NATIONAL FIRE SPRINKLER ASSOCIATION

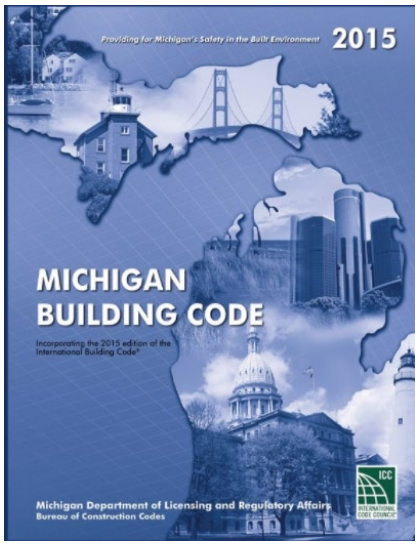
The Voice of the Fire Sprinkler Industry

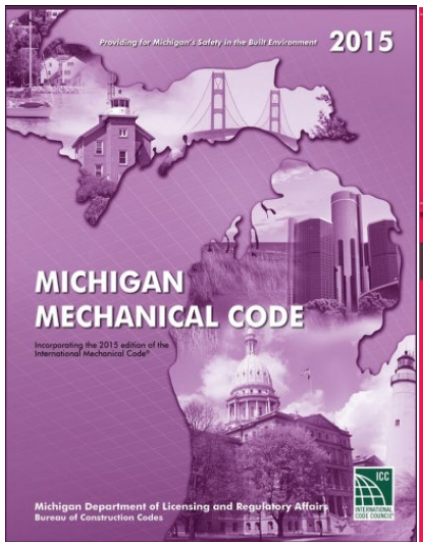
Fire Sprinkler Systems: Sprinkler Equipment

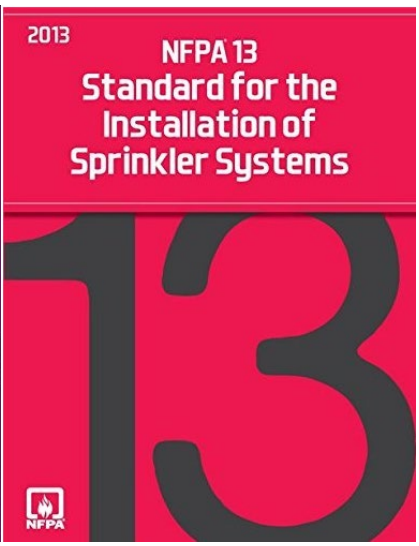
Participant Guide

2015 Michigan Codes

2013 NFPA 13







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Review Note

Blue Brute | C900

PRESSURE-RATED PVC PIPE

JM Eagle™

DELIVERING GOOD WATER TO YOU

AWWA C900-16, CSA B137.3
ASTM D1784 Cell Class 12454
ANSI/NSF 61/14, UL 1285

Gasket: ASTM F477
Joint: ASTM D3139

MARKETS

Potable | Irrigation | Reclaim | Sewer

DESCRIPTION

Available Pipe Sizes (CIOD)

4”, 6”, 8”, 10”, 12”, 14”, 16”, 18”, 20”, 24”, 30”, 36”, 42”, 48”

Nominal Laying length = 20 feet *(Laying length tolerances are in accordance with AWWA and CSA standards)*

Color: Blue | Green | Purple | White

AWWA C900-16	
305 psi	(DR 14)
235 psi	(DR 18)
200 psi	(DR 21)
165 psi	(DR 25)
125 psi	(DR 32.5)
100 psi	(DR 41)
80 psi	(DR 51)

Note: FM Approvals Pressure Class 185 psi for DR18 and 250 psi for DR14.

CSA B137.3	
309 psi	(DR 14)
235 psi	(DR 18)
167 psi	(DR 25)

BENEFITS

Field-cut with a power saw or handsaw; bevel without complicated machinery.

Does not need lining, wrapping, coating, or cathodic protection to prevent galvanic corrosion.

Corrosive resistant, safe, long-lasting, and stable solution for a modern infrastructure.

Consistency in carrying capacity (flow coefficient, C=150), for savings in pumping costs, and size of the pipe.

Made in America

JM Eagle 50 YEAR WARRANTY* ON PLASTIC PIPE

*50 year warranty only applicable to C900/Eagle Loc 900, C905, C909, AWWA C901/C906. Check www.jmeagle.com/warranty for full details.

Blue Brute | C900

PRESSURE-RATED PVC PIPE

SUBMITTAL AND DATA SHEET

DELIVERING GOOD WATER TO YOU

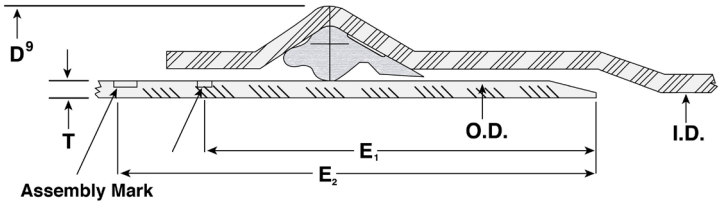
PIPE SIZE (IN)	AVERAGE O.D. (IN)	NOM. I.D. (IN)	MIN. T. (IN)	APPROX. E_1 (IN)	APPROX. E_2 (IN)	APPROX. D^9 (IN)	APPROX. WGT (LBS/FT)
PRESSURE CLASS 305 psi (DR 14)							
PIPE STIFFNESS: 815 psi							
4	4.80	4.07	0.343	4.5	5.5	6.365	3.2
6	6.90	5.86	0.493	5.25	6.25	8.887	6.7
8	9.05	7.68	0.646	6.25	7.25	11.499	11.6
10	11.10	9.42	0.793	7.25	8.25	14.072	17.6
12	13.20	11.20	0.943	8.25	9.25	16.57	25.1
16	17.40	14.85	1.242	7.25	8.75	21.637	43.77
24	25.80	21.89	1.843	9.75	11.25	31.958	98.33
PRESSURE CLASS 235 psi (DR 18)							
PIPE STIFFNESS: 364 psi							
4	4.80	4.23	0.267	4.5	5.5	6.204	2.6
6	6.90	6.09	0.383	5.25	6.25	8.654	5.3
8	9.05	7.98	0.503	6.25	7.25	11.195	9.2
10	11.10	9.79	0.617	7.25	8.25	13.699	13.9
12	13.20	11.65	0.733	8.25	9.25	16.125	19.7
14	15.30	13.50	0.850	6.5	8	18.603	26.75
16	17.40	15.35	0.967	7.25	8.75	21.135	34.86
18	19.50	17.20	1.083	7.75	9.25	23.832	48.95
20	21.60	19.06	1.200	8.75	10.25	26.107	54.22
24	25.80	22.76	1.433	9.75	11.25	31.089	77.97
30	32.00	28.23	1.778	11.5	13.5	38.264	117.82
PRESSURE CLASS 200 psi (DR 21)*							
PIPE STIFFNESS: 224 psi							
14	15.30	13.75	0.729	6.5	8	18.347	23.07
16	17.40	15.64	0.829	7.25	8.75	20.097	30.04
18	19.50	17.53	0.929	7.75	9.25	23.505	37.27
20	21.60	19.42	1.029	8.75	10.25	25.744	46.71
24	25.80	23.19	1.229	9.75	11.25	30.656	67.53
30	32.00	28.77	1.524	11.5	13.5	37.725	103.71
36	38.30	34.43	1.824	13.25	15.25	44.753	152.16
PRESSURE CLASS 165 psi (DR 25)							
PIPE STIFFNESS: 129 psi							
4	4.80	4.39	0.192	4.5	5.5	6.045	1.9
6	6.90	6.31	0.276	5.25	6.25	8.427	3.9
8	9.05	8.28	0.362	6.25	7.25	10.896	6.7
10	11.10	10.16	0.444	7.25	8.25	13.332	10.1
12	13.20	12.08	0.528	8.25	9.25	15.69	14.4
14	15.30	14.00	0.612	6.5	8	18.098	19.48
16	17.40	15.92	0.696	7.25	8.75	20.561	25.38
18	19.50	17.85	0.780	7.75	9.25	23.19	31.99
20	21.60	19.77	0.864	8.75	10.25	25.395	39.46
24	25.80	23.61	1.032	9.75	11.25	30.239	56.98
30	32.00	29.29	1.280	11.5	13.5	37.208	88.49
36	38.30	35.05	1.532	13.25	15.25	44.134	128.41
42	44.50	40.73	1.780	15.5	17.5	51.56	176.02
48*	50.80	46.49	2.032	16.5	18.5	58.393	231.22
PRESSURE CLASS 125 psi (DR 32.5)*							
PIPE STIFFNESS: 57 psi							
14	15.30	14.30	0.471	6.5	8	17.799	15.14
16	17.40	16.27	0.535	7.25	8.75	20.219	19.63
18	19.50	18.23	0.600	7.75	9.25	22.808	24.75
20	21.60	20.19	0.665	8.75	10.25	24.973	30.54
24	25.80	24.12	0.794	9.75	11.25	29.734	44.11
30	32.00	29.91	0.985	11.5	13.5	36.582	68.45
36	38.30	35.80	1.178	13.25	15.25	43.383	99.22
48	50.80	47.49	1.563	16.5	18.5	57.399	178.49

PIPE SIZE (IN)	AVERAGE O.D. (IN)	NOM. I.D. (IN)	MIN. T. (IN)	APPROX. E_1 (IN)	APPROX. E_2 (IN)	APPROX. D^9 (IN)	APPROX. WGT (LBS/FT)
PRESSURE CLASS 100 psi (DR 41)							
PIPE STIFFNESS: 28 psi							
14	15.30	14.52	0.373	6.5	8	17.599	12.01
16	17.40	16.51	0.424	7.25	8.75	19.992	15.63
18	19.50	18.50	0.476	7.75	9.25	22.555	19.72
20	21.60	20.49	0.527	8.75	10.25	24.691	24.31
24	25.80	24.48	0.629	9.75	11.25	29.397	35.10
30	32.00	30.35	0.780	11.5	13.5	36.163	54.65
36	38.30	36.30	0.934	13.25	15.25	42.885	78.97
42	44.50	42.18	1.085	15.5	17.5	50.108	108.19
48	50.80	48.14	1.239	16.5	18.5	56.736	142.10
PRESSURE CLASS 80 psi (DR 51)*							
PIPE STIFFNESS: 14 psi							
30	32.00	30.67	0.627	11.5	13.5	35.836	44.08
36	38.30	36.71	0.751	13.25	15.25	42.478	64.32
42	44.50	42.65	0.872	15.5	17.5	49.652	88.10
48	50.80	49.69	0.996	16.5	18.5	56.217	115.79

Product Standard: ANSI/AWWA C900-16
CSA B137.3* (DR 18, 25, 4"-18"; DR 14, 4"-12")
Pipe Compound: ASTM D1784 Cell Class 12454
Gasket: ASTM F477
Integral Bell Joint: ASTM D3139
Certifications: ANSI/NSF 61, ANSI/NSF 14*
UL 1285 (DR 14, 18, 25, up to 24"), FM 1612* (DR 14 / DR 18; 4-12"), CSA B137.3*
Note: FM Approvals Pressure Class 185 psi for DR 18 and 250 psi for DR 14.
Nominal Laying Length: 20 feet
(Laying length tolerences with AWWA and/or CSA standards)
Installation: JM Eagle™ Blue Brute Installation Guide

Manning Coefficient (n) = 0.009 • Hazen-Williams Coefficient (c) = 150

*Please call regarding availability.



I.D.: Inside Dameter
O.D.: Outside Diameter
T: Wall Thickness
D^9: Bell Outside Diameter

E_1: Distance between 1st Insertion/ Assembly Mark to the end of spigot.

E_2: Distance between 2nd Insertion/ Assembly Mark to the end of spigot.

Victaulic® QuickVic™ Rigid Coupling Style 107V

06.33

2 – 12"/DN50 – DN300

1.0 PRODUCT DESCRIPTION

Available Size

- 2 – 12"/DN50 – DN300

Pipe Material

- Carbon steel; Stainless steel
- For exceptions reference section 6.0 Notifications

Maximum Working Pressure

- Accommodates pressures ranging from full vacuum (29.9 in Hg/760 mm Hg) up to 750 psi/5171 kPa
- Working pressure dependent on pipe material, wall thickness and size of pipe

Operating Temperature

- Dependent on gasket selection from section 3.0

Function

- Joins carbon steel or stainless steel pipe prepared with the Victaulic Original Groove System (OGS) groove profile
- Provides a rigid pipe joint designed to restrict axial or angular movement

NOTE

- Applications that require NSF 61-approved products should specify the Victaulic Installation-Ready™ Rigid Coupling Style 807N (publication 06.28)

Pipe Preparation

- Cut or roll grooved in accordance with publication 25.01: Victaulic Standard Groove Specifications

Codes and Requirements

- Hanger support spacing corresponds to ASME B31.1 Power Piping Code and ASME B31.9 Building Services Piping Code

2.0 CERTIFICATION/LISTINGS

EN 10311
CPR (EU)
No. 305/2011

BS EN 10311
CPR (UK)
2019 No. 465

Product designed and manufactured under the Victaulic Quality Management System, as certified by LPCB in accordance with ISO-9001:2015.

NOTE

- See publication 10.01 for Fire Protection Certifications/Listings Reference Guide.

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

3.0 SPECIFICATIONS - MATERIAL

Housing: Ductile iron conforming to ASTM A536, Grade 65-45-12. Ductile iron conforming to ASTM A395, Grade 65-45-15, is available upon special request.

Housing Coating:

☐ Orange coating.

Gasket[1]:

☐ **Grade "EHP" EPDM**

EHP (Red and Green or Yellow and Green Stripes color code). Temperature range –30°F to +250°F/–34°C to +121°C. May be specified for hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. NOT COMPATIBLE WITH PETROLEUM SERVICES.

[1] Services listed are General Service Guidelines only. It should be noted that there are services for which these gaskets are not compatible. Reference should always be made to the latest Victaulic Seal Selection Guide for specific gasket service guidelines and for a listing of services which are not compatible.

NOTES

- Victaulic reserves the right to substitute equivalent and/or higher grade elastomer products.
- For additional gasket grades reference publication 06.23 for the Style 107N

Bolts/Nuts: (specify choice[2])

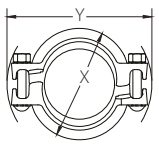
☐ Standard: Carbon steel oval neck track bolts meeting the mechanical property requirements of ASTM A449 (imperial) and ISO 898-1 Class 9.8 (M10-M16) Class 8.8 (M20 and greater). Carbon steel hex nuts meeting the mechanical property requirements of ASTM A563 Grade B (imperial - heavy hex nuts) and ASTM A563M Class 9 (metric - hex nuts). Track bolts and hex nuts are zinc electroplated per ASTM B633 Fe/Zn5, finish Type III (imperial) or Type II (metric).

☐ Optional: Stainless steel oval neck track bolts meeting the mechanical property requirements of ASTM F593, Group 2 (316 stainless steel), condition CW. Stainless steel heavy nuts meeting the mechanical property requirements of ASTM F594, Group 2 (316 stainless steel), condition CW. Bolts and nuts include galling reducing coating.[2]

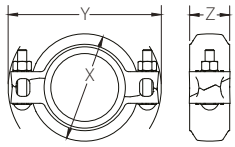
[2] Optional bolts/nuts are available in imperial sizes only.

4.0 DIMENSIONS

Style 107V QuickVic™ Rigid Coupling



Pre-Assembled
(Installation-Ready™ Condition)



Joint Assembled

Size		Pipe End Separation[3]	Bolt/Nut[4]		Dimensions					Weight
					Pre-Assembled (Installation-Ready™ Condition)		Joint Assembled			
Nominal inches DN	Actual Outside Diameter inches mm	Allowable inches mm	Qty.	Size inches mm	X inches mm	Y inches mm	X inches mm	Y inches mm	Z inches mm	Approximate (Each) lb kg
2 DN50	2.375 60.3	0.15 3.8	2	½ x 2¾ M12 x 70	4.00 102	6.13 156	3.50 89	6.13 156	2.25 57	2.9 1.3
2 ½	2.875 73.0	0.15 3.8	2	½ x 2¾ M12 x 70	4.63 118	6.75 171	4.13 105	6.75 171	2.38 60	3.3 1.5
3 DN80	3.500 88.9	0.15 3.8	2	½ x 3 M12 x 76	5.25 132	7.38 187	4.75 121	7.50 191	2.38 60	3.7 1.7
4 DN100	4.500 114.3	0.15 3.8	2	½ x 3 M12 x 76	6.63 168	8.75 222	6.00 152	8.75 222	2.38 60	5.0 2.3
6 DN150	6.625 168.3	0.15 3.8	2	⅝ x 3 ⅝ M16 x 92	8.88 226	11.38 289	8.13 207	11.25 286	2.38 60	8.1 3.7
8 DN200	8.625 219.1	0.20 5.1	2	¾ x 5 M20 x 127	11.25 286	14.38 365	10.50 267	14.13 359	2.75 70	16.1 7.3
10 DN250	10.750 273.0	0.20 5.1	2	⅞ x 6 ½ M22 x 165	13.50 343	17.25 438	12.75 324	17.00 432	2.88 73	24.7 11.2
12 DN300	12.750 323.9	0.20 5.1	2	⅞ x 6 ½ M22 x 165	15.75 400	19.25 489	14.88 378	19.00 483	2.88 73	29.1 13.2

[3] The Allowable Pipe End Separation dimension shown is for system layout purposes only. Style 107V QuickVic™ rigid couplings are considered rigid connections and will not accommodate expansion/contraction or angular movement of the piping system. Contact Victaulic for torsional resistance information.

[4] Contact Victaulic for stainless steel bolt lengths.

5.0 PERFORMANCE

Style 107V QuickVic™ Rigid Coupling

ANSI Standard

Size		Schedule 10			Standard Weight (STD)		
Nominal inches DN	Actual Outside Diameter inches mm	Wall Thickness inches mm	Maximum Joint Working Pressure[5] psi kPa	Maximum Permissible End Load[5] lb N	Wall Thickness inches mm	Maximum Joint Working Pressure[5] psi kPa	Maximum Permissible End Load[5] lb N
2 DN50	2.375 60.3	0.109 2.8	750 5171	3323 14781	0.154 3.9	750 5170	3323 14781
2 ½	2.875 73.0	0.120 3.1	600 4135	3895 17325	0.203 5.2	750 5170	4869 21658
3 DN80	3.500 88.9	0.120 3.1	600 4135	5773 25680	0.216 5.5	750 5170	7216 32098
4 DN100	4.500 114.3	0.120 3.1	600 4135	9543 42449	0.237 6.0	750 5170	11928 53058
6 DN150	6.625 168.3	0.134 3.4	500 3450	17236 76670	0.280 7.1	700 4825	24130 107335
8 DN200	8.625 219.1	0.148 3.8	300 2070	17528 77970	0.322 8.2	600 4135	35056 155936
10 DN250	10.750 273.0	0.165 4.2	300 2065	27200 121040	0.365 9.3	500 3450	45400 202030
12 DN300	12.750 323.9	0.180 4.6	200 1375	25500 113475	0.375 9.5	400 2750	51000 226950

[5] Working Pressure and End Load are total, from all internal and external loads, based on ANSI B36.10 sized carbon steel pipe, grooved in accordance with Victaulic specifications. Contact Victaulic for performance on other pipe.

NOTES

- WARNING: FOR ONE–TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1 ½ times the figures shown.
- FM approved on Schedule 10 pipe: sizes 2 – 4"/DN50 – DN100 rated to 400 psi/28 bar; size 6"/DN150 rated to 300 psi/21 bar; and sizes 8 – 10"/DN200 – DN250 (0.188" wall thickness) rated to 300 psi/21 bar. FM approved on standard weight pipe: sizes 2 – 4"/DN50 – DN100 rated to 600 psi/41 bar; size 6"/DN150 rated to 500 psi/34 bar; size 8"/DN200 rated to 450 psi/31 bar; and sizes 10 – 12"/DN250 – DN300 rated to 400 psi/28 bar.
- UL listed on Schedule 10 pipe: sizes 2 – 4"/DN50 – DN100 rated to 400 psi/28 bar and sizes 6 – 10"/DN150 – DN250 rated to 300 psi/21 bar. UL listed on standard weight pipe: sizes 2 – 3"/DN50 – DN80 rated to 600 psi/41 bar; size 4"/DN100 rated to 450 psi/31 bar; and sizes 6 – 12"/DN150 – DN300 rated to 400 psi/28 bar.

6.0 NOTIFICATIONS

⚠ WARNING

- **Read and understand all instructions before attempting to install, remove, adjust, or maintain any Victaulic piping products.**
- **Depressurize and drain the piping system before attempting to install, remove, adjust, or maintain any Victaulic piping products.**
- **Always confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to working with an end cap.**
- **Wear safety glasses, hardhat, and foot protection.**

Failure to follow these instructions could result in death or serious personal injury and property damage.

⚠ WARNING

- **Victaulic RX roll sets must be used when grooving light-wall/thin-wall stainless steel pipe for use with Victaulic Couplings.**
- **Victaulic RX grooving rolls must be ordered separately. They are identified by a silver color and the designation RX on the front of the roll sets.**

Failure to use Victauilc RX roll sets when grooving light-wall/thin-wall stainless steel pipe may cause joint failure, resulting in serious personal injury and/or property damage.

⚠ WARNING

- **When assembling Style 107V Couplings onto end caps, take additional time to inspect and verify that the end cap is seated fully against the center leg of the gasket. Always read and follow the installation instructions provided with the product; these instructions can be downloaded at Victaulic.com.**
- **Use only Victaulic End Caps containing the "QV" or "EZ QV" marking on the inside face.**
- **Always read and follow the I-ENDCAP, Victaulic End Cap Installation Safety Instructions, which can be downloaded at Victaulic.com.**
- **Victaulic recommends the use of Victaulic fittings with Style 107V Couplings.**

Failure to follow these instructions could result in death or serious personal injury and property damage.

NOTICE

- **Victaulic does not recommend the use of any furnace butt-welded pipe with sizes NPS 2"/DN50 and smaller Victaulic gasketed joint products. This includes, but is not limited to, ASTM A53 Type F pipe.**

7.0 REFERENCE MATERIALS

05.01: Victaulic Seal Selection Guide
06.15: Victaulic Pressure Ratings and End Loads for Victaulic Couplings on Steel Pipe
06.23: Victaulic QuickVic™ Rigid Coupling Style 107N
06.28: Victaulic QuickVic™ Installation-Ready™ Rigid Coupling for Potable Water Applications Style 807N
VS-07.14 Rev A QuickVic™ Grooved End Fittings
10.01: Victaulic Fire Protection Certifications/Listings Reference Guide
17.01: Victaulic Pipe Preparation for Use on Stainless Steel Pipe With Victaulic Products
17.09: Victaulic Pressure Ratings and End Loads for Victaulic Ductile Iron Grooved Couplings on Stainless Steel Pipe
25.01: Victaulic Standard Groove Specifications
26.01: Victaulic Design Data
29.01: Victaulic Terms and Conditions of Sale
I-100: Victaulic Field Installation Handbook
I-107V: Victaulic Installation Instructions – Style 107V QuickVic™ Installation-Ready™ Rigid Coupling
I-ENDCAP: Victaulic End Cap Installation Safety Instructions
I-IMPACT: Victaulic Impact Tool Usage Guidelines

BlazeMaster® Fire Protection Systems
Sample Specifications – North America

PART 1 - GENERAL

1.0 PRODUCT DESCRIPTION

CPVC fire sprinkler pipe and fittings shall be extruded/molded from BlazeMaster® CPVC compounds manufactured by Lubrizol Advanced Materials. The pipe compound shall meet cell class 23547 and the fittings compound shall meet cell class 24447 as defined by ASTM D1784. Both pipe and fittings compounds shall be certified by NSF International for use with potable water and shall be pressure rated by Plastics Pipe Institute (PPI).

1.1 PIPE AND FITTINGS

A. Pipe shall meet or exceed the requirements of ASTM F442 material designation CPVC 4120-06 in standard dimension ratio (SDR) 13.5. Additionally, the pipe must be marked with the following pressure ratings: “320 PSI @ 73° F”, “175 PSI @ 150° F” and “100 PSI @ 180° F”.

B. Fittings shall meet or exceed the requirements of ASTM F437 (schedule 80 threaded), ASTM F438 (schedule 40 socket) or ASTM F439 (schedule 80 socket).

C. Both pipe and fittings shall be Listed by Underwriters Laboratories for use in automatic fire sprinkler systems and shall bear the logo of the Listing Agency. See UL Fire Protection Equipment Directory, categories VIWT and HFYH.

D. Both pipe and fittings shall be certified by NSF International for use with potable water.

E. Ancillary products (including, but not limited to fire stops, thread sealants, leak detectors, etc.) coming into contact with pipe and fittings must be chemically compatible with BlazeMaster® CPVC pipe and fittings (reference the Lubrizol FBC™ System Compatible Program).

1.2 SOLVENT WELDING

All socket type joints shall be assembled with solvent cements that meet or exceed the requirements of ASTM F493. Safe handling of solvent cements shall be in accordance with ASTM F402. Solvent cement shall be certified by NSF International for use with potable water, and approved by the manufacturers. The solvent cements shall be approved for use with BlazeMaster® CPVC pipe and fittings.

1.3 BASIC USE

BlazeMaster® CPVC pipe and fittings shall be listed by UL and also either ULC or C-UL for use in:

A. Light Hazard occupancies as defined in NFPA 13, “Standard for the Installation of Sprinkler Systems.”

B. Residential occupancies as defined in NFPA 13R, “Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height.”

C. Residential occupancies as defined in NFPA 13D, “Standard for the Installation of Sprinkler Systems in One- and Two- Family Dwellings and Manufactured Homes.”

D. Underground water pressure service as defined by NFPA 24.

E. Air plenums per the requirements of UL 1887, as defined by NFPA 90A, the International Mechanical Code and the Uniform Mechanical Code.

F. BlazeMaster® pipe and fittings shall be permitted to protect ordinary hazard rooms of otherwise light hazard occupancies where the room does not exceed 400 square feet (i.e. Laundry room) as defined in NFPA 13 and NFPA 13.

PART 2 - PRODUCTS

2.0 MATERIALS

CPVC fire sprinkler pipe and fittings shall be extruded/molded from BlazeMaster® CPVC compounds manufactured by Lubrizol Advanced Materials.

2.1 MANUFACTURERS

Georg Fischer Harvel, LLC.	**NIBCO INC.**	**Tyco Fire Protection Products**	**The Viking Corporation**	**IPEX INC.**
(PIPE)	***(FITTINGS)***	***(PIPE & FITTINGS)***	***(PIPE)***	***(PIPE & FITTINGS)***
300 Kuebler Rd Easton, PA 18040	Middlebury Street Elkhart, IN 46516	1400 Pennbrook Pkwy, Lansdale, PA 19446	210 N. Industrial Pkwy Dr. Hastings, MI 49058	1425 North Service Road E., unit 3, Oakville, L6H 1A7
Phone: (610) 252-7355	Phone: (574) 295-3000	Phone: (215) 3620700	Phone: (269) 9459501	Phone: (800) 4639572

PART 3 – EXECUTION

3.0 SYSTEM DESIGN

A. System design shall be in accordance with standard industry practices and standards for fire sprinkler systems and the manufacturer's design/installation instructions. The design shall take into consideration the pressure and flow requirements, friction loss, operating temperatures, support spacing, joining methods, and thermal expansion and contraction.

B. The fire sprinkler piping system shall be hydraulically calculated using a Hazen-Williams C Factor of 150, and designed in accordance with the Standard for Installation of Sprinkler Systems (NFPA 13), the Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies (NFPA 13R) or the Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes (NFPA 13D).

C. The maximum design temperature/pressure rating shall not exceed 175 psi at 150°F.

3.1 INSTALLATION PROCEDURES

A. Installation practices such as pipe support spacing, bracing, allowance for thermal expansion/contraction, solvent welding and handling and storage shall be in accordance with the manufacturer's instructions and the UL Listing which includes installation limitations.

B. Refer to 3.2 below for submittal of installer training documentation.

3.2 QUALITY ASSURANCE

Installer Qualifications:

Fire Sprinkler Contractor must submit to the Contracting Officer documentation that verifies personnel assigned to this project prior to beginning construction who have successfully completed formal CPVC fire sprinkler systems training conducted by an authorized BlazeMaster® fire sprinkler systems trainer. The Contractor Training documentation shall be specific to BlazeMaster® pipe and fittings. Personnel's training documentation must be current and have been updated within the past two (2) years. (Note: this training does not imply compliance with any local or state contractor certification or licensing laws.)

3.3 TECHNICAL DATA

A. APPLICABLE STANDARDS

1. NSF/ANSI Standard 14 Plastic Piping Components and Related Materials.
2. NSF/ANSI Standard 61 Drinking Water System Components – Health Effects.
3. ASTM D1784 Specification for Rigid Poly(Vinyl Chloride)(PVC) Compounds and Chlorinated Poly(Vinyl Chloride)(CPVC) Compounds.
4. ASTM F402 Practice for Safe Handling of Solvent Cements, Primers and Cleaners Used for Joining Thermoplastics Pipe and Fittings.
5. ASTM F437 Specification for Threaded Chlorinated Poly(Vinyl Chloride) CPVC Plastic Pipe Fittings, Schedule 80.

6. ASTM F438 Specification Socket-Type Chlorinated Poly(Vinyl Chloride) CPVC Plastic Pipe Fittings, Schedule 40.
7. ASTM F439 Specification Socket-Type Chlorinated Poly(Vinyl Chloride) CPVC Plastic Pipe Fittings, Schedule 80.
8. ASTM F442 Specification Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe (SDR-PR).
9. ASTM F493 Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) CPVC Plastic Pipe and Fittings.
10. NFPA 13 Standard for the Installation of Sprinkler Systems.
11. NFPA 24 Installation of Private Fire Service Mains and Their Appurtenances.
12. NFPA 25 Standard for the Inspection, Testing and Maintenance of Water Based Extinguishing Systems.
13. NFPA 13R Standard for the Installation of Sprinklers in Residential Occupancies up to Four Stories in Height.
14. NFPA 13D Standard for the Installation of Sprinkler Systems in One and Two Family Dwellings.
15. NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems.
16. UL 1887 Fire Test of Plastic Sprinkler Pipe for Flame and Smoke Characterization.
17. UL 1821 Outline of Proposed Investigation for Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service.
18. Piping compound has a 180ºF Hydrostatic Design Basis (HDB) of 1250 psi as listed by the Plastic Pipe Institute.
19. Fitting compound has a 180ºF Hydrostatic Design Basis (HDB) of 1000 psi as listed by the Plastic Pipe Institute.

B. APPLICABLE CODES

1. ICC, International Building, Mechanical and Plumbing Codes.
2. IAPMO, Uniform Mechanical and Plumbing Codes.
3. NBC, National Building Code of Canada.

3.4 TESTING

After the system is installed and solvent-welded joints have cured per the manufacturer's installation instructions, the system shall be hydrostatically tested per the manufacturer's installation instructions and the requirements of the applicable NFPA Standard (NFPA 13, 13R or 13D) and per the local Codes/Rules/Regulations for the jurisdiction installed in.

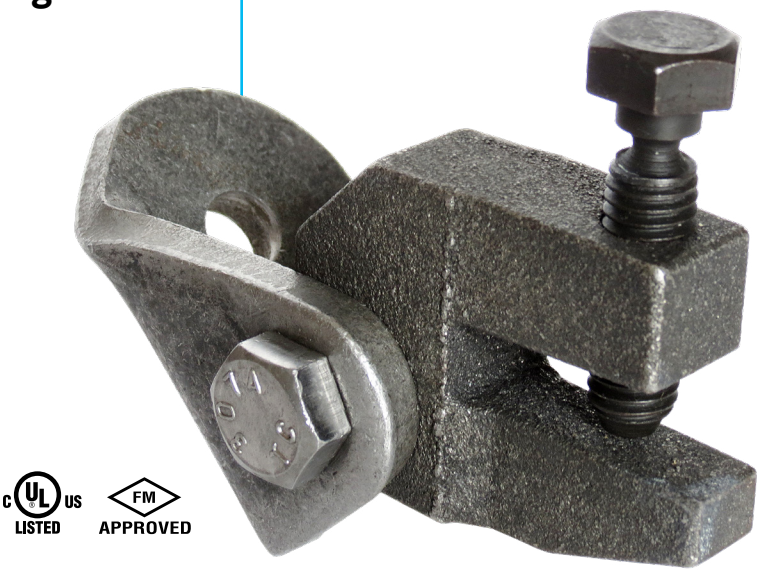
Maintenance shall be in accordance with the Standard for Inspection, Testing and Maintenance of Water Based Extinguishing Systems as defined by NFPA 25.

3.5 WARRANTY

Consult the manufacturer for specific warranty information.

ASC Engineered Solutions

Sway Brace Swivel Attachment
Fig. AF076



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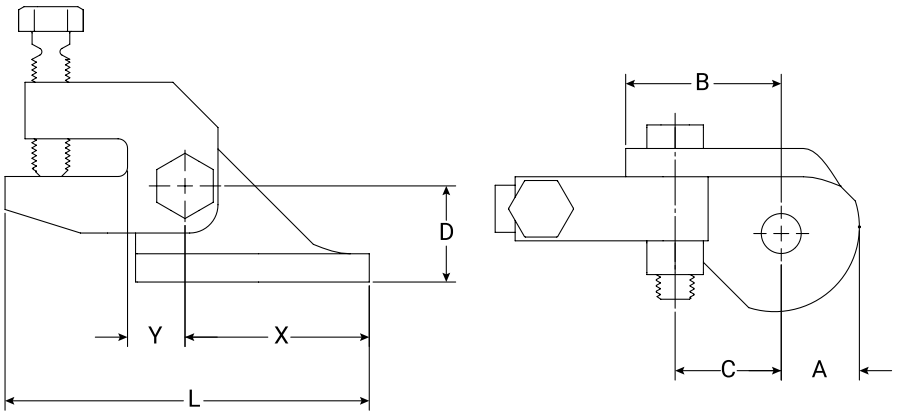


FIG. AF076 Dimensions and Weight

A	B	C	D	L	X	Y	Weight
In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	lbs/kg
1.000 25.40	1.830 46.48	1.250 31.75	1.380 35.05	4.20 106.7	2.25 57.20	0.75 19.10	1.68 0.76

Material Specifications

Size Range:
Brace Member: See Table
Anchors: ½" (M12)

Material
Ductile Iron Casting with Carbon Steel Baseplate and Hardware

Finish
Plain

Service
A seismic swivel attachment designed to connect a brace member to the building structure or to a seismic structural attachment. The AF076 rigidly braces piping systems subjected to horizontal and vertical seismic loads.

Approvals
cULus Listed (ANSI/UL 203a) and FM Approved (FM 1950-13). Complies with NFPA 13, ASCE 7, IBC, & MSS SP-127 bracing requirements.

Features
The set screw provides a visual indication that proper installation has been achieved.

Ordering
Specify figure number and description.

AFCON
An ASC Engineered Solution

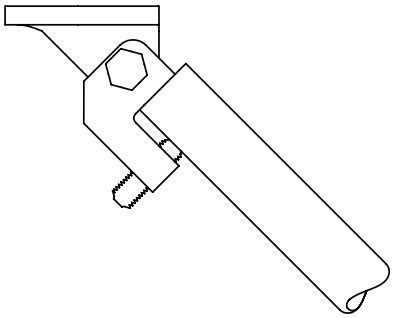
PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

Sway Brace Swivel Attachment
Fig. AF076

FIG. AF076 cULus Listing per ANSI/UL 203A (ASD)

Brace Member	Fastener Size	Horizontal Load Rating at Brace Angle			
		30°-44°	45°-59°	60°-90°	Listed
1" – 2" Sch 40 Pipe (DN25 – DN50)	½" (M12)	875 lbf (3.89 kN)	1237 lbf (5.51 kN)	1515 lbf (6.74 kN)	1750 lbf (7.78 kN)

1) Load ratings may apply to NPFA 13 fastener orientations A, B, C, D, E, F, G, H, or I.
2) Brace Angles are determined from Vertical.
3) Listed load ratings reduced for angle ranges in accordance with NFPA 13-2019 Table 18.5.2.3.
4) See table below for listed brace members.
5) Minimum safety factor of 2.2 in accordance with NFPA 13-2019 Section A.18.5.2.3.



