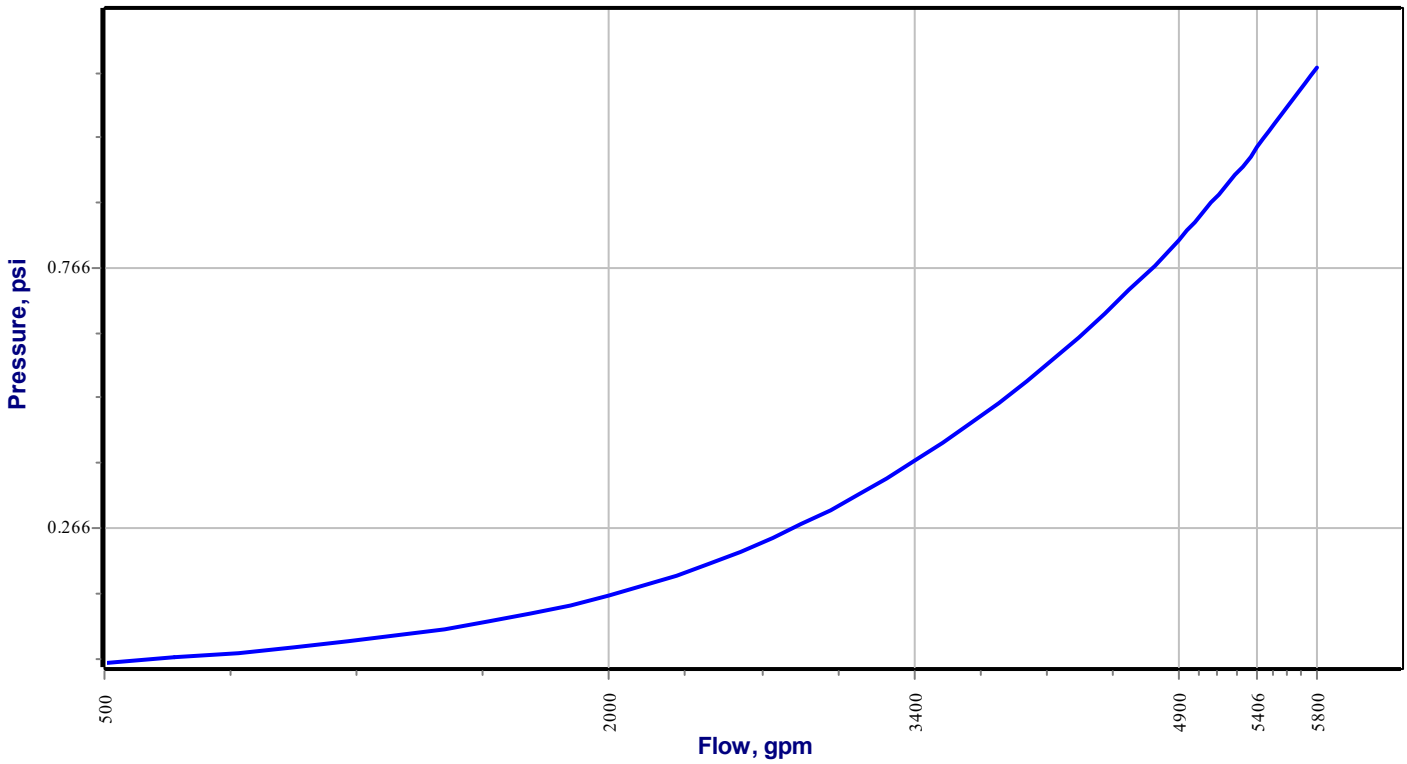
Pressure Loss Function

Design Area: 1.2; Valve Ref.: 468 (Gate A2360, Size = 6); Inlet Node: GTV1-I; Outlet Node: GTV1-O



Pressure Loss Function

Design Area: 1.2; Valve Ref.: 469 (Gate A2360, Size = 6); Inlet Node: GTV2-I; Outlet Node: GTV2-O



HYDRAULIC CALCULATIONS
for

Job Information

Project Name : TRACTOR SUPPLY - LAKE CITY, FL

Contract No. : C25-16229

City: LAKE CITY, FLORIDA 32025

Project Location: 129 SW. CHAD PLACE

Date: 7/29/2025

Contractor Information

Name of Contractor: TRIPLE "A" FIRE PROTECTION

Address: P.O. BOX 1037

City: SEMMES, ALABAMA 36575

Phone Number: 251.649.2034

E-mail: joshuaw@aaafp.com

Name of Designer: JOSHUA WIGGINS

Authority Having Jurisdiction: FIRE MARSHAL

Design

Remote Area Name	2
Remote Area Location	FRONT CANOPY
Occupancy Classification	OH2
Density (gpm/ft²)	0.2
Area of Application (ft²)	1406.5
Coverage per Sprinkler (ft²)	256
Number of Calculated Sprinklers	7
In-Rack Demand (gpm)	0
Special Heads	
Hose Streams (gpm)	250
Total Water Required (incl. Hose Streams) (gpm)	545.1
Required Pressure at Source (psi)	61.9
Type of System	Wet
Volume - Entire System (gal)	966.5 gal

Water Supply Information

Date	7/24/2024
Location	SW CHAD PLACE
Source	W1

Notes

Hydraulic Analysis for : 2

Calculation Info

Calculation Mode	Demand
Hydraulic Model	Hazen-Williams
Fluid Name	Water @ 60F (15.6C)
Fluid Weight, (lb/ft³)	N/A for Hazen-Williams calculation.
Fluid Dynamic Viscosity, (lb·s/ft²)	N/A for Hazen-Williams calculation.

Water Supply Parameters

Supply 1 : W1

Flow (gpm)	Pressure (psi)
0	110
1300	100

Supply Analysis

Node at Source	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)	Available Pressure (psi)	Total Demand (gpm)	Required Pressure (psi)
W1	110	100	1300	108	545.1	61.9

Hoses

Inside Hose Flow / Standpipe Demand (gpm)	0
Outside Hose Flow (gpm)	250
Additional Outside Hose Flow (gpm)	
Other (custom defined) Hose Flow (gpm)	0
Total Hose Flow (gpm)	250

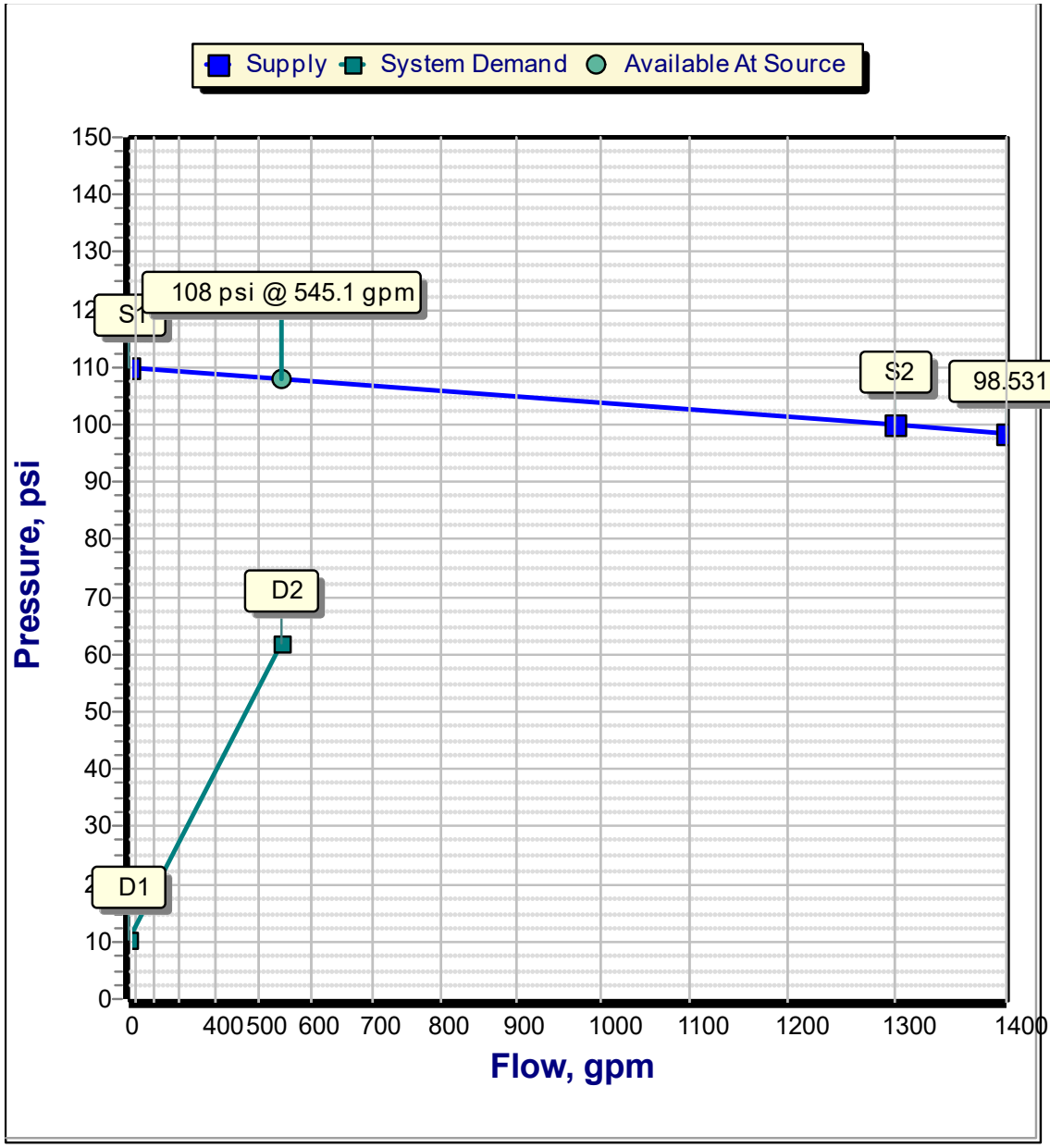
Sprinklers

Ovehead Sprinkler Flow (gpm)	295.1
InRack Sprinkler Flow (gpm)	0
Other (custom defined) Sprinkler Flow (gpm)	0
Total Sprinkler Flow (gpm)	295.1

Other

Required Margin of Safety (psi)	0
BOR - Pressure (psi)	52.9
BOR - Flow (gpm)	295.1
Demand w/o System Pump(s)	N/A

Hydraulic Analysis for : 2



File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Hydraulic Analysis for : 2