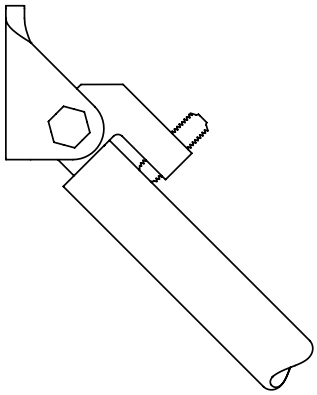
NFPA 13 Orientations A, B, or C

FIG. AF076 cULus Listing per UL 203A (ASD) for NFPA 13-2016 Editions or Earlier

UL's current Listings are predicated on installation in accordance with the latest edition of NFPA 13. The 2016 and earlier editions of NFPA 13 referenced a minimum safety factor of 1.5 for the load rating as compared to 2.2 for the current edition. The load ratings noted in this table are consistent with the historical cULus Listings that were evaluated to the requirements of UL 203A, Outline of Investigation for Sway Brace Devices for Fire Sprinkler System Piping, based upon a minimum safety factor of 1.5 in accordance with the earlier editions of NFPA 13. The load ratings based upon the 2016 or earlier editions of NFPA 13 should only be used where approved by the Authority Having Jurisdiction (AHJ).

Brace Member	Fastener Size	Horizontal Load Rating at Brace Angle			
		30°-44°	45°-59°	60°-90°	Listed
1" – 2" Sch 40 Pipe (DN25 – DN50)	½" (M12)	1382 lbf (6.15 kN)	1955 lbf (8.70 kN)	2393 lbf (10.65 kN)	2765 lbf (12.30 kN)

1) Load ratings may apply to NPFA 13 fastener orientations A, B, C, D, E, F, G, H, or I.
2) Brace Angles are determined from Vertical.
3) Listed load ratings reduced for angle ranges in accordance with NFPA 13-2016 Table 9.3.5.2.3.
4) See table below for listed brace members.
5) Minimum safety factor of 1.5 in accordance with NFPA 13-2016 Section A.9.3.5.2.3.

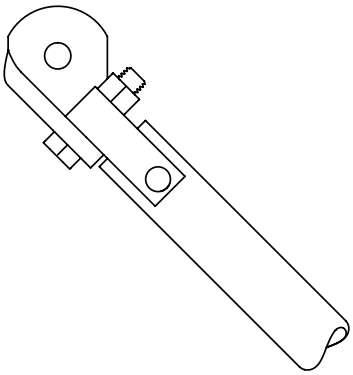


NFPA 13 Orientations D, E, or F

FIG. AF076 FM Approved (Listing) per FM 1950-13 (ASD)

Brace Member	Fastener Size	Horizontal Load Rating at Brace Angle			
		30°-44°	45°-59°	60°-74°	75°-90°
1" – 2" Sch 40 Pipe (DN25 – DN50)	½" (M12)	1310 lbf (5.83 kN)	1810 lbf (8.05 kN)	2630 lbf (11.70 kN)	2930 lbf (13.03 kN)

1) Load ratings may apply to NPFA 13 fastener orientations A, B, C, D, E, F, G, H, or I.
2) Brace Angles are determined from Vertical.
3) Listed load ratings reduced for angle ranges in accordance with NFPA 13-2019 Table 18.5.2.3.
4) See table below for listed brace members.
5) Minimum safety factor of 1.5 in accordance with NFPA 13-2016 Section A.9.3.5.2.3. To convert the load ratings above to a safety factor of 2.2 per NFPA 13-2019 Section A.18.5.2.3, multiply load ratings by a factor of 0.68.
6) To convert to LRFD Load Ratings, ASD Load Ratings may be multiplied by a factor of 1.5.



NFPA 13 Orientations G, H, or I

asc-es.com

Building connections that last™

Sway Brace Swivel Attachment
Fig. AF076

FIG. AF076 Listed, Approved, & Tested Brace Members

Brace Member	Brace Size	Standard (or Equivalent)	UL	FM
Sch. 40 NPS Pipe	1", 1¼", 1½", 2"	ASTM A53, A106, A135, or A795	✓	✓
Sch. 40 Metric Pipe	DN25 DN32	KS D 3562	✓	✓
		EN10255H		✓
Metric Pipe	DN40 DN50	GB/T 3091		✓
		JIS G3454		✓

FIG. AF076 Horizontal Prying Factors (Pr) Per NFPA: Angles (Deg)

Fastener Orientation	A	B	C	D	E	F	G	H	I
Brace Angle	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
AF076	2.52	1.07	1.38	1.62	1.42	2.25	2.75	1.94	1.59
AF076 w/ Metal Deck	2.52	1.16	1.38	–	–	–	–	–	–

Prying Factors calculated in accordance with NFPA 13-2019 Section A.18.5.12.2 with additional consideration for baseplate eccentricity.

ASC Engineered Solutions

Sway Brace Swivel Attachment
Fig. AF076

Method 1 – Connection to Brace Member First

1. Slide the brace member over the lower jaw until it contacts the back wall.
2. Hand tighten the set screw until it contacts the brace member. Continue to torque the set screw until the head breaks off.
3. Rotate the brace assembly up to the fastener or the related seismic structural attachment and connect through the mounting hole.
4. Tighten per the fastener or structural attachment specifications.
5. Ensure the brace angle is within the specified range.

Notes: The cross bolt should be hand tight. For visual inspection, at least one thread should be exposed.

Method 2 – Connection to Structure First

1. Connect the AF076 to the fastener or the related seismic structural attachment.
2. Tighten per the fastener or structural attachment specifications.
3. Slide the brace member over the lower jaw until it contacts the back wall.
4. Hand tighten the set screw until it contacts the brace member. Continue to torque the set screw until the head breaks off.
5. Rotate the brace member until the brace angle is within the specified range.

Notes: The cross bolt should be hand tight. For visual inspection, at least one thread should be exposed.

Structural Attachments, Anchors, & Fasteners Listed, Approved, & Tested with the AF076

Structural Attachment	Structure
AF085	Steel Joist (Top Chord)
AF086	Horizontal Steel Flange (I-Beam Bottom Flange)
AF087	Horizontal Steel Flange (I-Beam Top or Bottom Flange) C-Channel (Top or Bottom Flange) Vertical Flange of a Joist (Top Chord)
AF778	Horizontal Steel Flange (I-Beam Top or Bottom Flange) C-Channel (Top or Bottom Flange) Vertical Flange of a Joist (Top Chord)
AF779	All Structures with the Applicable Approved Anchor or Fastener
DeWalt Power-Stud®+ SD1	Cracked Concrete Cracked Concrete Filled Metal Deck
DeWalt Power-Stud®+ SD2	Cracked Concrete Cracked Concrete Filled Metal Deck
DeWalt Wood-Knocker®II+	Cracked Concrete
DeWalt Bang-It®+	Cracked Concrete Filled Metal Deck
DeWalt DDI+™	Cracked Concrete Filled Metal Deck
Anchors & Fasteners Per NFPA 13	Cracked Concrete Cracked Concrete Filled Metal Deck Steel Wood Saw Lumber or Glue-Laminated Timbers

Notes:

ASC Engineered Solutions™ brand bracing components are designed to be compatible ONLY with other ASC Engineered Solutions brand bracing components, resulting in a Listed seismic bracing assembly. Updated UL listing information may be viewed at www.ul.com and updated FM approval information may be viewed at www.approvalguide.com.

Disclaimer:

ASC Engineered Solutions does not provide any warranties and specifically disclaims any liability whatsoever with respect to ASC bracing products and components that are used in combination with products, parts or systems not manufactured or sold by ASC. In no event shall ASC be liable for any incidental, direct, consequential, special or indirect damages or lost profits where non-ASC bracing components have been, or are used.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

asc-es.com

Building connections that last™

ASC Engineered Solutions

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INTERNATIONAL: +31-53-572-5570

CANADA: 800-661-8998
LATIN AMERICA: 708-534-1414
EMAIL: marketing@asc-es.com

Fig. 86 - C-Clamp with Set Screw and Lock Nut

Recommended for attachment to “W” and “M” beams where thickness of flange Z does not exceed 0.75". When clamp is used with Fig. 89 retaining clip, flange thickness may not exceed 0.62".

We have Revit content for Hangers. Please select a specific size Hanger to get the corresponding detailed Revit assembly file. The RFA can be downloaded by scrolling to the Downloads panel and clicking the second link at this item level.

The Revit assembly file cannot be downloaded using the MultiCAD functionality.

1

Item #	CAD	Finish	Rod Size	Max Load	Weight
3/8-86-Plain	CAD	Plain	0.375 in	400 lb	0.28 lb
3/8-86-Zinc_Plated	CAD	Zinc Plated	0.375 in	400 lb	0.28 lb
1/2-86-Plain	CAD	Plain	0.5 in	400 lb	0.31 lb

Item #	CAD	Finish	Rod Size	Max Load	Weight
1/2-86-Zinc_Plated	CAD	Zinc Plated	0.5 in	400 lb	0.31 lb
5/8-86-Plain	CAD	Plain	0.625 in	440 lb	0.42 lb
5/8-86-Zinc_Plated	CAD	Zinc Plated	0.625 in	440 lb	0.42 lb
3/4-86-Plain	CAD	Plain	0.75 in	500 lb	0.55 lb
3/4-86-Zinc_Plated	CAD	Zinc Plated	0.75 in	500 lb	0.55 lb

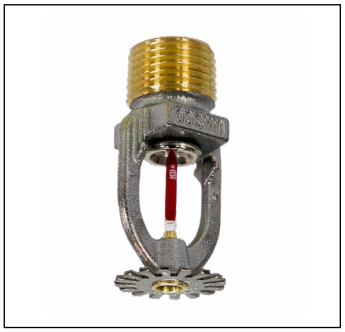
Reliable®

F1FR42 Series
Quick-Response Sprinklers

K-factor 4.2 (60)

Features

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



Model F1FR42 Pendent

Model F1FR42 Upright

Product Description

Reliable Model F1FR series sprinklers are quick-response standard spray automatic fire sprinklers utilizing a sensitive 3.0 mm glass bulb thermal element.

Pendent and horizontal sidewall sprinklers may be installed exposed or surface mounted using escutcheons such as the Reliable Models B, C, or HB (reference Technical Bulletin 204). When installed recessed, the Model F1FR42 series sprinklers are specifically listed with and may only be installed with listed Reliable escutcheons. Refer to the technical information on the following pages for specific listings for recessed installations and refer to Figure 3 for dimensional information.

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

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

Note: This bulletin may contain information on New and Legacy sprinklers that reflects a dimensional change only. Sprinkler Identification Number (SIN), application, performance, and listings/approval are not otherwise affected. Sprinklers with new frames can be identified by a rotoclip indent on one side of the wrench boss and in some cases an installed rotoclip. Sprinklers with new frames will include the suffix “N” in the order. For reference only, legacy version of this sprinkler can be found on Technical Bulletin 014.

F1FR42 Series Sprinklers Summary — **Table A**

Sprinkler Model	K-Factor gpm/psi$^{1/2}$ (lpm/bar$^{1/2}$)	Orientation	Listings & Approvals	Max. Working Pressure psi (bar)	Sprinkler Identification Number (SIN)
F1FR42	4.2 (60)	Upright	cULus	175 (12)	RA1423
		Pendent		175 (12)	RA1413

Model F1FR42 Upright Sprinkler — SIN RA1423

Technical Specifications
- **Style:** Upright
- **Threads:** 1/2" NPT or ISO 7-R1/2
- **Nominal K-Factor:** 4.2 (60)
- **Max. Working Pressure:** 175 psi (12 bar)

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

Sprinkler Finishes
(See Table B)

Sensitivity
Quick Response

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

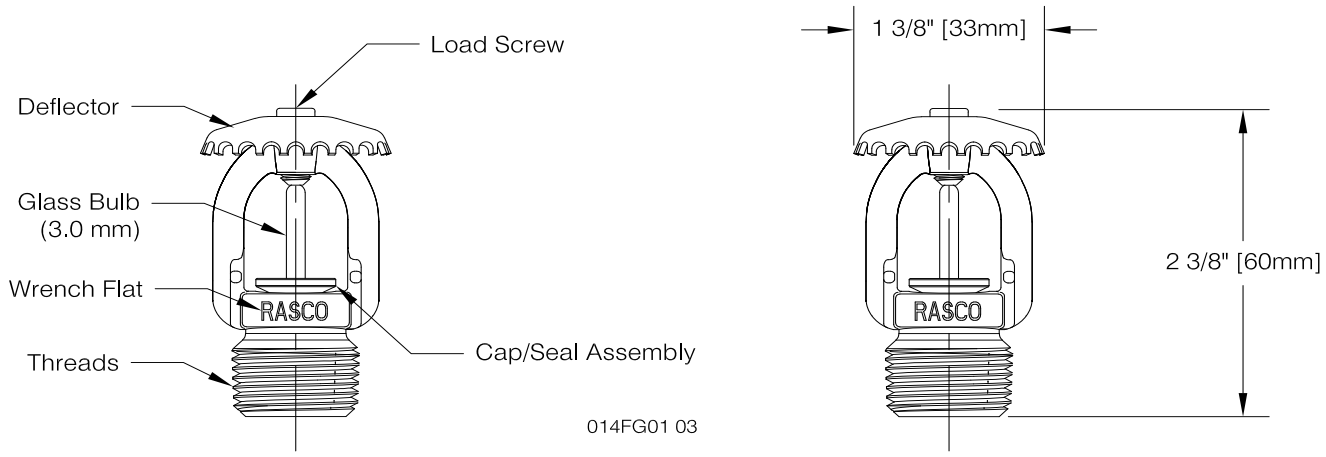
Guards & Shields (New Frames)
F-1 Guard Kit
F-3 Guard/Shield Kit

Guards & Shields (Legacy Frames)
D-1 Guard

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

Listings and Approvals
cULus

Model F1FR42 Upright Sprinkler Components and Dimensions — **Figure 1**



Model F1FR42 Pendent Sprinkler — SIN RA1413

Technical Specifications
Style:
Pendent
Recessed Pendent
Threads: 1/2" NPT or ISO 7-R1/2
Nominal K-Factor: 4.2 (60)
Max. Working Pressure: 175 psi (12 bar)

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

Sprinkler Finishes
(See Table B)

Sensitivity
Quick Response

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

Recessed Escutcheons
Model F1
Model F2
Model FP

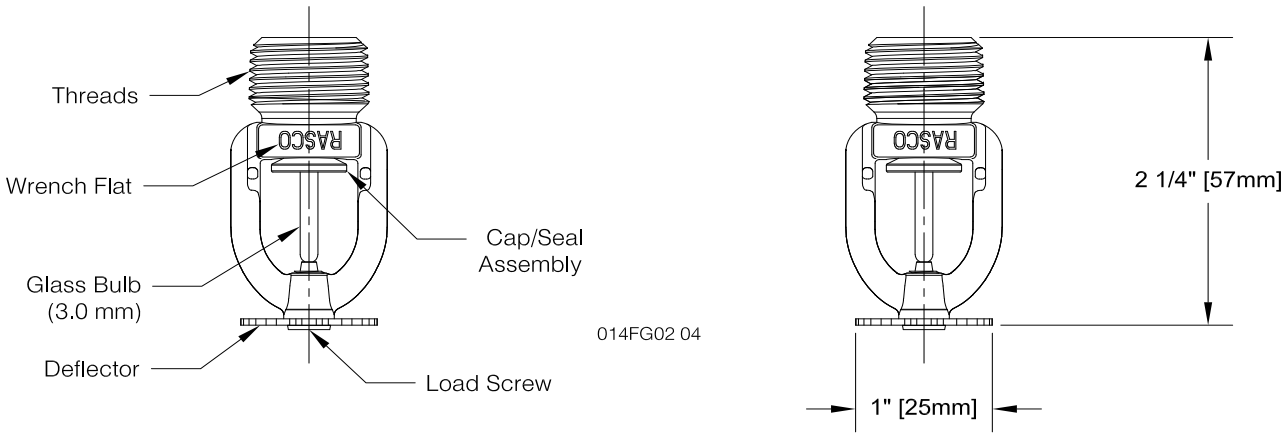
Guards & Shields (New Frames)(2)
F-7 Guard Kit
F-8 Guard/Shield Kit
Guards & Shields (Legacy Frames)(2)
D-1 Guard

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

Listings and Approvals
cULus

Notes:
1. 286°F (141°C) and higher temperature rated sprinklers not listed for recessed use.
2. Not suitable for recessed pendent installations.

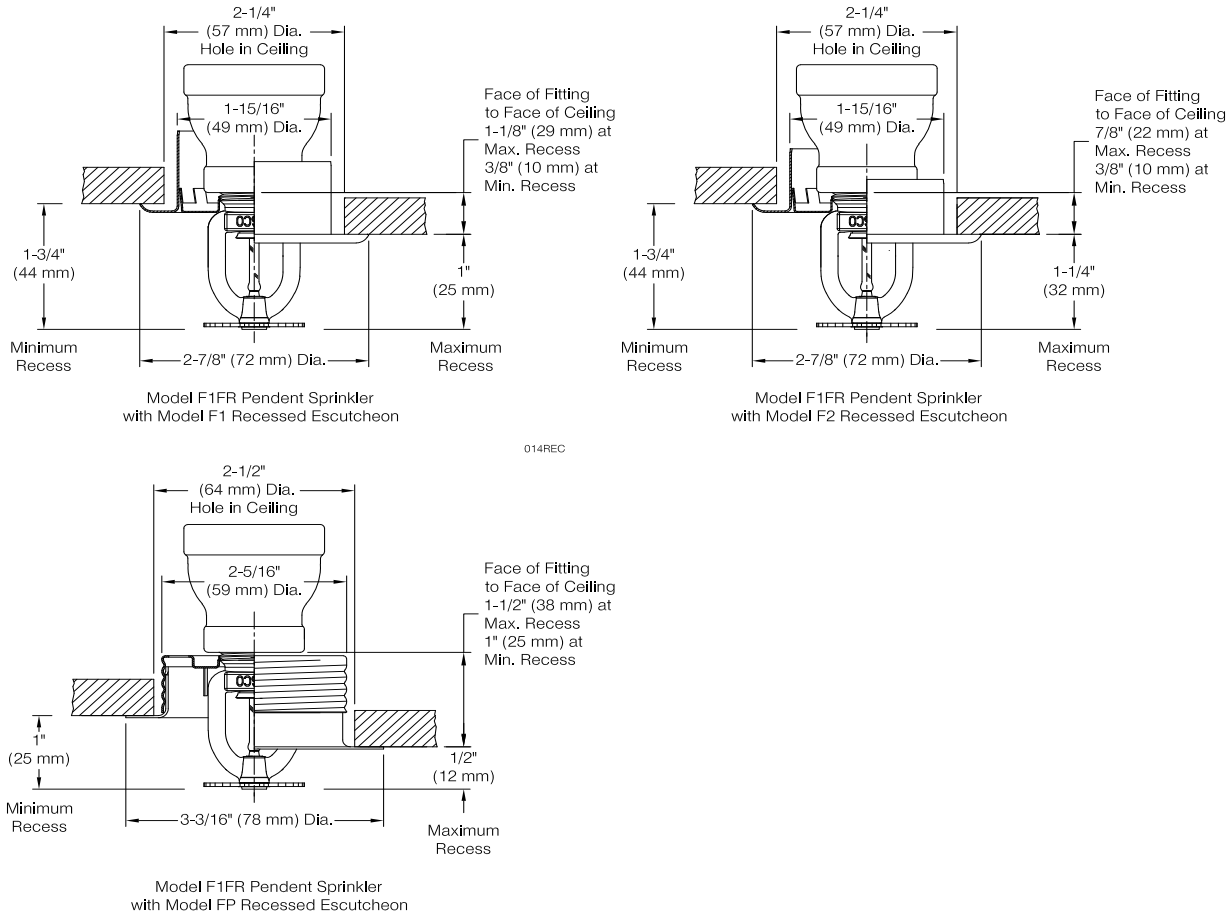
Model F1FR42 Pendent Sprinkler Components and Dimensions — **Figure 2**



Note: Please refer to Figure 3 for recessed installation.

Recessed Installation: Pendent Sprinklers

Figure 3



F1 Escutcheon
(F2 similar)

FP Escutcheon

Wrenches

Model W2 (upright, pendent)

Model W4 (recessed pendent)

Model J (New frame with guard installed)

Model JD (Legacy frame with guard installed)

Finishes[1][2]

Table B

Standard Finishes		Special Application Finishes	
Sprinkler	**F1, F2 and FP[3] Escutcheons**	**Sprinkler**	**F1, F2 and FP[3] Escutcheons**
Bronze	Brass	Electroless Nickel PTFE[4]	Bright Brass
Chrome Plated	Chrome Plated	Bright Brass[5]	Black Paint
White Polyester[4]	White Polyester	Black Paint	Off White
		Off White	Chrome Dull
		Chrome Dull	

Notes:
1. Other finishes and colors are available on special order. Consult your Reliable sales representative for details.
2. Paint or any other coating applied over the factory finish will void all approvals and warranties.
3. The Model FP assembly consists of a sprinkler mounted in a galvanized steel cup with a finished trim ring or cover plate.
4. cULus Listed as corrosion resistant.
5. For 200°F (93°C) maximum temperature rated sprinklers only.

Installation

Model F1FR Series sprinklers must be installed in accordance with NFPA13 and the requirements of all applicable authorities having jurisdiction. Model F1FR Series sprinklers must be installed with the Reliable sprinkler installation wrench identified in this Bulletin. Any other wrench may damage the sprinkler. A leak tight sprinkler joint can be obtained with a torque of 6 to 18 lb-ft (11 to 24 N-m). Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

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

Maintenance

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

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

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

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

Guarantee

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

Ordering Information

Specify the following when ordering:

Model
- F1FR42

Deflector/Orientation
- Upright
- Pendent
- Pendent - FP

Temperature Rating
- See sprinkler technical specifications

Sprinkler Finish
- See Table B

Recessed Escutcheon*
- F1
- F2
- FP

Escutcheon Finish
- See Table B

Sprinkler Wrench
- Model W2 (upright and pendent)
- Model W4 (recessed)
- Model J (New frame with guard installed)
- Model JD (Legacy frame with guard installed)

***Notes:** 286°F (141°C) sprinklers are not listed to be used recessed.

P/N 9999970622

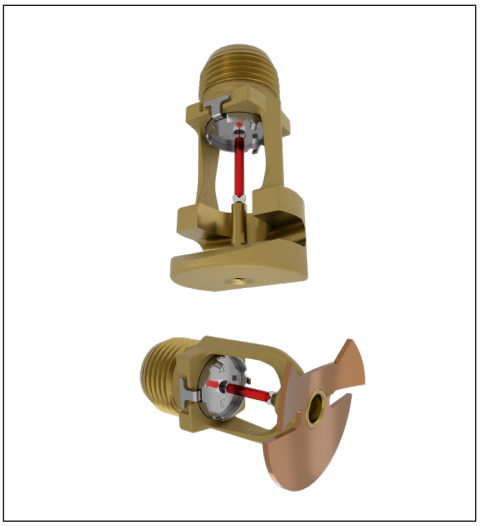
TECHNICAL DATA

SPECIFIC APPLICATION WINDOW SPRINKLERS (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

Viking Specific Application window sprinklers are quick response glass bulb, automatic sprinklers. Both Pendent Vertical Sidewall (VSW) and Horizontal Sidewall (HSW) versions are available to meet design needs.
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.



2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

Evaluation Recognition: ICC-ES Evaluation Report No. ESR-4288

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

3. TECHNICAL DATA

Minimum Operating Pressure: 7 psi (0.5 bar)
Rated to: 175 PSI (12 bar)
Factory tested hydrostatically to 500 psi (34.5 bar).
Thread size: 1/2" NPT (15 mm BSPT)
Nominal K-factor: 5.6 U.S. (80.6 metric*)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)

* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

SIN	THREAD	DESCRIPTION
VK960	NPT	Pendent VSW
VK960	BSPT	Pendent VSW
VK962	NPT	HSW
VK962	BSPT	HSW

Material Standards:
Sprinkler Body: Brass CW602N or QM Brass
Deflector: Phosphor Bronze UNS-C51000
Pip Cap Shell - Stainless Steel UNS-S44400
Pip Cap Disc - Stainless Steel UNS-S30100
Belleville Spring - Nickel Alloy
Pip Cap Seal - Polytetrafluoroethylene (PTFE)
Compression Screw: Brass CW612N, CW508L, UNS-C36000 or UNS-C26000
Shipping Cap: Polyethylene
Bulb: Glass, nominal 3 mm diameter

Ordering Information: Refer to Table 1

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

ICC-ES Evaluation Report No. ESR-4288
www.icc-es.org

4. INSTALLATION

Refer to appropriate NFPA Installation Standards. Also refer to Figures 3 through 6.

NOTICE **Risk of permanent damage.**

Over-tightening the sprinkler can cause permanent damage.
> Tighten the sprinkler to a MAXIMUM torque of 14 ft-lbs. (19 N-m).

5. OPERATION

During fire conditions, when the temperature around the sprinkler reaches its operating temperature, the heat-sensitive liquid in the glass bulb expands, causing the bulb to shatter, releasing the pip cap assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

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

7. AVAILABILITY

Viking automatic window 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.

Replaces F_042519 Rev 21.2
(Revised sprinkler part numbers)

TECHNICAL DATA

SPECIFIC APPLICATION WINDOW SPRINKLERS (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: SPRINKLER ORDERING INFORMATION

Instructions: Using the sprinkler base part number,
(1) add the suffix for the desired Finish
(2) add the suffix for the desired Temperature Rating.

SIN	Sprinkler Base Part Number	Style	Size		1: Finishes		2: Temperature Ratings				
			NPT Inch	BSPT mm	Description	Suffix[1]	Sprinkler Temperature Classification	Nominal Rating	Max. Ambient Ceiling Temperature[2]	Bulb Color	Suffix
VK960	23832	Pendent VSW	1/2	--	Brass	A	Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red	B
VK960	23829	Pendent VSW	--	15	Chrome	F	Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green	E
VK962	23834	HSW	1/2	--	White Polyester	M-/W					
VK962	23831	HSW	--	15	Black Polyester	M-/B					
					ENT[3,4]	JN					

Corrosion Resistant Sprinkler Finish: ENT

Example: 23832JNE = VK960, 200 °F (93 °C) Temperature Rated Sprinkler with an ENT[3,4] finish.

Accessories

Sprinkler Wrenches and tools:
Standard Wrench Part Number: 23559MB
Sprinkler Cabinet:
Holds up to 6 sprinklers: Part number 01724A

Footnotes

1. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
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. cULus Listed as corrosion resistant.
4. The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway.

Figure 1: Sprinkler Wrench

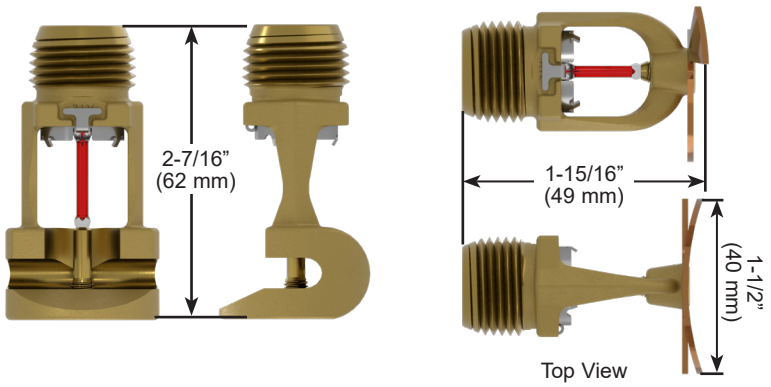


Figure 1: Sprinkler Dimensions (Pendent VSW and HSW)

VIKING	TECHNICAL DATA	SPECIFIC APPLICATION WINDOW SPRINKLERS (K5.6)

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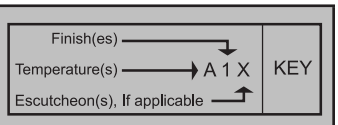
APPROVAL CHART
Viking Specific Application Pendent Vertical Sidewall Window Sprinklers
VK960 K5.6 (80.6 metric)
Maximum 175 PSI (12 Bar) WWP



Sprinkler Base Part Number[1]	Thread Size		Listings and Approvals[2]
	NPT Inch	BSPT mm	cULus and ICC-ES[5]
23832	1/2	--	A1
23829	--	15	A1

Approved Temperature Rating Codes:

A = 155 °F (68 °C) and 200 °F (93 °C)

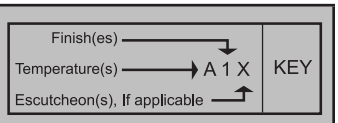
Approved Finish Codes:

1 = Brass, Chrome, White Polyester [3,4], Black Polyester [3,4], and ENT [4]

Footnotes

1 Base Part number is shown. For complete part number, refer to Viking's current price schedule.
2 This table shows the listings and approvals available at the time of publication. Check with the manufacturer for any additional approvals.
3 Other colors are available upon request with the same Listings and Approvals as the standard colors.
4 cULus Listed as corrosion resistant.
5 See ICC-ES Evaluation Report No. ESR-4288 at www.icc-es.org.

APPROVAL CHART
Viking Specific Application Horizontal Sidewall Window Sprinklers
VK962 K5.6 (80.6 metric)
Maximum 175 PSI (12 Bar) WWP



Sprinkler Base Part Number[1]	Thread Size		Listings and Approvals[2]
	NPT Inch	BSPT mm	cULus and ICC-ES[5]
23834	1/2	--	A1
23831	--	15	A1

Approved Temperature Rating Codes:

A = 155 °F (68 °C) and 200 °F (93 °C)

Approved Finish Codes:

1 = Brass, Chrome, White Polyester [3,4], Black Polyester [3,4], and ENT [4]

Footnotes

1 Base Part number is shown. For complete part number, refer to Viking's current price schedule.
2 This table shows the listings and approvals available at the time of publication. Check with the manufacturer for any additional approvals.
3 Other colors are available upon request with the same Listings and Approvals as the standard colors.
4 cULus Listed as corrosion resistant.
5 See ICC-ES Evaluation Report No. ESR-4288 at www.icc-es.org.

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DESIGN CRITERIA - Pendent Vertical Sidewall Window Sprinkler VK960

(Also refer to the Approval Chart.)

cULus Listing Requirements:

Viking Specific Application Pendent Vertical Sidewall Pendent Sprinkler VK960 is cULus Listed as a Specific Application Window Sprinkler for interior use and as an open sprinkler for Outside use; refer to the installation standards such as NFPA 13 for minimum water supply requirements, pressures, and installation guidelines. In addition, the following requirements must be met:

System Types:
- For Interior sprinklers: Wet Systems
- For Outdoor sprinklers: Deluge systems

Areas of Use:
Consult an Authority Having Jurisdiction (AHJ) for local standards, codes, or other requirements. These sprinklers are intended for use in either a sprinklered or unsprinklered building to protect non-operable window areas that are part of a fire separation, only if the following apply:

- Refer to Figure 3A. For interior separations, the sprinklers must be installed on both sides of the window within the fire separation.
- Refer to Figure 3B. For areas where separation from an adjacent space is defined as protecting an adjacent structure from a fire in the building being protected, the sprinklers must be installed on the interior side of the building, OR
- Refer to Figure 3C. For areas where exterior spatial separation is defined as exposure protection, open window sprinklers must be installed on the exterior portion of the building.

Glass Types:
The following specifications must apply in order for the Viking Specific Application Window Sprinkler to be used.

- Type: Non-operable and/or stronger assemblies
- Treatments: heat-strengthened and tempered
- Glazing: single-glazed/single pane, double-glazed/double pane or insulated.
- Thickness: Minimum 1/4” (6 mm)

Window Frame/Mullion Types:
Non combustible with EPDM rubber gasket; Vertical joints of glass panes must be connected by butt-joints using a silicone sealant between the individual panes or by noncombustible mullions. Refer to Figures 4A and 4B.

Maximum Length of Window: Unlimited

Maximum Height of Window: 13’ (4,0 m) Refer to Figure 5.

Maximum distance between sprinklers: 12’ (3,7 m) Refer to Figures 4A and 4B

Minimum distance between sprinklers: 6’ (1,8 m). Refer to Figures 4A and 4B (unless separated by a mullion meeting depth of a baffle; mullion must extend to the back of the sprinkler deflector.)

Minimum flow per sprinkler: 15 gpm (57 Lpm)

Maximum pressure: 175 PSI (12 bar)

Minimum distance from standard sprinklers: 6’ (1,8 m) unless separated by a baffle

Maximum distance from vertical mullion: 7’ (2,1 m) Refer to figure 4A

Minimum distance from vertical mullions: 4” (100 mm)

Deflector Location:
Sprinkler Deflectors must be located as described below in order to ensure that the entire surface of the glass window is covered. Sprinkler Deflectors are positioned with respect to the window frame, not the ceiling.
- Pendent Vertical Sidewall: Locate 4” to 12” (100 mm to 300 mm) from the face of the glass and 2” to 4” (50 mm to 100 mm) down from the top of exposed glass. Refer to Figure 5A.

Minimum clearance to face of glass to combustible materials: 2” (50 mm)

Escutcheons: Standard surface mount or raised escutcheons may be used.

Minimum flow per sprinkler: 15 gpm (56,8 Lpm)

Continues on next page.

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DESIGN CRITERIA - Pendent Vertical Sidewall Window Sprinkler VK960

(Also refer to the Approval Chart.)

Continued from previous page.

Interior protection sprinklered building: Identify which compartmented area has the most hydraulically demanding window sprinklers. Calculate up to the most demanding 46.5 linear feet (14.2 linear meters) of window sprinklers on one side of the glazing. The 46.5 linear feet (14,2 linear meters) is based upon 1.2 x the square root of the system area of operation, when the system area of operation is 1500 ft^2 (140 m^2). in accordance with NFPA 13 Light/Ordinary Hazard density curves.

Where the area of Glazing is less than 46.5 linear feet (14.2 linear meters), all window sprinklers on one side shall be calculated. If an area reduction for quick response sprinklers is utilized, the linear length of the calculated window sprinklers may be reduced, but in no case shall be less than 36 linear feet (1.2 x √900).

If a single fire can be expected to operate window sprinklers and sprinklers within the design area of a hydraulically calculated system, the water demand of the window sprinklers shall be added to the water demand of the hydraulic calculations and shall be balanced to the calculated area demand.

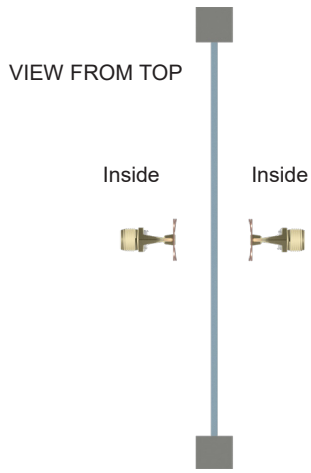
If the window sprinklers are located in an area other than the hydraulic design area, the demand of the window sprinklers is not required to be added to the demand of the remote hydraulic design area. However, it is necessary to prove hydraulically the simultaneous operation of the window sprinklers and the ceiling sprinklers adjacent to the window sprinklers.

Interior protection of non-sprinklered building: Calculate all sprinklers on the most demanding side of the glazing assembly within the enclosure.

Exterior exposure protection: Calculate all sprinklers controlled by the deluge valve using the design requirements of NFPA.

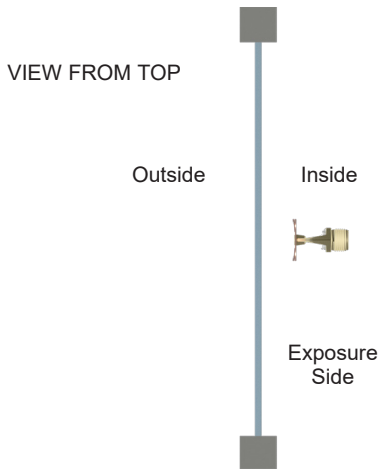
Duration of water supply: Duration of water supply must comply with requirements of NFPA. If window sprinklers are used to provide the equivalency of a fire rating, the water supply must be capable of supplying water for the required rating period.

Figure 3A



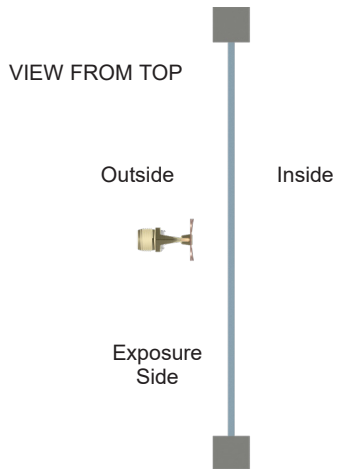
When acceptable to the Authority Having Jurisdiction the window sprinklers may be used in either a sprinklered or unsprinklered building to protect non-operable window openings that are in an interior fire separation, the window sprinklers are installed on both sides of the window in the fire separation.