Graph Labels

Label	Description	Values	
		Flow (gpm)	Pressure (psi)
S1	Supply point #1 - Static	0	110
S2	Supply point #2 - Residual	1300	100
D1	Elevation Pressure	0	10.2
D2	System Demand	545.1	61.9

Curve Intersections & Safety Margins

Curve Name	Intersection		Safety Margin	
	Pressure (psi)	Flow (gpm)	Pressure (psi)	@ Flow (gpm)
Supply	106.3	762.2	46.1	545.1

Open Heads

Head Ref.	Head Type	Coverage	K-Factor	Required			Calculated		
				Density	Flow	Pressure	Density	Flow	Pressure
		(ft²)	(gpm/psi½)	(gpm/ft²)	(gpm)	(psi)	(gpm/ft²)	(gpm)	(psi)
S21	Overhead Sprinkler	256	11.2	0.2	51.2	20.9	0.2	51.2	20.9
S22	Overhead Sprinkler	256	11.2	0.2	51.2	20.9	0.201	51.4	21
S23	Overhead Sprinkler	256	11.2	0.2	51.2	20.9	0.202	51.7	21.3
S24	Overhead Sprinkler	256	11.2	0.2	51.2	20.9	0.205	52.4	21.9
S25	Overhead Sprinkler	127.5	5.6	0.2	25.5	20.7	0.227	29	26.7
S26	Overhead Sprinkler	127.5	5.6	0.2	25.5	20.7	0.231	29.5	27.7
S27	Overhead Sprinkler	127.5	5.6	0.2	25.5	20.7	0.236	30.1	28.9

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
S21 13.33	Overhead Sprinkler HEAD	11.2 Open	51.2 0	256 0.2	20.9 -10.2	20.9 51.2
S22 13.33	Overhead Sprinkler HEAD	11.2 Open	51.4 0.2	256 0.201	21 -10.2	20.9 51.2
S23 13.33	Overhead Sprinkler HEAD	11.2 Open	51.7 0.5	256 0.202	21.3 -10.2	20.9 51.2
S24 13.33	Overhead Sprinkler HEAD	11.2 Open	52.4 1.2	256 0.205	21.9 -10.2	20.9 51.2
S25 10	Overhead Sprinkler HEAD	5.6 Open	29 3.5	127.5 0.227	26.7 -8.6	20.7 25.5
S26 10	Overhead Sprinkler HEAD	5.6 Open	29.5 4	127.5 0.231	27.7 -8.6	20.7 25.5
S27 10	Overhead Sprinkler HEAD	5.6 Open	30.1 4.6	127.5 0.236	28.9 -8.6	20.7 25.5
001 13.33	Node NODE				23.4 -10.2	
093 13.33	Node NODE				23.5 -10.2	
103 13.33	Node NODE				23.8 -10.2	
127 13.33	Node NODE				24.4 -10.2	
005 19.03	Node NODE				25 -13	
083 19.03	Node NODE				25.2 -13	
073 19.03	Node NODE				25.3 -13	
075 19.03	Node NODE				25.3 -13	
071 19.03	Node NODE				25.5 -13	
082 19.03	Node NODE				25.5 -13	
069 19.03	Node NODE				26 -13	
081 19.03	Node NODE				26.3 -13	
067 19.03	Node NODE				26.9 -13	
080 19.03	Node NODE				27.6 -13	
065 19.03	Node NODE				28.1 -13	
079 19.03	Node NODE				28.7 -13	
063 19.03	Node NODE				29.7 -13	
143 11	Node NODE				29.9 -9.1	

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
078 19.03	Node NODE				30.1 -13	
160 11	Node NODE				30.9 -9.1	
061 19.03	Node NODE				31.7 -13	
177 11	Node NODE				32.3 -9.1	
059 19.03	Node NODE				33.2 -13	
057 19.03	Node NODE				34.1 -13	
055 19.03	Node NODE				34.5 -13	
053 19.03	Node NODE				34.7 -13	
004 15.46	Node NODE				37.5 -11.3	
006 15.46	Node NODE				37.5 -11.3	
007 15.46	Node NODE				37.5 -11.3	
008 15.46	Node NODE				37.6 -11.3	
009 15.46	Node NODE				37.8 -11.3	
010 15.46	Node NODE				38 -11.3	
011 15.46	Node NODE				38.3 -11.3	
012 15.46	Node NODE				38.7 -11.3	
014 15.46	Node NODE				39.2 -11.3	
022 15.46	Node NODE				40.3 -11.3	
019 15.46	Node NODE				40.3 -11.3	
016 15.46	Node NODE				40.3 -11.3	
015 15.46	Node NODE				40.4 -11.3	
CKV-O 6.18	Node NODE				47.7 -6.8	
CKV-I 5.49	Node NODE				49.4 -6.5	
BFV-O 4.13	Node NODE				50.1 -5.8	
BFV-I 3.81	Node NODE				51.3 -5.7	

Node Data

Node# Elev	Type Hgroup	K-Fact. Open/Closed	Discharge Overdischarge	Coverage Density	Tot. Pres. Elev. Pres.	Req. Pres. Req. Discharge
ft		gpm/psi½	gpm gpm	ft² gpm/ft²	psi psi	psi gpm
BOR 1	Node NODE				52.9 -4.3	
BFP-O 3	Node NODE				53.1 -5.3	
BFP-I 3	Node NODE				55.7 -5.3	
294 -8	Node NODE				57.3 0	
291 -8	Node NODE				58.3 0	
H1 -8	Outside Hose HOSE		250		61 0	250
GTV2-O -8	Node NODE				61 0	
GTV2-I -8	Node NODE				61 0	
296 -8	Node NODE				61.1 0	
301 -8	Node NODE				61.1 0	
GTV1-O -8	Node NODE				61.9 0	
GTV1-I -8	Node NODE				61.9 0	
W1 -8	Supply SUPPLY		-545.1		61.9 0	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
S21	13.33	11.2	51.2	1	1x(us.90)=2	1.33	120	20.9	
001	13.33		51.2	1.049		2	0.7394	0	
						3.33		2.5	
001	13.33		0	1.25	1x(us.Tee-Br)=6	10.54	120	23.4	
005	19.03		51.2	1.38	2x(us.90)=6	12	0.1945	-2.5	
						22.54		4.4	
005	19.03		-19.5	1.5	1x(us.Tee-Br)=9.84	0.95	120	25	
075	19.03		31.7	1.68		9.84	0.0308	0	
						10.79		0.3	
075	19.03		0	1.25	1x(us.Tee-Br)=7.43	153.69	120	25.3	
004	15.46		31.7	1.442		7.43	0.0647	1.5	
						161.12		10.4	
004	15.46		0	3		10.35	120	37.5	
006	15.46		31.7	3.26		0	0.0012	0	
						10.35		0.0	
006	15.46		31.9	3		10.35	120	37.5	
007	15.46		63.6	3.26		0	0.0044	0	
						10.35		0.0	
007	15.46		30.8	3		10.35	120	37.5	
008	15.46		94.4	3.26		0	0.0092	0	
						10.35		0.1	
008	15.46		26.4	3		10.51	120	37.6	
009	15.46		120.9	3.26		0	0.0145	0	
						10.51		0.2	
009	15.46		28.9	3		10.67	120	37.8	
010	15.46		149.8	3.26		0	0.0216	0	
						10.67		0.2	
010	15.46		27.1	3		10.67	120	38	
011	15.46		176.9	3.26		0	0.0294	0	
						10.67		0.3	
011	15.46		24.8	3		10.67	120	38.3	
012	15.46		201.7	3.26		0	0.0374	0	
						10.67		0.4	
012	15.46		21.4	3		10.51	120	38.7	
014	15.46		223.1	3.26		0	0.0452	0	
						10.51		0.5	
014	15.46		16.8	3	1x(us.Tee-Br)=20.16	2.91	120	39.2	
015	15.46		240	3.26		20.16	0.0517	0	
						23.07		1.2	
015	15.46		55.1	3	2x(us.90)=18.82	19.43	120	40.4	
CKV-O	6.18		295.1	3.26		18.82	0.0758	4	
						38.25		2.9	
CKV-O	6.18		0	3		0.7		47.7	CV-1 FR
CKV-I	5.49		295.1	0		0	1.8665	0.3	Check
						0.7		1.3	***
CKV-I	5.49		0	3		1.35	120	49.4	
BFV-O	4.13		295.1	3.26		0	0.0758	0.6	
						1.35		0.1	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 1									
BFV-O	4.13		0	3		0.32		50.1	BFV-N
BFV-I	3.81		295.1	0		0	3.2128	0.1	***
						0.32		1	
BFV-I	3.81		0	3		2.81	120	51.3	
BOR	1		295.1	3.26		0	0.0758	1.2	
						2.81		0.2	
BOR	1		0	6	2x(us.90)=48.39	14.42	140	52.9	
294	-8		295.1	6.4		48.39	0.0021	3.9	
						62.8		0.1	
294	-8		0	6	2x(us.90)=43.14	360.31	150	57.3	
291	-8		295.1	6.09		43.14	0.0024	0	
						403.45		1	
291	-8		0	6	1x(us.90)=24.19	14.5	140	58.3	
BFP-O	3		295.1	6.4		24.19	0.0021	-4.8	
						38.69		0.1	
BFP-O	3		0	6		0.5		53.1	Watts 757
BFP-I	3		295.1	0		0	5.1525	0	DCDA
						0.5		2.6	***
BFP-I	3		0	6	2x(us.90)=48.39	15	140	55.7	
296	-8		295.1	6.4		48.39	0.0021	4.8	
						63.39		0.1	
296	-8		0	6		4	150	61.1	
301	-8		295.1	6.09		0	0.0024	0	
						4		0	
301	-8		250	6	1x(us.Tee-Br)=46.22	56.5	150	61.1	
GTV1-O	-8		545.1	6.09		46.22	0.0074	0	
						102.72		0.8	
GTV1-O	-8		0	6		0.88		61.9	Gate A2360
GTV1-I	-8		545.1	0		0	0.0114	0	***
						0.88		0	
GTV1-I	-8		0	6		1.72	150	61.9	
W1	-8		545.1	6.09		0	0.0074	0	
						1.72		0.0	
W1								61.9	
Path No: 2									
S22	13.33	11.2	51.4	1	1x(us.90)=2	1.33	120	21	
093	13.33		51.4	1.049		2	0.7437	0	
						3.33		2.5	
093	13.33		0	1.25	1x(us.Tee-Br)=6	10.54	120	23.5	
083	19.03		51.4	1.38	2x(us.90)=6	12	0.1956	-2.5	
						22.54		4.4	
083	19.03		-12.4	1.5		7.26	120	25.2	
071	19.03		38.9	1.68		0	0.0449	0	
						7.26		0.3	
071	19.03		-8.1	1.25	2x(us.Tee-Br)=14.86	153.69	120	25.5	
007	15.46		30.8	1.442		14.86	0.0612	1.5	
						168.55		10.3	
007								37.5	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 3									
S23	13.33	11.2	51.7	1	1x(us.90)=2	1.33	120	21.3	
103	13.33		51.7	1.049		2	0.7522	0	
						3.33		2.5	
103	13.33		0	1.25	1x(us.Tee-Br)=6	10.54	120	23.8	
082	19.03		51.7	1.38	2x(us.90)=6	12	0.1978	-2.5	
						22.54		4.5	
082	19.03		8.1	1.5		5.11	120	25.5	
069	19.03		59.8	1.68		0	0.0995	0	
						5.11		0.5	
069	19.03		-26.4	1.5		7.39	120	26	
081	19.03		33.4	1.68		0	0.0338	0	
						7.39		0.2	
081	19.03		52.4	1.5		3.13	120	26.3	
067	19.03		85.8	1.68		0	0.1939	0	
						3.13		0.6	
067	19.03		-28.9	1.5		7.79	120	26.9	
080	19.03		56.8	1.68		0	0.0905	0	
						7.79		0.7	
080	19.03		29	1.5		2.88	120	27.6	
065	19.03		85.8	1.68		0	0.194	0	
						2.88		0.6	
065	19.03		-27.1	1.5		5.63	120	28.1	
079	19.03		58.7	1.68		0	0.096	0	
						5.63		0.5	
079	19.03		29.5	1.5		5.04	120	28.7	
063	19.03		88.1	1.68		0	0.2039	0	
						5.04		1	
063	19.03		-24.8	1.5		3.46	120	29.7	
078	19.03		63.3	1.68		0	0.1106	0	
						3.46		0.4	
078	19.03		30.1	1.5		7.21	120	30.1	
061	19.03		93.4	1.68		0	0.2272	0	
						7.21		1.6	
061	19.03		-21.4	1.5		10.51	120	31.7	
059	19.03		72	1.68		0	0.1402	0	
						10.51		1.5	
059	19.03		-16.8	1.5		10.35	120	33.2	
057	19.03		55.1	1.68		0	0.0856	0	
						10.35		0.9	
057	19.03		-19.1	1.5		10.35	120	34.1	
055	19.03		36.1	1.68		0	0.039	0	
						10.35		0.4	
055	19.03		-18	1.5	1x(us.Tee-Br)=9.84	10.35	120	34.5	
053	19.03		18.1	1.68		9.84	0.0108	0	
						20.2		0.2	
053	19.03		0	1.25	1x(us.Tee-Br)=7.43	154.69	120	34.7	
022	15.46		18.1	1.442	2x(us.90)=7.43	14.86	0.0228	1.5	
						169.55		3.9	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 3									
022	15.46		0	3		13.71	120	40.3	
019	15.46		18.1	3.26		0	0.0004	0	
						13.71		0	
019	15.46		18	3		8.18	120	40.3	
016	15.46		36.1	3.26		0	0.0015	0	
						8.18		0.0	
016	15.46		19.1	3	1x(us.Tee-Br)=20.16	5.27	120	40.3	
015	15.46		55.1	3.26		20.16	0.0034	0	
						25.43		0.1	
015								40.4	
Path No: 4									
S24	13.33	11.2	52.4	1	1x(us.90)=2	1.33	120	21.9	
127	13.33		52.4	1.049		2	0.7712	0	
						3.33		2.6	
127	13.33		0	1.25	1x(us.Tee-Br)=6	10.54	120	24.4	
081	19.03		52.4	1.38	2x(us.90)=6	12	0.2028	-2.5	
						22.54		4.6	
081								26.3	
Path No: 5									
S25	10	5.6	29	1	1x(us.90)=2	7	120	26.7	
143	11		29	1.049	1x(us.Tee-Br)=5	7	0.2573	-0.4	
						14		3.6	
143	11		0	1.25	1x(us.Tee-Br)=6	11.42	120	29.9	
080	19.03		29	1.38	2x(us.90)=6	12	0.0677	-3.5	
						23.42		1.6	
080								27.6	
Path No: 6									
S26	10	5.6	29.5	1	1x(us.90)=2	7	120	27.7	
160	11		29.5	1.049	1x(us.Tee-Br)=5	7	0.2656	-0.4	
						14		3.7	
160	11		0	1.25	1x(us.Tee-Br)=6	11.42	120	30.9	
079	19.03		29.5	1.38	2x(us.90)=6	12	0.0699	-3.5	
						23.42		1.6	
079								28.7	
Path No: 7									
S27	10	5.6	30.1	1	1x(us.90)=2	7	120	28.9	
177	11		30.1	1.049	1x(us.Tee-Br)=5	7	0.2762	-0.4	
						14		3.9	
177	11		0	1.25	1x(us.Tee-Br)=6	11.42	120	32.3	
078	19.03		30.1	1.38	2x(us.90)=6	12	0.0726	-3.5	
						23.42		1.7	
078								30.1	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 8									
H1	-8		250	6		8.27	150	61	
GTV2-O	-8		250	6.09		0	0.0018	0	
						8.27		0.0	
GTV2-O	-8		0	6		0.88		61	Gate A2360
GTV2-I	-8		250	0		0	0.0035	0	***
						0.88		0	
GTV2-I	-8		0	6	1x(us.Tee-Br)=46.22	0.86	150	61	
301	-8		250	6.09		46.22	0.0018	0	
						47.08		0.1	
301								61.1	
Path No: 9									
005	19.03		0	1.5	1x(us.Tee-Br)=9.84	9.41	120	25	
073	19.03		19.5	1.68		9.84	0.0125	0	
						19.25		0.2	
073	19.03		12.4	1.25	1x(us.Tee-Br)=7.43	153.69	120	25.3	
006	15.46		31.9	1.442		7.43	0.0654	1.5	
						161.12		10.5	
006								37.5	
Path No: 10									
083	19.03		0	1.5	1x(us.Tee-Br)=9.84	3.09	120	25.2	
073	19.03		12.4	1.68		9.84	0.0054	0	
						12.94		0.1	
073								25.3	
Path No: 11									
071	19.03		0	1.5		5.24	120	25.5	
082	19.03		8.1	1.68		0	0.0025	0	
						5.24		0.0	
082								25.5	
Path No: 12									
069	19.03		0	1.25	2x(us.Tee-Br)=14.86	169.69	120	26	
008	15.46		26.4	1.442	8x(us.90)=29.73	44.59	0.0462	1.5	
						214.28		9.9	
008								37.6	
Path No: 13									
067	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	26.9	
009	15.46		28.9	1.442		14.86	0.0545	1.5	
						168.55		9.2	
009								37.8	

PIPE INFORMATION

Node 1 Node 2	Elev 1 Elev 2	K-Factor 1 K-Factor 2	Flow added (q) Total flow (Q)	Nominal ID Actual ID	Fittings quantity x (name) = length	L F T	C Factor Pf per ft	total (Pt) elev (Pe) frict (Pf)	NOTES
	(ft)	(gpm/psi½)	(gpm)	(in)	(ft)	(ft)	(psi)	(psi)	
Path No: 14									
065	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	28.1	
010	15.46		27.1	1.442		14.86	0.0484	1.5	
						168.55		8.2	
010								38	
Path No: 15									
063	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	29.7	
011	15.46		24.8	1.442		14.86	0.041	1.5	
						168.55		6.9	
011								38.3	
Path No: 16									
061	19.03		0	1.25	2x(us.Tee-Br)=14.86	153.69	120	31.7	
012	15.46		21.4	1.442		14.86	0.0313	1.5	
						168.55		5.3	
012								38.7	
Path No: 17									
059	19.03		0	1.25	2x(us.Tee-Br)=14.86	169.69	120	33.2	
014	15.46		16.8	1.442	8x(us.90)=29.73	44.59	0.02	1.5	
						214.28		4.3	
014								39.2	
Path No: 18									
057	19.03		0	1.25	2x(us.Tee-Br)=14.86	155.87	120	34.1	
016	15.46		19.1	1.442	2x(us.90)=7.43	22.3	0.0253	1.5	
						178.16		4.5	
016								40.3	
Path No: 19									
055	19.03		0	1.25	2x(us.Tee-Br)=14.86	158.04	120	34.5	
019	15.46		18	1.442	2x(us.90)=7.43	22.3	0.0227	1.5	
						180.34		4.1	
019								40.3	