Figure 3B



When acceptable to the Authority Having Jurisdiction the window sprinklers may be used in either a sprinklered or unsprinklered building to protect non-operable window openings that are part of a fire separation provided in jurisdictions where exterior spatial separation is defined as protecting an adjacent building from a fire in your building, window sprinklers are installed on the interior side of the glass.

Figure 3C



When acceptable to the Authority Having Jurisdiction the window sprinklers may be used in either a sprinklered or unsprinklered building to protect non-operable window openings that are part of a fire separation provided in jurisdictions where exterior spatial separation is defined as protecting your building from a fire in adjacent building, open window sprinklers are installed on the exterior side of the glass.

Figure 3: Typical Non-Operable Windows

VIKING	TECHNICAL DATA	SPECIFIC APPLICATION WINDOW SPRINKLERS (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

DESIGN CRITERIA - Horizontal Sidewall Window Sprinkler VK962

(Also refer to the Approval Chart.)

cULus Listing Requirements:

Viking Specific Application Horizontal Sidewall Sprinkler VK962 is cULus Listed as a Specific Application Window Sprinkler for interior use and as an open sprinkler for Outside use; refer to the installation standards such as NFPA 13 for minimum water supply requirements, pressures, and installation guidelines. In addition, the following requirements must be met:

System Types:
- For Interior sprinklers: Wet Systems
- For Outdoor sprinklers: Deluge systems

Areas of Use:
Consult an Authority Having Jurisdiction (AHJ) for local standards, codes, or other requirements. These sprinklers are intended for use in either a sprinklered or unsprinklered building to protect non-operable window areas that are part of a fire separation, only if the following apply:

- Refer to Figure 3A. For interior separations, the sprinklers must be installed on both sides of the window within the fire separation.
- Refer to Figure 3B. For areas where separation from an adjacent space is defined as protecting an adjacent structure from a fire in the building being protected, the sprinklers must be installed on the interior side of the building, OR
- Refer to Figure 3C. For areas where exterior spatial separation is defined as exposure protection, open window sprinklers must be installed on the exterior portion of the building.

Glass Types:
The following specifications must apply in order for the Viking Specific Application Window Sprinkler to be used.

- Type: Non-operable and/or stronger assemblies
- Treatments: heat-strengthened and tempered
- Glazing: single-glazed/single pane, double-glazed/double pane or insulated.
- Thickness: Minimum 1/4” (6 mm)

Window Frame/Mullion Types:
Non combustible with EPDM rubber gasket; Vertical joints of glass panes must be connected by butt-joints using a silicone sealant between the individual panes or by noncombustible mullions. Refer to Figures 4A and 4B.

Maximum Length of Window: Unlimited

Maximum Height of Window: 13’ (4,0 m) Refer to Figure 5.

Maximum distance between sprinklers: 8’ (2,4 m) Refer to Figures 4A and 4B.

Minimum distance between sprinklers: 6’ (1,8 m) Refer to Figures 4A and 4B (unless separated by a mullion meeting depth of a baffle; mullion must extend to the back of the sprinkler deflector.)

Maximum pressure: 175 PSI (12 bar)

Minimum distance from standard sprinklers: 6’ (1,8 m) unless separated by a baffle

Maximum distance from vertical mullion: 5’ (15 m) Refer to Figure 4A

Minimum distance from vertical mullions: 4” (100 mm)

Deflector Location:
Sprinkler Deflectors must be located as described below in order to ensure that the entire surface of the glass window is covered. Sprinkler Deflectors are positioned with respect to the window frame, not the ceiling.
- Horizontal Sidewall: Locate within the outside edge of the window frame from 1/2” to 4” (13 mm to 100 mm) away from the glass and 1” to 3” (25 mm to 75 mm) down from the top of the exposed glass. Refer to Figure 5B.

Minimum clearance to face of glass to combustible materials: 2” (50 mm)

Escutcheons: Standard surface mount or raised escutcheons may be used.

Minimum flow per sprinkler: 20 gpm (75,7 Lpm) for sprinkler spacing of 6’ to 8’ (1,83 m to 2,44 m) or 15 gpm (56,8 Lpm) for sprinkler spacing less than 6’ (1,83 m).

Continues on next page.

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DESIGN CRITERIA - Horizontal Sidewall Window Sprinkler VK962

(Also refer to the Approval Chart.)

Continued from previous page.

Interior protection sprinklered building: Identify which compartmented area has the most hydraulically demanding window sprinklers. Calculate up to the most demanding 46.5 linear feet (14.2 linear meters) of window sprinklers on one side of the glazing. The 46.5 linear feet (14,2 linear meters) is based upon 1.2 x the square root of the system area of operation, when the system area of operation is 1500 ft^2 (140 m^2). in accordance with NFPA 13 Light/Ordinary Hazard density curves.

Where the area of Glazing is less than 46.5 linear feet (14.2 linear meters), all window sprinklers on one side shall be calculated. If an area reduction for quick response sprinklers is utilized, the linear length of the calculated window sprinklers may be reduced, but in no case shall be less than 36 linear feet (1.2 x $\sqrt{900}$).

If a single fire can be expected to operate window sprinklers and sprinklers within the design area of a hydraulically calculated system, the water demand of the window sprinklers shall be added to the water demand of the hydraulic calculations and shall be balanced to the calculated area demand.

If the window sprinklers are located in an area other than the hydraulic design area, the demand of the window sprinklers is not required to be added to the demand of the remote hydraulic design area. However, it is necessary to prove hydraulically the simultaneous operation of the window sprinklers and the ceiling sprinklers adjacent to the window sprinklers.

Interior protection non-sprinklered building: Calculate all sprinklers on the most demanding side of the glazing assembly within the enclosure.

Exterior exposure protection: Calculate all sprinklers controlled by the deluge valve using the design requirements of NFPA.

Duration of water supply: Duration of water supply must comply with requirements of NFPA. If window sprinklers are used to provide the equivalency of a fire rating, the water supply must be capable of supplying water for the required rating period.

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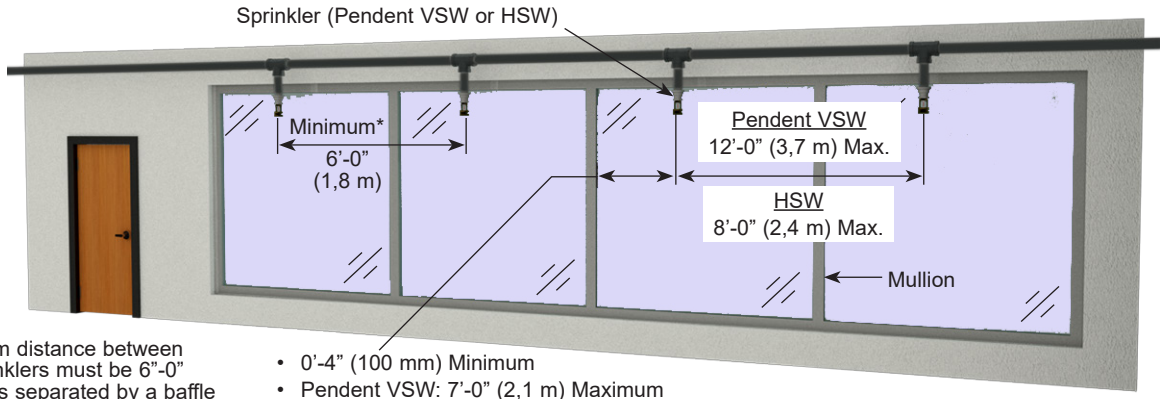
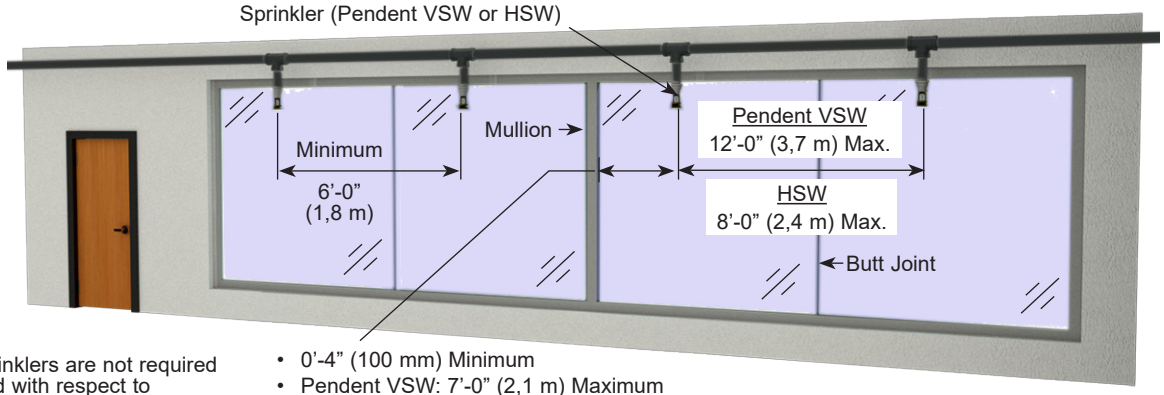


*The minimum distance between Window Sprinklers must be 6"-0" (1,8 m) unless separated by a baffle or mullion of adequate depth to act as a baffle.

- 0'-4" (100 mm) Minimum
- Pendent VSW: 7'-0" (2,1 m) Maximum
- HSW: 5'-0" (1,5 m) Maximum

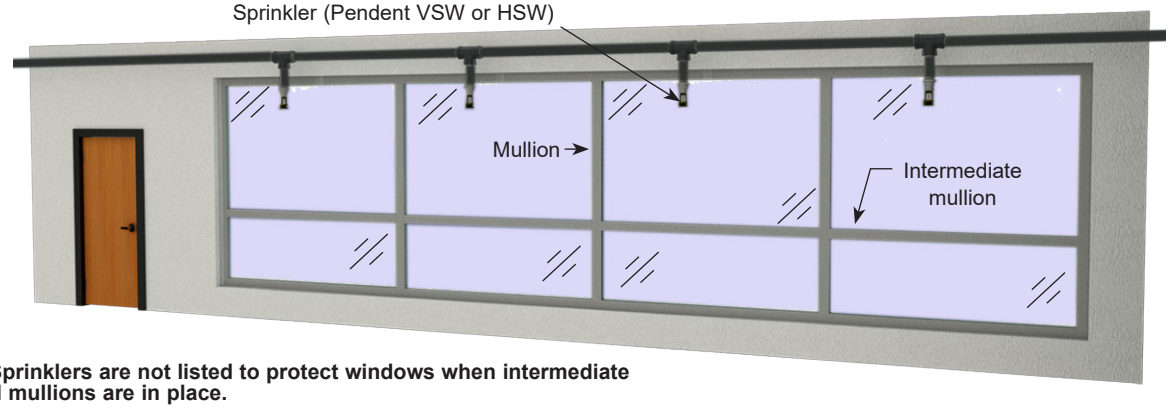
Figure 4A: Multiple Windows Separated by Mullions



Window Sprinklers are not required to be located with respect to horizontal or vertical butt joints.

- 0'-4" (100 mm) Minimum
- Pendent VSW: 7'-0" (2,1 m) Maximum
- HSW: 5'-0" (1,5 m) Maximum

Figure 4B: Multiple Windows Separated by Butt Joints



Window Sprinklers are not listed to protect windows when intermediate horizontal mullions are in place.

Figure 4C: Windows with Horizontal Mullions

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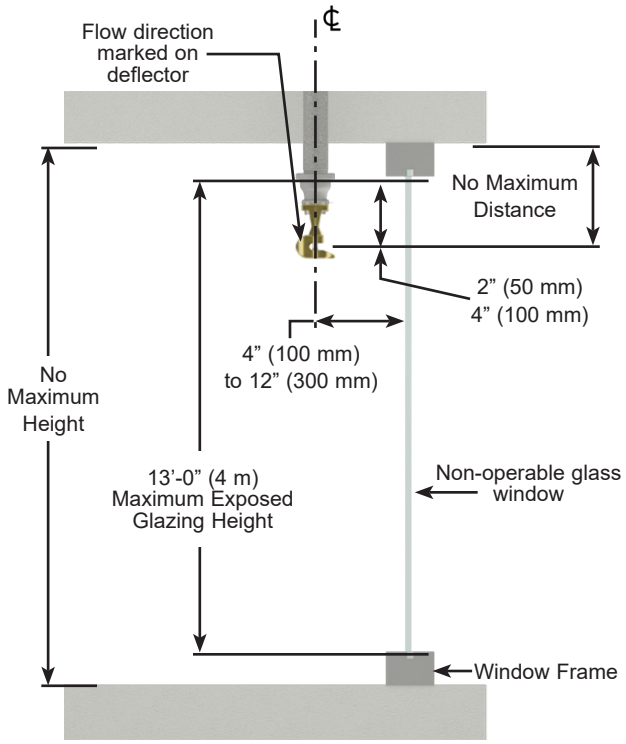
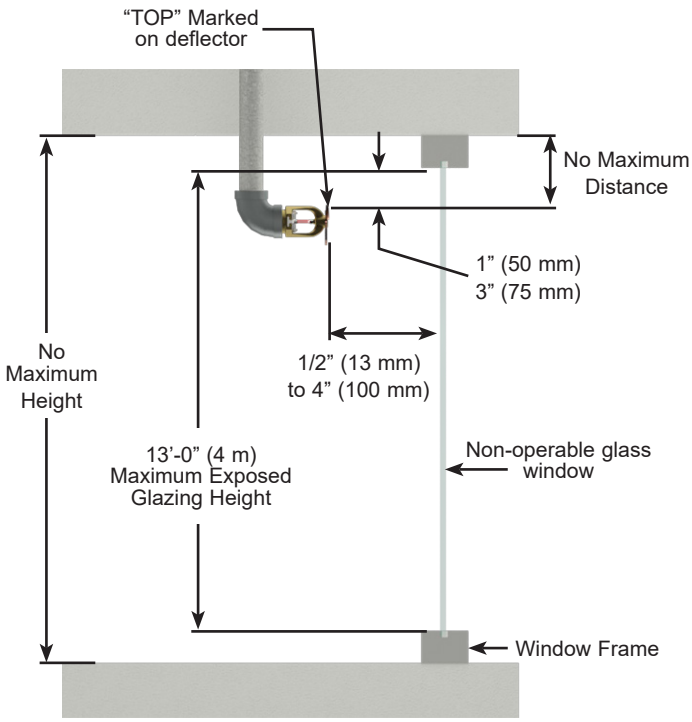
Figure 5A: Pendent Vertical Sidewall



NOTE: Position the sprinkler with the frame arms aligned parallel to glazing and deflector flow indicator pointed towards glazing.

Figure 5B: Horizontal Sidewall



NOTE: Position the sprinkler with the frame arms aligned vertically and marked side of the deflector facing parallel to glazing.

All combustible materials must be kept a minimum of 2” (50 mm) from the sprinklered face of the glazing. A minimum 3’-0” (900 mm) pony wall may be used or other method acceptable to the Authority Having Jurisdiction

Do not use any type of window coverings between the sprinkler and the glazing.

Figure 5: Installation Dimensions

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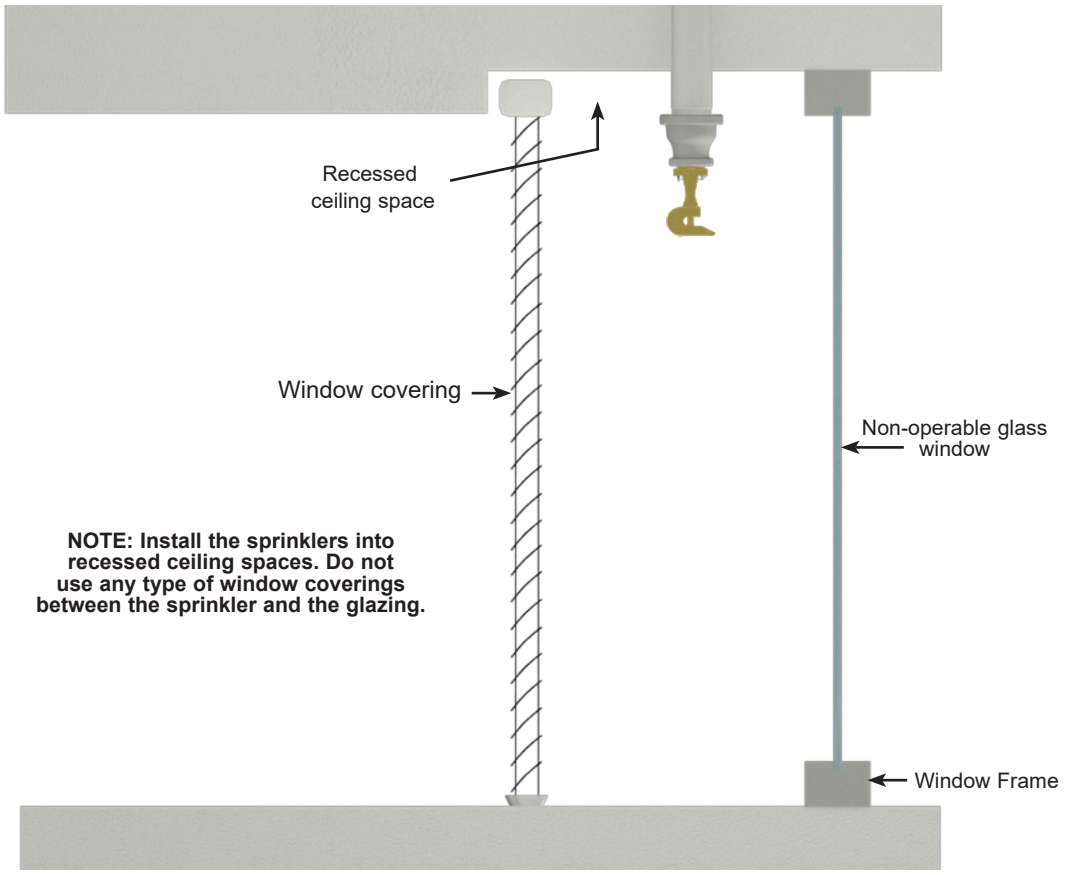


NOTE: Install the sprinklers into recessed ceiling spaces. Do not use any type of window coverings between the sprinkler and the glazing.

All combustible materials must be kept a minimum of 2” (50 mm) from the sprinklered face of the glazing. A minimum 3’-0” (900 mm) pony wall may be used or other method acceptable to the Authority Having Jurisdiction.

Figure 6: Recessed Ceiling Space Installation

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:

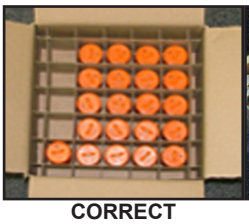
  1/2" NPT: 14 ft-lbs. (19.0 N-m)

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

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

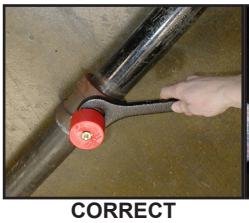
CORRECT
(Original container used)

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!

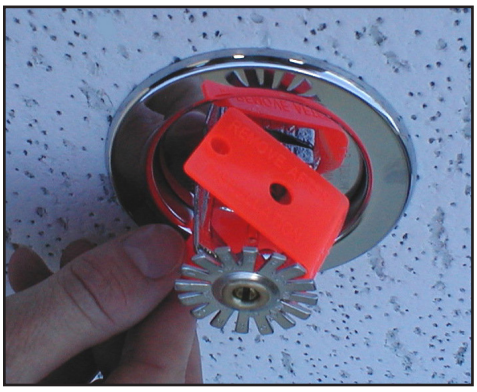


Figure 1: Sprinkler shield being removed from a pendent sprinkler.

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

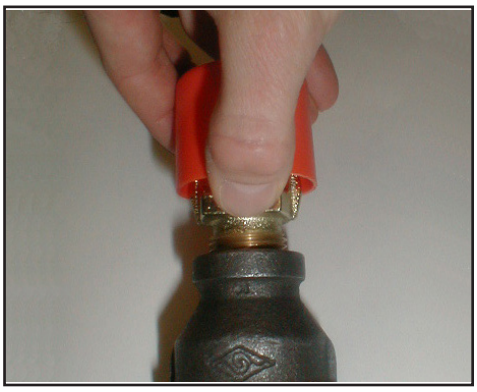


Figure 3: Sprinkler cap being removed from and upright sprinkler.

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.

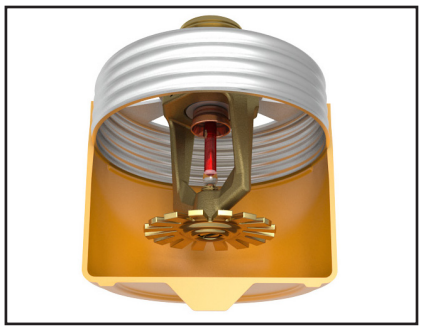
*** Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.**

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.

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
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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.

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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.

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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.

VIKING®

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
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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.

Model ESFR-34
33.6 K-factor Pendent Sprinklers
Early Suppression, Fast Response

General Description

TYCO Model ESFR-34 Pendent Sprinklers are Early Suppression, Fast Response Sprinklers having a nominal K-factor of 33.6 (See Figure 1). They are suppression-mode sprinklers that are especially advantageous as a means of eliminating the use of in-rack sprinklers when protecting high-piled storage.

The Model ESFR-34 Sprinklers are primarily used for ceiling-only sprinkler protection of (but not limited to) the following storage applications:

- most encapsulated or non-encapsulated common materials including cartoned, unexpanded plastics
- uncartoned (exposed) expanded plastics in accordance with FM Global standards
- some storage arrangements of rubber tires, roll paper, flammable liquids, and aerosols

For more specific criteria, refer to Table B as well as the applicable design standard.

The Model ESFR-34 can protect a storage arrangement of 50 ft (15,2 m) with a ceiling height of 55 ft (16,8 m) without requiring in-rack sprinklers. In addition, it can be installed with a maximum centerline of thermal sensing element-to-ceiling distance of 17 in. (432 mm).

IMPORTANT

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

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

NOTICE

The Model ESFR-34 Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of FM Global, in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

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

In all cases, the appropriate FM installation standard, or other applicable standard, must be referenced to ensure applicability and to obtain complete installation guidelines. The general guidelines in this technical data sheet are not intended to provide complete installation criteria.

Sprinkler Identification Number

See Table A for sprinkler identification number.

Technical Data

Approvals
FM Approved

Finish
Natural Brass

Physical Characteristics

Frame	Brass
Deflector	Bronze
Compression Screw	Stainless Steel
Hook	MONEL
Strut	MONEL
Link Assembly	Solder, Nickel
Button	Stainless Steel
Sealing Assembly	Beryllium Nickel w/TEFLON

Additional Technical Data
See Table A for additional technical data.

Operation

The fusible link assembly is comprised of two link halves that are joined together by a thin layer of solder. When the rated temperature is reached, the solder melts and the two link halves separate, activating the sprinkler and flowing water.

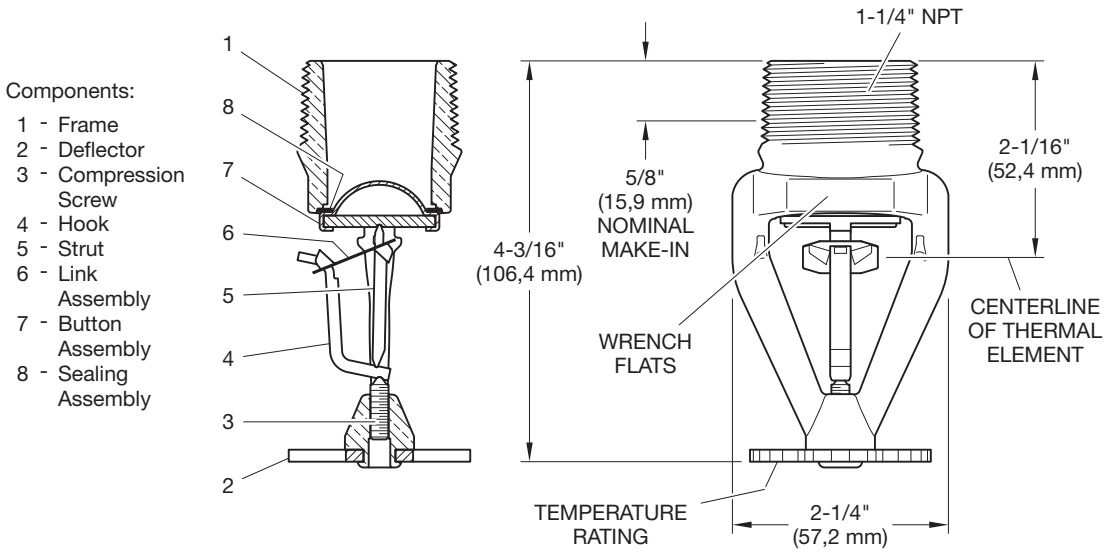


FIGURE 1
MODEL ESFR-34 (TY9286) EARLY SUPPRESSION, FAST RESPONSE PENDENT SPRINKLER 33.6 K-FACTOR

Design Criteria

The following general guidelines provided for the TYCO Model ESFR-34 Pendent Sprinklers can be used for a quick reference.

FM Global Property Loss Prevention Data Sheet 2-0, "Installation Guidelines for Automatic Sprinklers", provides the installation guidelines for the TYCO K33.6 sprinkler under the heading of Storage Sprinkler, whereas FM Global Property Loss Prevention Data Sheet 8-9, "Storage of Class 1, 2, 3, 4 and Plastic Commodities", provides its design guidelines. In all cases, the appropriate FM Global installation standard must be referenced to ensure applicability and cannot be substituted by other codes or standards. Table B provides a summary of the design and installation guidelines provided in Data Sheets 2-0 and 8-9; they are not intended to provide complete installation criteria.

Item	Description
Sprinkler Identification Number (SIN)	TY9286
K-factor, gpm/psi½ (lpm/bar½)	33.6 gpm/psi½ (480 lpm/bar½)
Thread Size	1 1/4 in. NPT or ISO 7-R 1 1/4
Sprinkler Orientation	Pendent
Maximum Working Pressure, psi (bar)	175 psi (12,1 bar)

TABLE A
MODEL ESFR-34 PENDENT SPRINKLER
TECHNICAL DATA

In addition to this technical data sheet, the following Technical Data Sheets describe other TYCO ESFR Sprinklers:

- **TFP312**
  Model ESFR-25 (TY9226)
  K=25.2 Pendent Sprinkler
- **TFP315**
  Model ESFR-17 (TY7226)
  K=16.8 Pendent Sprinkler
- **TFP316**
  Model ESFR-17 (TY7126)
  K=16.8 Upright Sprinkler
- **TFP317**
  Model ESFR-17 (TY7223)
  K=16.8 Pendent Sprinkler
- **TFP318**
  Model ESFR-1 (TY6226)
  K=14.0 Pendent Sprinkler
- **TFP319**
  Model ESFR-14 (TY6236)
  K=14.0 Pendent Sprinkler
- **TFP320**
  Model ESFR-17 (TY7229)
  K=16.8 Dry Pendent Sprinkler
- **TFP321**
  Model ESFR-22 (TY8223)
  K=22.4 Pendent Sprinkler

Roof Construction
Refer to FM 2-0, Section 2.2

Description	Specification
Sprinkler Type	QR Storage (ESFR)
Temperature Rating °F (°C)	165°F (74°C) and 212°F (100°C)
Response Type	QR
Sprinkler Position	Pendent, frame arms aligned with pipe, deflectors parallel to floor
System Type	Wet
Maximum Area of Coverage	100 ft^2 (9,3 m^2)
Minimum Area of Coverage	64 ft^2 (5,9 m^2)
Maximum Slope Ceiling	Up to 10°
Maximum Spacing	For buildings up to 30 ft (9,1 m): 12 ft (3,7 m) For buildings over 30 ft (9,1 m): 10 ft (3,0 m)
Minimum Spacing	8 ft (2,4 m)
Deflector Distance from Walls	Minimum of 4 in. (100 mm) from walls but no more than 1/2 the allowable distance permitted between sprinklers
Deflector to Top of Storage	Minimum of 36 in. (914 mm)
Centerline of Thermal Sensing Element to Ceiling Distance	Min. Distance: Refer to FM 2-0, Section 2.2 Max. Distance: 17 in. (432 mm)
Maximum Ceiling Height	55 ft (16,8 m)
Maximum Storage Height	50 ft (15,2 m)
Storage Arrangement	Palletized, solid piled, open frame; single row or double row
Commodity	Class I - IV, Cartoned unexpanded plastic
Sprinkler System Design	Total of 9 operating sprinklers (3 sprinklers on the most remote 3 lines) with a minimum pressure of 55 psi (3.8 bar) available at the most remote sprinkler
Obstruction Criteria	Refer to FM 2-0 Section 2.2
Minimum Aisle Width	6 ft (1,8 m)
Hose Stream Allowance and Water Supply Duration	250 gpm for 60 minutes (950 lpm for 60 minutes)

TABLE B
MODEL ESFR-34 PENDENT SPRINKLERS
FM GLOBAL COMMODITY SELECTION AND DESIGN CRITERIA

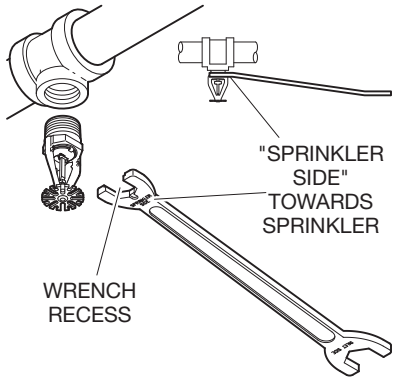


FIGURE 2
W-TYPE 26
SPRINKLER WRENCH

Installation

TYCO Model ESFR-34 Pendent Sprinklers must be installed in accordance with this section.

General Instructions
Damage to the fusible Link Assembly during installation can be avoided by handling the sprinkler by the frame arms only (that is, do not apply pressure to the fusible Link Assembly), and by using the appropriate sprinkler wrench. Failure to do so can lead to an unstable link assembly and premature activation of the sprinkler. Damaged sprinklers must be replaced.

A leak-tight 1 1/4 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 30 to 40 lb-ft (40,7 to 54,2 N·m). Higher levels of torque can distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

Note: *Install the Model ESFR-34 Pendent Sprinkler in the pendent position (See Figure 2).*

Step 1. With pipe-thread sealant applied, hand-tighten the sprinkler into the sprinkler fitting. Do not apply pressure to the Link Assembly, and handle the Model ESFR-34 Pendent Sprinkler only by the Frame arms.

Step 2. Use only the W-Type 26 Sprinkler Wrench (See Figure 2) to install the Model ESFR-34 Pendent Sprinkler. Fully engage (seat) the wrench recess on the sprinkler wrench flats (See Figure 1) and wrench-tighten.

Step 3. After installation, inspect the Link Assembly of each Model ESFR-34 Pendent Sprinkler for damage. In particular, verify that the Link Assembly and Hook are positioned as illustrated in Figures 1 and 2, and that the Link Assembly is not bent, creased, or forced out of normal position in any way. Replace damaged sprinklers.

Care and Maintenance

TYCO Model ESFR-34 Pendent Sprinklers must be maintained and serviced in accordance with this section.

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

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.

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 (for example, NFPA 25), in addition to the standards of any authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

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

Limited Warranty

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

Ordering Procedure

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

Sprinkler Assemblies with 1 1/4 Inch NPT Thread Connection
Specify: Model ESFR-34 (TY9286), K=33.6, Early Suppression, Fast Response Pendent Sprinkler with 1 1/4 in. NPT thread connection, (specify) temperature rating, Natural Brass, P/N (specify):

165°F (74°C) 51-681-1-165
212°F (100°C) 51-681-1-212

Special Order Sprinkler Assemblies with ISO 7-1 Thread Connections
Specify: Model ESFR-34 (TY9286), K=33.6, Early Suppression, Fast Response Pendent Sprinkler with ISO 7-R 1 1/4 thread connection, (specify) temperature rating, Natural Brass, P/N (specify):

165°F (74°C) 51-682-1-165
212°F (100°C) 51-682-1-212

Sprinkler Wrench
Specify: W-Type 26 Sprinkler Wrench, P/N 56-341-1-001

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

Victaulic® FireLock™ Series FL-SA/DS and FL-SA/RE Specific Application Low Flow Attic Scheme, Quick Response Upright, K5.6 (8.0)

46.02

FL-SA/RE, V5620

FL-SA/DS, V5621

1.0 PRODUCT DESCRIPTION

SPECIFIC APPLICATION ATTIC SPRINKLERS		
SIN	**V5620**	**V5621**
ORIENTATION	Upright	Upright
K-FACTOR[1]	5.6 Imp./8.1 S.I.	5.6 Imp./8.1 S.I.
CONNECTION	½" NPT	½" NPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)	175 psi (1200 kPa)
GLOBE RE-DESIGNATION	GL5620	GL5621

AVAILABLE WRENCHES	
SPRINKLER	**V56 Open End**
Upright	■

Factory Hydrostatic Test: 100% @ 500 psi/3447 kPa/34 bar

Min. Operating Pressure: UL: 12.8 psi/88 kPa/0.9 bar

Temperature Rating: See tables in section 2.0

[1] For K-Factor when pressure is measured in bar, multiply S.I. units by 10.0.

2.0 CERTIFICATION/LISTINGS

c UL us LISTED

Sprinkler Model	SIN	Nominal K Factor Imperial	Listing Agency/ Approved Temperature Ratings	Area of Use	Roof Span ft	Roof Pitch
RE	V5620	5.6	cULus 200°F/93°C	RIDGE/SLOPE	72' MAX	3:12 to 6:12
DS	V5621	5.6	cULus 200°F/93°C	HIP/SINGLE SLOPE	72' MAX	

NOTE

- Listings and approval as of printing.
- Listed to be utilized per NFPA 13 in conformance with the New Technology and Equivalency Sections.

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

3.0 SPECIFICATIONS – MATERIAL

Deflector: Bronze

Bulb Nominal Diameter: 3.0 mm

Load Screw: Brass

Pip Cap: Brass

Spring Seal Assembly: PTFE coated Beryllium nickel alloy

Frame: Brass

Lodgement Spring: Stainless steel

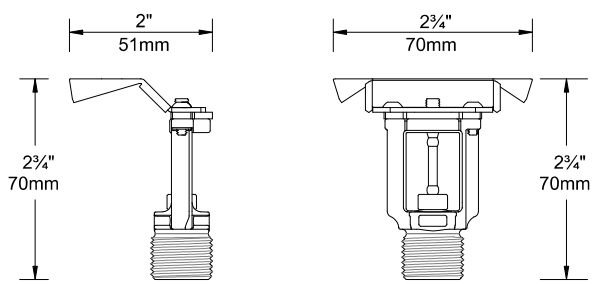
Installation Wrench: Ductile iron

Sprinkler Frame Finishes: Plain brass

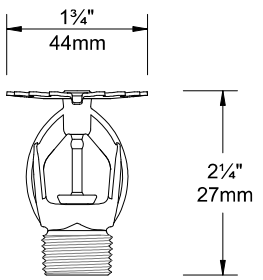
NOTE

- For cabinets and other accessories refer to separate sheet.

4.0 DIMENSIONS



V5621



V5620

5.0 PERFORMANCE

Installation

The Specific Application Attic Sprinklers for Protecting Attics must be installed in accordance with this section. The FL-SA/RE and FL-SA/DS Specific Application Attic Sprinklers comprise an overall protection scheme which takes into account strategic positioning for activation sensitivity while providing unique distribution characteristics specifically designed for attic construction.

The protection methodology utilizing these sprinklers has been full scale fire tested in the built attic environment. As such, they must be installed in accordance with the guidelines set forth within this data sheet. The NFPA 13 Density/Area prescriptive spacing requirements do not apply as these sprinklers are not bound by the NFPA 13 "S x L Rules". The positioning and spacing requirements of this data sheet take precedence over any other prescriptive requirements that may exist in NFPA 13.

To install the Specific Application Attic Sprinklers, the following steps shall be taken:

Step 1. Sprinklers must be oriented correctly as follows:

- Series FL-SA/RE Sprinklers
  - At horizontal ridge (peak) – installed in the upright vertical position with deflector parallel to the ceiling below (i.e. sprinkler centerline perpendicular to the ridgeline).
  - Near eave or under hip type roofs – installed in the upright position with deflector parallel to roof deck (i.e. sprinkler centerline perpendicular to the roof slope).
- Series FL-SA/DS Sprinklers
  - These sprinklers are installed downslope from a ridgeline/peak (See FIGURE 11). Installed in the upright position with deflector parallel to roof deck (i.e. sprinkler centerline perpendicular to the roof slope).

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

NOTE

- Do not grasp the sprinkler by the deflector.