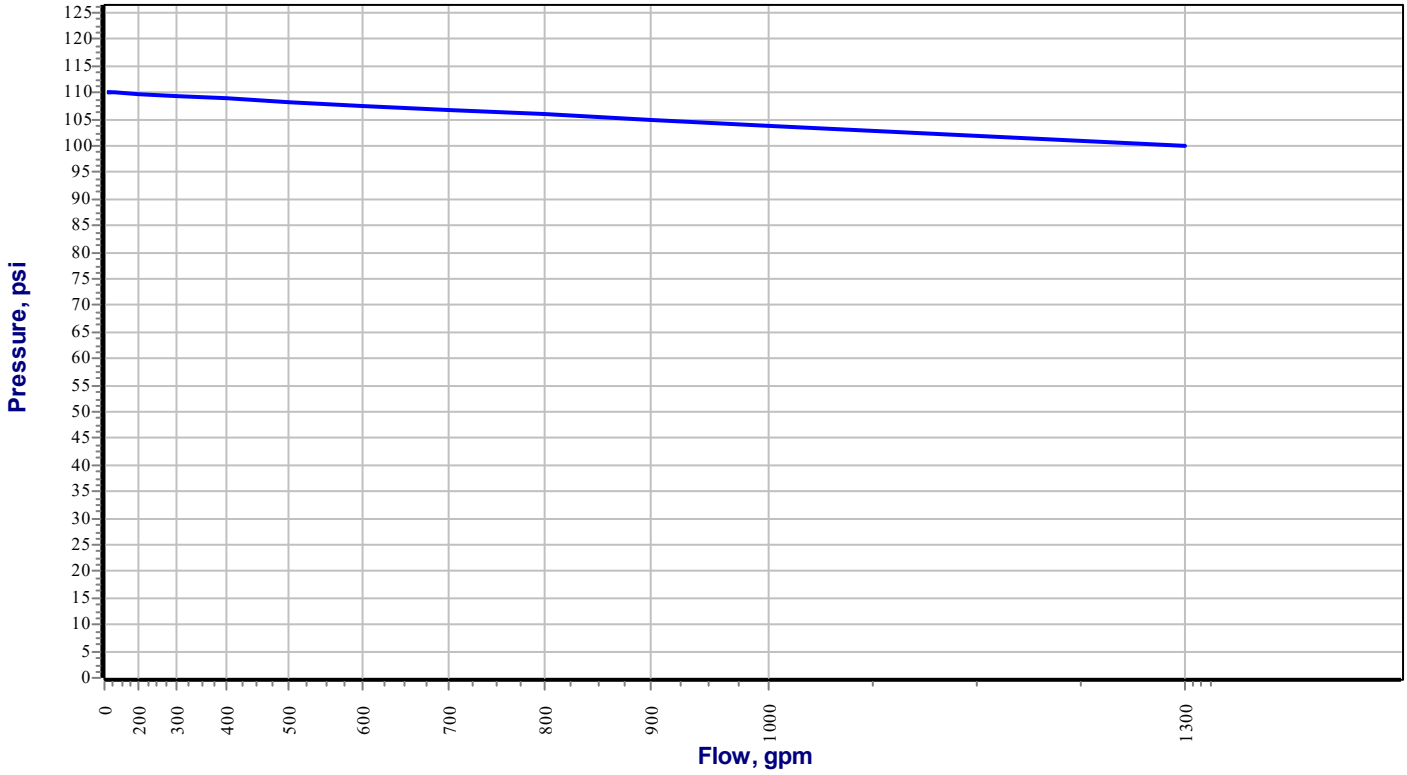
* Pressures are balanced to a high degree of accuracy. Values may vary by 0.1 psi due to display rounding.

* Maximum Velocity of 19.44 ft/s occurs in the following pipe(s): (127-S24)

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

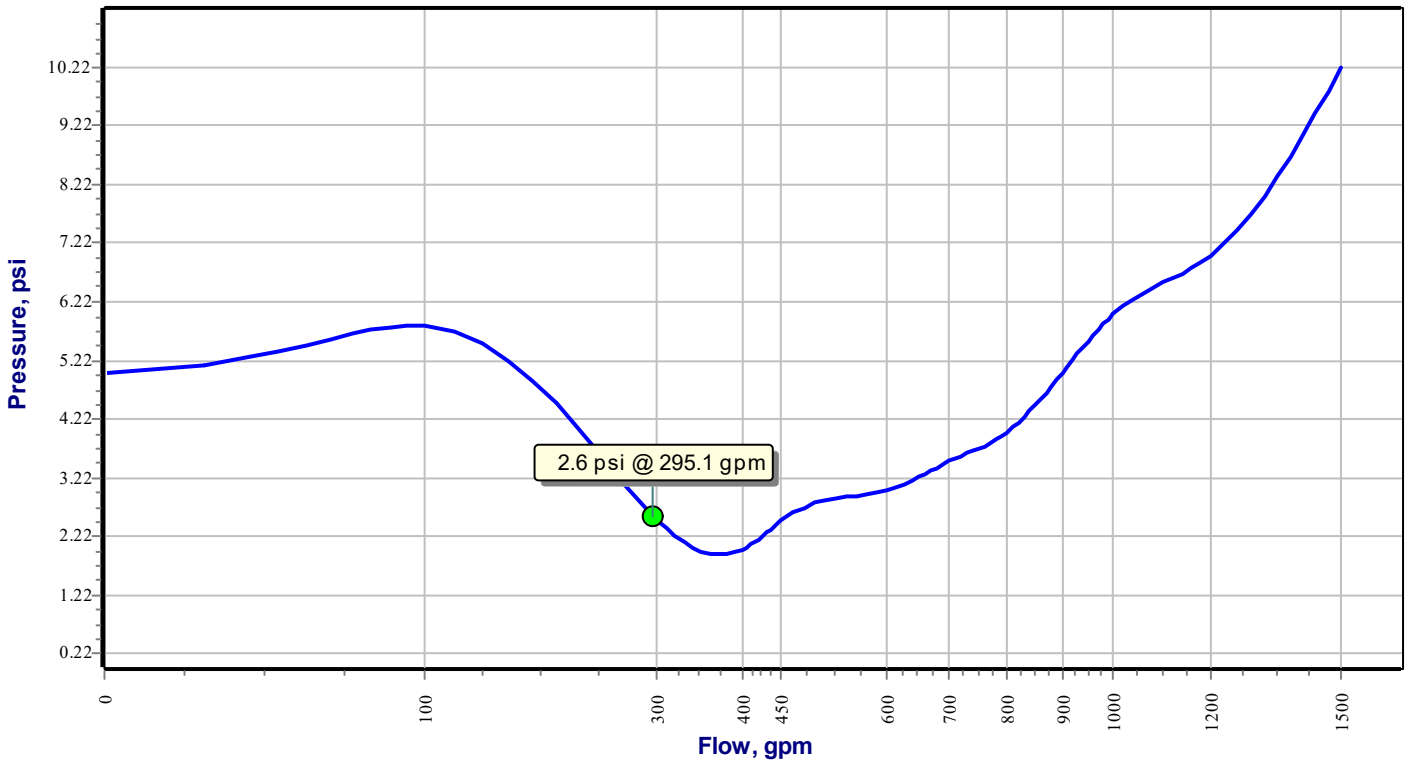
Pressure vs. Flow Function

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



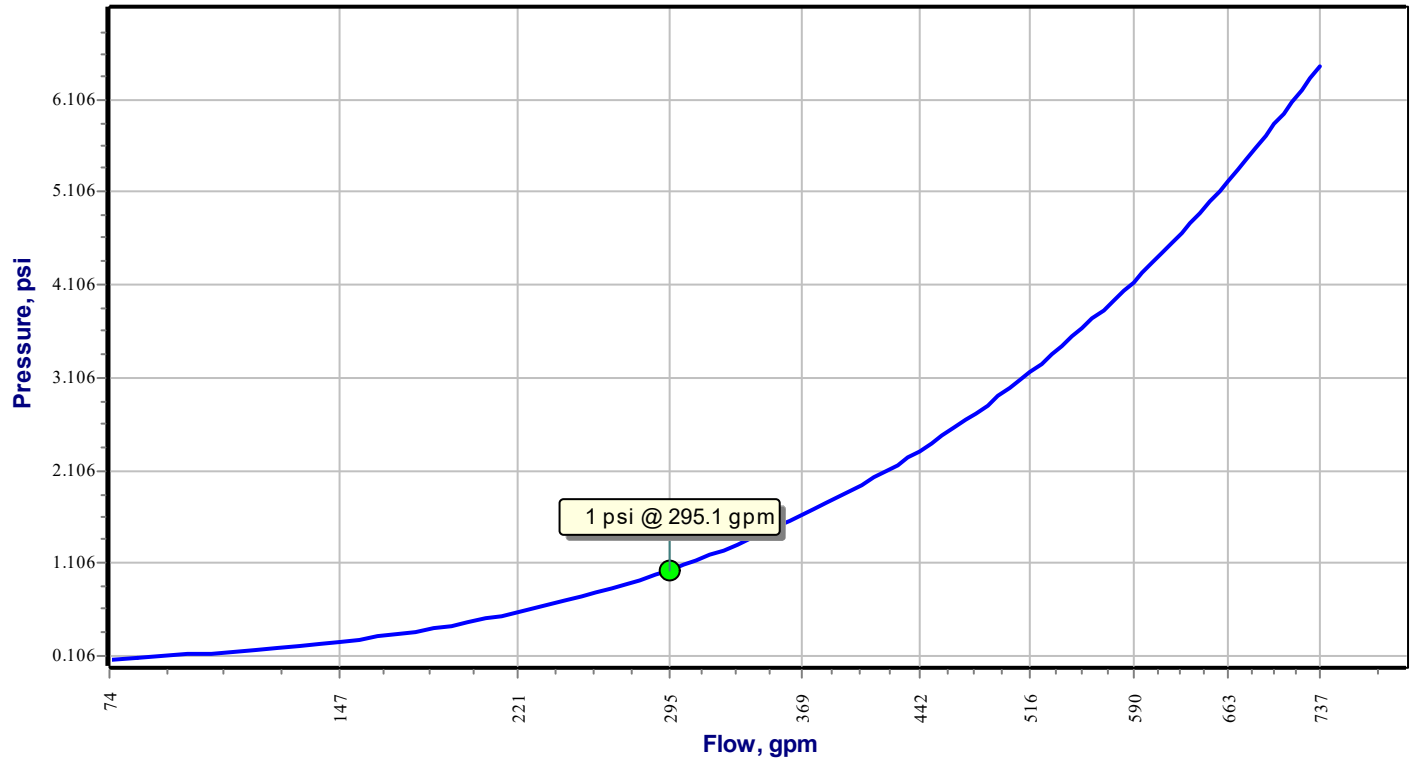
Pressure Loss Function

Design Area: 2; BFP Ref.: 466 (Watts 757 DCDA, Size = 6); Inlet Node: BFP-I; Outlet Node: BFP-O

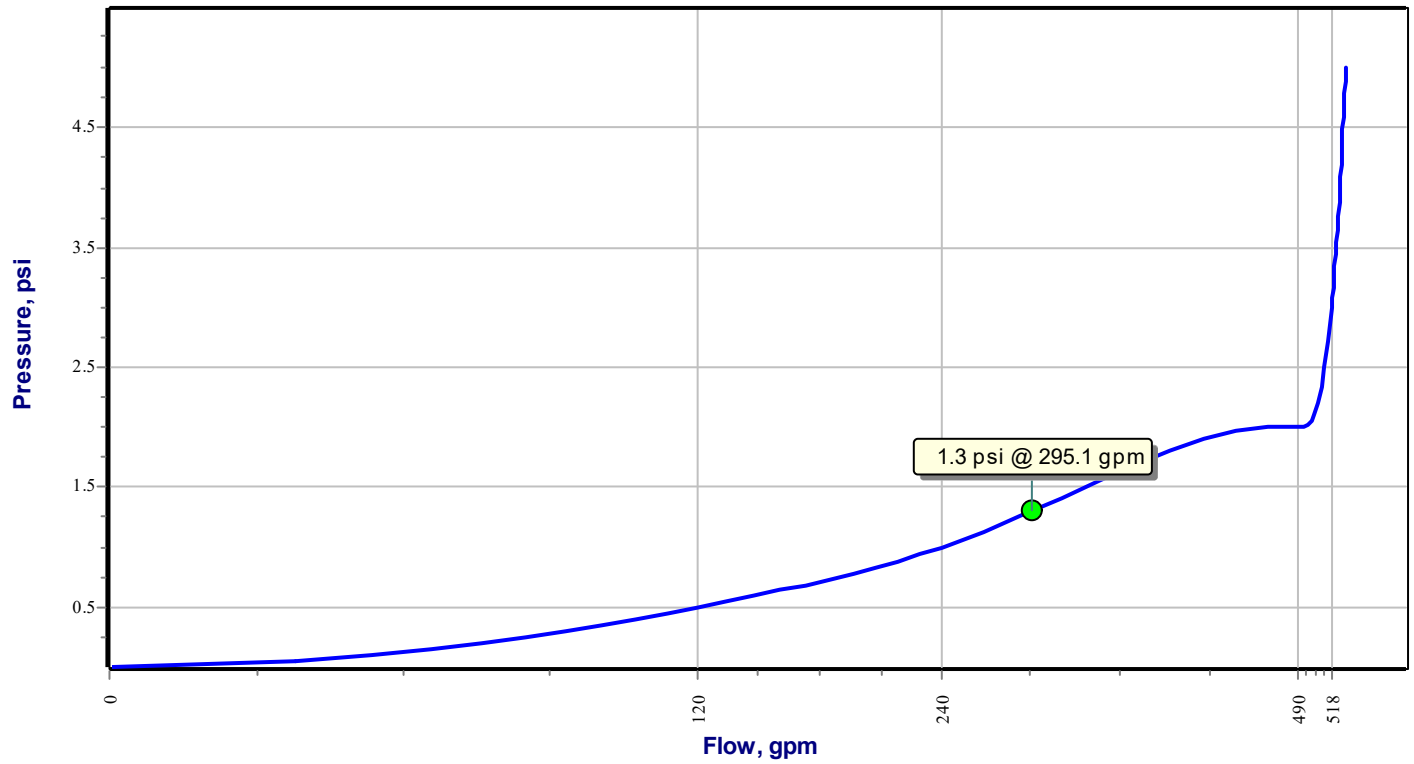


File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

Pressure Loss Function
Design Area: 2; Valve Ref.: 464 (BFV-N, Size = 3); Inlet Node: BFV-I; Outlet Node: BFV-O

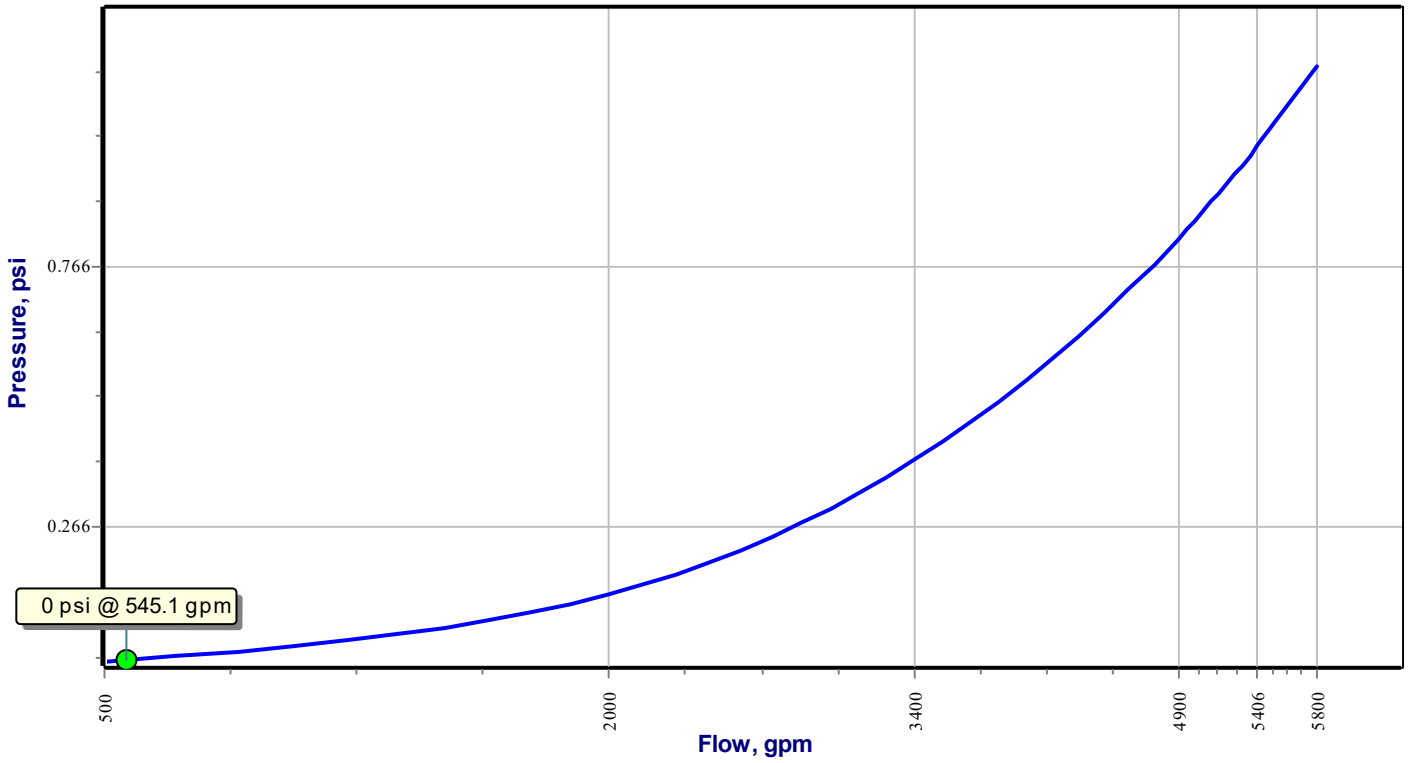


Pressure Loss Function
Design Area: 2; Valve Ref.: 465 (CV-1 FR Check, Size = 3); Inlet Node: CKV-I; Outlet Node: CKV-O