Step 3. Wrench-tighten the sprinkler using only the appropriate wrench. Wrenches are only to be applied to the sprinkler wrench flats or wrench hex, as applicable.

NOTE

- Do not apply wrench to frame arms.

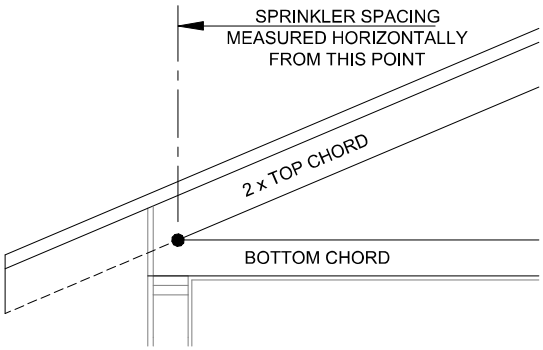


Figure 6A

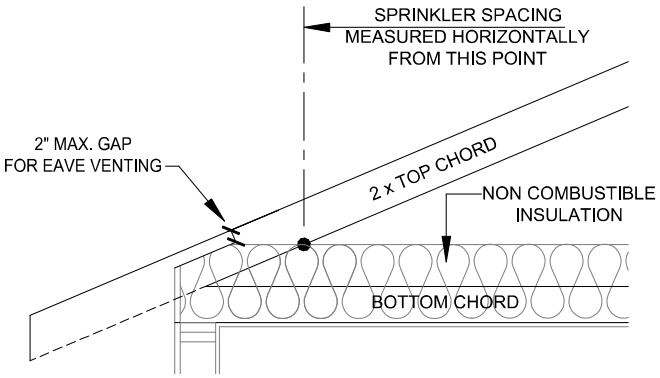


Figure 6B

FIGURE 6: DIMENSION FROM EAVE

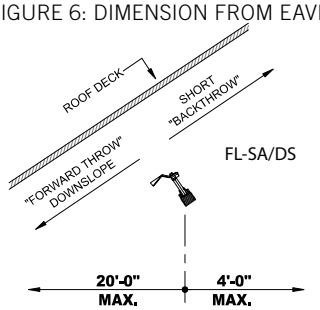


FIGURE 7: SPRINKLER FRAME ORIENTATION TO ROOF SLOPE

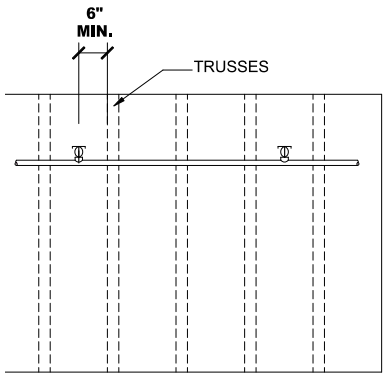


FIGURE 8: DIMENSION FROM TRUSS

5.0 PERFORMANCE (CONTINUED)

System Design Procedure

Gable Style Roof

Option 1: Ridge Sprinklers Only

- When utilizing this option Series FL-SA/RE sprinklers are used to protect the entirety of the attic space. The span of the attic is measured along the floor (or ceiling of floor below) of the attic space from the peak to the intersection of the bottom of the top chord of the roof joist and the non-combustible insulation or floor joist on the floor (or ceiling of floor below). The span is twice the longer of the two measured spans. (See Figure 6)
- The maximum span which can be protected by a single line of FL-SA/RE sprinklers at the peak is a total span of 24 ft or a maximum half span of 12 ft.

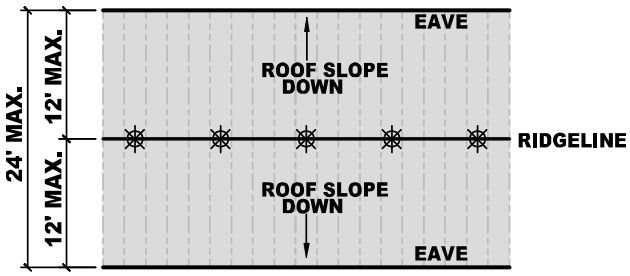


Figure 9A

Option 2: Ridgeline Sprinklers/Eave Sprinklers (FL-SA/RE)

- This approach utilizes the FL-SA/RE sprinklers at the Ridgeline and downslope covering to the eave. (See Figure 10 for dimensional limitations)

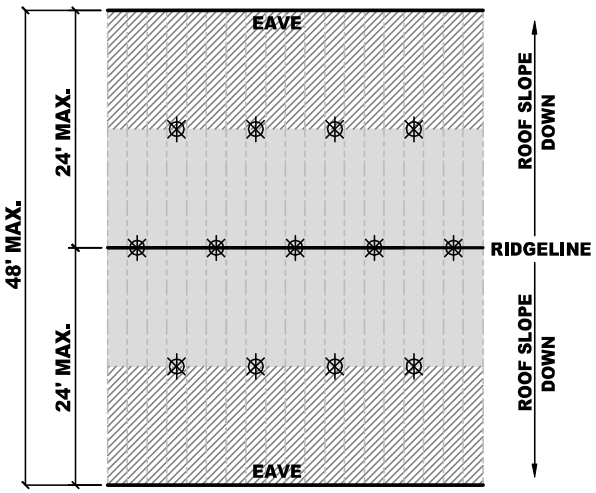


Figure 9B

Option 3: Ridgeline Sprinklers with Downslope Sprinklers

- The maximum span of this approach is 72 ft or a half span of 36 ft. as measured horizontally. (See Figure 10 and Figure 11 for dimensional limitations)

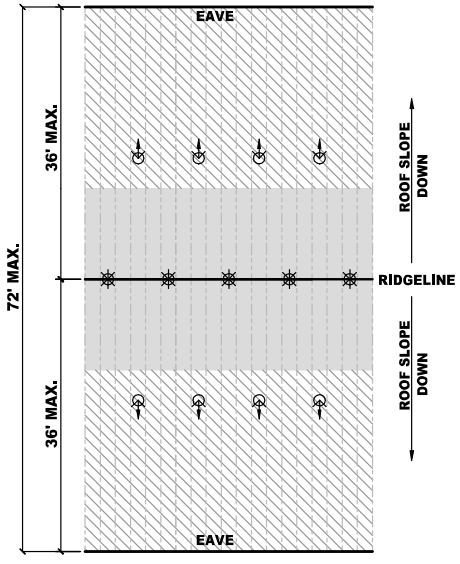


Figure 9C

= Model FL-SA/RE

= Model FL-SA/DS

5.0 PERFORMANCE (CONTINUED)

Ridgeline Design Criteria

Sprinkler Model

- FL-SA/RE

Flow Rate

- 20 gpm

Distance Between Sprinklers Along Ridge

- Minimum 6 ft
- Maximum 8 ft

Minimum Distance to Downslope Sprinkler

- 6 ft (measured horizontally)

Maximum Distance to Downslope Sprinkler

- 16 ft (measured horizontally)

Deflector Distance Below Ceiling (At Ridgeline)

- Minimum 16 in
- Maximum 24 in

Deflector Distance Below Ceiling (When Downslope of Ridgeline)

- Install with deflector below bottom of top chord 1"minimum to 3" maximum.

Lateral Maximum Distance From Ridgeline

- 12 in

Distance From Hip Peak

- Minimum 1 ft
- Maximum 4 ft

Installation

- When installed for Ridgeline protection, the FL-SA/RE Sprinkler has a zone of protection of 24 ft. wide as measured horizontally across the ridgeline). The maximum zone of protection on either side of the ridgeline is 12 ft. (as measured horizontally). The zone of protection along the ridgeline is 8 ft. (4 ft. maximum to either side of the FL-SA/RE Sprinkler).
- When a FL-SA/RE sprinkler is installed under a horizontal Ridge, the deflector is to be positioned parallel with the floor/ceiling below. (Regardless of allowed offset from directly below ridge)
- Maximum span for FL-SA/RE sprinkler to cover is 24 ft wide attic.
- Sprinklers must be installed with the frame arms parallel to the ridge.
- Centerline of sprinkler must be a minimum of 6" laterally from face of any truss. (see Figure 8)
- For obstruction criteria, see Obstruction section within this data sheet.
- When installed under a flat sloped ceiling (noncombustible insulation filled joist channels) maximum deflector to ceiling distance is the same as maximum distance below bottom of top chord or deflector distance below ridge.

Hydraulic Calculations

- See Hydraulic Design Section

NOTE

- If a flat sloped ceiling is present utilizing non combustible insulation, the insulation must completely fill the pockets between the joists, and the insulation must be secured in place with metal wire netting or equivalent. The metal wire netting is intended to hold the insulation in place should the insulation become wetted by the operation of the sprinkler. Attic sprinklers have not been evaluated for use with spray foam insulation.

= Model FL-SA/RE

= Model FL-SA/DS

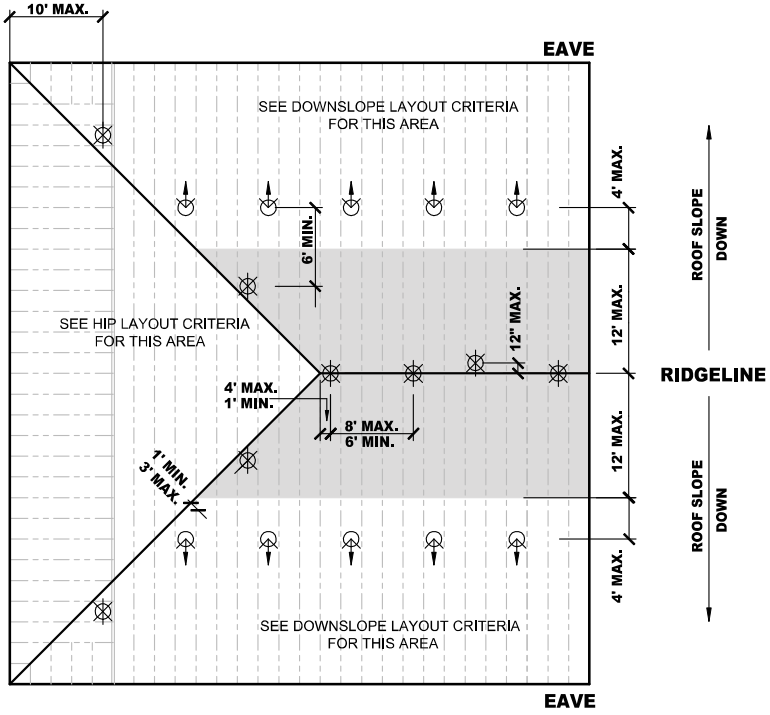


Figure 10: Ridgeline Layout Criteria

5.0 PERFORMANCE (CONTINUED)

Downslope Design Criteria

Sprinkler Model

- FL-SA/DS

Flow Rate

- 20 gpm

Distance Between Sprinklers Perpendicular to Slope

- Minimum 4 ft
- Maximum 8 ft

Maximum Sprinkler Throw (measured horizontally)

- Upslope - 4 ft
- Downslope - 20 ft

Minimum Distance Between Sprinklers Downslope of the FL-SA/DS (Throw Direction)

- 15 ft

Deflector Distance Below Ceiling

- Install with deflector below bottom of top chord

1" minimum to 4" maximum.

Distance Away From Hip Line

- Minimum 1 ft
- Maximum 3 ft

Installation

- The FL-SA/DS Sprinkler has a zone of protection of 20 ft. forward (measured on the horizontal); 4 ft. backwards (measured on the horizontal; and 8 ft. wide (4 ft. laterally to either side of the sprinkler).
- Ensure that the sprinkler deflector is installed with the deflector parallel to the sloped roof above.
- Centerline of sprinkler must be a minimum of 6" laterally from face of truss (See Figure 8).
- Must be offset at least one channel laterally from any Ridgeline sprinkler.
- Sprinklers must be installed with the frame arms perpendicular to the roof slope.
- For obstruction criteria, see Obstruction section within this data sheet.
- When installed under a flat sloped ceiling (noncombustible insulation filled joist channels) maximum deflector to ceiling distance is the same as maximum distance below bottom of top chord.

Hydraulic Calculations

- See Hydraulic Design Section

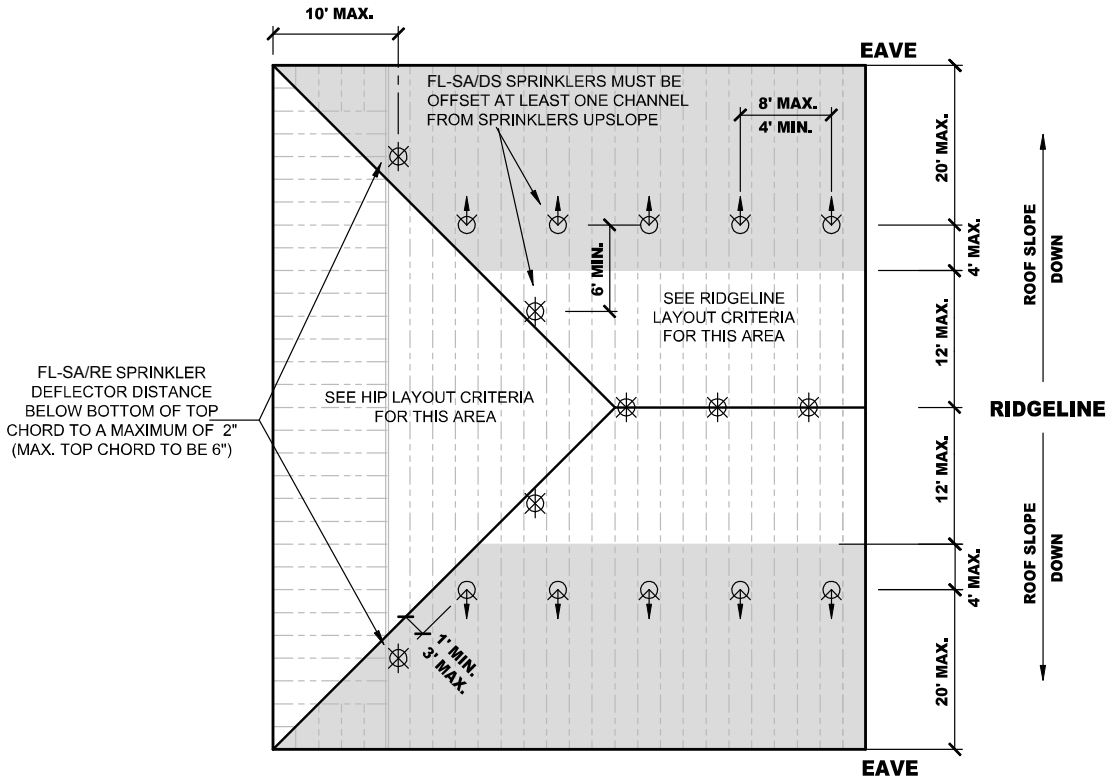


Figure 11: Downslope Layout Criteria

NOTE

- If a flat sloped ceiling is present utilizing non combustible insulation, the insulation must completely fill the pockets between the joists, and the insulation must be secured in place with metal wire netting or equivalent. The metal wire netting is intended to hold the insulation in place should the insulation become wetted by the operation of the sprinkler. Attic sprinklers have not been evaluated for use with spray foam insulation.

= Series FL-SA/RE
= Series FL-SA/DS

5.0 PERFORMANCE (CONTINUED)

Hip Area Sprinkler Design Criteria

Hip Truss/Jack Truss Construction

Sprinkler Model

- FL-SA/RE

FLOW RATE

- 20 gpm

Distance Between Sprinklers

First Row From Eave (measured horizontally)

- Minimum 6 ft
- Maximum 8 ft

Distance Between Sprinklers

All Other Rows Upslope (measured horizontally)

- Minimum 6 ft
- Maximum 12 ft

Distance From Eave To First Row (measured horizontally)

- Minimum 5 ft
- Maximum 12 ft

Distance Between Rows (measured horizontally)

- Minimum 6 ft
- Maximum 10 ft

Minimum Distance Between Sprinklers

- 6 ft

Deflector Distance Below Ceiling

- Install with deflector below bottom of top chord 1" minimum to 3" maximum.

Sprinkler At Apex

- A FL-SA/RE Sprinkler must be installed between 1 ft. to 5 ft. down from the intersection of the ridgeline and hip lines (Apex)

Sprinklers Adjacent To Hip Line

- All FL-SA/RE Sprinklers directly adjacent to hip line shall be 1 ft. to 3 ft. from hip line (as measured perpendicular to hip line)

Installation

- Ensure that the sprinkler is installed with the deflector parallel to the sloped roof above.
- Sprinklers must be installed with the frame arms perpendicular to the roof slope (see Figure 7).
- For obstruction criteria, see Obstruction section within this data sheet.
- When installed under a flat sloped ceiling (noncombustible insulation filled joist channels) maximum deflector to ceiling distance is the same as maximum distance below bottom of top chord.

Hydraulic Calculations

- See Hydraulic Design Section

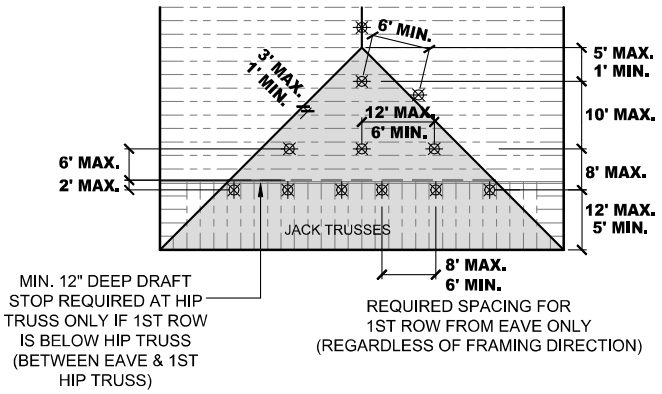


FIGURE 12A: HIP LAYOUT CRITERIA
WHEN FIRST ROW OF SPRINKLERS PLACED "WITHIN" JACK TRUSSES

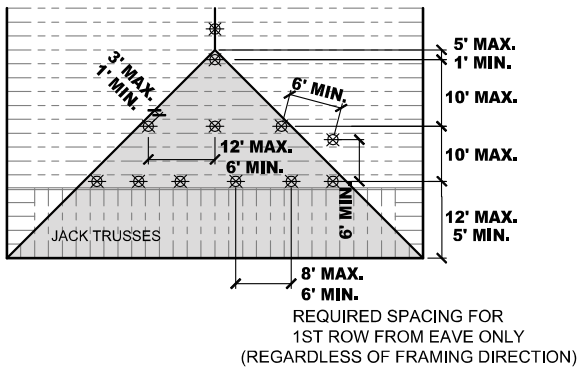


FIGURE 12B: HIP LAYOUT CRITERIA
WHEN FIRST ROW OF SPRINKLERS PLACED "BEYOND" JACK TRUSSES

FIGURE 12: HIP LAYOUT CRITERIA - HIP TRUSS/ JACK TRUSS CONSTRUCTION

NOTE

- If a flat sloped ceiling is present utilizing non combustible insulation, the insulation must completely fill the pockets between the joists, and the insulation must be secured in place with metal wire netting or equivalent. The metal wire netting is intended to hold the insulation in place should the insulation become wetted by the operation of the sprinkler. Attic sprinklers have not been evaluated for use with spray foam insulation.

= Series FL-SA/RE
= Series FL-SA/DS

5.0 PERFORMANCE (CONTINUED)

Hip Area Sprinkler Design Criteria

Framing Members Parallel to Roof Slope

Sprinkler Model

- FL-SA/RE

Flow Rate

- 20 gpm

Distance From Eave to First Row (Measured Horizontally)

- Minimum 5 ft
- Maximum 12 ft

Maximum Distance Between Sprinklers

- See Figure 13

Deflector Distance Below Ceiling

- Install with deflector below bottom of top chord 1" minimum to 3" maximum.

Sprinkler at Apex

- A FL-SA/RE Sprinkler must be installed between 1 ft. to 5 ft. down from the intersection of the ridgeline and hip lines (Apex)

Sprinklers Adjacent To Hip Line

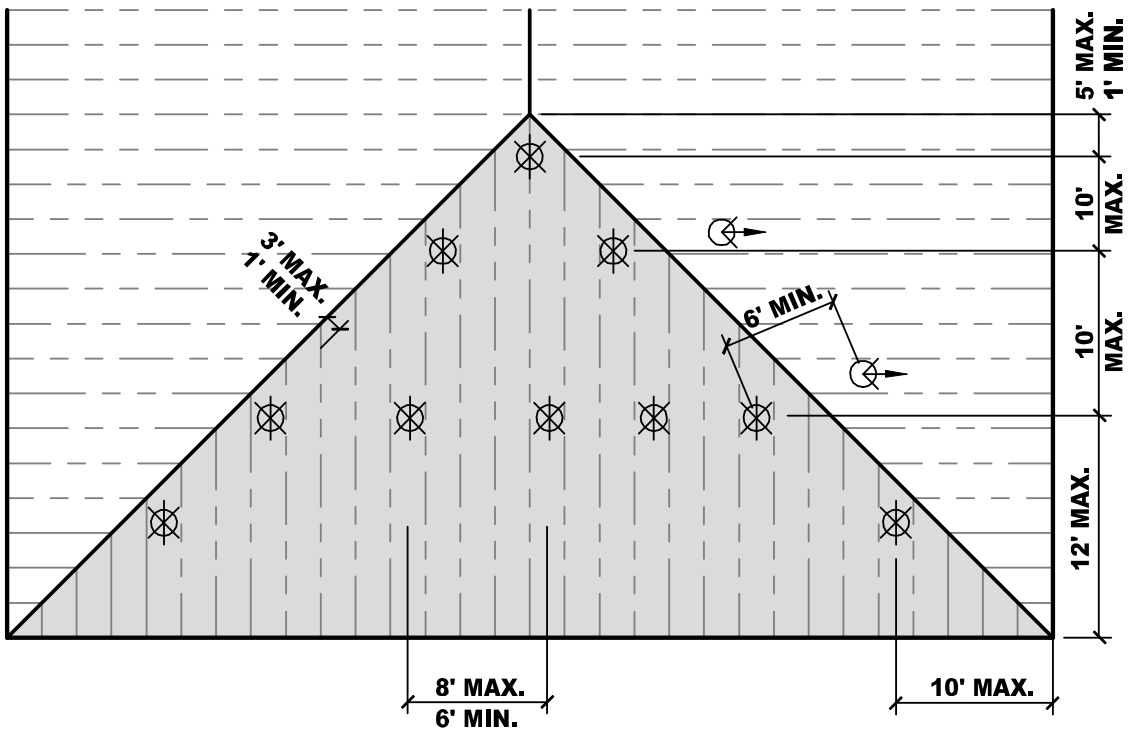
- All FL-SA/RE Sprinklers directly adjacent to hip line shall be 1 ft. to 3 ft. from hip line (as measured perpendicular to hip line)

Installation

- Ensure that the sprinkler is installed with the deflector parallel to the sloped roof above
- Sprinklers must be installed with the frame arms perpendicular to the roof slope.
- For obstruction criteria, see Obstruction section within this data sheet.
- When installed under a flat sloped ceiling (noncombustible insulation filled joist channels) maximum deflector to ceiling distance is the same as maximum distance below bottom of top chord.

Hydraulic Calculations

- See Hydraulic Design Section



TYPICAL BELOW ENTIRE HIP ROOF WHEN FRAMING IS PARALLEL TO ROOF SLOPE

FIGURE 13: HIP LAYOUT CRITERIA
FRAMING MEMBERS PARALLEL TO ROOF SLOPE

NOTE

- If a flat sloped ceiling is present utilizing non combustible insulation, the insulation must completely fill the pockets between the joists, and the insulation must be secured in place with metal wire netting or equivalent. The metal wire netting is intended to hold the insulation in place should the insulation become wetted by the operation of the sprinkler. Attic sprinklers have not been evaluated for use with spray foam insulation.

= Series FL-SA/RE
= Series FL-SA/DS

5.0 PERFORMANCE (CONTINUED)

Hip Area Sprinkler Design Criteria

Framing Members Parallel to Roof Slope

Sprinkler Model

- FL-SA/DS (FL-SA/RE @ apex)

Flow Rate

- 20 gpm

Distance Between Sprinklers (Laterally)

- Minimum 4 ft.
- Maximum 8 ft.

Distance From Eave To First Row (Measured Horizontally)

- Minimum 5 ft.
- Maximum 20 ft.

Deflector Distance Below Ceiling

- Install with deflector below bottom of top chord 1" minimum to 4" maximum.

Sprinkler At Apex

- A FL-SA/RE Sprinkler must be installed between 1 ft. to 5 ft. down from the intersection of the ridgeline and hip lines (Apex)

Sprinklers Adjacent To Hip Line

- All FL-SA/RE Sprinklers directly adjacent to hip line shall be 1 ft. to 3 ft. from hip line (as measured perpendicular to hip line)

Installation

- Ensure that the sprinkler is installed with the deflector parallel to the sloped roof above
- Sprinklers must be installed with the frame arms perpendicular to the roof slope.
- For obstruction criteria, see Obstruction section within this data sheet
- When installed under a flat sloped ceiling (noncombustible insulation filled joist channels) maximum deflector to ceiling distance is the same as maximum distance below bottom of top chord.

Hydraulic Calculations

- See Hydraulic Design Section

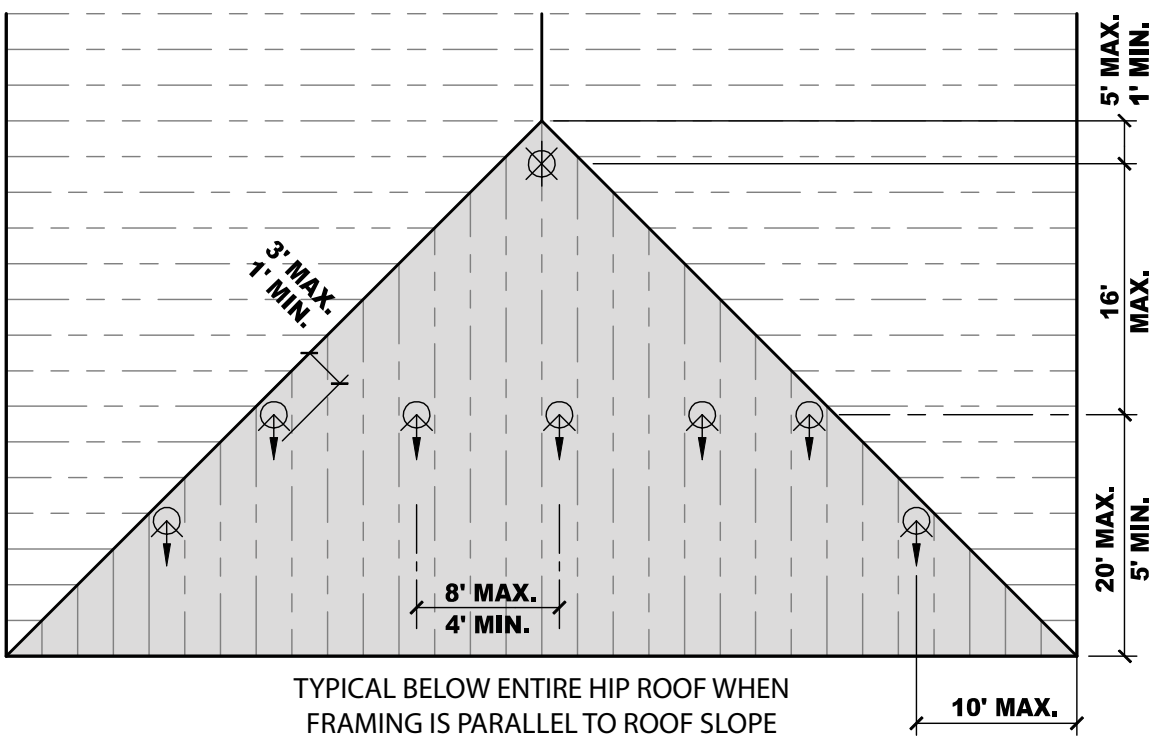


FIGURE 13A: HIP LAYOUT CRITERIA
FRAMING MEMBERS PARALLEL TO ROOF SLOPE

NOTE

- If a flat sloped ceiling is present utilizing non combustible insulation, the insulation must completely fill the pockets between the joists, and the insulation must be secured in place with metal wire netting or equivalent. The metal wire netting is intended to hold the insulation in place should the insulation become wetted by the operation of the sprinkler. Attic sprinklers have not been evaluated for use with spray foam insulation.

= Series FL-SA/RE
= Series FL-SA/DS

5.0 PERFORMANCE (CONTINUED)

Single Slope Design Criteria

Sprinkler Model

- FL-SA/DS

Flow Rate

- 20 gpm

Deflector Distance Below Peak (See Figure 14a)

- Minimum 16 in.
- Maximum 24 in.

Deflector Distance Below Sloping Roof Deck (See Figure 14a)

- Install with deflector below bottom of top chord to a maximum of 2 in.

Distance Between Sprinklers Perpendicular to the Slope

- Minimum 4 ft.
- Maximum 8 ft.

Maximum Allowed Sprinkler Throw (Measured Horizontally)

- Downslope - 16 ft.

Minimum Distance Between Sprinklers Downslope Of The FL-SA/DS (Throw Direction)

- 15 ft. (as measured on the slope)

Installation

- Ensure that the sprinkler deflector is installed with the deflector parallel to the sloped roof above.
- Centerline of sprinkler must be a minimum of 6" laterally from face of truss. See Figure 8.
- When two rows of FL-SA/DS sprinklers are utilized, the adjacent rows of sprinklers must be offset at least one channel laterally from each other. See Figure 14C.
- Sprinklers must be installed with the frame arms perpendicular to the roof slope. See Figure 7.
- For obstruction criteria, see Obstruction section within this data sheet.
- When installed under a flat sloped ceiling (noncombustible insulation filled joist channels) maximum deflector to ceiling distance is the same as maximum distance below bottom of top chord.

Hydraulic Calculations

- See Hydraulic Design Section

NOTE

- If a flat sloped ceiling is present utilizing non combustible insulation, the insulation must completely fill the pockets between the joists, and the insulation must be secured in place with metal wire netting or equivalent. The metal wire netting is intended to hold the insulation in place should the insulation become wetted by the operation of the sprinkler. Attic sprinklers have not been evaluated for use with spray foam insulation.

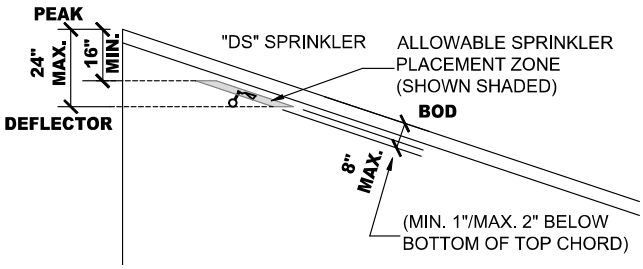


FIGURE 14A - SECTION VIEW DS SPRINKLER & DEFLECTOR PLACEMENT AT PEAK

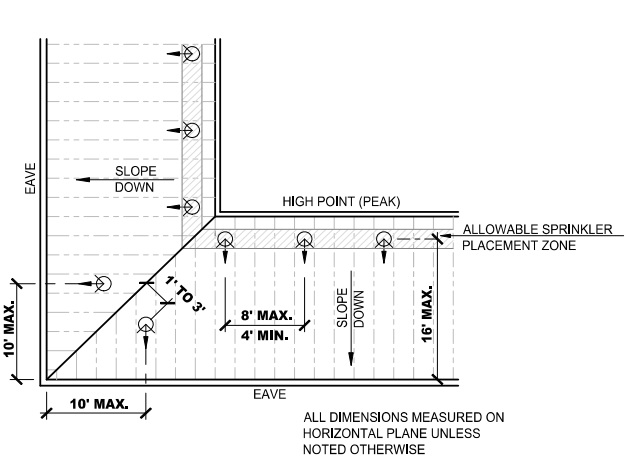


FIGURE 14B - 1 ROW DS SPRINKLER (HIP SHOWN AT CORNER)

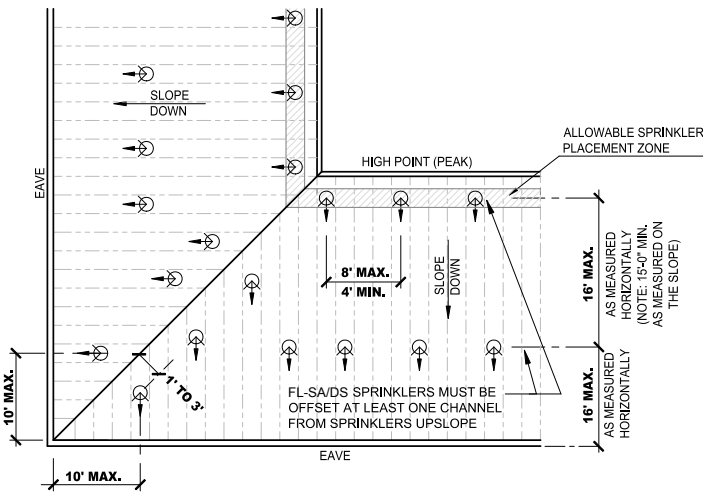


FIGURE 14C - 2 ROW DS SPRINKLER (HIP SHOWN AT CORNER)

FIGURE 14: SINGLE SLOPE LAYOUT CRITERIA

5.0 PERFORMANCE (CONTINUED)

Dormer Protection Criteria

The protection scheme for dormer roofs shall be in accordance with the following guidelines:

Dormers Built Entirely Over (on top) of Main Roof Sheathing – 4 Sprinklers or Less – Any Slope

- RE/DS Sprinklers allowed (CPVC allowance applies for wet systems only)
- Standard Spray Sprinklers allowed

Dormers Built Entirely Over (on top) of Main Roof Sheathing - More than 4 Sprinklers

- RE/DS Sprinklers allowed where the pitch is between 3:12 and 6:12. Protection scheme utilized shall be in accordance with this document
- Standard Spray Sprinklers allowed for any slope

Dormers Open to Attic Space Below – 4 Sprinklers or Less – Any Slope

- RE/DS Sprinklers allowed (CPVC allowance applies for wet systems only)
- Standard Spray Sprinklers allowed.

Dormers Open to Attic Space Below - More than 4 Sprinklers

- RE/DS Sprinklers allowed where the pitch is between 3:12 and 6:12. Protection scheme utilized shall be in accordance with this document
- Standard Spray Sprinklers allowed for any slope. (Required to calculate Attic in accordance with NFPA 13 (i.e. 2535 sq. ft. for Dry Systems)

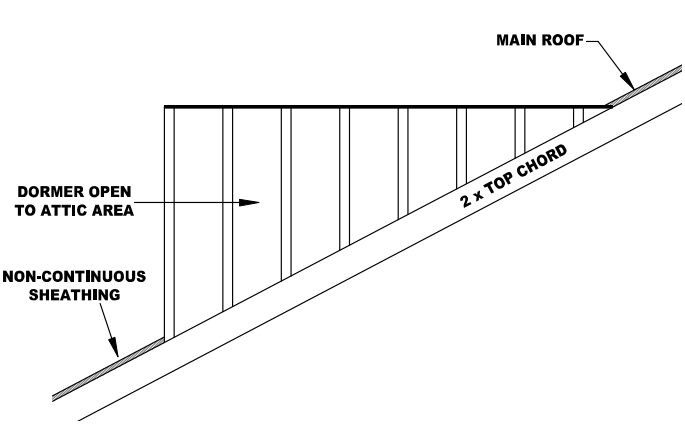


FIGURE 15A
DORMER OPEN TO ATTIC SPACE

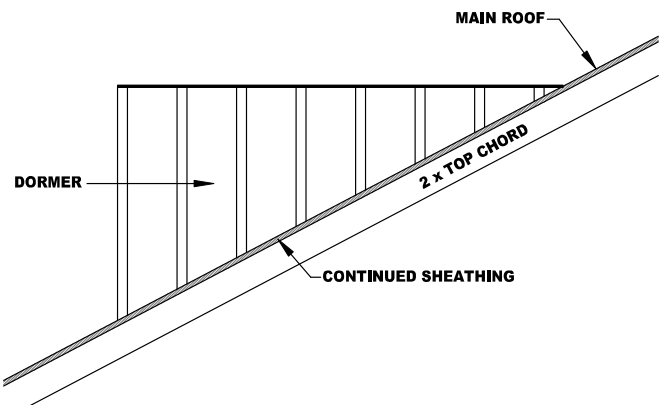


FIGURE 14C
2 ROW DS SPRINKLER
(HIP SHOWN AT CORNER)

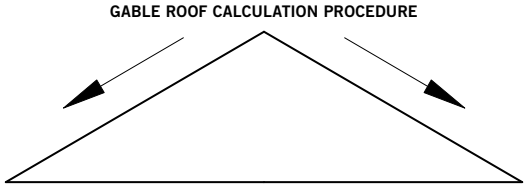
FIGURE 15: DORMERS SECTION VIEW

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

The Specific Application Attic protection scheme shall be hydraulically calculated in accordance with the following guidelines. These calculation guidelines are applicable only to the special Attic Protection scheme utilizing FL-SA/RE and FL-SA/DS sprinklers. These requirements are based on special full scale fire testing and in no way should be utilized when designing other than these specially listed and tested sprinklers for use in sloped combustible attic structures.

As with Hydraulic Calculations performed in accordance with NFPA 13, multiple areas of piping may need to be investigated and multiple calculations performed should it not be readily obvious of the hydraulically most demanding area due to non-typical pipe layout. Hose allowances must be included in the hydraulic calculations in accordance with NFPA 13.



3 BRANCHLINE DESIGN - WET SYSTEM

3 Branchline Design – Wet System

Perform the following 2 calculations:

Calculation #1: Calculate the 5 most hydraulically demanding sprinklers consisting of 5 FL-SA/RE (Ridgeline) sprinklers. Minimum sprinkler flow is 20 gpm per sprinkler. See Figure 16A.

Calculation #2: Calculate the 5 most hydraulically demanding sprinklers consisting of 2 FL-SA/DS (Downslope) sprinklers and 3 FL-SA/RE (Ridgeline) sprinklers. Minimum sprinkler flow is 20 gpm per sprinkler. See Figure 16B.

Note: If additional sprinklers are required beyond an obstruction, calculate up to 2 additional sprinklers beyond the obstruction. See Figure 16B.

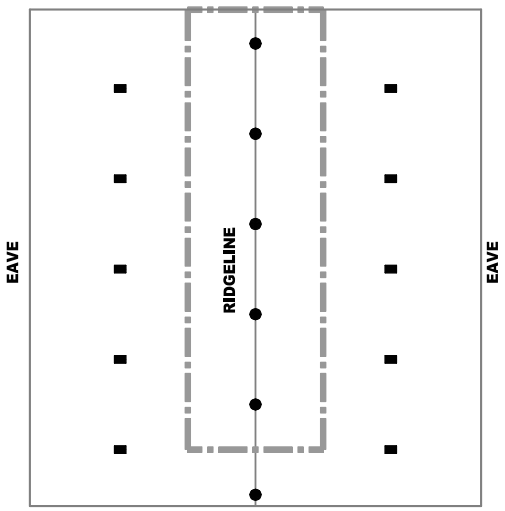


FIGURE 16A
DORMER OPEN TO ATTIC SPACE

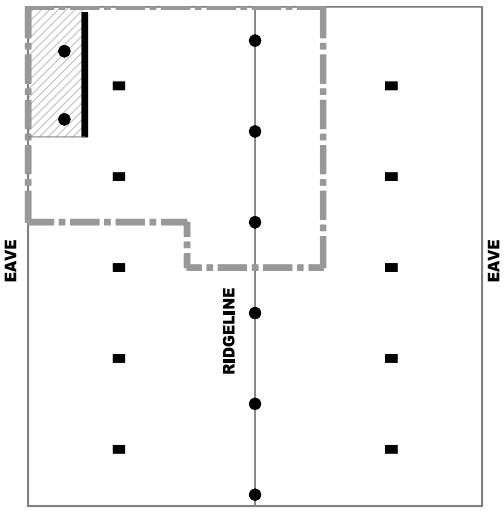


FIGURE 16B
2 ROW DS SPRINKLER
(HIP SHOWN AT CORNER)

FIGURE 16: HYDRAULIC CALCULATION REQUIRED FOR WET 3 BRANCHLINE SYSTEM

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

3 Branchline Design - Dry System

Perform the following 2 calculations:

Calculation #1: Calculate the 6 most hydraulically demanding sprinklers consisting of 6 FL-SA/RE (Ridgeline) sprinklers. Minimum sprinkler flow is 20 gpm per sprinkler. See Figure 17A.

Calculation #2: Calculate the 6 most hydraulically demanding sprinklers consisting of 2 FL-SA/DS (Downslope) sprinklers and 4 FL-SA/RE (Ridgeline) sprinklers. Minimum sprinkler flow is 20 gpm per sprinkler. See Figure 17B.

Note: If additional sprinklers are required beyond an obstruction, calculate up to 2 additional sprinklers beyond the obstruction. See Figure 17B.

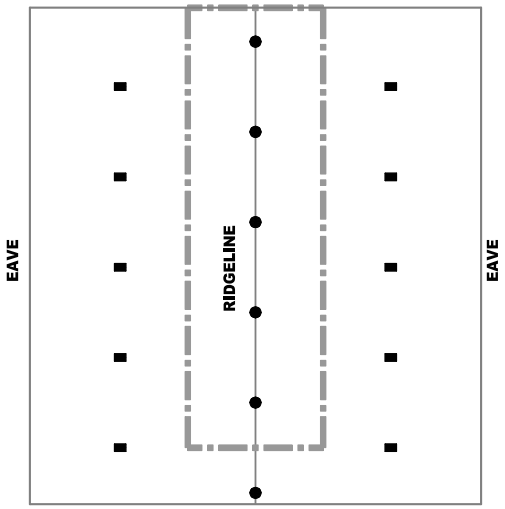


FIGURE 17A

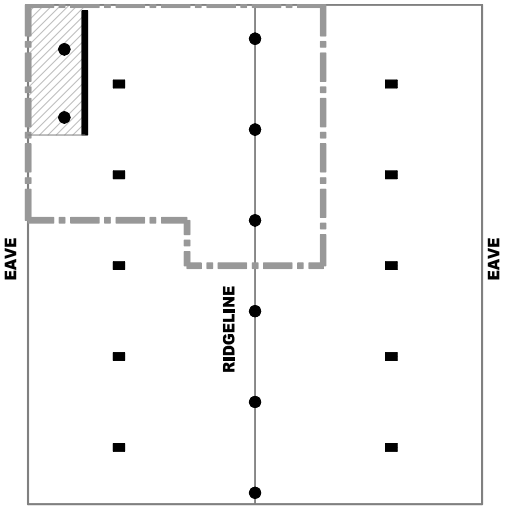


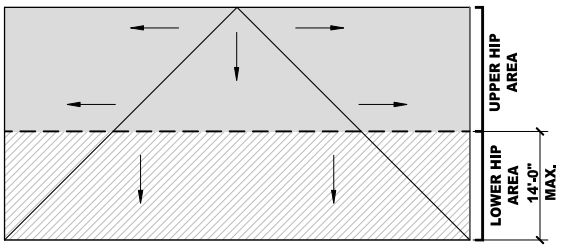
FIGURE 17B

FIGURE 17: HYDRAULIC CALCULATIONS REQUIRED FOR DRY 3 BRANCHLINE SYSTEM

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

Hip Roof Calculation Procedure



When a Hip is included in the design of the attic, there are three calculations required. One calculation for the "Ridge/Hip Transition" area. The second and third calculations determine the pipe sizing for the Hip area itself. For the purposes of these hydraulic calculations the Hip is broken into two areas; the "Lower Hip" area; and the "Upper Hip" area. See above figure.

Hip Calculation (Hip Truss/Jack Truss Construction) - Wet System

Calculation #1 – Ridge/Hip Transitions

- Calculate the most demanding 7 contiguous sprinklers with a maximum of 5 sprinklers along the ridge plus the 2 most demanding sprinklers within the hip area. See Figure 18A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Calculation #2 – Lower Hip Area

- Calculate up to the 7 most demanding contiguous sprinklers along the eave. This may include sprinklers on both sides of the hip line as shown. See Figure 18B.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Calculation #3 – Upper Hip Area

If there are 4 sprinklers or less in the shaded area (Figure 18B):

- Calculate up to the 7 most demanding contiguous sprinklers in the "Upper Hip" area. This may include sprinklers on both sides of the hip line as shown.
- Minimum sprinkler flow is 20 gpm per sprinkler.

If there are more than 4 sprinklers in the shaded area (Figure 18C):

- Calculate the hydraulically most demanding 75% of the total number of sprinklers located within the "Upper Hip" area, rounding up to the nearest sprinkler. (Minimum number of sprinklers to be calculated is 7)
- Minimum sprinkler flow is 20 gpm per sprinkler.

– Example shown in Figure 18C results in 9 sprinklers to be calculated. (12 x 0.75 = 9)

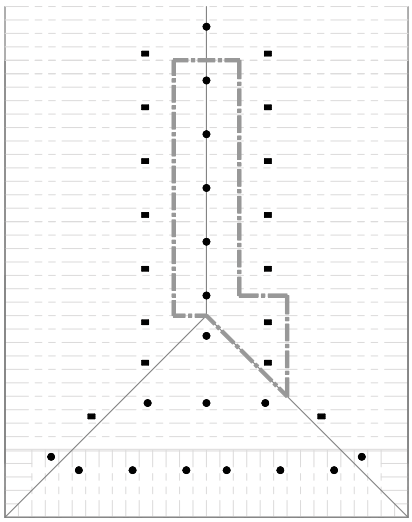


FIGURE 18A

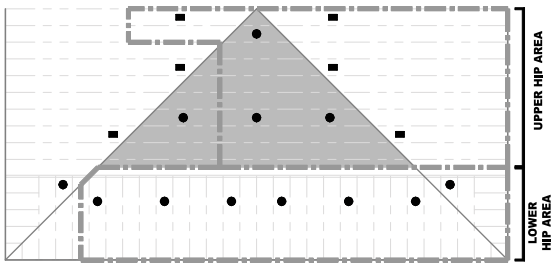


FIGURE 18B

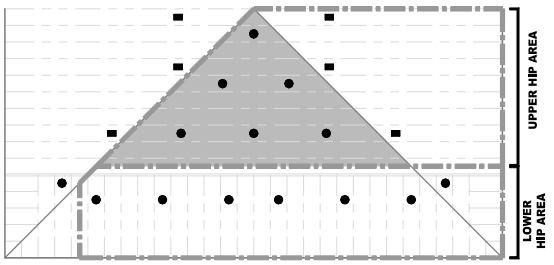


FIGURE 18C

FIGURE 18: HYDRAULIC CALCULATIONS REQUIRED FOR HIP - WET SYSTEM (HIP TRUSS/JACK TRUSS CONSTRUCTION)

● = RE

■ = DS

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

Hip Calculation (Hip Truss/Jack Truss Construction - Dry System)

Calculation #1 – Ridge/Hip Transitions

- Calculate the most demanding 8 contiguous sprinklers with a maximum of 6 sprinklers along the ridge plus the 2 most demanding sprinklers within the hip area. See FIGURE 19A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Calculation #2 – Lower Hip Area

- Calculate the 8 most demanding contiguous sprinklers along the eave. This may include sprinklers on both sides of the hip line as shown. See FIGURE 19B.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Calculation #3 – Upper Hip Area

If there are 4 sprinklers or less in the shaded area (FIGURE 19B):

- Calculate up to the 8 most demanding contiguous sprinklers in the "Upper Hip" area. This may include sprinklers on both sides of the hip line as shown. See FIGURE 19B.
- Minimum sprinkler flow is 20 gpm per sprinkler.

If there are more than 4 sprinklers in the shaded area (FIGURE 19C):

- Calculate all sprinklers in the "Upper Hip" area.
- Minimum sprinkler flow is 20 gpm per sprinkler.

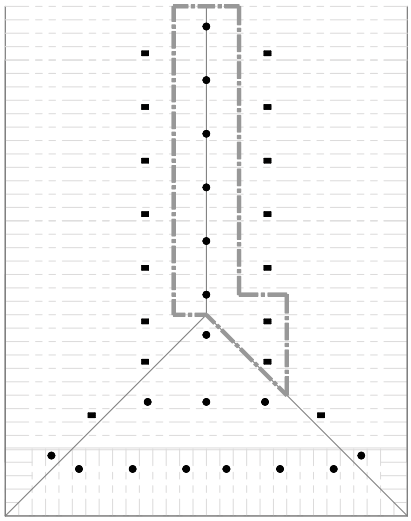


FIGURE 19A

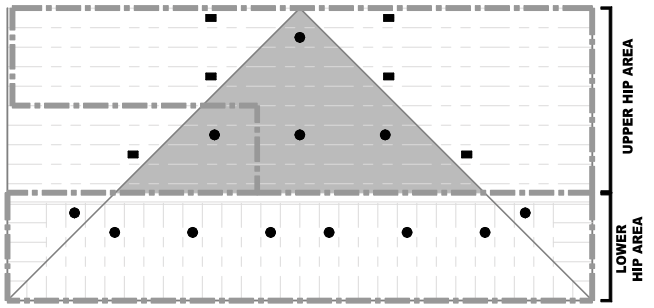


FIGURE 19B

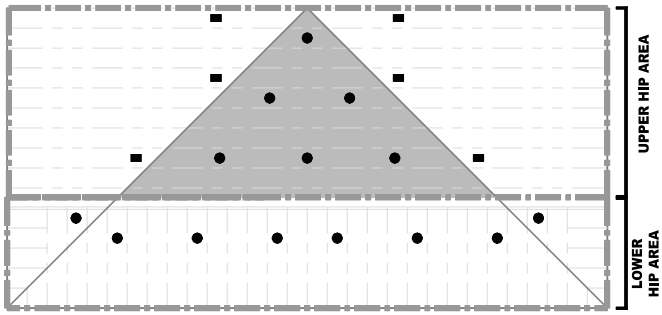


FIGURE 19C

FIGURE 19: HYDRAULIC CALCULATIONS REQUIRED FOR HIP - DRY SYSTEM (HIP TRUSS/JACK TRUSS CONSTRUCTION)

● = RE

■ = DS

(Examples shown in these figures are for reference only. Actual sprinklers selected based on piping configuration which results in the most demanding hydraulic demand.)

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

Hip Calculation RE Sprinklers (Framing Members Parallel To Roof Slope) - Wet System

Calculation #1 – Ridge/Hip Transitions

- Calculate the most demanding 7 contiguous sprinklers with a maximum of 5 sprinklers along the ridge plus the 2 most demanding sprinklers within the hip area. See Figure 18A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Calculation #2 – Hip Area

- Calculate all sprinklers within the hip area shown shaded. See Figure 20.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Hip Calculation RE Sprinklers (Framing Members Parallel To Roof Slope) - Dry System

Calculation #1 – Ridge/Hip Transitions

- Calculate the most demanding 8 contiguous sprinklers with a maximum of 6 sprinklers along the ridge plus the 2 most demanding sprinklers within the hip area. See Figure 19A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Calculation #2 – Hip Area

- Calculate all sprinklers within the hip area shown shaded. See Figure 20.
- Minimum sprinkler flow is 20 gpm per sprinkler.

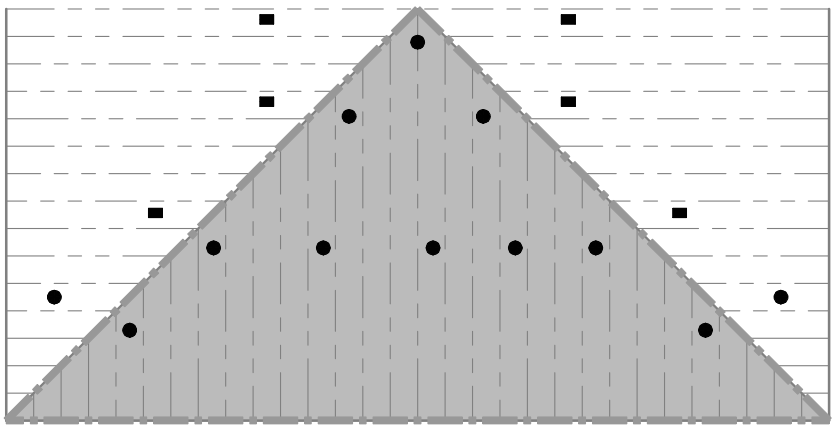


FIGURE 20: HYDRAULIC CALCULATIONS REQUIRED FOR RE @ HIP (FRAMING MEMBERS PARALLEL TO SLOPE)

● = RE

■ = DS

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

Hip Calculation DS Sprinklers (Framing Members Parallel To Roof Slope) - Wet System

Calculation #1 – Ridge/Hip Transitions

- Calculate the most demanding 7 contiguous sprinklers with a maximum of 5 sprinklers along the ridge plus the 2 most demanding sprinklers within the hip area. See Figure 18A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Calculation #2 – Hip Area

- Calculate all sprinklers within the hip area shown shaded. See Figure 20A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Hip Calculation DS Sprinklers (Framing Members Parallel To Roof Slope) - Dry System

Calculation #1 – Ridge/Hip Transitions

- Calculate the most demanding 8 contiguous sprinklers with a maximum of 6 sprinklers along the ridge plus the 2 most demanding sprinklers within the hip area. See Figure 19A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Calculation #2 – Hip Area

- Calculate all sprinklers within the hip area shown shaded. See Figure 20A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

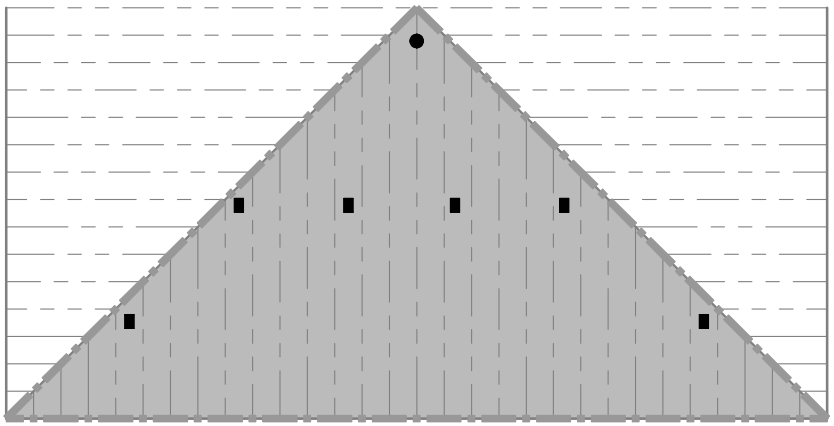


FIGURE 20A: HYDRAULIC CALCULATIONS REQUIRED FOR DS @ HIP (FRAMING MEMBERS PARALLEL TO SLOPE)

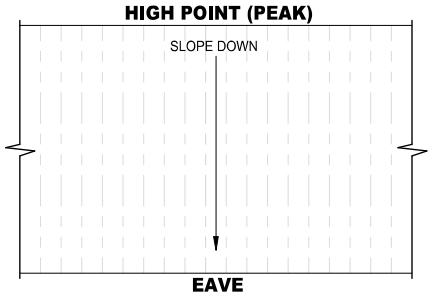
● = RE

■ = DS

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

Single Slope Roof Calculation Procedure



When a single slope roof area exists, the following calculation procedures shall be followed to size piping to the sprinklers protecting this area. NOTE: Single Slopes (with vertical shear walls) result in different fire dynamics than might be seen with gable and/or hip roof construction.

Single Slope Roof Calculation - Wet System

1: Row Protection

- Calculate the most hydraulically demanding 5 contiguous DS sprinklers. See Figure 21A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

2: Row Protection

The following 2 sets of calculations shall be performed:

- Calculation #1: Calculate the most hydraulically demanding 5 contiguous sprinklers consisting of 3 at the high point and 2 on the adjacent slope. See Figure 21B.
- Calculation #2: Calculate the most hydraulically demanding 5 contiguous sprinklers along the high point. See Figure 21C.
- Minimum sprinkler flow is 20 gpm per sprinkler.

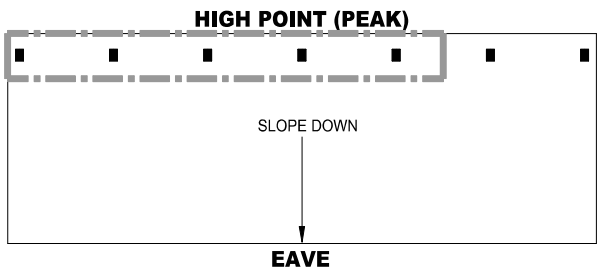


FIGURE 21A
1 ROW PROTECTION CALCULATION

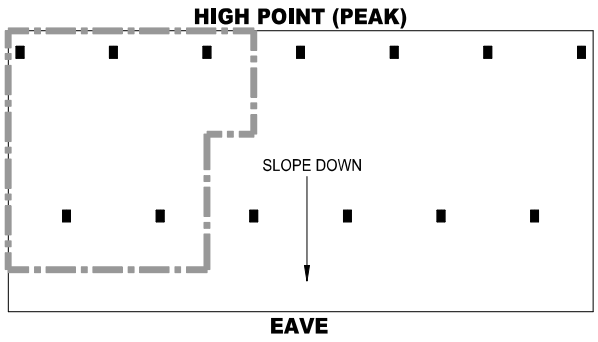


FIGURE 21B
2 ROW PROTECTION CALCULATION #1

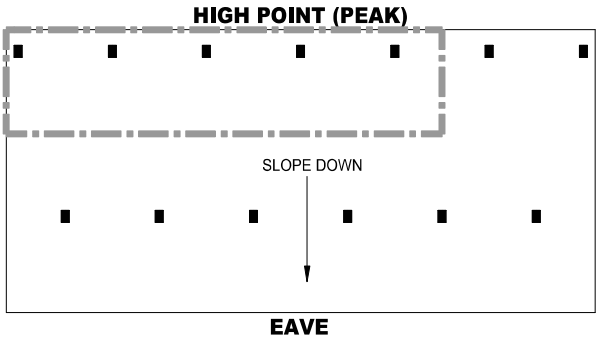


FIGURE 21C
2 ROW PROTECTION CALCULATION #2

FIGURE 21: HYDRAULIC CALCULATIONS REQUIRED FOR WET SYSTEM
SINGLE SLOPE DESIGN

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

Single Slope Roof Calculation Procedure

Single Slope Roof Calculation - Dry System

1: Row Protection

- Calculate the most hydraulically demanding 7 contiguous DS sprinklers. See Figure 22A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

2: Row Protection

The following 2 sets of calculations shall be performed:

- Calculation #1: Calculate the 7 most hydraulically demanding contiguous DS sprinklers located along the high point (peak). See Figure 22B.
- Calculation #2: Calculate the 7 most hydraulically contiguous DS sprinklers consisting of 5 DS at the hight point (peak) and 2 DS sprinklers on the adjacent downslope branchline. See Figure 22C.
- Minimum sprinkler flow is 20 gpm per sprinkler.

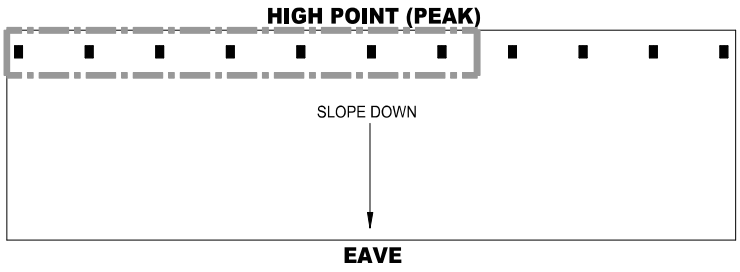


FIGURE 22A
1 ROW PROTECTION CALCULATION #1

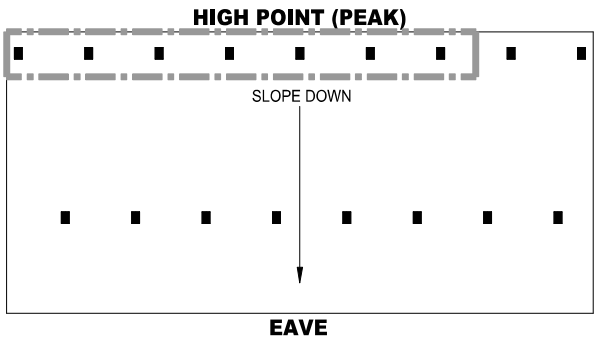


FIGURE 22B
1 ROW PROTECTION CALCULATION

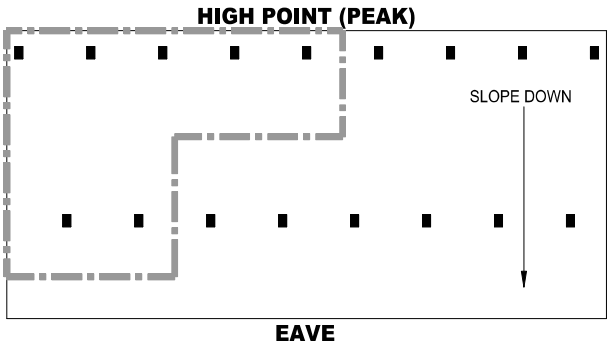


FIGURE 22C
1ROW PROTECTION CALCULATION #2

FIGURE 21: HYDRAULIC CALCULATIONS REQUIRED FOR DRY SYSTEM
SINGLE SLOPE DESIGN

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

Single Slope Roof With Hip Calculation Procedure

Single Slope Roof Calculation - Wet System

1: Row Protection

- Calculate the 5 most hydraulically demanding contiguous DS sprinklers located along the high point plus the 2 most demanding sprinklers along the hip line. See Figure 23A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

2: Row Protection

The following 3 sets of calculations shall be performed:

- Calculation #1: Calculate the 3 most hydraulically demanding contiguous DS sprinklers located along the high point (peak) plus the 2 most demanding sprinklers along the hip line. See Figure 23B.
- Calculation #2: Calculate the most hydraulically demanding 5 contiguous sprinklers along the high point. See Figure 23C.
- Calculation #3: Calculate all sprinklers within the shaded corner Hip area as shown. See Figure 23D.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Note: The "plus 2" most demanding sprinklers along the hip line may vary from that shown in the figures depending on actual piping. Designer may need to investigate multiple options to determine the 2 most demanding sprinklers to incorporate into the calculations.

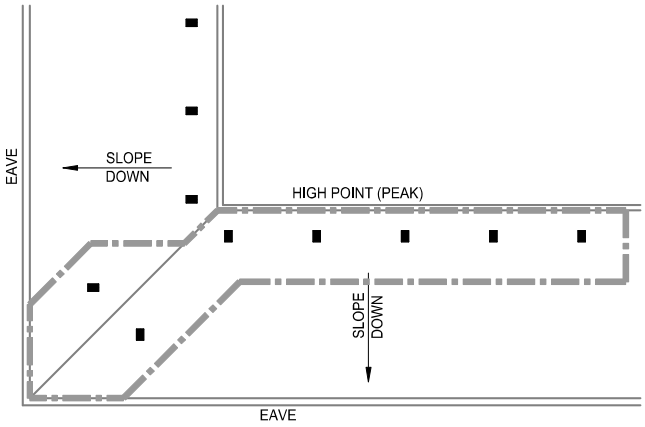


FIGURE 23A: 1 ROW PROTECTION CALCULATION

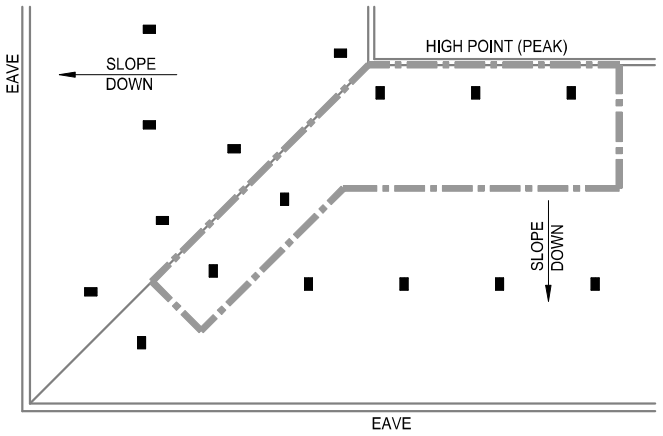


FIGURE 23B: 2 ROW PROTECTION CALCULATION #1

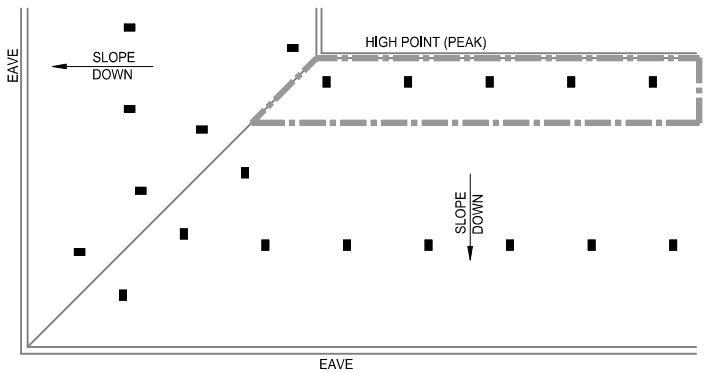


FIGURE 23C: 2 ROW PROTECTION CALCULATION #2

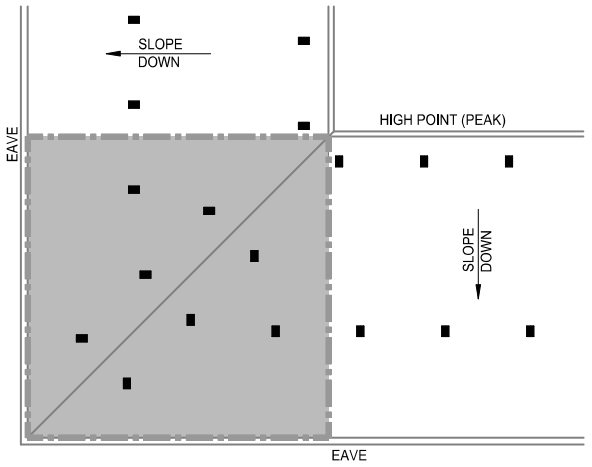


FIGURE 23D: 2 ROW PROTECTION CALCULATION #3

FIGURE 23: SINGLE SLOPE DESIGN

5.0 PERFORMANCE (CONTINUED)

Hydraulic Design

Single Slope Roof With Hip Calculation Procedure

Single Slope Roof Calculation - Dry System

1 Row Protection

- Calculate the 7 most hydraulically demanding contiguous DS sprinklers located along the high point plus the 2 most demanding sprinklers along the hip line. See Figure 24A.
- Minimum sprinkler flow is 20 gpm per sprinkler.

2 Row Protection

The following 2 sets of calculations shall be performed:

- Calculation #1: Calculate the 7 most hydraulically demanding contiguous DS sprinklers located along the high point (peak) plus the 2 most demanding sprinklers along the hip line. See Figure 24B.
- Calculation #2: Calculate all sprinklers within the shaded corner Hip area as shown. See Figure 24C.
- Minimum sprinkler flow is 20 gpm per sprinkler.

Note: The "plus 2" most demanding sprinklers along the hip line may vary from that shown in the figures depending on actual piping. Designer may need to investigate multiple options to determine the 2 most demanding sprinklers to incorporate into the calculations.

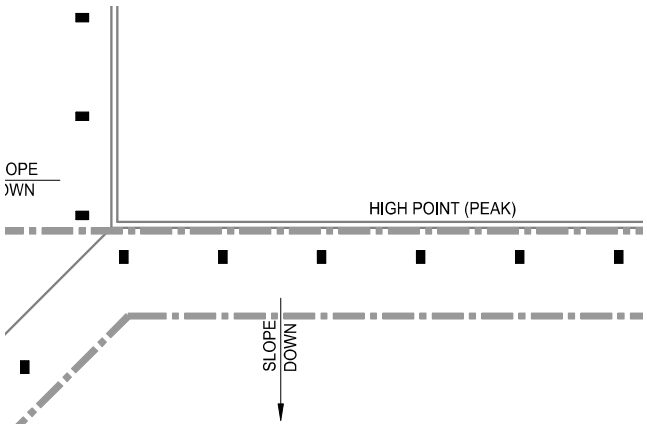


FIGURE 24A: 1 ROW PROTECTION CALCULATION

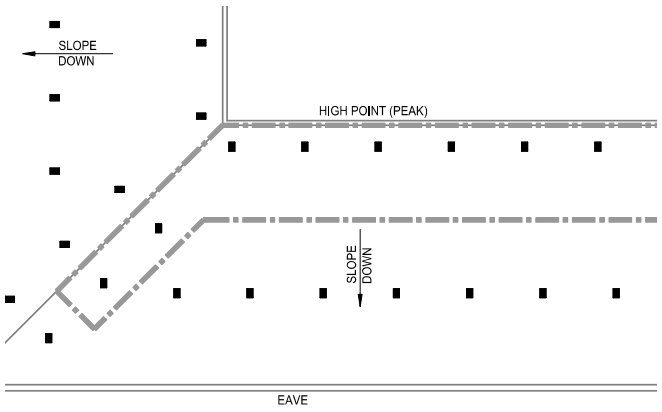


FIGURE 24B: 2 ROW PROTECTION CALCULATION #1

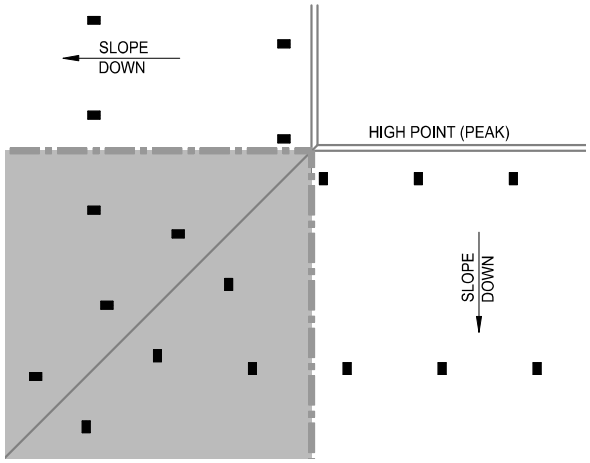


FIGURE 24C: 2 ROW PROTECTION CALCULATION #2

FIGURE 24: SINGLE SLOPE DESIGN

5.0 PERFORMANCE (CONTINUED)

Obstructions

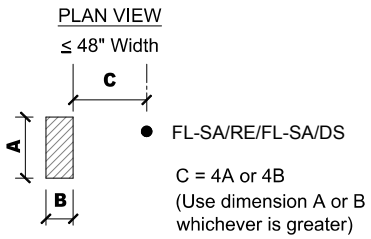
The following guidelines outline criteria to minimize critical obstructions to spray pattern development and to maximize effectiveness in achieving control.

General

- Structural trusses and web members are not considered "obstructions" provided a minimum 6" lateral distance from sprinklers to side of truss/web member is maintained.
- FL-SA/RE and FL-SA/DS sprinklers may be installed directly on maximum nominal 2½" (DN65) pipe without the need for a "Sprig-up". For pipe larger than 2½" nominal, see NPFA 13 for Sprig requirements.
- Sprinklers shall be positioned away from obstructions a minimum distance of Four (4) times the maximum dimension of the obstruction (e.g. Ducts, pipe). This 4X requirement does not apply to truss web members provided the web members do not exceed 6" and the minimum lateral distance of 6" from sprinkler to side of member is maintained.

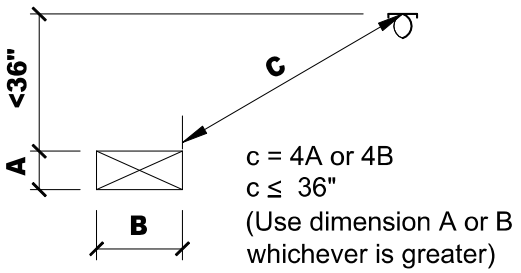
Obstruction criteria is otherwise grouped into three categories (See Figure 25, Figure 26 and Figure 27)

- **Vertical Obstructions**
  Those obstructions which run vertically through the attic. These may consist of fireplace flues, walls, vents, stacks, etc. These obstructions will typically run up to or penetrate the roof deck.
- **Suspended Horizontal Obstructions**
  Those obstructions which are typically "suspended" within the attic space itself and run horizontally. These obstructions will have clearance over and under the obstruction to allow discharge of water around the obstruction. These obstructions may consist of ductwork; walkways; etc. Horizontal obstructions located within 1'-0" vertically of the bottom chords or ceiling joists are not considered "Suspended" Horizontal Obstructions.
- **Obstructions at Upper Deck**
  Those obstructions which are either attached directly to the roof deck or to the top chords/joists of the roof framing in a manner that little to no discharge of water can pass/clear the top of the obstruction. These obstructions can have an impact on the upper portion of the spray pattern from sprinklers.



Should the sprinkler not be able to be located a distance of 4X away from obstruction, an additional sprinkler must be installed on the opposite side of the obstruction within 1'-0" from the opposite side of the obstruction.

FIGURE 25: VERTICAL OBSTRUCTIONS FL-SA/RE/FL-SA/DS SPRINKLERS



No additional sprinkler required below, if equal to or less than 48" suspended obstruction.