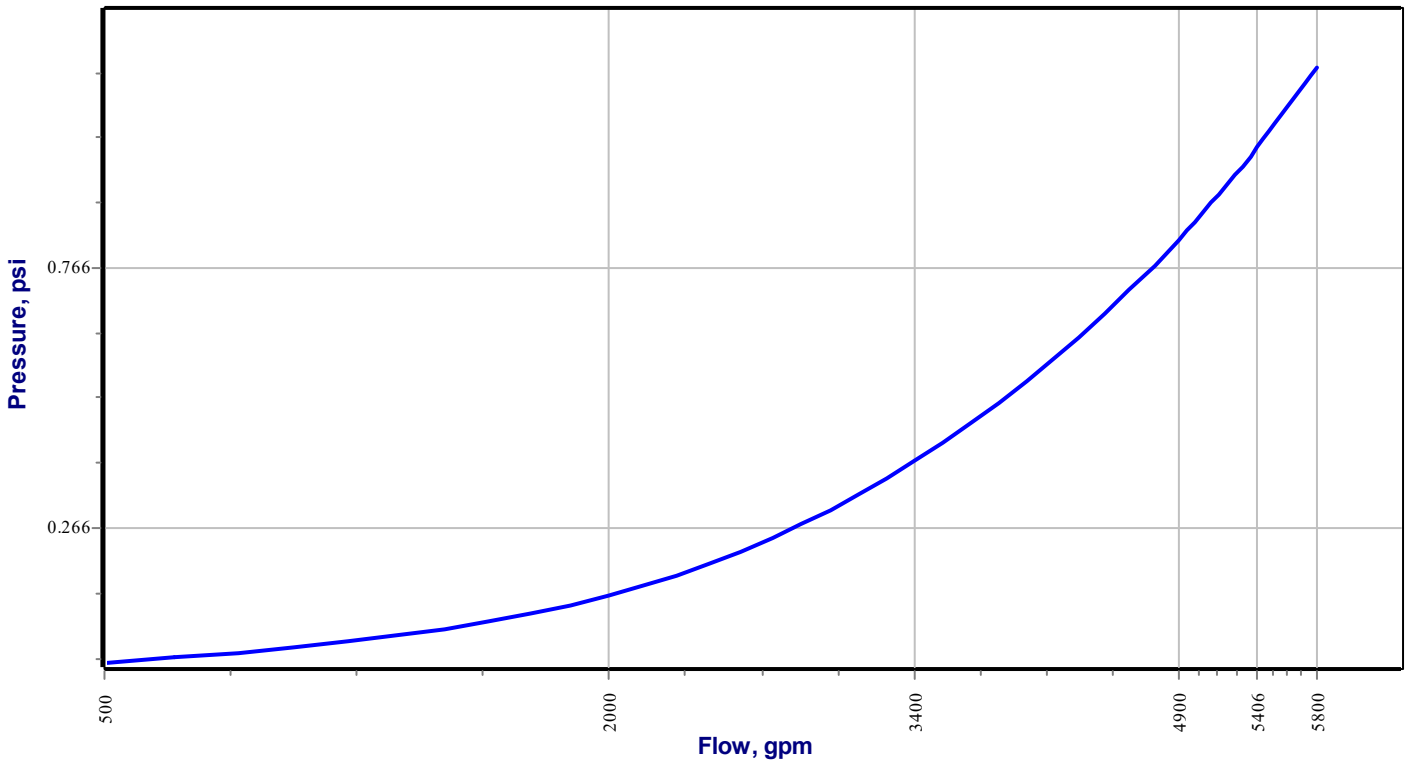


File: P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg

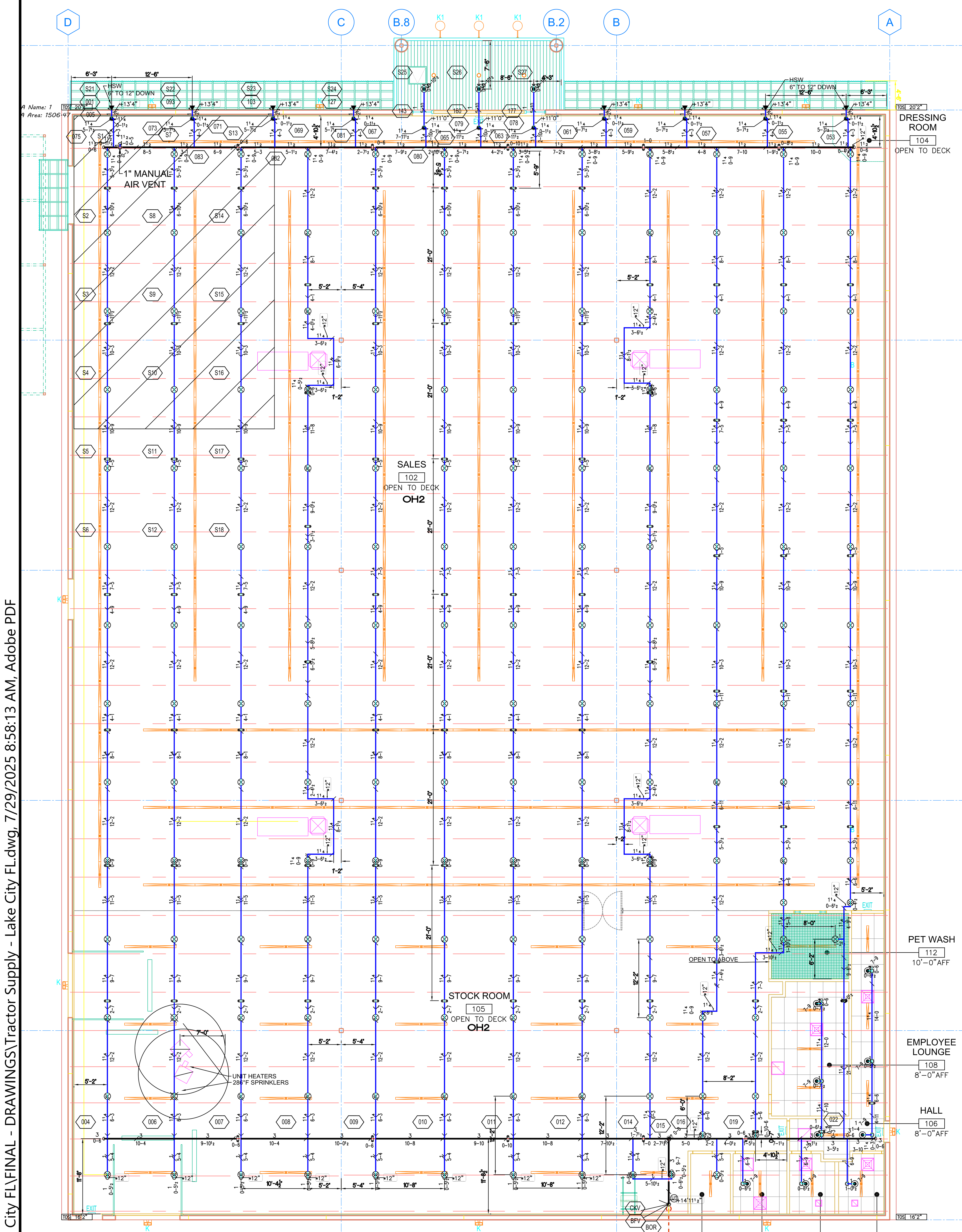
Pressure Loss Function
Design Area: 2; Valve Ref.: 468 (Gate A2360, Size = 6); Inlet Node: GTV1-I; Outlet Node: GTV1-O



Pressure Loss Function
Design Area: 2; Valve Ref.: 469 (Gate A2360, Size = 6); Inlet Node: GTV2-I; Outlet Node: GTV2-O



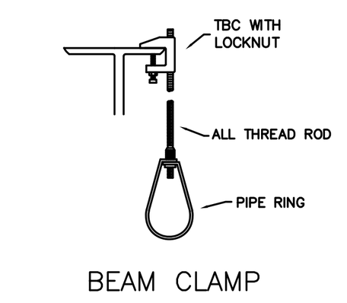
DRAWINGS



PIPING/RCP PLAN

TOS: 16'-2-1/2" - 20'-2-1/2"
FF: 0'-0"

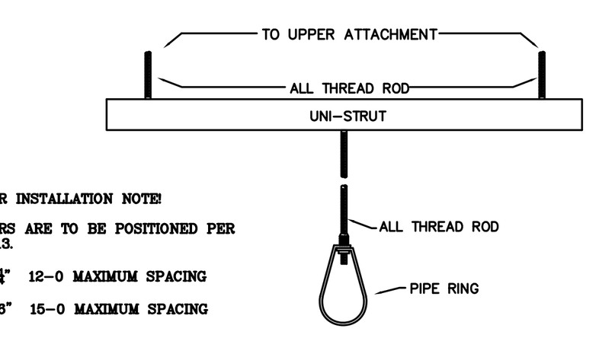
1/8"=1'-0"



#01 HANGER

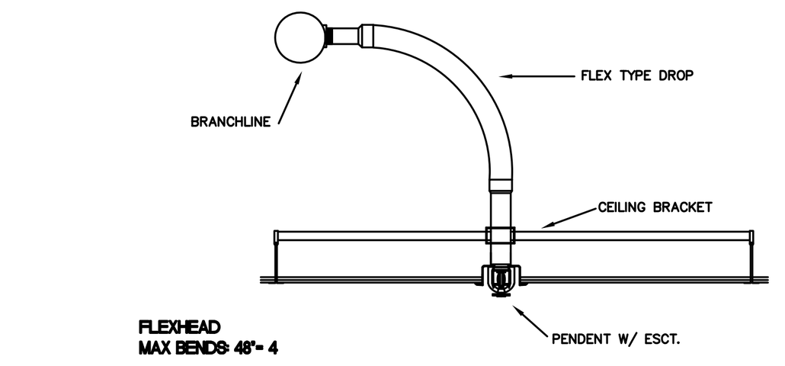
NTS

HANGER INSTALLATION NOTE!
HANGERS ARE TO BE POSITIONED PER NFPA 13.
1" – 1¼" 12–0 MAXIMUM SPACING
1½" – 6" 15–0 MAXIMUM SPACING



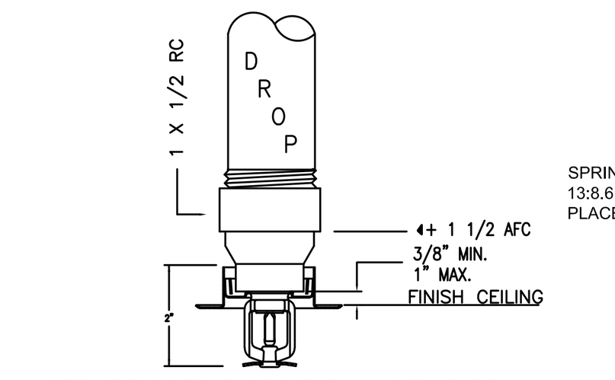
#11 HANGER

NTS



TYPICAL RETURN BEND

NTS

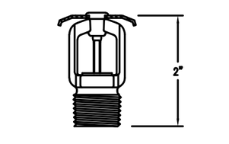


SEE SPRINKLER BLOCK FOR MANUFACTURE

RECESSED SPRINKLER

NTS

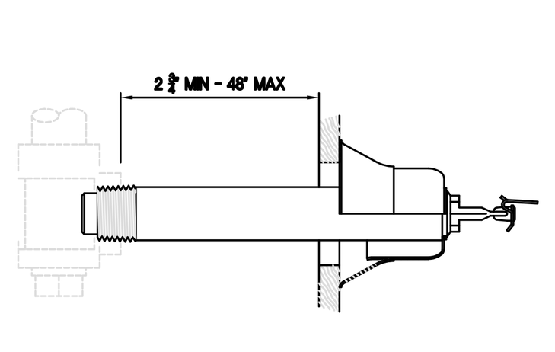
SPRINKLER DEFLECTOR IS TO BE POSITIONED PER NFPA 13:8.6.4.1.2 FOR OBSTRUCTED CONSTRUCTION. THIS WILL PLACE THE DEFLECTOR BETWEEN 1" & 22" FROM THE DECK.



SEE SPRINKLER BLOCK FOR MANUFACTURE

UPRIGHT SPRINKLER

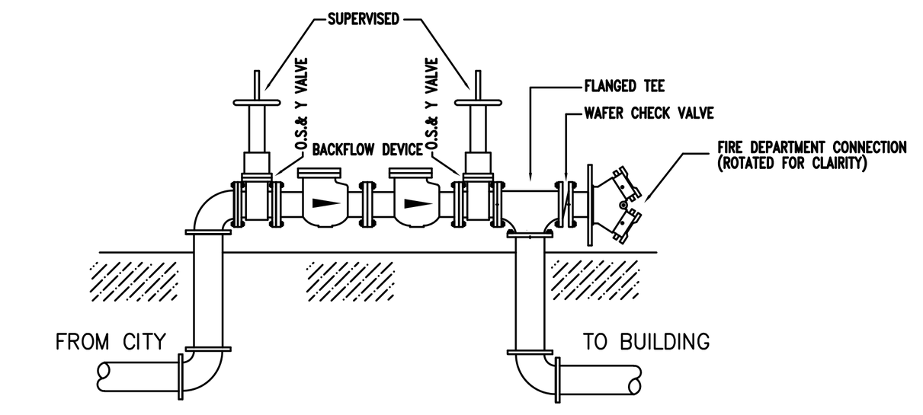
NTS



SEE SPRINKLER BLOCK FOR MANUFACTURE
DRY EXTENDED (#401)

SPRINKLER

NTS



CONTROL VALVES ARE TO BE SUPERVISED OPEN

DOUBLE CHECK ASSEMBLY

NTS

Calculation results for Design Area 1 - SALES AREA

This system as shown on TRIPLE "A" FIRE PROTECTION company print no ____ dated ____
for TRACTOR SUPPLY - LAKE CITY, FL at 129 SW. CHAD PLACE
contract no C25-16229 is designed to discharge at a rate of 0.2 gpm/ft² (L/min/m²) of floor area over a maximum area of 1506.5 ft² when supplied with water at a rate of 321.7 gpm at 52.1 psi at the base of the riser.
Hose stream allowance of ____ is included in the above.