FIGURE 26A

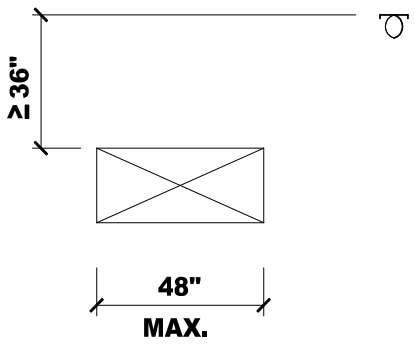
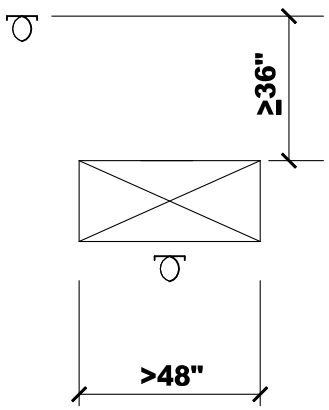


FIGURE 26B



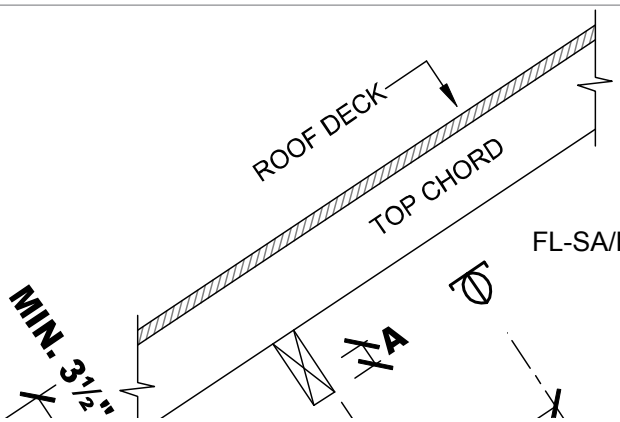
Additional sprinkler required below, if greater than 48" suspended obstruction.

FIGURE 26C

FIGURE 26: SUSPENDED HORIZONTAL OBSTRUCTIONS FL-SA/RE/FL-SA/DS SPRINKLERS

5.0 PERFORMANCE (CONTINUED)

Obstructions



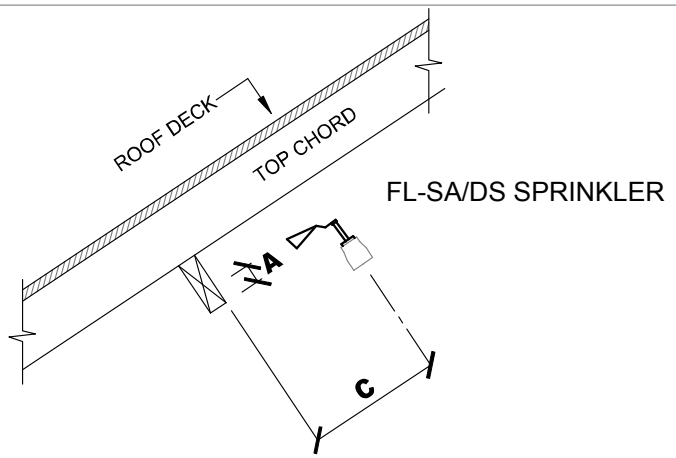
DISTANCE FROM SPRINKLER TO SIDE OF OBSTRUCTION	MAXIMUM ALLOWABLE DISTANCE OF DEFLECTOR ABOVE BOTTOM OF OBSTRUCTION
C inches (metric)	**A** inches (mm)
Less than 1 ft. 6 in. (457mm)	NOT ALLOWED
1 ft. 6 in. (457mm) to less than 3 ft. 0 in. (914mm)	1 in. (25)
3 ft. 0 in. (914mm) to less than 4 ft. 0 in. (1.2m)	3 in. (76)
4 ft. 0 in. (1.2m) to less than 4 ft. 6 in. (1.4m)	5 in. (127)
4 ft. 6 in. (1.4m) to less than 6 ft. 0 in. (1.8m)	7 in. (178)
6 ft. 0 in. (1.8m) to less than 6 ft. 6 in. (2m)	9 in. (229)
6 ft. 6 in. (2m) to less than 7 ft. 0 in. (2.1m)	11 in. (279)
7 ft. 0 in. (2.1m) to less than 8 ft. 0 in. (2.4m)	14 in. (356)
8 ft. 0 in. (2.4m) to less than 8 ft. 6 in. (2.6m)	15 in. (381)
8 ft. 6 in. (2.6m) to less than 9 ft. 0 in. (2.7m)	17 in. (432)

*Minimum 3½" clear space needed for unimpeded hot gas flow

FIGURE 27: OBSTRUCTIONS AT UPPER DECK FL-SA/RE SPRINKLER

5.0 PERFORMANCE (CONTINUED)

Obstructions



DISTANCE FROM SPRINKLER TO SIDE OF OBSTRUCTION	MAXIMUM ALLOWABLE DISTANCE OF DEFLECTOR ABOVE BOTTOM OF OBSTRUCTION
C feet (m)	**A** inches (mm)
Less than 8 ft. (2.4m)	NOT ALLOWED
18 ft. (2.4m) to less than 10 ft. (3.0m)	1 in. (25)
10 ft. (3.0m) to less than 11 ft. (3.3m)	2 in. (51)
11 ft. (3.3m) to less than 12 ft. (3.7m)	3 in. (76)
12 ft. (3.7m) to less than 13 ft. (4.0m)	4 in. (102)
13 ft. (4.0m) to less than 14 ft. (4.3m)	6 in. (152)
14 ft. (4.3m) to less than 15 ft. (4.6m)	7 in. (178)
15 ft. (4.6m) to less than 16 ft. (4.9m)	9 in. (229)
16 ft. (4.9m) to less than 17 ft. (5.2m)	11 in. (279)
17 ft. (5.2) or greater	14 in. (356)

FIGURE 28: OBSTRUCTIONS AT UPPER DECK FL-SA/DS SPRINKLER

5.0 PERFORMANCE (CONTINUED)

Obstructions

Piggyback Trusses

When trusses are stacked ("Piggyback") at the peak, consideration to obstructions to the spray pattern of the RE sprinklers must be made. These "Piggyback" configurations will typically include 2X "Stiffeners" running perpendicular to the trusses. Additionally, these "stiffeners" will be sandwiched between the uppermost and lowermost horizontal chords of the two stacked trusses. In the event that all members are above the level of the FL-SA/RE deflector, no obstruction exists to the FL-SA/RE spray pattern. See Figure 29 and Figure 30.

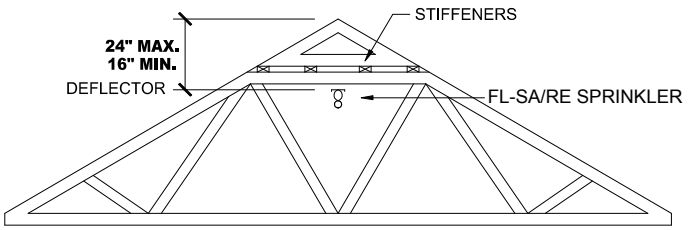


FIGURE 29: DEFLECTOR COMPLETELY BELOW STIFFENERS AND HORIZONTAL WEB MEMBERS (NO OBSTRUCTION)

In the event that the FL-SA/RE Deflector is located completely above the stiffeners and horizontal web members, the parameters of Figure 28 must be met for the spray pattern to be considered unobstructed.

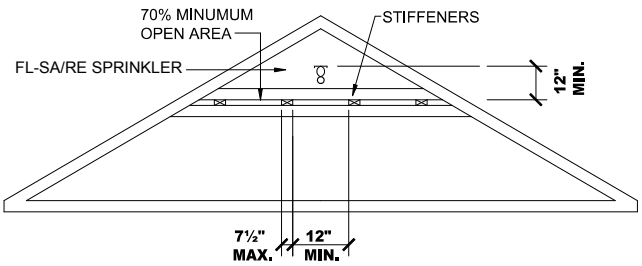


FIGURE 30: DEFLECTOR ABOVE STIFFENERS AND HORIZONTAL WEB MEMBERS (NO OBSTRUCTION)

5.0 PERFORMANCE (CONTINUED)

CPVC Guidelines

Use Of Ul Listed Cpvc Piping With Globe Specific Application Attic Sprinklers (Wet Systems Only)

UL Listed CPVC piping may be used in a combustible concealed attic space requiring sprinklers when installed in accordance with the following guidelines. For clarity, the following guidlines reference both "Ridgeline/ Downslope" areas as well as "Hip" areas. Refer to Figure 1 on page 1 for explanation of these areas.

Notice: For installations in accordance with Figure 31, where the use of non-combustible insulation is specified, verify with the insulation manufacturer as to the non-combustibility of the insulation. The non-combustible insulation (fiberglass) may be faced or unfaced. Where faced, the facing need not be non-combustible. The insulation is to have a flame spread index of not more than 25. Verify chemical compatibility of the insulation with the UL Listed CPVC by consulting the CPVC Manufacturer's literature.

CPVC At Bottom Chords To Feed Ceiling Sprinklers Below

UL Listed CPVC may be used to feed the wet system ceiling sprinklers on the floor below when adhering to the following guidelines: (See Figure 31)

- There must be 6 in. (152.4 mm) of non-combustible insulation covering the horizontal or vertical pipe extending 12 in. (304.8 mm) on each side away from the centerline of the pipe. Refer to Figure 29A.
- The area above the pipe must be protected with FL-SA/RE and FL-SA/DS Special Application Attic Sprinklers. If the pipe is located inside the ceiling joist, the joist channel must be covered or filled with 6 in. (152.4 mm) of non-combustible insulation on top of the pipe and the area above must be protected by FL-SA/RE and/or FL-SA/DS Sprinklers. Refer to Figure 29B. Insulation is for fire protection purposes. It is not freeze protection. CPVC must be installed in accordance with the CPVC Manufacturer's installation guide instructions.

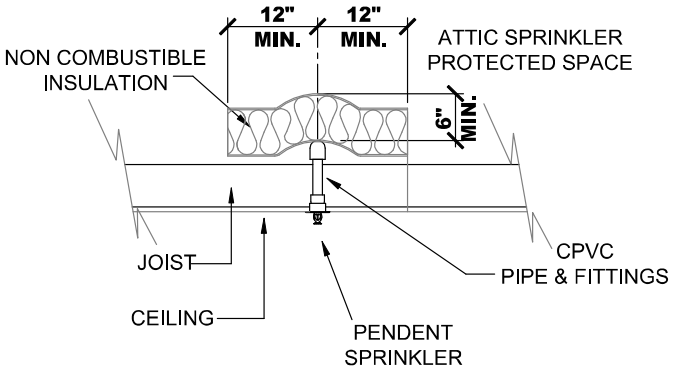


FIGURE 31A

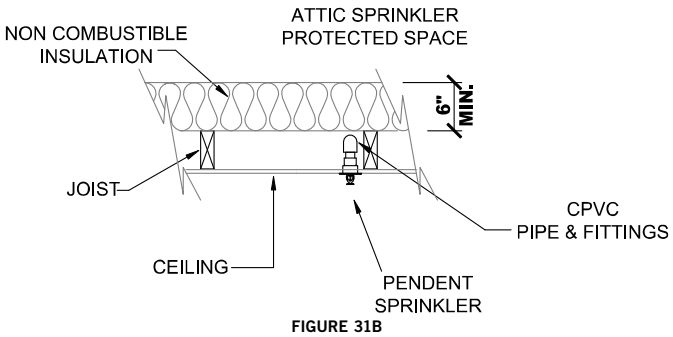


FIGURE 31B

FIGURE 31: NON-COMBUSTIBLE INSULATION FOR THE PROTECTION OF CPVC PIPE

5.0 PERFORMANCE (CONTINUED)

CPVC Guidelines

Use of UL Listed CPVC Piping with Specific Application Attic Sprinklers (Wet Systems Only)

CPVC at Ridgeline/Downslope Areas Only

UL Listed CPVC Pipe and Fittings may be used to feed the FL-SA/RE and FL-SA/DS sprinklers protecting the attic space when adhering to the following guidelines: (See Figure 32)

- Wet Systems only
- Risers are vertical and protected by FL-SA/RE or FL-SA/DS Sprinklers located at a maximum lateral distance of 12 in. (304.8 mm) from the riser centerline.
- FL-SA/RE or FL-SA/DS Sprinklers are directly mounted on the branchline.
- FL-SA/RE or FL-SA/DS Sprinklers are on arm-overs and located at a maximum lateral distance of 6 in. (152.4 mm) from the branchline centerline.
- FL-SA/RE or FL-SA/DS Sprinklers are on vertical sprigs attached to the branchline.

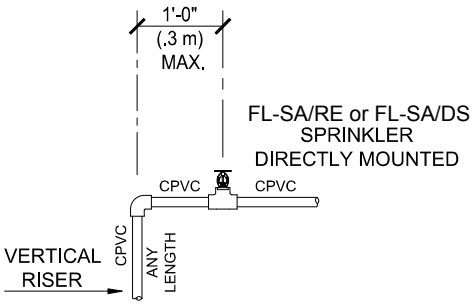


FIGURE 32A
VERTICAL RISER DIRECT MOUNT

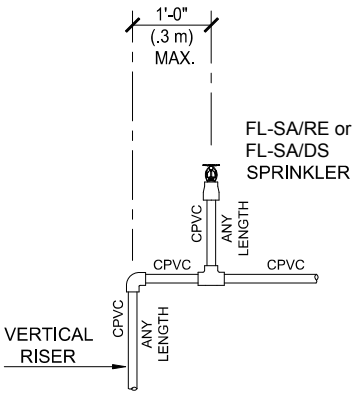


FIGURE 32B
VERTICAL RISER SPRIG UP

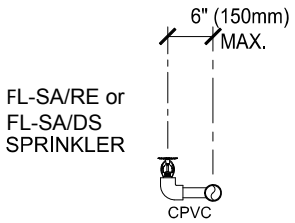


FIGURE 32C
DIRECT MOUNT
ARM-OVER

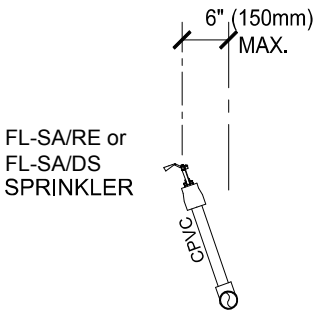


FIGURE 32D
ANGLED SPRIG

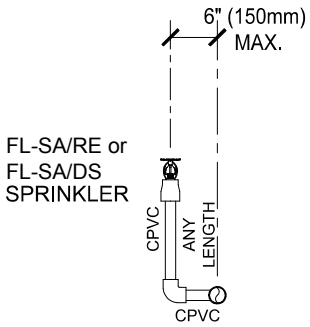


FIGURE 32E
ARM OVER SPRIG

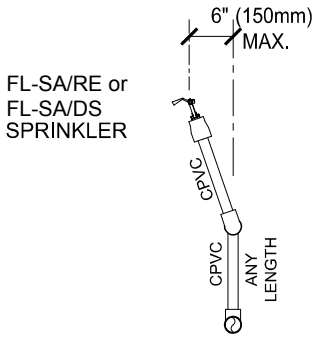


FIGURE 32F
VERTICAL SPRIG WITH
SWING JOINT

FIGURE 32: CPVC ALLOWANCE GUIDELINES
WET SYSTEMS ONLY
(DIRECTLY FEEDING FL-SA/RE / FL-SA/DS SPRINKLERS)

5.0 PERFORMANCE (CONTINUED)

CPVC Guidelines

CPVC at Hip Areas

Listed CPVC may be used to feed the FL-SA/RE and FL-SA/DS sprinklers protecting the Hip areas when adhering to the following guidelines:

- Wet systems only
- When the horizontal branchline piping feeding sprinklers within the hip roof areas is run over the bottom chords of the trusses, it shall be covered with a minimum of 6 in. (152.4 mm) in depth of non-combustible insulation (See Figure 34). This insulation must extend nominally 12 in. (304.8 mm) on each side away from the centerline of the CPVC branchline. Insulation is for fire protection purposes. It is not freeze protection.
- When the horizontal CPVC branchline piping feeding the sprinklers within the hip roof areas is located within the ceiling joist, the joist channel must be covered or filled with a minimum of 6 in (152.4 mm) depth of noncombustible insulation on top of the branchline feeding the sprigs (See Figure 33). Insulation is for fire protection purposes. It is not freeze protection.
- A minimum lateral distance of 18 in (450 mm) is maintained between the CPVC pipe and a heat producing device such as heat pumps, fan motors, and heat lamps.
- The sprinklers (RE or DS) may be fed by exposed vertical sprigs directly to a sprinkler or exposed angled sprigs directly to a sprinkler provided:
  - Vertical sprigs have no maximum exposed length, the RE or DS Sprinkler is located at a maximum lateral distance of 12 in (3304.8 mm) from the sprig centerline.
  - Angled sprigs with a maximum exposed length of 3 ft. (0.9 m).

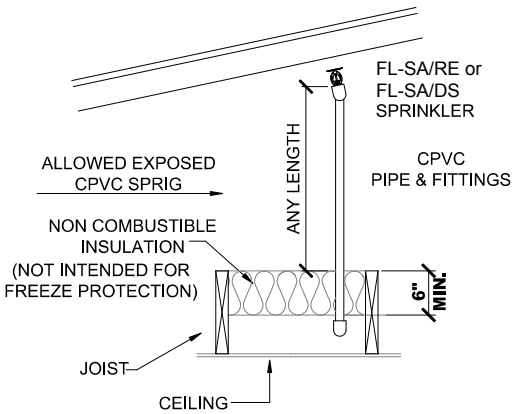


FIGURE 33A
VERTICAL SPRIG

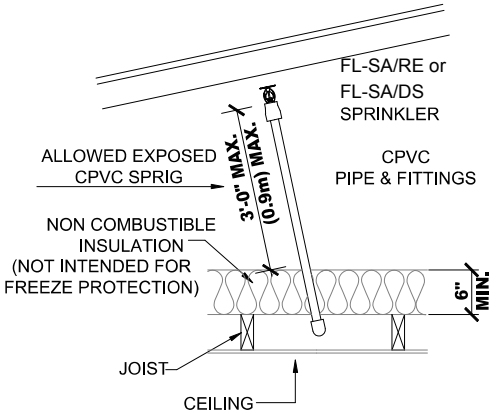


FIGURE 33B
ANGLED SPRIG

FIGURE 33: EXPOSED CPVC AT HIP ROOF AREAS (HORIZONTAL BRANCHLINE WITHIN JOISTS) WET SYSTEMS ONLY

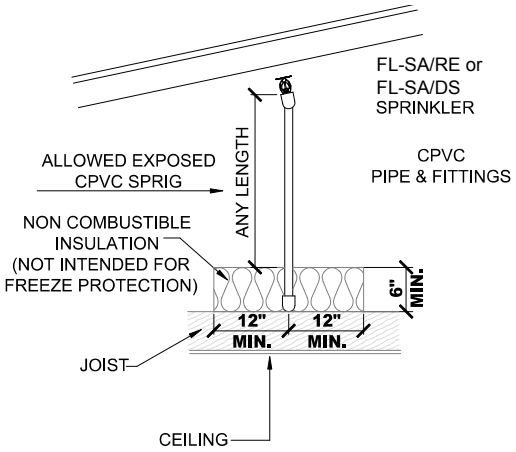


FIGURE 34A
VERTICAL SPRIG

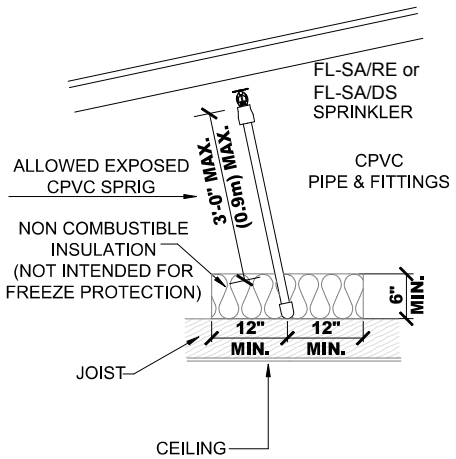


FIGURE 34B
ANGLED SPRIG

FIGURE 34: CPVC AT HIP ROOF AREAS (HORIZONTAL BRANCHLINE OVER JOISTS) WET SYSTEMS ONLY

6.0 NOTIFICATIONS

⚠ WARNING

- **Read and understand all instructions before attempting to install any Victaulic products.**
- **Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.**
- **Wear safety glasses, hardhat, and foot protection.**

Failure to follow these instructions could result in death or serious personal injury and property damage.

- **These products shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA 13, 13D, 13R, etc.) standards, or equivalent standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.**
- **The installer shall understand the use of this product and why it was specified for the particular application.**
- **The installer shall understand common industry safety standards and potential consequences of improper product installation.**
- **It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.**
- **The material specifier shall evaluate the effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on materials to confirm system life will be acceptable for the intended service.**

Failure to follow installation requirements and local and national codes and standards could compromise system integrity or cause system failure, resulting in death or serious personal injury and property damage.

7.0 REFERENCE MATERIALS

Ratings: All glass bulbs are rated for temperatures from -67°F/-55°C.

Model AV-1-300 Alarm Check Valve, 300 psi (20,7 bar) 2-1/2, 4, 6 & 8 Inch (DN65, DN100, DN150 & DN200) Vertical or Horizontal* Installation

General Description

The TYCO Model AV-1-300 Alarm Check Valves are divided seat ring, rubber-faced clapper, waterflow alarm check valves that are intended for use in wet pipe (automatic sprinkler) fire protection systems. They may be installed vertically or horizontally*, and they are designed to automatically actuate electric and/or hydraulic alarms when there is a steady flow of water into the system that is equivalent to the discharge rate of one or more sprinklers.

A separately ordered TYCO Model RC-1 Retard Chamber is required for installations subject to variable pressures. It is used to help prevent false alarms associated with pressure variations in public water supplies. For more information about the TYCO Model RC-1 Retard Chamber, refer to Technical Data Sheet TFP920.

The AV-1-300 Alarm Check Valve trim includes pressure gauges to monitor system pressure conditions, a bypass check valve, a main drain valve, and an alarm test valve. The bypass check valve reduces the possibility of false alarms by permitting slow as well as small transient increases in water supply pressure to be passed through to the system without opening the waterway clapper.

* 4, 6, and 8 inch (DN100, DN150, and DN200) valve sizes

NOTICE

The TYCO Model AV-1-300 Alarm Check Valves 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 authorities having jurisdiction, such as FM Global. 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 and C-UL Listed
FM Approved

Working Water Pressure Range
20 to 300 psi (1,4 to 20,7 bar)

Friction Loss
Refer to Graph A.

End Connections
Groove x Groove
Flange x Groove
Flange x Flange
Refer to Table A for size applicability

Weights
Refer to Table A.

Physical Characteristics
The body is ductile iron, the hand-hole cover is ductile iron, and the seat ring is bronze. The clapper for the 2-1/2 in. (DN65) valve size is stainless steel. The clapper for the larger valve sizes is ductile iron. All valve sizes utilize an EPDM clapper facing.

Flanged connections are available drilled per ANSI, ISO, AS, and JIS specifications as detailed in Table B.

Threaded port connections for the AV-1-300 Valves are available NPT threaded or threaded per ISO 7-1 as detailed in the Ordering Procedure section. Valves with NPT threaded ports readily accept the trim arrangements detailed in Figures 4 through 6.

UL c UL FM APPROVED

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

VALVE PARTS			
NO.	DESCRIPTION	QTY.	REF.
1	Valve Body	1	NR
2	Handhole Cover	1	NR
3	Handhole Cover Gasket	1	See (a)
4	Seat Ring	1	NR
5	Clapper	1	See (b)
6	Clapper Facing	1	See (a) or (b)
7	Clapper Washer	1	See (b)
8	Lock Nut, 2-1/2 Inch Valve	1	See (b)
	Self-Locking Hex Cap Screw, 4, 6, & 8 Inch Valves	1	See (b)
9	Clapper Hinge Pin	1	See (b)
10	Clapper Hinge Pin Bushing, 2-1/2 Inch Valve	2	NR
	4, 6, & 8 Inch Valves	4	NR
11	Clapper Spring	1	See (b)

VALVE PARTS			
NO.	DESCRIPTION	QTY.	REF.
12	Handhole Cover Hex Bolt, 2-1/2 Inch Valve, 1/2-13 UNC-2A x 1-1/4" Long	4	CH
	4 Inch Valve, 1/2-13 UNC-2A x 1-3/4" Long	4	CH
	6 Inch Valve, 1/2-13 UNC-2A x 1-3/4" Long	6	CH
	8 Inch Valve, 3/4-10 UNC-2A x 2" Long	6	CH
13	Clapper Hinge Pin Square Head Pipe Plug, 3/8" NPT, 4, 6, & 8 Inch Valves only	1	CH

REPLACEMENT PARTS		
NO.	DESCRIPTION	P/N
(a)	Repair Parts Kit, Includes 3 & 6	
	2-1/2 Inch Valve	92-200-1-216
	4 Inch Valve	92-200-1-416
	6 Inch Valve	92-200-1-620
	8 Inch Valve	92-200-1-816
(b)	Clapper Assembly, Includes 5-9, 11	
	2-1/2 Inch Valve	92-200-1-218
	Includes 5-11	
	4 Inch Valve	92-200-1-423
	6 Inch Valve	92-200-1-623
	8 Inch Valve	92-200-1-823

NOTES:

1. F x F valve shown for reference; components for G x G and F x G valves are shared.
2. NR: Not Replaceable
3. CH: Common Hardware

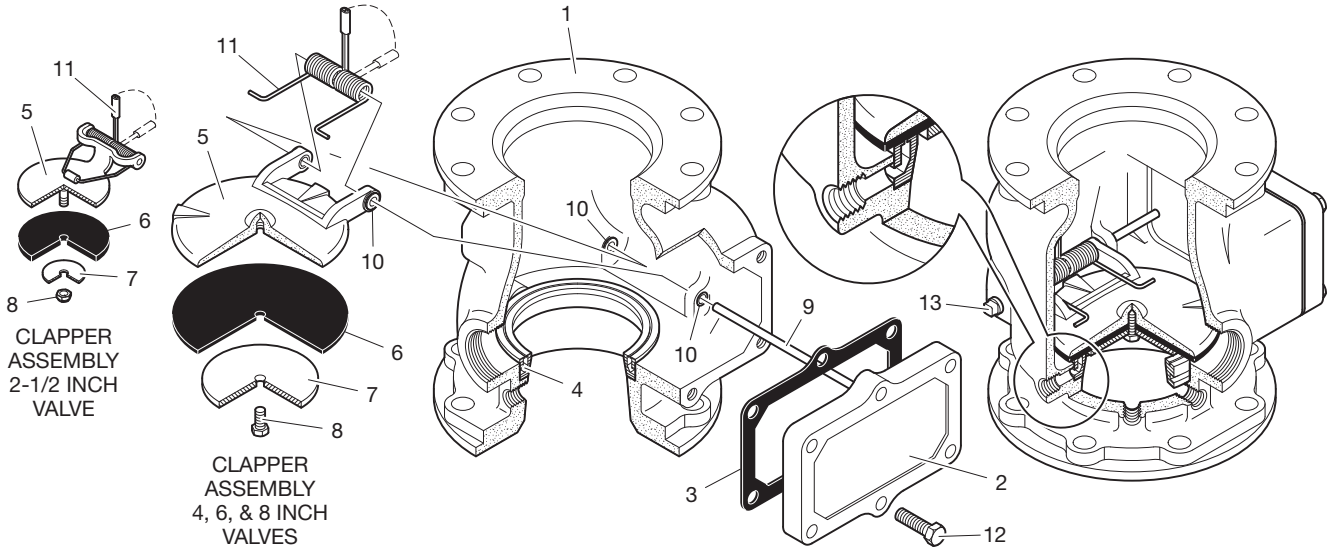
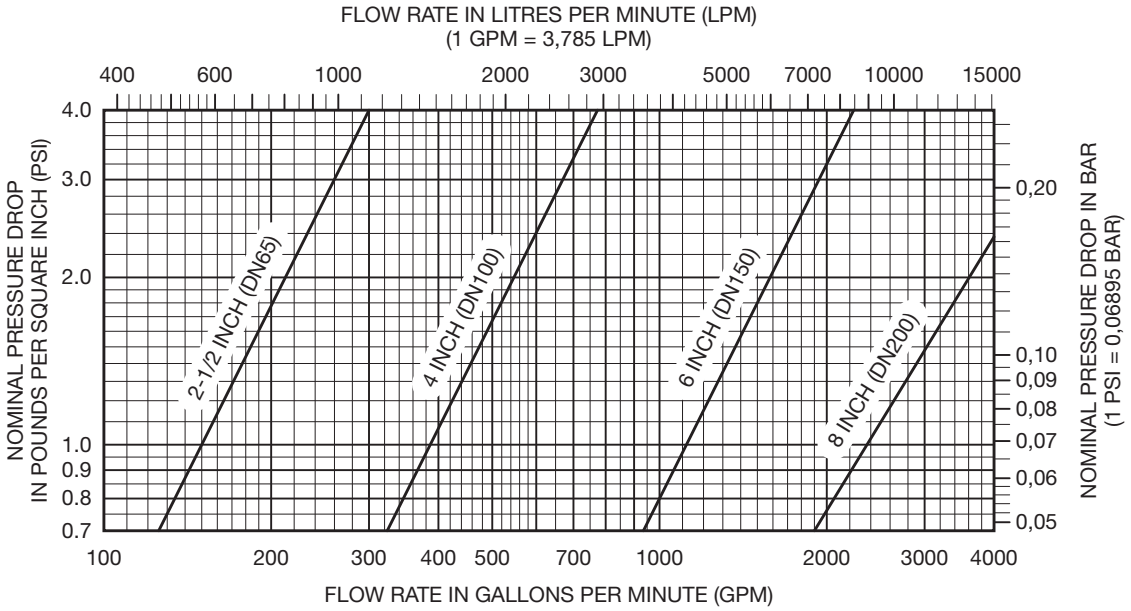


FIGURE 1
MODEL AV-1-300 ALARM CHECK VALVE ASSEMBLY

Nominal Valve Size Inches (DN)	Groove x Groove lb (kg)	Flange x Groove lb (kg)	Flange x Flange lb (kg)
2-1/2 (65)	22 (10,0)	28 (12,7)	N/A
4 (100)	38 (17,2)	47 (21,3)	57 (25,9)
6 (150)	58 (26,3)	70 (31,8)	84 (38,1)
8 (200)	102 (46,3)	120 (54,4)	149 (67,6)

TABLE A
MODEL AV-1-300 ALARM CHECK VALVE
AVAILABLE VALVE END CONNECTIONS AND VALVE WEIGHTS



GRAPH A
MODEL AV-1-300 ALARM CHECK VALVE
NOMINAL PRESSURE LOSS VERSUS FLOW

Nominal Valve Size in. (DN)	Flange Drilling Specification														
	Nominal Dimensions in. (mm)														
	ANSI B16.1 (Class 125)[1]			ISO2084 (PN10)[2]			ISO2084 (PN16)[3]			JIS B 2210 (10K)			AS 2129 (Table E)		
	Dim. A	Dim. B	Qty.	Dim. A	Dim. B	Qty.	Dim. A	Dim. B	Qty.	Dim. A	Dim. B	Qty.	Dim. A	Dim. B	Qty.
2-1/2 (DN65)	5,50 (139,7)	0.75 (19,0)	4	Use ISO 2084 (PN16)			5.71 (145,0)	0.71 (18,0)	4	5.51 (140,0)	0.75 (19,0)	4	5.00 (127,0)	0.71 (18,0)	4
4 (DN100)	7.50 (190,5)	0.75 (19,0)	8				7.09 (180,0)	0.71 (18,0)	8	6.89 (175,0)	0.75 (19,0)	8	7.00 (178,0)	0.71 (18,0)	8
6 (DN150)	9.50 (241,3)	0.87 (22,0)	8				9.45 (240,0)	0.87 (22,0)	8	9.45 (240,0)	0.91 (23,0)	8	9.25 (235,0)	0.87 (22,0)	8
8 (DN200)	11.75 (298,5)	0.87 (22,0)	8	11.61 (295,0)	0.87 (22,0)	8	11.61 (295,0)	0.87 (22,0)	12	11.42 (290,0)	0.91 (23,0)	12	11.50 (292,0)	0.87 (22,0)	8

NOTES
1. Same drilling as for B16.5 (Class 150) and B16.42 (Class 150).
2. Same drilling as for B4504 Section 3.2 (PN10) and DIN2532 (PN10).
3. Same drilling as for B4504 Section 3.2 (PN16) and DIN 2532 (PN16).

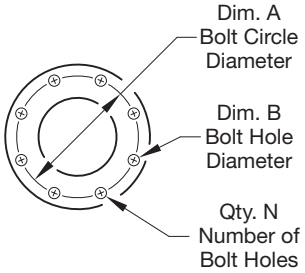


TABLE B
MODEL AV-1-300 ALARM CHECK VALVE
FLANGE DRILLING SPECIFICATIONS

Operation

When the fire protection system is initially pressurized, water flows into the system until the water supply and system pressure become equalized, and the torsion Spring closes the Waterway Clapper in the Alarm Check Valve. Once the pressures stabilize, the Alarm Check Valve is in service and the centrally located groove in the Seat Ring is sealed. Consequently, with the Alarm Check Valve set for service, there is no flow through the alarm port to the alarm devices (i.e., water motor alarm and/or pressure alarm switch).

When there is a steady flow of water into the sprinkler system due to a sprinkler operation, the Waterway Clapper opens as shown in Figure 2. Water is then permitted to flow into the centrally located groove in the Seat Ring and out through the alarm port towards the Restriction Assembly as shown in Figure 3. When the flow through the Inlet Restriction of the Restriction Assembly exceeds the flow through the Outlet Restriction, the Retard Chamber (where provided for systems with variable pressure), begins to fill.

Subsequently, the Water Motor Alarm and/or the pressure alarm switch will be actuated. The alarms will continue to be actuated as long as the Waterway Clapper remains open. Water in the alarm lines will automatically drain out through the 1/8 inch (3,2 mm) Drain Orifice in the Restriction Assembly (see Figure 3) when the Waterway Clapper closes (due to a stop in the flow of water into the sprinkler system).

For variable pressure systems, slow as well as small transient increases in water supply pressure may continue to build up in the system (via the Bypass Check Valve) without opening the Waterway Clapper.

A transient surge in supply pressure that is sufficient only to open the Waterway Clapper momentarily will not cause a false alarm, and a portion of the increase in pressure will be trapped within the system, thus reducing the possibility of another opening. Any water in the alarm line is automatically drained, further reducing the possibility of a false alarm due to a successive transient surge in supply pressure.

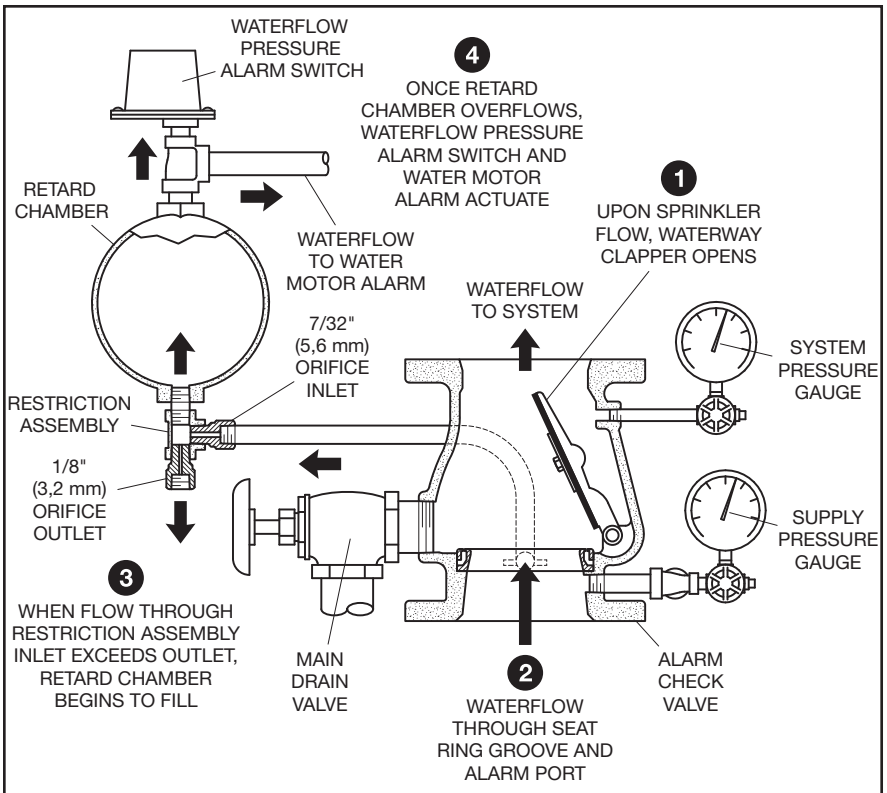


FIGURE 2
MODEL AV-1-300 ALARM CHECK VALVE OPERATION

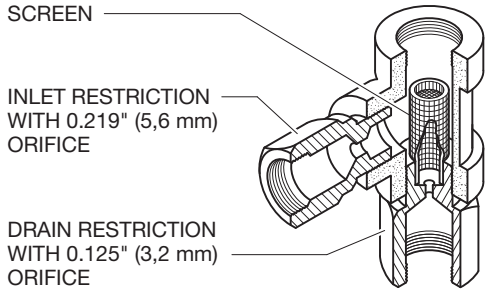


FIGURE 3
RESTRICTION ASSEMBLY
(PROVIDED WITH ALARM CHECK VALVE TRIM)

Design Criteria

In planning installation of the TYCO Model AV-1-300 Alarm Check Valves, consideration must be given to the disposal of the large quantities of water that may be associated with draining the system or performing a flow test.

Valves installed in the vertical position must have the flow going up. Valves installed in the horizontal position must be positioned so that the drain connection points down.

The sprinkler system designer must be aware that the configuration of the piping network and its tendency to trap pockets of air (such as in the case of a peaked-roof gridded system) can affect the performance of the alarm system. Although a slight amount of trapped air is desirable to prevent significant pressure increases due to thermally induced expansion of the water, a large quantity of trapped air in a system may result in the possibility of an intermittent alarm.

The possibility of an intermittent alarm condition is a consequence of the fact

that the flow out of the system through the test valve or a single sprinkler is very small relative to the flow that can be passed through the valve. This difference increases with valve size. If the system were free of trapped air, flow in would equal flow out and the Waterway Clapper would always stabilize at some open position (as needed to accommodate the required flow). With trapped air in the system, however, the Waterway Clapper first opens wider since the system initially demands greater flow until the air pockets are compressed (back to nearly the supply pressure), and then it will tend to return closer to the Seat Ring. If the volume of the air pockets is excessive, flow into the system can be momentarily reduced to nearly zero (once the air pockets are compressed) and the Waterway Clapper may close, causing flow to the alarms to be shutoff.

After the Waterway Clapper has closed, sufficient water must flow out of the system before the Waterway Clapper will again open. A repetition of the above described condition is termed an intermittent alarm.

Using a vent (which can also serve as an end-of-line Inspector's Test Connection) piped from the top of a cross main or end of a branch line at the point most remote from the alarm valve, and filling the system slowly in accordance with the steps described in the Setting Procedure section, can prevent an excessive amount of air from being trapped.

Installation

NOTICE

Proper operation of the TYCO Model AV-1-300 Alarm Check Valves depends upon the trim described in this data sheet installed in accordance with the following instructions. Failure to follow the appropriate trim installation instructions may prevent the device from functioning properly as well as void listings/approvals and the manufacturer's warranties.

The Alarm Check Valves must be installed in readily visible and accessible locations.

It is recommended that provision be made for viewing the alarm line drain water by locating the main drain outlet in a readily visible area.

Wet pipe fire protection systems must be maintained at a minimum temperature of 40°F (4°C).

Step 1. Trim the Alarm Check Valve in accordance with Figure 4, 5, or 6, as applicable. Apply pipe-thread sealant sparingly to male threads only.

Step 2. The Alarm Vent Trim illustrated in Figure 8 must be installed if a water motor alarm is not to be used.

Step 3. Plug unused alarm connections.

Step 4. Suitable provision must be made for disposal of alarm line and system drainage water. Drainage water must be directed so that it will not cause damage or result in dangerous conditions.

Step 5. The alarm line drain must be arranged so that there will be no danger of freezing.

Step 6. The check valve in the externally mounted bypass around the Waterway Clapper must be installed with its arrow pointed up, and the drain check valve must be installed with its arrow pointing towards the drain.

Step 7. It is recommended that a vent connection (which may also be used as an end-of-line Inspector's Test Connection), be piped from a cross main or branch line at the point most remote from the alarm valve. The vent line should be connected to the top of a cross main or to the end of a branch line and be located at the highest level of a multi-level installation.

The vent connection can be used to bleed-off excessive air from the system, and therefore, minimize the possibility of a false alarm due to a transient surge in supply pressure. The contraction/expansion associated with an excessive amount of trapped air could also cause the Waterway Clapper to cycle open and shut during an inspector's test or during a discharge by a single sprinkler.

Setting Procedure

Steps 1 through 11 are to be performed when initially setting the Model AV-1-300 Alarm Check Valve or after system operation due to a fire.

NOTICE

Filling the system with water will result in operation of the associated alarms. Consequently, notification must first be given to the owner and fire department, central station, or other signal station to which the alarms are connected.

Notify the proper authorities and all personnel who may be affected that an alarm test is to be performed.

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

Step 1. Open the 1/4 inch Gauge Test Valves for the Supply and System Pressure Gauges.

Step 2. Check to see that the Handhole Cover bolts are tight. If not, cross-tighten them.

Step 3. Close the Alarm Test Valve.

Step 4. Open the remote cross main or branch line vent connection. (Refer to Step 7 in the Installation section.)

Step 5. Slowly open the main control valve until the sound of flowing water just begins and then open the valve one more turn.

Step 6. Close the remote branchline vent connection after the discharge of aerated water ceases, and the outlet has flowed full for at least 15 seconds.

Step 7. Fully open the main control valve.

Step 8. Open the end-of-line Inspector's Test Connection (or Alarm Test Valve, if acceptable to the authority having jurisdiction) and verify that the system alarms operate.

Step 9. Close the end-of-line Inspector's Test Connection (or Alarm Test Valve).

Step 10. Verify that water ceases to flow from the alarm line drain. If water continues to flow, follow the corrective procedure described in the Care and Maintenance section.

The Restriction Assembly has a 1/8 in. (3,2 mm) diameter drain orifice. Sufficient time must be allowed for drainage of the Retard Chamber and the piping to the water motor alarm.

Step 11. After verification that the flow of water out of the alarm line drain has stopped, the alarm valve is set and is ready for service.

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-003
3	1/2" Swing Check Valve	2	46-049-1-007
4	1/2" Globe Valve	1	46-047-1-005
5	1/2" Y-Strainer	1	52-353-1-006
6	Restriction Assembly	1	92-210-2-005
7	1-1/4" Angle Valve	1	46-048-1-011
8	External By-Pass Tube	1	92-304-1-017
9	Alarm Test Tube	1	92-304-1-047
10	1/2" NPT x 1/2" Tube Connector	2	CH
11	1/2" NPT x 5/8" Tube Connector	2	CH
12	1/4" Plug	2	CH
13	1/2" Union	1	CH
14	1/4" 90° Elbow	1	CH
15	1/2" 90° Elbow	1	CH
16	1/2" Tee	2	CH

NO.	DESCRIPTION	QTY.	P/N
17	1/2" x 1/4" x 1/2" Tee	2	CH
18	1/2" x 1/2" x 3/4" Tee	1	CH
19	1-1/4" x 1-1/4" x 1/2" Tee	1	CH
20	1/4" x 1" Nipple	2	CH
21	1/4" x 2-1/2" Nipple	1	CH
22	1/2" x 1-1/2" Nipple	7	CH
23	1/2" x 2" Nipple	2	CH
24	1/2" x 2-1/2" Nipple	1	CH
25	1/2" x 3" Nipple	1	CH
26	1/2" x 4" Nipple	1	CH
27	1/2" x 6" Nipple	1	CH
28	1-1/4" x 2-1/2" Nipple	1	CH
29	1-1/4" x 3-1/2" Nipple	1	CH

NOTES:

1. All Fittings and Nipples are galvanized (Standard Order).
2. CH: Common Hardware.

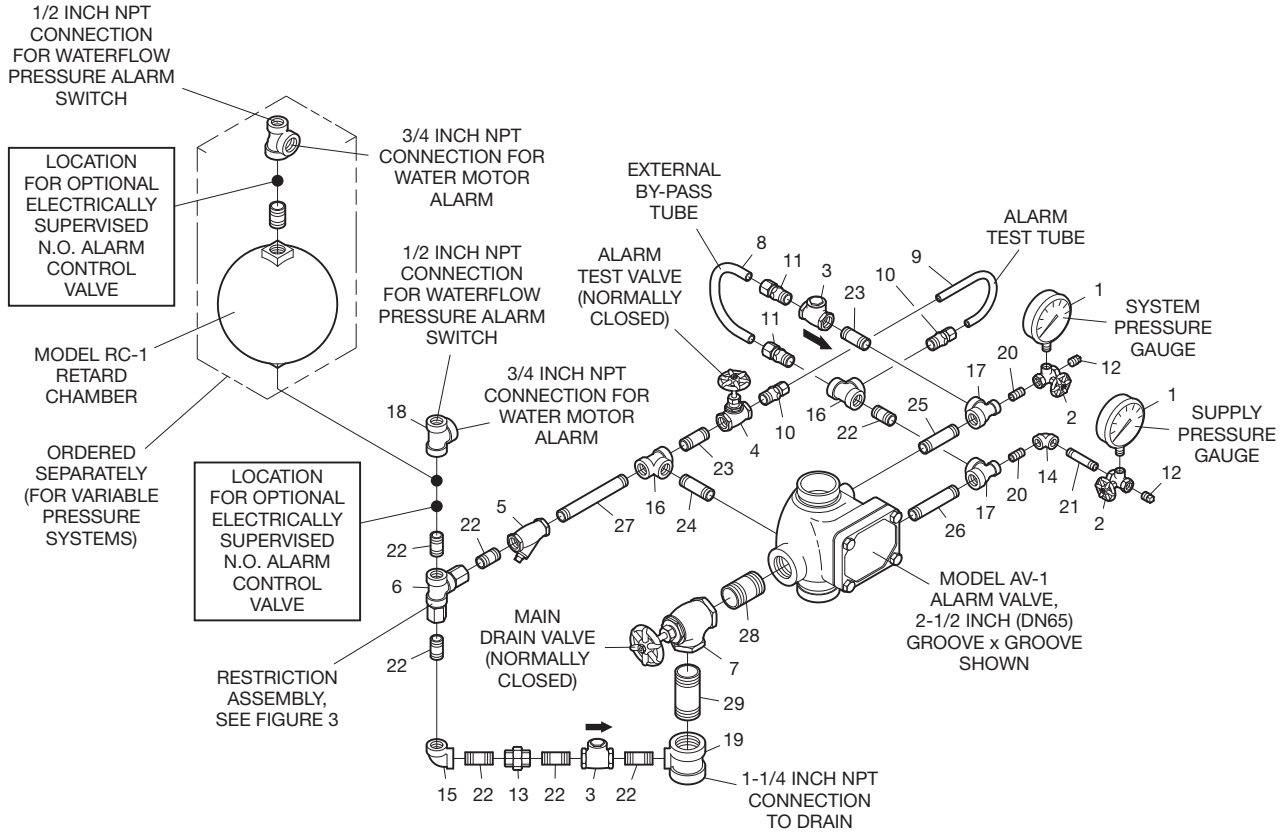


FIGURE 4 (1 OF 3)
VERTICAL CLOSED DRAIN TRIM — STANDARD ORDER
FOR 2-1/2 INCH (DN65) MODEL AV-1-300 ALARM CHECK VALVES (P/N 52-204-4-950)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-003
3	1/2" Swing Check Valve	2	46-049-1-007
4	1/2" Globe Valve	1	46-047-1-005
5	1/2" Y-Strainer	1	52-353-1-006
6	Restriction Assembly	1	92-210-2-005
7	2" Angle Valve	1	46-048-1-012
8	1/4" Plug	2	CH
9	1/2" x 1/4" Reducing Bushing	1	CH
10	1/2" Union	3	CH
11	1/2" 90° Elbow	4	CH
12	1/2" 45° Elbow	1	CH
13	1/2" x 1/4" x 1/2" Tee	1	CH
14	1/2" x 1/2" x 3/4" Tee	1	CH
15	1/2" Tee	1	CH
16	2" x 2" x 1/2" Tee	1	CH
17	1/4" x Close Nipple	1	CH
18	1/4" x 4" Nipple	1	CH
19	1/2" x Close Nipple	4	CH
20	1/2" x 1-1/2" Nipple	5	CH
21	1/2" x 2" Nipple	2	CH

NO.	DESCRIPTION	QTY.	P/N
22	1/2" x 3" Nipple	2	CH
23	1/2" x 3-1/2" Nipple	1	CH
24	1/2" x 5" Nipple	1	CH
25	1/2" x 5-1/2" Nipple	1	CH
26	1/2" x 6-1/2" Nipple	1	CH
27	Select Nipple per Table	2	CH
28	Select Nipple per Table	2	CH
29	2" x 3" Nipple	2	CH

Nipple Number	Select Appropriate Nipple Sizes per AV-1 Alarm Check Valve Size	
	4 Inch (DN100)	6 Inch (DN150)
27	1/2" x 1-1/2"	1/2" x 2-1/2"
28	1/2" x 3-1/2"	1/2" x 4-1/2"

NOTES:

1. Install subassemblies in alphabetical order.
2. All Fittings and Nipples are galvanized (Standard Order).
3. CH: Common Hardware.

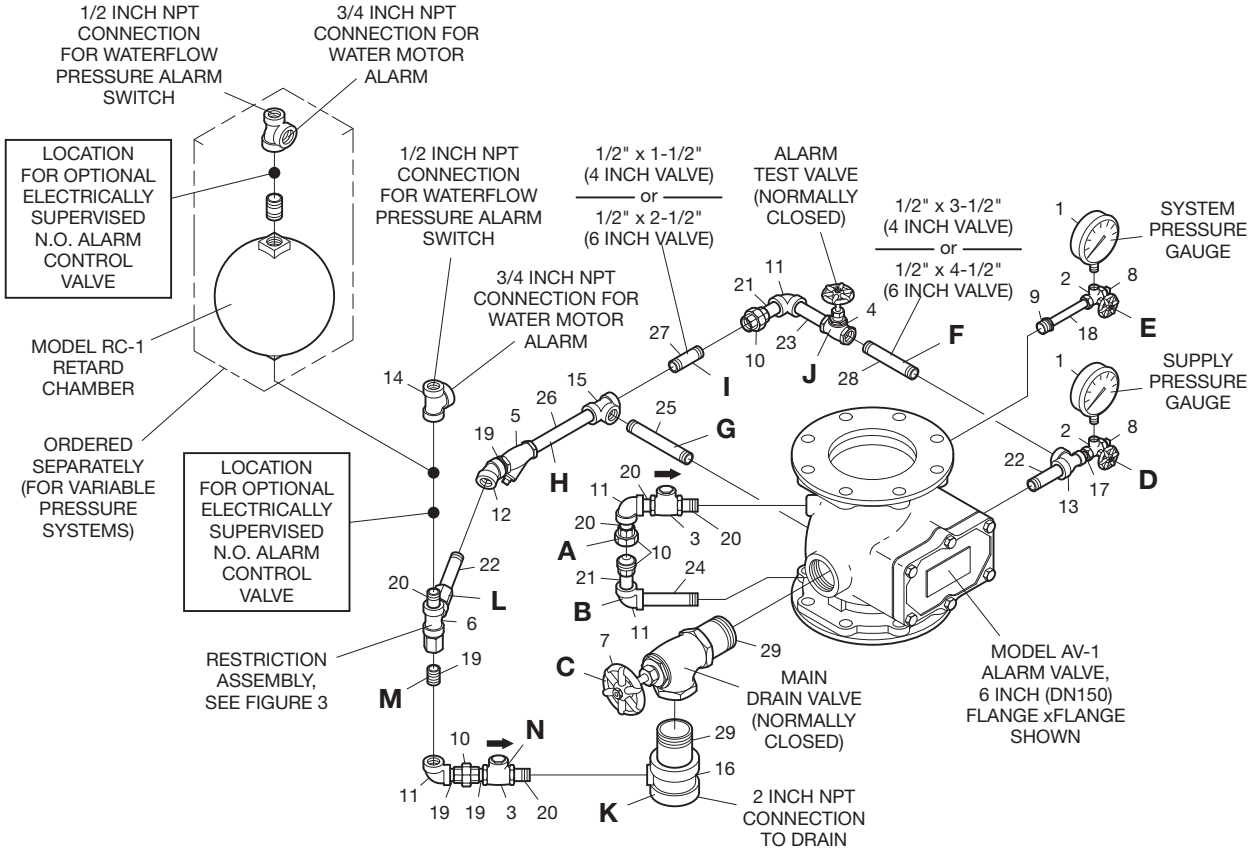


FIGURE 4 (2 OF 3)
VERTICAL CLOSED DRAIN TRIM — STANDARD ORDER — SEMI-PREASSEMBLED
FOR 4 & 6 INCH (DN100 & DN150) MODEL AV-1-300 ALARM CHECK VALVES (P/N 52-204-4-951)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-003
3	1/2" Swing Check Valve	1	46-049-1-007
4	3/4" Swing Check Valve	1	46-049-1-008
5	1/2" Globe Valve	1	46-047-1-005
6	1/2" Y-Strainer	1	52-353-1-006
7	Restriction Assembly	1	92-210-2-005
8	2" Angle Valve	1	46-048-1-012
9	1/4" Plug	2	CH
10	1/2" Union	2	CH
11	3/4" Union	1	CH
12	1/2" 90° Elbow	2	CH
13	1/2" 45° Elbow	1	CH
14	1/2" Tee	1	CH
15	1/2" x 1/2" x 3/4" Tee	1	CH
16	3/4" x 1/4" x 3/4" Tee	2	CH
17	3/4" x 3/4" x 1/2" Tee	1	CH
18	2" x 2" x 1/2" Tee	1	CH
19	1/4" x 1-1/2" Nipple	2	CH
20	1/2" x Close Nipple	3	CH
21	1/2" x 1-1/2" Nipple	3	CH

NO.	DESCRIPTION	QTY.	P/N
22	1/2" x 2" Nipple	1	CH
23	1/2" x 3" Nipple	1	CH
24	1/2" x 3-1/2" Nipple	2	CH
25	1/2" x 4-1/2" Nipple	2	CH
26	1/2" x 6-1/2" Nipple	1	CH
27	3/4" x Close Nipple	2	CH
28	3/4" x 1-1/2" Nipple	1	CH
29	3/4" x 2-1/2" Nipple	1	CH
30	3/4" x 3" Nipple	1	CH
31	3/4" x 4-1/2" Nipple	1	CH
32	2" x 3" Nipple	1	CH
33	2" x 3-1/2" Nipple	1	CH

NOTES:
1. Install subassemblies in alphabetical order.
2. All Fittings and Nipples are galvanized (Standard Order).
3. CH: Common Hardware.

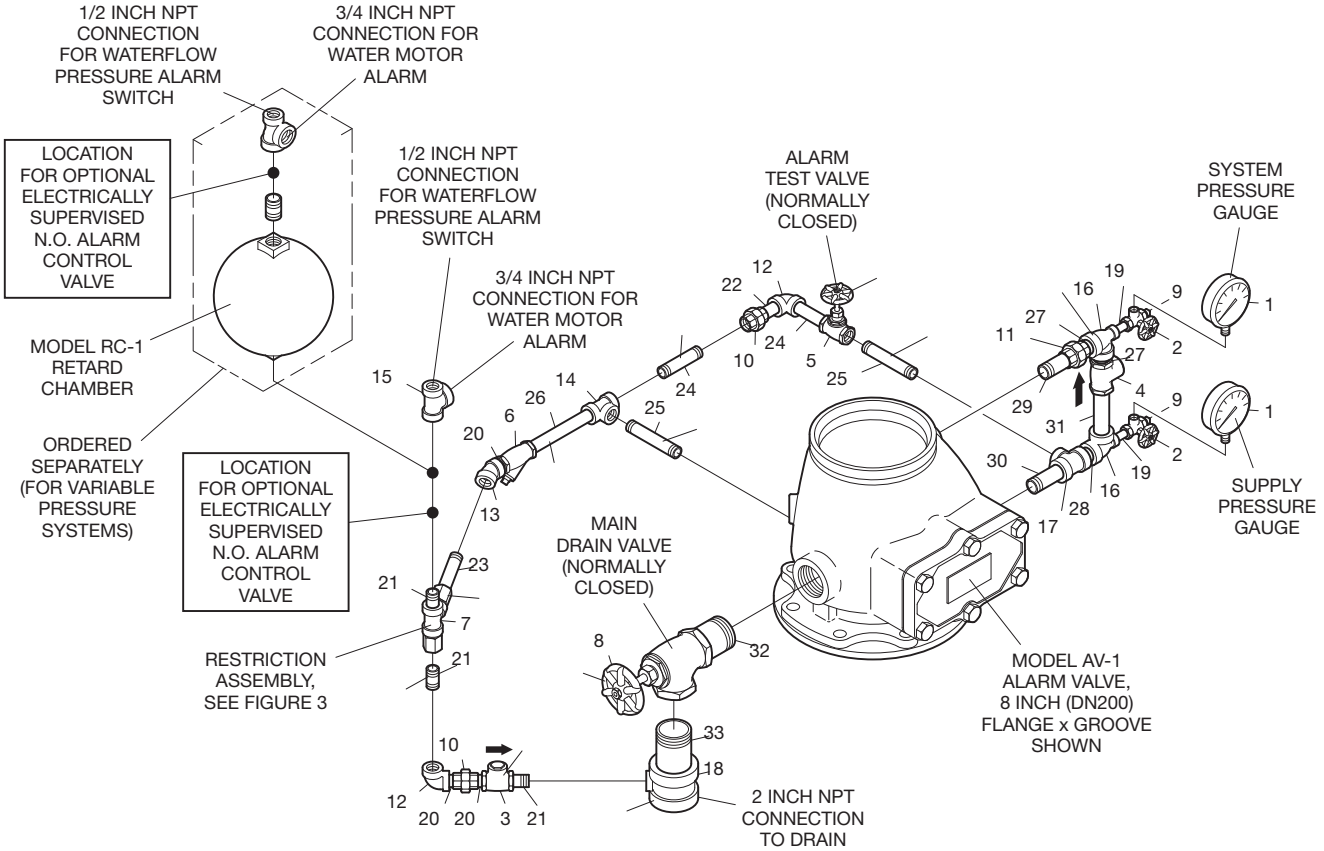


FIGURE 4 (3 OF 3)
VERTICAL CLOSED DRAIN TRIM — STANDARD ORDER — SEMI-PREASSEMBLED FOR 8 INCH (DN200) MODEL AV-1-300 ALARM CHECK VALVES (P/N 52-204-4-952)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-003
3	1/2" Swing Check Valve	1	46-049-1-007
4	1/2" Globe Valve	1	46-047-1-005
5	1/2" Y-Strainer	1	52-353-1-006
6	Restriction Assembly	1	92-210-2-005
7	1-1/4" Angle Valve	1	46-048-1-011
8	External By-Pass Tube	1	92-304-1-017
9	Alarm Test Tube	1	92-304-1-047
10	1/2" NPT x 1/2" Tube Connector	2	CH
11	1/2" NPT x 5/8" Tube Connector	2	CH
12	Support Bar	1	92-304-1-014
13	Jam Nut	1	92-640-1-037
14	PVC Nipple	1	92-640-1-009
15	Support Bracket	1	92-343-1-006
16	Drip Funnel	1	92-343-1-007
17	1/4" Plug	2	CH

NO.	DESCRIPTION	QTY.	P/N
18	1/4" 90° Elbow	1	CH
19	1/2" Tee	2	CH
20	1/2" x 1/4" x 1/2" Tee	2	CH
21	1/2" x 1/2" x 3/4" Tee	1	CH
22	1-1/4" x 1-1/4" x 1/2" Tee	2	CH
23	1/4" x 1" Nipple	2	CH
24	1/4" x 2-1/2" Nipple	1	CH
25	1/2" x 1-1/2" Nipple	3	CH
26	1/2" x 2" Nipple	2	CH
27	1/2" x 2-1/2" Nipple	1	CH
28	1/2" x 3" Nipple	1	CH
29	1/2" x 4" Nipple	1	CH
30	1/2" x 5" Nipple	1	CH
31	1-1/4" x 2-1/2" Nipple	2	CH
32	1-1/4" x 8-1/2" Nipple	1	CH

NOTES:
1. All Fittings and Nipples are galvanized (Standard Order).
2. CH: Common Hardware.

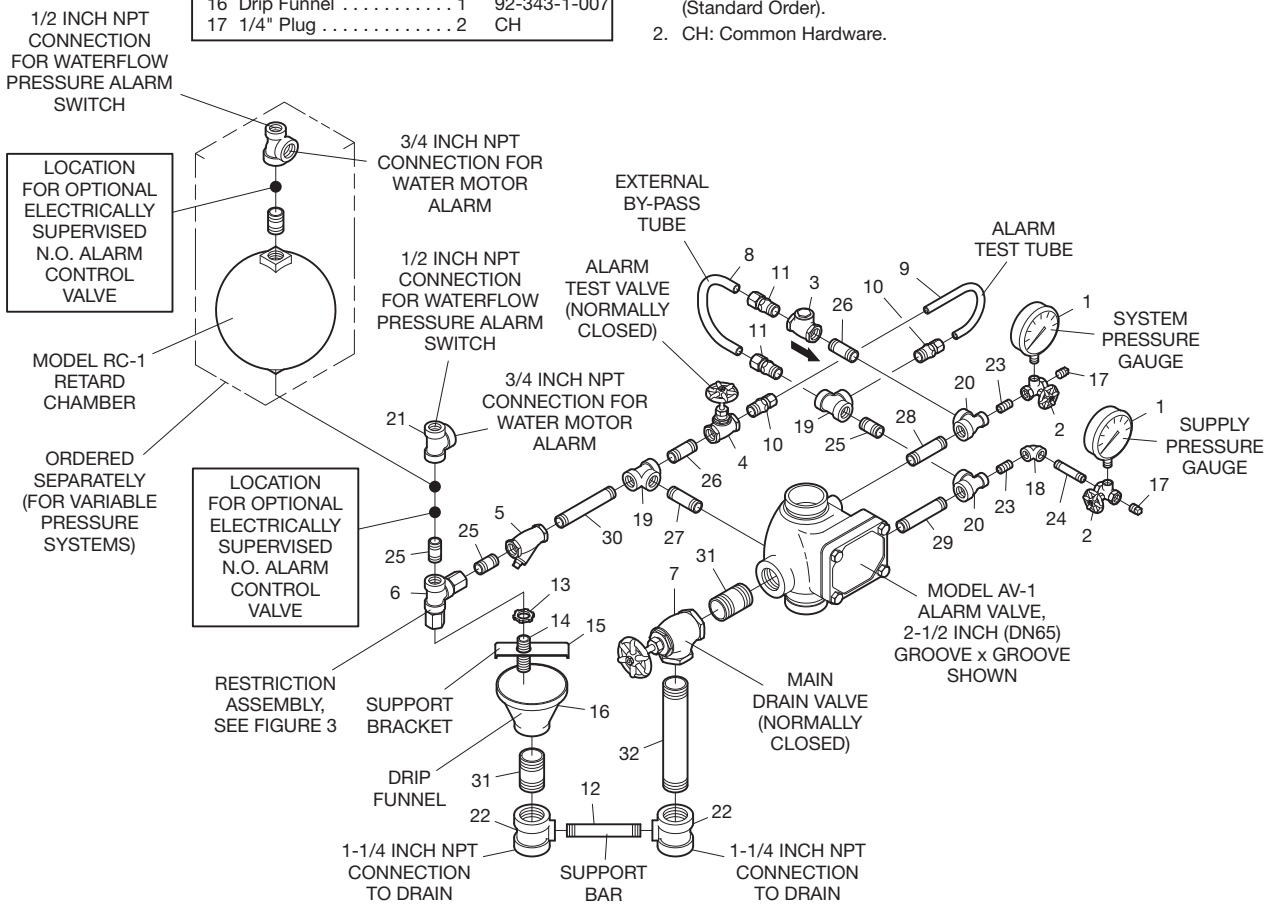


FIGURE 5 (1 OF 3)
VERTICAL OPEN DRAIN TRIM — SPECIAL ORDER
FOR 2-1/2 INCH (DN65) MODEL AV-1-300 ALARM CHECK VALVES (P/N 52-204-4-053)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-003
3	1/2" Swing Check Valve	1	46-049-1-007
4	1/2" Globe Valve	1	46-047-1-005
5	1/2" Y-Strainer	1	52-353-1-006
6	Restriction Assembly	1	92-210-2-005
7	2" Angle Valve	1	46-048-1-012
8	Drip Funnel Connector	1	92-211-1-005
9	Drip Funnel Bracket	1	92-211-1-003
10	Drip Funnel	1	92-343-1-007
11	1/4" Plug	2	CH
12	1/2" x 1/4" Reducing Bushing	1	CH
13	1/2" Union	2	CH
14	1/2" 90° Elbow	3	CH
15	1/2" 45° Elbow	1	CH
16	1/2" x 1/4" x 1/2" Tee	1	CH
17	1/2" x 1/2" x 3/4" Tee	1	CH
18	1/2" Tee	2	CH
19	1/4" x Close Nipple	1	CH
20	1/4" x 4" Nipple	1	CH
21	1/2" x Close Nipple	3	CH

NO.	DESCRIPTION	QTY.	P/N
22	1/2" x 1-1/2" Nipple	4	CH
23	1/2" x 2" Nipple	2	CH
24	1/2" x 3" Nipple	1	CH
25	1/2" x 3-1/2" Nipple	1	CH
26	1/2" x 5" Nipple	1	CH
27	1/2" x 5-1/2" Nipple	1	CH
28	1/2" x 6-1/2" Nipple	1	CH
29	Select Nipple per Table	2	CH
30	Select Nipple per Table	2	CH
31	2" x 3" Nipple	1	CH

Nipple Number	Select Appropriate Nipple Sizes per AV-1 Alarm Check Valve Size	
	4 Inch (DN100)	6 Inch (DN150)
29	1/2" x 1-1/2"	1/2" x 2-1/2"
30	1/2" x 3-1/2"	1/2" x 4-1/2"

NOTES:

1. Install subassemblies in alphabetical order.
2. All Fittings and Nipples are galvanized (Standard Order).
3. CH: Common Hardware.

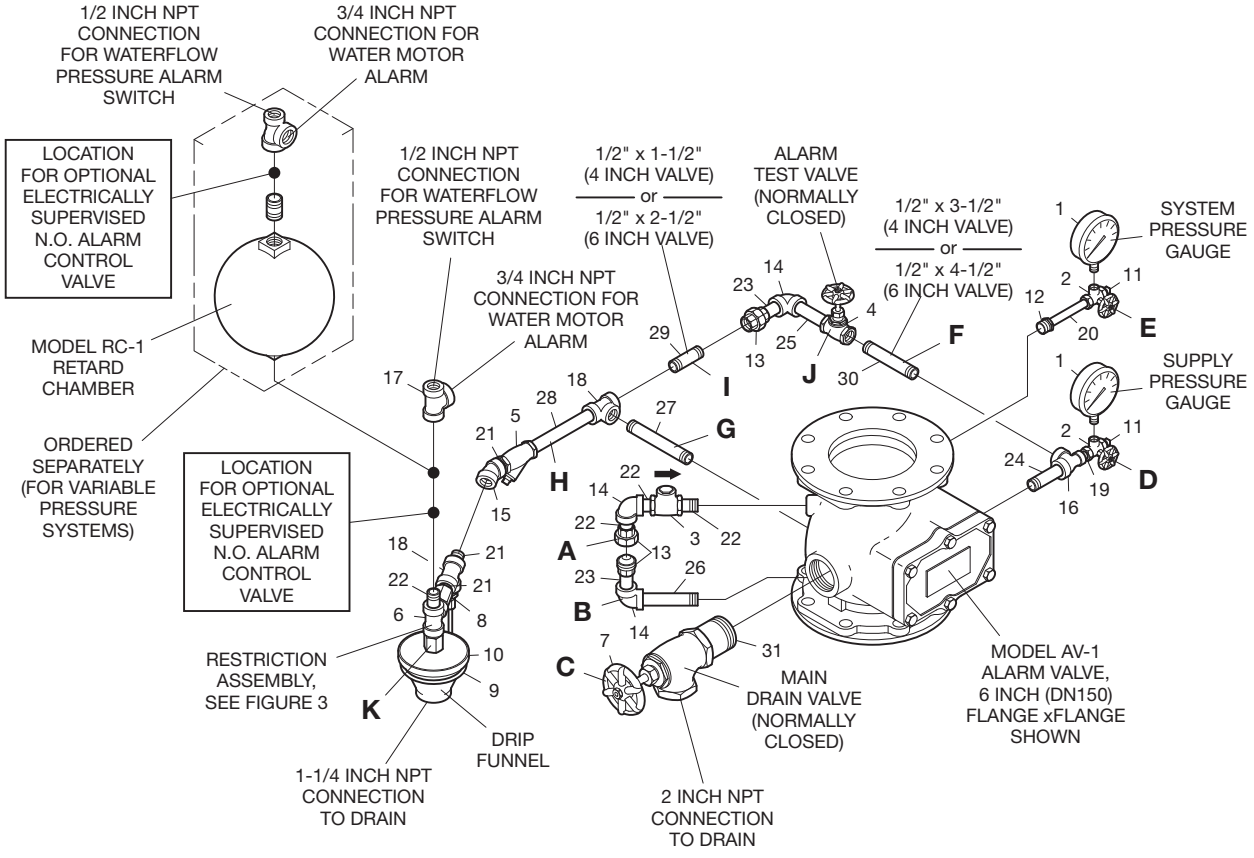


FIGURE 5 (2 OF 3)
VERTICAL OPEN DRAIN TRIM — SPECIAL ORDER — SEMI-PREASSEMBLED
FOR 4 & 6 INCH (DN100 & DN150) MODEL AV-1-300 ALARM CHECK VALVES (P/N 52-204-4-954)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-003
3	3/4" Swing Check Valve	1	46-049-1-008
4	1/2" Globe Valve	1	46-047-1-005
5	1/2" Y-Strainer	1	52-353-1-006
6	Restriction Assembly	1	92-210-2-005
7	2" Angle Valve	1	46-048-1-012
8	Drip Funnel Connector	1	92-211-1-005
9	Drip Funnel Bracket	1	92-211-1-003
10	Drip Funnel	1	92-343-1-007
11	1/4" Plug	2	CH
12	1/2" Union	1	CH
13	3/4" Union	1	CH
14	1/2" 90° Elbow	1	CH
15	1/2" 45° Elbow	1	CH
16	1/2" Tee	2	CH
17	1/2" x 1/2" x 3/4" Tee	1	CH
18	3/4" x 1/4" x 3/4" Tee	2	CH
19	3/4" x 3/4" x 1/2" Tee	1	CH

NO.	DESCRIPTION	QTY.	P/N
20	1/4" x 1-1/2" Nipple	2	CH
21	1/2" x Close Nipple	3	CH
22	1/2" x 1-1/2" Nipple	1	CH
23	1/2" x 2" Nipple	1	CH
24	1/2" x 3-1/2" Nipple	2	CH
25	1/2" x 4-1/2" Nipple	2	CH
26	1/2" x 6-1/2" Nipple	1	CH
27	3/4" x Close Nipple	2	CH
28	3/4" x 1-1/2" Nipple	1	CH
29	3/4" x 2-1/2" Nipple	1	CH
30	3/4" x 3" Nipple	1	CH
31	3/4" x 4-1/2" Nipple	1	CH
32	2" x 3" Nipple	1	CH

NOTES:

1. Install subassemblies in alphabetical order.
2. All Fittings and Nipples are galvanized (Standard Order).
3. CH: Common Hardware.