Occupancy classification:	OH2	Number of heads flowing:	12
Commodity classification:		System Type:	Wet
Maximum storage height:		Maximum velocity:	23.28 ft/s
Storage arrangement:			

Flow from In-Rack sprinklers:	0 gpm	Pressure Required at Source:	61 psi
Flow from Overhead sprinklers:	321.7 gpm	Pressure Available at Source:	107.8 psi
Flow from Inside Hoses:	0 gpm	Surplus Pressure at Source:	46.8 psi
Flow from Outside Hoses:	250 gpm	REMOTE AREA NOTE! DESIGN PER NFPA 13:19.3.3.2.3 .20/1500 BASE	
Other fixed flows:	0 gpm		
Total flow in system piping:	571.7 gpm		
Additional flow at/beyond source:	0 gpm		
Total of all flows:	571.7 gpm		

Calculation results for Design Area 1.1 - SALES AREA - PROOF

This system as shown on TRIPLE "A" FIRE PROTECTION company print no ____ dated ____
for TRACTOR SUPPLY - LAKE CITY, FL at 129 SW. CHAD PLACE
contract no C25-16229 is designed to discharge at a rate of 0.2 gpm/ft² (L/min/m²) of floor area over a maximum area of 1506.5 ft² when supplied with water at a rate of 318.4 gpm at 51 psi at the base of the riser.
Hose stream allowance of ____ is included in the above.

Occupancy classification:	OH2	Number of heads flowing:	12
Commodity classification:		System Type:	Wet
Maximum storage height:		Maximum velocity:	21.93 ft/s
Storage arrangement:			

Flow from In-Rack sprinklers:	0 gpm	Pressure Required at Source:	59.9 psi
Flow from Overhead sprinklers:	318.4 gpm	Pressure Available at Source:	107.8 psi
Flow from Inside Hoses:	0 gpm	Surplus Pressure at Source:	47.9 psi
Flow from Outside Hoses:	250 gpm	REMOTE AREA NOTE! DESIGN PER NFPA 13:19.3.3.2.3 .20/1500 BASE	
Other fixed flows:	0 gpm		
Total flow in system piping:	568.4 gpm		
Additional flow at/beyond source:	0 gpm		
Total of all flows:	568.4 gpm		

Calculation results for Design Area 1.2 - SALES AREA - PROOF

This system as shown on TRIPLE "A" FIRE PROTECTION company print no ____ dated ____
for TRACTOR SUPPLY - LAKE CITY, FL at 129 SW. CHAD PLACE
contract no C25-16229 is designed to discharge at a rate of 0.2 gpm/ft² (L/min/m²) of floor area over a maximum area of 1506.5 ft² when supplied with water at a rate of 316.5 gpm at 49.9 psi at the base of the riser.
Hose stream allowance of ____ is included in the above.

Occupancy classification:	OH2	Number of heads flowing:	12
Commodity classification:		System Type:	Wet
Maximum storage height:		Maximum velocity:	20.67 ft/s
Storage arrangement:			

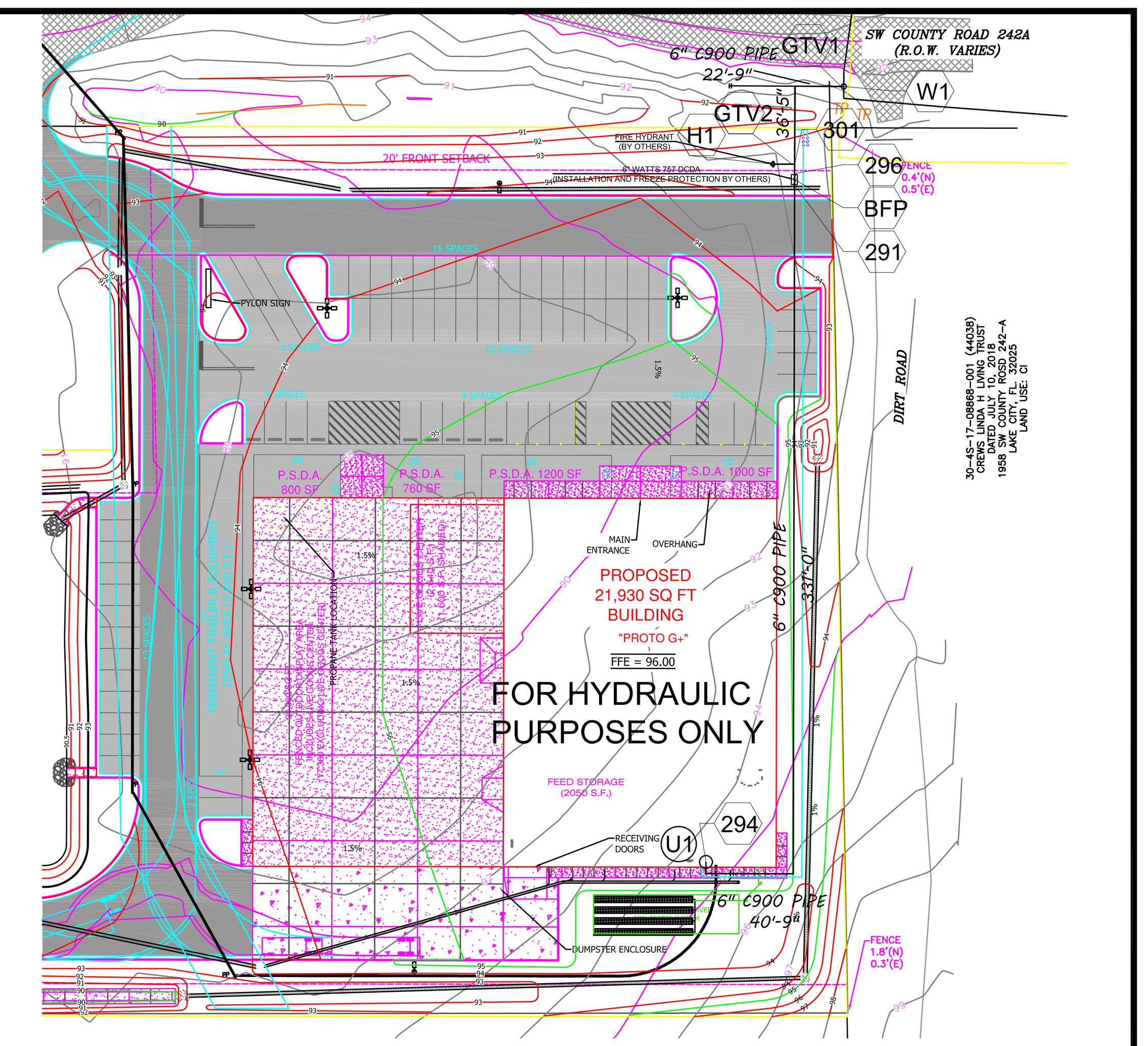
Flow from In-Rack sprinklers:	0 gpm	Pressure Required at Source:	58.9 psi
Flow from Overhead sprinklers:	316.5 gpm	Pressure Available at Source:	107.8 psi
Flow from Inside Hoses:	0 gpm	Surplus Pressure at Source:	49 psi
Flow from Outside Hoses:	250 gpm	REMOTE AREA NOTE! DESIGN PER NFPA 13:19.3.3.2.3 .20/1500 BASE	
Other fixed flows:	0 gpm		
Total flow in system piping:	566.5 gpm		
Additional flow at/beyond source:	0 gpm		
Total of all flows:	566.5 gpm		

Calculation results for Design Area 2 - FRONT CANOPY

This system as shown on TRIPLE "A" FIRE PROTECTION company print no ____ dated ____
for TRACTOR SUPPLY - LAKE CITY, FL at 129 SW. CHAD PLACE
contract no C25-16229 is designed to discharge at a rate of 0.2 gpm/ft² (L/min/m²) of floor area over a maximum area of 1406.5 ft² when supplied with water at a rate of 295.1 gpm at 52.9 psi at the base of the riser.
Hose stream allowance of ____ is included in the above.

Occupancy classification:	OH2	Number of heads flowing:	7
Commodity classification:		System Type:	Wet
Maximum storage height:		Maximum velocity:	19.44 ft/s
Storage arrangement:			

Flow from In-Rack sprinklers:	0 gpm	Pressure Required at Source:	61.9 psi
Flow from Overhead sprinklers:	295.1 gpm	Pressure Available at Source:	108 psi
Flow from Inside Hoses:	0 gpm	Surplus Pressure at Source:	46.1 psi
Flow from Outside Hoses:	250 gpm	REMOTE AREA NOTE! DESIGN PER NFPA 13:19.3.3.4.2 SINGLE LINE OF SPRINKLERS (WET or DRY) MAXIMUM OF 7 FLOWING SPRINKLERS	
Other fixed flows:	0 gpm		
Total flow in system piping:	545.1 gpm		
Additional flow at/beyond source:	0 gpm		
Total of all flows:	545.1 gpm		



UNDERGROUND NOTES (REFERENCES FROM NFPA 13)

1. PIPE AND FITTINGS ARE TO BE IN ACCORDANCE WITH CHAPTER 6.
2. PIPE BURY TO BE A MINIMUM OF 30" OR 36" UNDER DRIVES PER 6.4.2.2.3.
3. PIPING IS TO BE RESTRAINED IN ACCORDANCE WITH CHAPTER 6.6.2.
4. PIPING IS TO BE FLUSHED AT THE MAXIMUM RATE AVAILABLE PER 6.10.2.1.3.1.
5. PIPING IS TO BE TESTED IN ACCORDANCE WITH CHAPTER 6.10.2.2.

NOTE - HYDRAULIC INFOMATION ONLY FOR ADDITIONAL SEE CIVIL

SITE PLAN

1"=60'-0"

— — — EXIST UNDERGROUND
———— NEW UNDERGROUND
3 WAY FIRE HYDRANT

WATER TEST DATA!

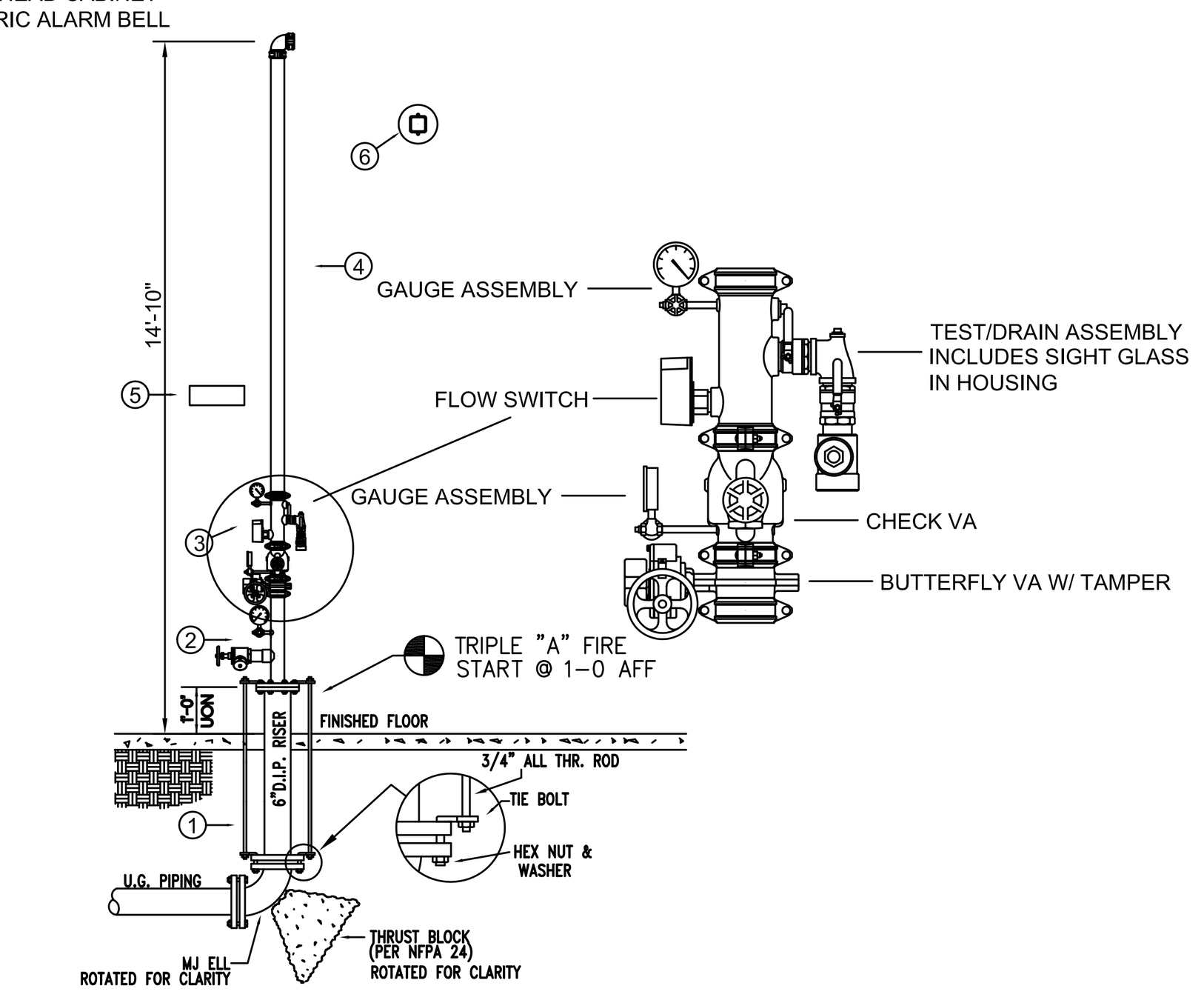
WATER TEST IS PER LAKE CITY WATER AUTHORITY AND IS CONSIDERED TO BE EFFECTIVE AT THE CONNECTION TO THE CITY WATER DISTRIBUTION SYSTEM. PRESSURE HYDRANT IS LOCATED ABOVE THE FINISHED FLOOR LEVEL.

7-24-2024 @ 9:10 AM

STATIC = 110 psi
RESIDUAL = 100 psi
FLOW = 1300 gpm

RISER LEGEND

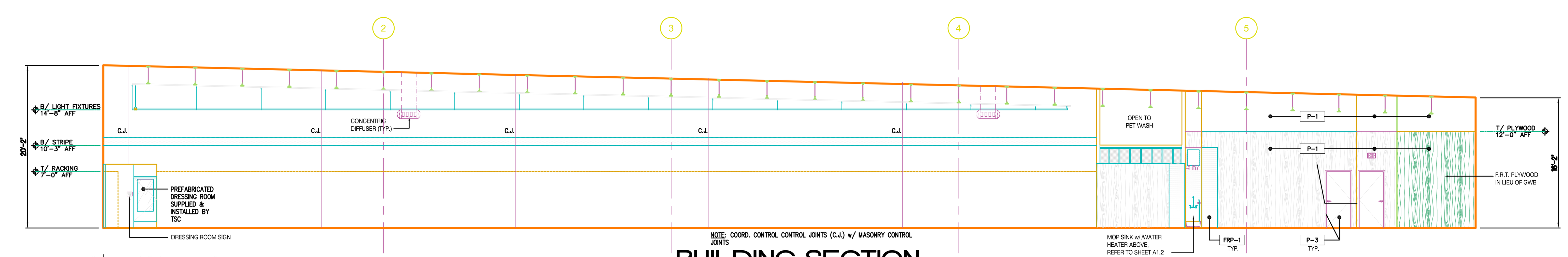
1. 6" ENTRY (BY OTHERS)
2. 3"x 2'- 0" F-G SPOOL w/6" FLANGE; w/2-1/2" TOL@0-8" FROM GROOVE (BFP TEST VALVE) & ½" TOL@1'3" FROM GROOVE (GAUGE)
3. 3" GROOVED LANSDALE RISER PAK w/ CONTROL, TEST, DRAIN & FLOW SWITCH
4. 3"x 9'-6" G-G SPOOL
5. 6 UNIT HEAD CABINET
6. ELECTRIC ALARM BELL



RISER SECTION

1/4"=1'-0"

ENTRY SHOWN IS TRADITIONAL - CONTRACTOR MAY INSTALL "IN-RISER" TYPE AND STILL COMPLY WITH NFPA 13



BUILDING SECTION

3/32"=1'-0"

NOTES REFERENCES TO NFPA 13 ARE FROM THE 2019 EDITION

1. CONSTRUCTION CONSISTS OF SLAB ON GRADE WITH STEEL COLUMNS SUPPORTING METAL BEAMS AND STEEL JOISTS WITH A NONCOMBUSTIBLE ROOF DECK.

2. SPRINKLER DESIGN IS IN ACCORDANCE W/ NFPA 13 19.3.3.2 FOR AREA/DENSITY METHOD.

3. PIPING TO CONFORM W/ NFPA 13 7.3 ASTM A-135 BLACK STEEL SCHEDULE 10/40. ALL SCH.10 PIPE IS GROOVED AND ALL SCH.40 PIPE IS THREADED.

4. FITTINGS TO CONFORM W/ NFPA 13 7.4 AND ARE TO BE A COMBINATION OF THREADED, WELDED AND /OR GROOVED.

5. HANGERS TO CONFORM W/ NFPA 13 17.1 AND ARE TO CONSIST OF ATR, SWIVEL RING AND UPPER ATTACHMENT.

NOTES REFERENCES TO NFPA 13 ARE FROM THE 2019 EDITION

6. MAINS AND BRANCHLINES ARE CUT DIMENSIONS W/ MAINS INDICATING CENTER TO CENTER OF WELD-O-LETS.

7. STORAGE (UON) IS TO CONFORM WITH NFPA 13 4.3 AND WILL CONSIST OF 12 FEET OR LESS OF CLASS I THROUGH III COMMODITIES. CLASS IV COMMODITIES ARE LIMITED TO 10 FEET IN HEGHT. THE DESIGN DENSITY IS FOR AN ORDINARY GROUP 2 HAZARD.

8. CENTER OF TILE INSTALLATION IS REQUIRED BY CONTRACT DOCUMENTS. SPRINKLER LOCATIONS FOR THIS PROJECT ARE TO CONFORM W/ NFPA 13. DEVIATIONS FROM THIS PLAN FOR AESTHETIC APPEAL WILL RESULT IN EXTRA COMPENSATION.

scale: ⅛"= 1'-0"

LEGEND

A/S–AUTOMATIC SPRINKLER
AFF–ABOVE FINISH FLOOR
ASR–AUTOMATIC SPRINKLER RISER
ATR–ALL THREAD ROD
BOB–BOTTOM OF BEAM
BOP–BOTTOM OF PURLIN
GOE–GROOVE ONE END
GOL–GROOVE O LET
GWB–GYPSUM WALL BOARD
SSP–STANDARD SPRAY PENDENT
SSU–STANDARD SPRAY UPRIGHT
TBC–TOP BEAM CLAMP
TOE–THREAD ONE END
TOJ–TOP OF JOIST
TYP–TYPICAL
UON–UNLESS OTHERWISE NOTED
#1 (0–6)–HANGER DESIGNATION/LENGTH
*6 –CENTER OF PIPING FROM DECK
1 –HYDRAULIC REFERENCE POINT
EL.+?'?? –DENOTES PIPE ELEVATION (AFF)
9'6 –DENOTES CEILING ELEVATION

SPRINKLERS

SYM	CNT	POSITION	FINISH	TEMP	K	NPT	SIN	MFG.	MODEL#	ESCUTCHEON
◉	9	PEND	WHITE	155	5.60	1/2"	VK302	VIKING	VK302	RECESSED
	3	PEND	CHROME	200	5.60	1"	VK154	Viking	SR DRY	#401
⊠	2	UPR	BRASS	286	8.00	3/4"	VK350	VIKING	VK350	N/A
⊗	167	UPR	BRASS	200	8.00	3/4"	VK350	VIKING	VK350	N/A
	8	SIDE	CHROME	200	11.20	1"	TY5339	Tyco	DS–3	#401

TOTAL SPRINKLERS THIS DRAWING = 189

Florida Department of Financial Services
Division of State Fire Marshal
200 East Gaines Street
Tallahassee, FL 32399

TRIPLE "A" FIRE PROTECTION, INC.
P.O BOX 1037
SEMMES, AL 36575
COC LICENSE #FPC22-000064
HOLDER: HEATHER M. TILLMAN
NICET LEVEL III #152893

STEVE W TURNER NICET LEVEL IV #117771

TRIPLE A FIRE PROTECTION INC.

HEATHER M TILLMAN NICET LEVEL III #152893

TRACTOR SUPPLY - LAKE CITY, FL

129 S.W. CHAD PLACE LAKE CITY, FL 32025

FIRE SPRINKLER

ENG: JRW	CONT. NO: C25-16229	REV:
INS:	DATE: 7/29/2025	
LINES: 10/40	MAINS: 10	

TRIPLE "A" FIRE PROTECTION, INC.
P.O. BOX 1037 SEMMES, AL 36575

SCALE: 1/8"=1'	TOTAL SPR: 189	DWG. FP1.0

P:\Projects\Tractor Supply Lake City FL\FINAL - DRAWINGS\Tractor Supply - Lake City FL.dwg, 7/29/2025 8:58:13 AM, Adobe PDF