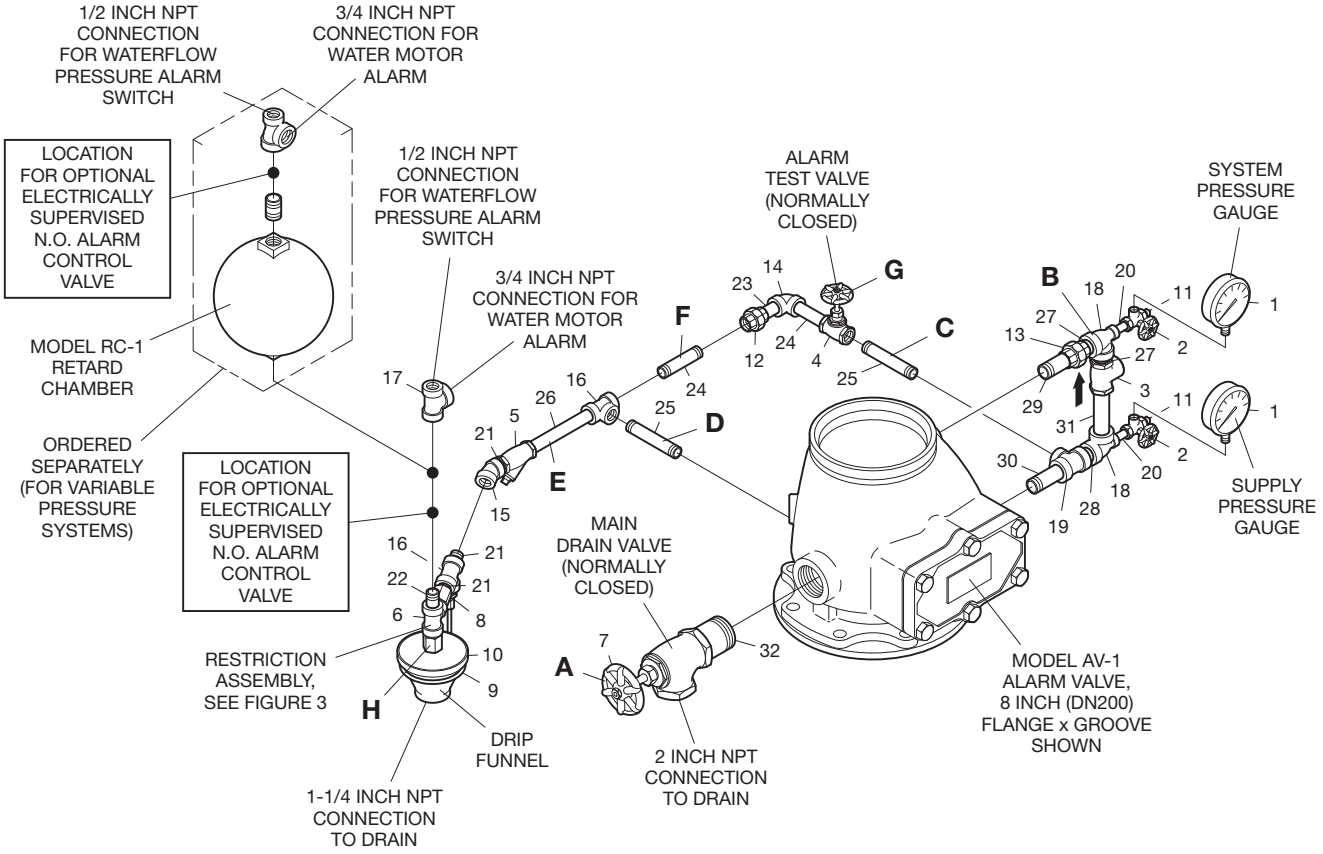


FIGURE 5 (3 OF 3)
VERTICAL OPEN DRAIN TRIM — SPECIAL ORDER — SEMI-PREASSEMBLED
FOR 8 INCH (DN200) MODEL AV-1-300 ALARM CHECK VALVES (P/N 52-204-4-955)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-003
3	1/2" Swing Check Valve	2	46-049-1-007
4	1/2" Globe Valve	1	46-047-1-005
5	1/2" Y-Strainer	1	52-353-1-006
6	Restriction Assembly	1	92-210-2-005
7	2" Globe Valve	1	46-047-1-010
8	1/4" Plug	2	CH
9	1/2" Union	3	CH
10	1/2" 90° Elbow	5	CH
11	1/2" x 1/4" x 1/2" Tee	1	CH
12	1/2" x 1/2" x 3/4" Tee	1	CH
13	1/2" Tee	1	CH
14	2" x 2" x 1/2" Tee	1	CH
15	1/4" x Close Nipple	1	CH
16	1/4" x 4" Nipple	1	CH
17	1/2" x 1-1/2" Nipple	8	CH
18	1/2" x 2" Nipple	3	CH
19	1/2" x 3" Nipple	2	CH
20	1/2" x 3-1/2" Nipple	1	CH

NO.	DESCRIPTION	QTY.	P/N
21	1/2" x 5" Nipple	1	CH
22	1/2" x 5-1/2" Nipple	1	CH
23	Select Nipple per Table	2	CH
24	Select Nipple per Table	2	CH
25	Select Nipple per Table	2	CH
26	2" x 2-1/2" Nipple	2	CH

Nipple Number	Select Appropriate Nipple Sizes per AV-1 Alarm Check Valve Size	
	4 Inch (DN100)	6 Inch (DN150)
23	1/2" x 1-1/2"	1/2" x 2-1/2"
24	1/2" x 3-1/2"	1/2" x 4-1/2"
25	1/2" x 7"	1/2" x 8"

NOTES:

1. All Fittings and Nipples are galvanized (Standard Order).
2. CH: Common Hardware.

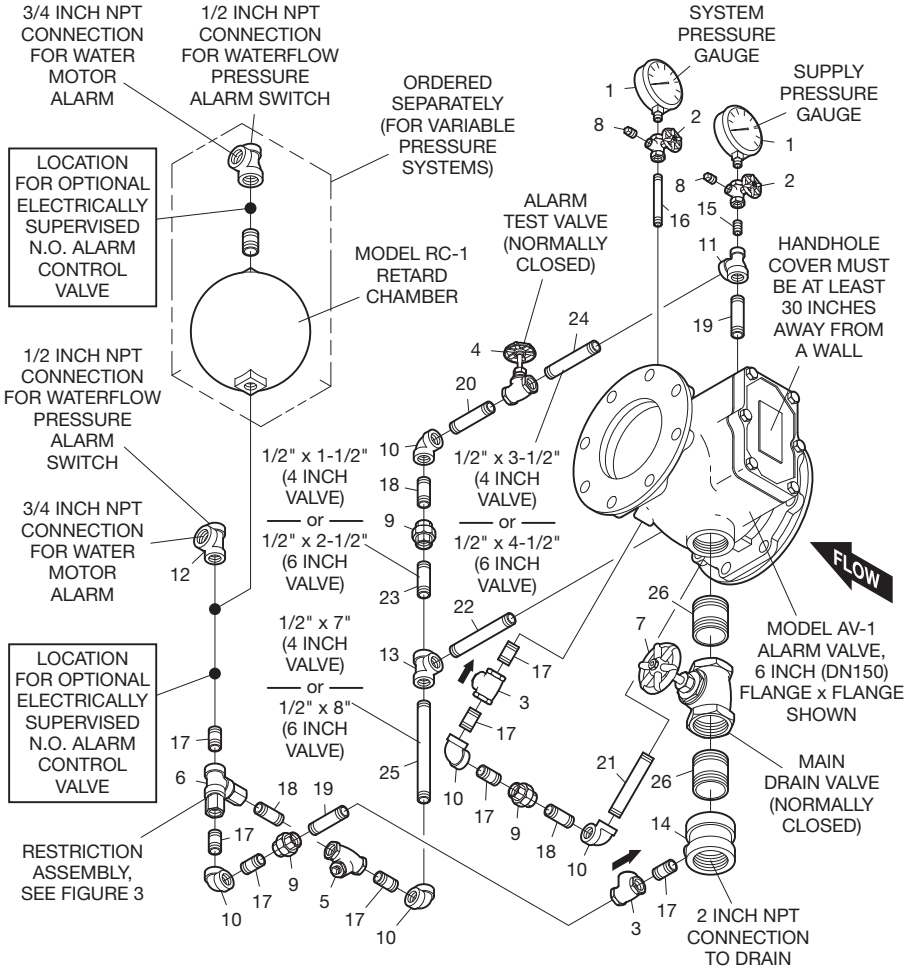


FIGURE 6 (1 OF 2)
HORIZONTAL CLOSED DRAIN TRIM — SPECIAL ORDER
FOR 4 & 6 INCH (DN100 & DN150) MODEL AV-1-300 ALARM CHECK VALVES (P/N 52-204-4-057)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-003
3	1/2" Swing Check Valve	1	46-049-1-007
4	3/4" Swing Check Valve	1	46-049-1-008
5	1/2" Globe Valve	1	46-047-1-005
6	1/2" Y-Strainer	1	52-353-1-006
7	Restriction Assembly	1	92-210-2-005
8	2" Globe Valve	1	46-047-1-010
9	1/4" Plug	2	CH
10	1/2" Union	2	CH
11	3/4" Union	1	CH
12	1/2" 90° Elbow	3	CH
13	1/2" Tee	1	CH
14	1/2" x 1/2" x 3/4" Tee	1	CH
15	3/4" x 1/4" x 3/4" Tee	2	CH
16	3/4" x 3/4" x 1/2" Tee	1	CH
17	2" x 2" x 1/2" Tee	1	CH
18	1/4" x 1-1/2" Nipple	2	CH
19	1/2" x 1-1/2" Nipple	5	CH
20	1/2" x 2" Nipple	2	CH
21	1/2" x 3" Nipple	1	CH

NO.	DESCRIPTION	QTY.	P/N
22	1/2" x 3-1/2" Nipple	2	CH
23	1/2" x 4-1/2" Nipple	2	CH
24	1/2" x 9-1/2" Nipple	1	CH
25	3/4" x Close Nipple	2	CH
26	3/4" x 1-1/2" Nipple	1	CH
27	3/4" x 2-1/2" Nipple	1	CH
28	3/4" x 3" Nipple	1	CH
29	3/4" x 4-1/2" Nipple	1	CH
30	2" x 2-1/2" Nipple	1	CH
31	2" x 3" Nipple	1	CH

NOTES:
1. All Fittings and Nipples are galvanized (Standard Order).
2. CH: Common Hardware.

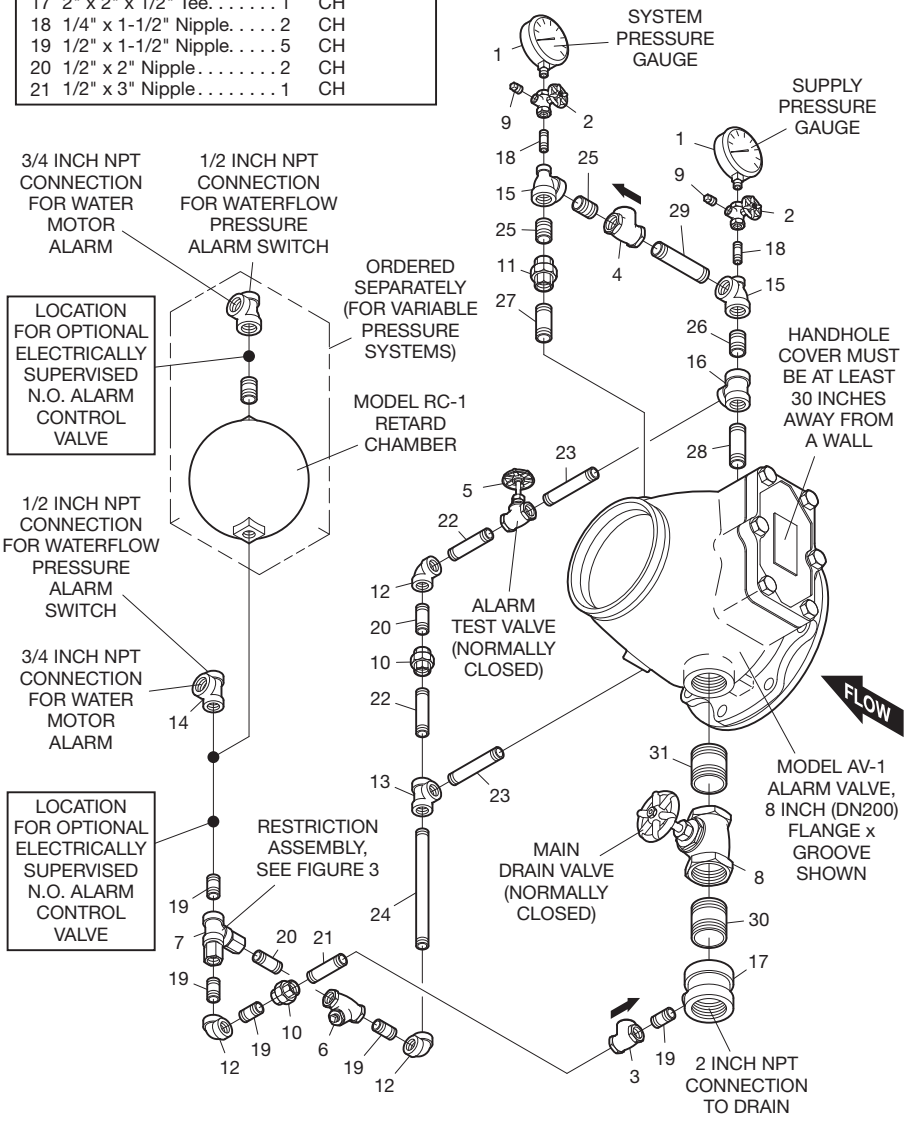
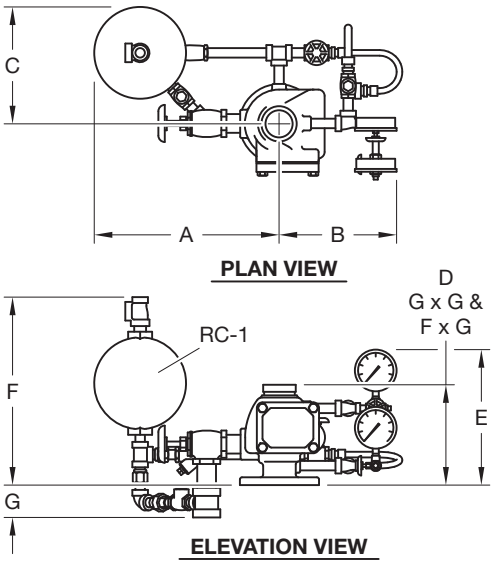
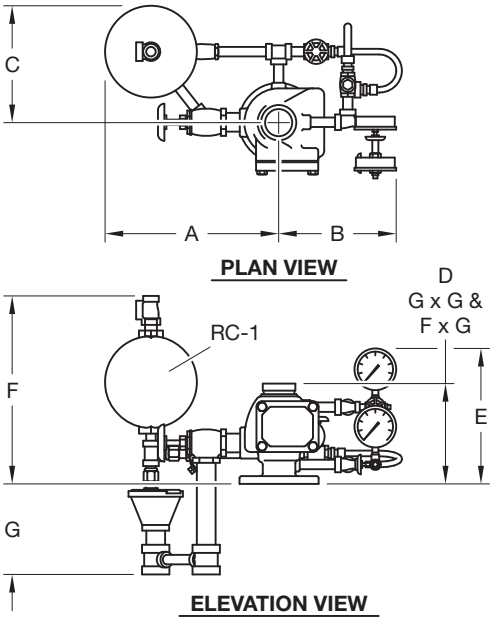


FIGURE 6 (2 OF 2)
HORIZONTAL CLOSED DRAIN TRIM — SPECIAL ORDER
FOR 8 INCH (DN200) MODEL AV-1-300 ALARM CHECK VALVES (P/N 52-204-4-058)

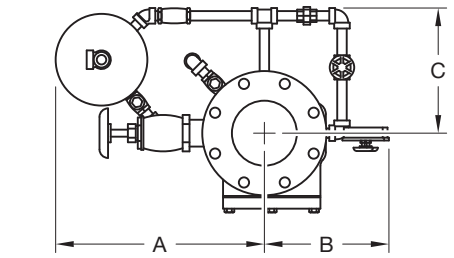


Vertical Closed Drain Trim		
Dimension	Dimensions in Inches and (mm)	
	With RC-1	Without RC-1
A	16-1/2 (419)	13-1/2 (343)
B	10-1/2 (267)	10-1/2 (267)
C	10-1/2 (267)	10 (254)
D	8-7/8 (225)	8-7/8 (225)
E	12-1/4 (311)	12-1/4 (311)
F	16-1/2 (419)	N/A
G	3 (75)	3 (75)

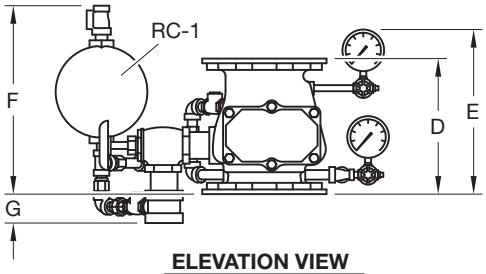


Vertical Open Drain Trim		
Dimension	Dimensions in Inches and (mm)	
	With RC-1	Without RC-1
A	15-1/2 (394)	13-1/2 (343)
B	10-1/2 (267)	10-1/2 (267)
C	10-1/2 (267)	10 (254)
D	8-7/8 (225)	8-7/8 (225)
E	12-1/4 (311)	12-1/4 (311)
F	16-1/2 (419)	N/A
G	3 (75)	3 (75)

FIGURE 7 (1 OF 3)
INSTALLATION DIMENSIONS
FOR 2-1/2 INCH (DN65) MODEL AV-1-300 ALARM CHECK VALVES

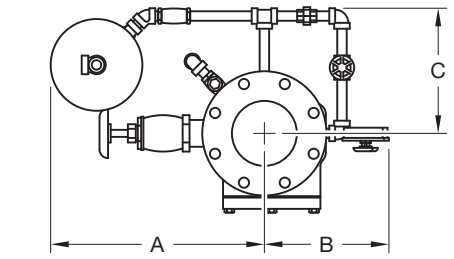


PLAN VIEW

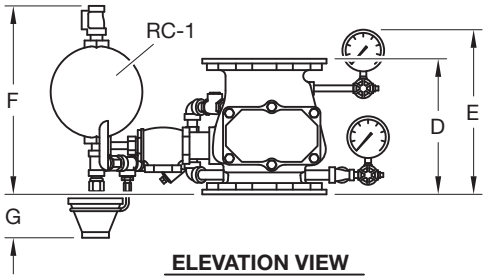


ELEVATION VIEW

Vertical Closed Drain Trim				
Dimension	Dimensions in Inches and (mm)			
	With RC-1		Without RC-1	
	4 Inch (DN100)	6 Inch (DN150)	4 Inch (DN100)	6 Inch (DN150)
A	19 (483)	19 (483)	19 (483)	19 (483)
B	10-1/2 (267)	11-1/4 (286)	10-1/2 (267)	11-1/4 (286)
C	10-1/2 (267)	11-1/2 (292)	10-1/2 (267)	11-1/2 (292)
D (G x G)	10-1/4 (260)	12-1/4 (311)	10-1/4 (260)	12-1/4 (311)
D (F x F)	10 (254)	12 (305)	10 (254)	12 (305)
D (F x G)	10 (254)	12 (305)	10 (254)	12 (305)
E	12-1/2 (318)	15 (381)	12-1/2 (318)	15 (381)
F	15-1/2 (394)	15-1/2 (394)	11-1/2 (292)	11-1/2 (292)
G	3 (75)	2-3/4 (70)	3 (75)	2-3/4 (70)

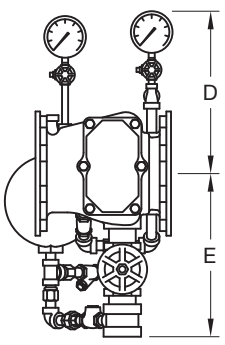


PLAN VIEW

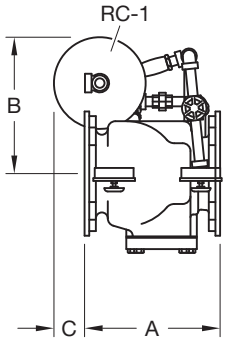


ELEVATION VIEW

Vertical Open Drain Trim				
Dimension	Dimensions in Inches and (mm)			
	With RC-1		Without RC-1	
	4 Inch (DN100)	6 Inch (DN150)	4 Inch (DN100)	6 Inch (DN150)
A	19 (483)	19 (483)	19 (483)	19 (483)
B	10-1/2 (267)	11-1/4 (286)	10-1/2 (267)	11-1/4 (286)
C	10-1/2 (267)	11-1/2 (292)	10-1/2 (267)	11-1/2 (292)
D (G x G)	10-1/4 (260)	12-1/4 (311)	10-1/4 (260)	12-1/4 (311)
D (F x F)	10 (254)	12 (305)	10 (254)	12 (305)
D (F x G)	10 (254)	12 (305)	10 (254)	12 (305)
E	12-1/2 (318)	15 (381)	12-1/2 (318)	15 (381)
F	15-1/2 (394)	15-1/2 (394)	11-1/2 (292)	11-1/2 (292)
G	3 (75)	2-3/4 (70)	3 (75)	2-3/4 (70)



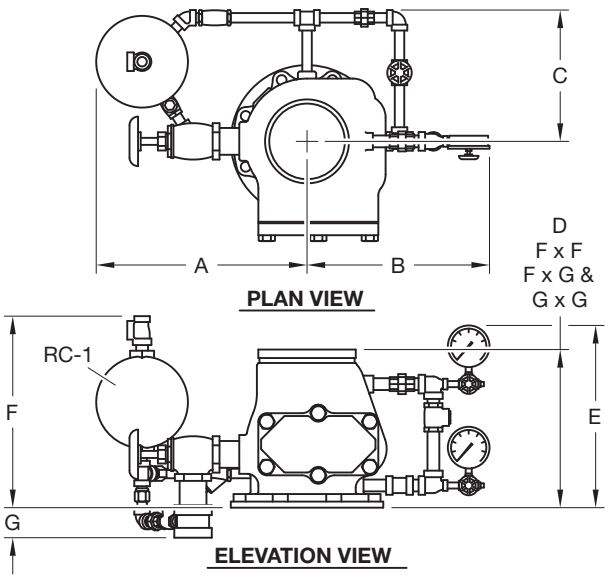
ELEVATION VIEW



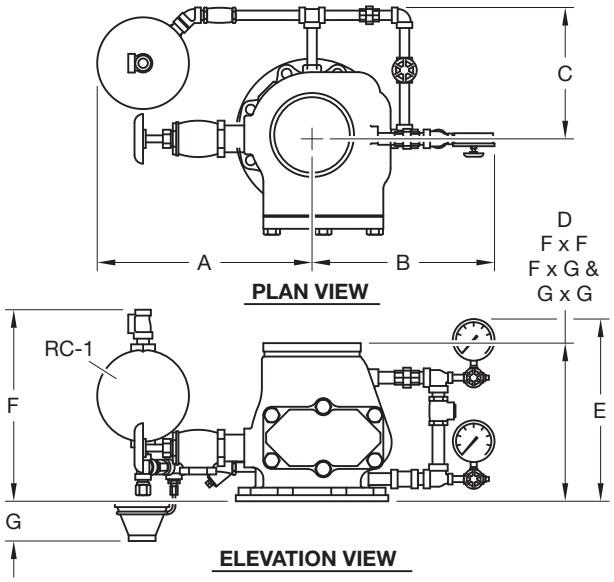
PLAN VIEW

Horizontal Closed Drain Trim				
Dimension	Dimensions in Inches and (mm)			
	With RC-1		Without RC-1	
	4 Inch (DN100)	6 Inch (DN150)	4 Inch (DN100)	6 Inch (DN150)
A (G x G)	10-1/4 (260)	12-1/4 (311)	10-1/4 (260)	12-1/4 (311)
A (F x F)	10 (254)	12 (305)	10 (254)	12 (305)
A (F x G)	10 (254)	12 (305)	10 (254)	12 (305)
B	15 (381)	15 (381)	10-1/2 (267)	11-1/2 (292)
C	3-1/4 (83)	3-1/4 (83)	3-1/4 (83)	3-1/4 (83)
D	14 (356)	15 (381)	14 (356)	15 (381)
E	13-3/4 (349)	14-3/4 (375)	13-3/4 (349)	14-3/4 (375)

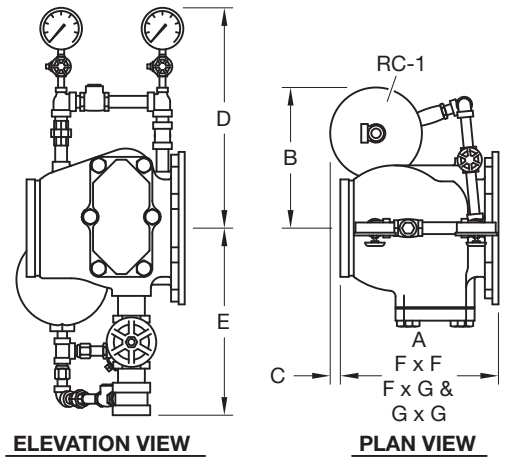
FIGURE 7 (2 OF 3)
INSTALLATION DIMENSIONS
FOR 4 & 6 INCH (DN100 & DN150) MODEL AV-1-300 ALARM CHECK VALVES



Vertical Closed Drain Trim		
Dimension	Dimensions in Inches and (mm)	
	With RC-1	Without RC-1
A	18-1/2 (470)	15-3/4 (400)
B	16-1/8 (410)	16-1/8 (410)
C	12 (305)	12 (305)
D	14 (356)	14 (356)
E	16-1/2 (419)	16-1/2 (419)
F	15-1/2 (394)	N/A
G	2-1/2 (64)	2-1/2 (64)



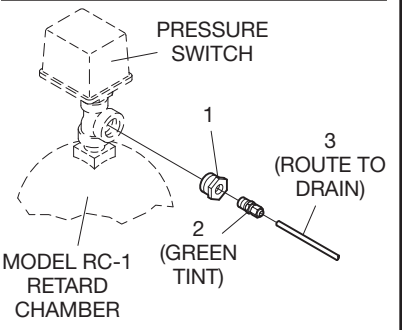
Vertical Open Drain Trim		
Dimension	Dimensions in Inches and (mm)	
	With RC-1	Without RC-1
A	18-1/2 (470)	15-3/4 (400)
B	16-1/8 (410)	16-1/8 (410)
C	12 (305)	12 (305)
D	14 (356)	14 (356)
E	16-1/2 (419)	16-1/2 (419)
F	15-1/2 (394)	N/A
G	3-1/2 (89)	3-1/2 (89)



Horizontal Closed Drain Trim		
Dimension	Dimensions in Inches and (mm)	
	With RC-1	Without RC-1
A	14 (356)	14 (356)
B	15 (381)	12 (305)
C	1-1/2 (38)	N/A
D	19-1/2 (495)	19-1/2 (495)
E	16-1/2 (419)	16-1/2 (419)

FIGURE 7 (3 OF 3)
INSTALLATION DIMENSIONS
FOR 8 INCH (DN200) MODEL AV-1-300 ALARM CHECK VALVES

NO.	DESCRIPTION	QTY.	P/N
1	3/4" x 1/4" Hex Bushing	1	CH
2	3/32" Vent Fitting	1	92-032-1-002
3	1/4" x 5'-0" Tubing	1	CH



Note: The Trim kit is ordered separately when a Water Motor Alarm is not installed.

FIGURE 8
ALARM VENT TRIM KIT
(P/N 52-201-2-012)

Care and Maintenance

The following procedures and inspections should be performed in accordance with this section, in addition to any specific requirements of the NFPA. Any impairment must be immediately corrected.

NOTICE

Performing the care and maintenance procedures will result in operation of the associated alarms. Consequently, notification must first be given to the owner and fire department, central station, or other signal station to which the alarms are connected.

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.

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

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

The TYCO Model AV-1-300 Alarm Check Valves do not require any regularly scheduled maintenance. It is recommended, however, that proper operation of the alarms be periodically verified in accordance with a procedure that is acceptable to the authority having jurisdiction. Any impairment must be immediately corrected.

Inspection Procedure
It is recommended that the following inspection procedure be performed at least quarterly by a qualified Inspection Service.

Step 1. Notify the proper authorities and all personnel who may be affected that an alarm test is to be performed.

Step 2. Open the end-of-line Inspector's Test Connection (or Alarm Test Valve, if acceptable to the authority having jurisdiction) and verify that the system alarms operate in accordance with the requirements of the authority having jurisdiction. Verify that the water motor alarm and/or the pressure alarm switch properly actuate and within the elapsed time required by the authority having jurisdiction.

Step 3. Verify that water is flowing out of the alarm line drain at a rate consistent with the 1/8 inch (3,2 mm) diameter drain orifice in the Restriction Assembly.

Step 4. Close the end-of-line Inspector's Test Connection (or Alarm Test Valve).

Step 5. Verify that water ceases to flow from the alarm line drain.

Step 6. Clean the 1/2 inch Strainer (located in the valve trim) as well as the 3/4 inch Strainer (located at the connection to the water motor alarm, as applicable). Be sure to replace the strainer baskets and tighten the caps securely.

NOTICE

Cleaning of the Strainers after each operation of the alarms is especially important in the case of water supplies (such as lakes and rivers) having a large quantity of suspended matter. A clogged alarm line can prevent operation of the alarms.

Step 7. Notify all authorities responsible for monitoring the installation that the fire protection system has been returned to service.

Sprinkler System Drain-Down
Draining the sprinkler system must be done in accordance with the following procedure:

Step 1. Close the main control valve, if this has not already been done.

Step 2. Open the remote cross main or branch line vent connection. (Refer to Step 7 in the Installation section.)

Step 3. Open the Main Drain Valve. Check first to see that the drainage water discharge will not cause damage or result in dangerous conditions.

Step 4. Wait until the Supply Pressure Gauge reads zero pressure and the sound of draining water has stopped before performing any maintenance work on the fire protection system.

Leakage from Alarm Line Drain
Follow the steps indicated below until water ceases to flow from the alarm line drain. After each step check if leakage has stopped.

Step 1. Open the Main Drain Valve. Let the water flow for about 5 seconds and then close the Main Drain Valve. This should flush any loose debris that may have become trapped between the Clapper Facing and the Seat Ring or in the seating area of the Drain Valve.

Step 2. Repeat Step 1 if the rate of continued flow out of the drain was noticeably reduced.

Step 3. Open the Alarm Test Valve and allow water to flow for about 5 seconds before re-closing the valve. This should flush any loose debris that may have become trapped in the seating area of the Alarm Test Valve.

Step 4. Repeat Step 3 if the rate of continued flow out of the drain was noticeably reduced.

Step 5. Determine whether the water is flowing from the Alarm Port as shown in Figure 1, or past the Alarm Test Valve. If the leakage is past the Alarm Test Valve, close the main control valve, and then repair or replace the Alarm Test Valve as necessary.

Step 6. If it appears that the leakage noted in Step 5 is from the Alarm Port, drain the system in accordance with the prescribed procedure. After the system has been drained, remove the Handhole Cover.

Step 7. While holding the Spring down by the coils, remove the Hinge Pin. Remove the Spring and Waterway Clapper Assembly.

Nominal Valve Sizes in. (DN)	Handhole Cover Bolt Torque lb-ft (N·m)
2-1/2 (DN65)	20 (27)
4 (DN100)	25 (34)
6 (DN150)	25 (34)
8 (DN200)	50 (68)

TABLE C
HANDHOLE COVER BOLTS
RECOMMENDED TORQUE

Step 8. Using a light, check for and remove any debris that may have become lodged within the Seat Ring groove. Inspect the Seat Ring seat for any damage. If the Seat Ring has become dented across the seat then the Alarm Check Valve will have to be replaced. It is impractical to re-face a Seat Ring in the field.

Step 9. Check for and remove any debris that may have become lodged in the Clapper Facing. If a minor imperfection remains in the Clapper Facing, then turn it over after thoroughly cleaning both surfaces with a clean cloth. Replace the Clapper Facing if necessary. Be sure to securely re-tighten the retaining fastener for the Clapper Washer.

Step 10. Replace the Spring and Waterway Clapper Assembly as shown in Figure 1. While holding the coils of the Spring down, re-insert the Hinge Pin. Be sure that the Hinge Pin is pushed all the way to the rear of the valve.

Step 11. Install the Handhole Cover:

- **a.** Align the Handhole Cover Gasket and Handhole Cover in proper orientation with the valve body as shown in Figure 1, and hold in place.
- **b.** Apply LOCTITE No. 242 (or equivalent) to the Hex Bolt threads.
- **c.** Insert the Hex Bolts through the Handhole Cover Gasket and Handhole Cover, and hand-tighten into the valve body.
- **d.** Using a crossdraw sequence to assure uniformity, wrench-tighten the Hex Bolts to the recommended torque values as shown in Table C.
- **e.** Inspect to assure all the Hex Bolts are securely tightened.

Step 12. Return the Alarm Valve to operation in accordance with the steps described in the Setting Procedure section.

Clogged Alarm Line Drain
If water either does not flow or only dribbles out of the alarm line drain during an alarm test, then it is likely that the screen protecting the Restriction Assembly drain orifice as shown in Figure 3, has become clogged.

NOTICE

For variable pressure systems, a clogged alarm line drain will increase the likelihood of a false alarm.

First break the union downstream of the Drain Restriction and remove the Drain Restriction for cleaning by back-flushing the screen. Re-install the Drain Restriction and re-assemble the drain line.

Loss of Excess System Pressure
For variable pressure systems, the System Pressure Gauge normally indicates a pressure greater than that shown by the Supply Pressure Gauge. Also, the value should be close to that of the peak supply pressure that has occurred after the system was placed in service.

NOTICE

For variable pressure systems, loss of excess system pressure will increase the likelihood of a false alarm.

Follow the procedure indicated below to correct a loss of excess system pressure condition.

Step 1. Check for signs of continued leakage from the alarm line drain. If rust stains and/or water deposits indicate that continued leakage has been taking place, take corrective action according to the procedure described in the subsection entitled “Leakage from Alarm Line Drain.”

Step 2. If there are no signs of continued leakage from the alarm line drain, close the main control valve, slowly remove the plug from the supply pressure gauge test valve to relieve the supply pressure, and then slowly open the union in the externally mounted bypass.

Step 3. Check for leakage past the Bypass Check Valve. If there is leakage, debris may have become lodged between its clapper and seat. Drain the system in accordance with the prescribed procedure and then clean or replace the Bypass Check Valve as required.

Step 4. Re-assemble the externally mounted bypass, replace the plug into the Gauge Test Valve, and return the fire protection system to operation in accordance with the steps described in the Operation section.

Step 5. If there are no signs of leakage past either the Alarm Check Valve Clapper per Step 1 or the Bypass Check Valve per Step 2, inspect the sprinkler system for leakage.

Excess Pressure Due to Thermal Expansion
Wet pipe sprinkler systems subject to ambient temperatures in excess of 100°F (38°C) can experience significant increases in system pressure due to the thermal expansion of the water. In particular, a gridded wet-pipe system with a relatively small air pocket and no relief valve can be subjected to an increase of more than 100 psi (6,9 bar), due to an increase in ambient temperature of approximately 50°F (28°C).

As necessary, install a pressure relief valve, in accordance with the requirements of the authority having jurisdiction, to automatically relieve the excess pressure that could otherwise be created in wet-pipe systems exposed to significant increases in ambient temperature.

False Alarms
Follow the step below when repeated false alarms occur in a variable pressure system.

Step 1. Check for and correct the cause of continued leakage out the alarm line drain.

Step 2. Check for and clean a clogged alarm line drain.

Step 3. Check for and correct the cause of a loss in excess system pressure.

Step 4. Drain the sprinkler system and re-fill it using the steps described in the Setting Procedure section.

Intermittent Alarms
If the pressure alarm switch gives a steady signal, but the water motor generates an intermittent alarm, check for binding in the water motor alarm drive shaft.

If the water motor alarm and/or the pressure alarm switch provide an intermittent alarm, it is likely the consequence of an excessive amount of air being trapped within the sprinkler system. Drain down the sprinkler system and refill it using the steps described in the Setting Procedure section.

A discontinuance of an alarm may also be caused by the Clapper closing due to a sudden drop in supply pressure or the shut-off of a pump in the supply line. These types of problems can only be corrected by maintaining a steady supply pressure.

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. Refer to Table A (Page 3) for Flange Drilling Specifications. The Price Book provides Part Numbers (P/Ns) for factory pretrimmed Model AV-1-300 Valves.

Standard AV-1-300 Alarm Check Valve

(Assumes American Standard Flange Drilling, American Threaded Ports, and American Groove Outside Diameter, as applicable.)

Specify: (size in inches) Model AV-1-300 Alarm Check Valve with (end connections), P/N (specify):

2-1/2 Inch Valves

2.88 inch (73,0 mm) Groove O.D. x
2.88 inch (73,0 mm) Groove O.D.
2-1/2 Inch G x G 52-203-1-110

ANSI Flange x
2.88 inch (73,0 mm) Groove O.D.
2-1/2 Inch F x G. 52-203-1-210

4 Inch Valves

4.50 inch (114,3 mm) Groove O.D. x
4.50 inch (114,3 mm) Groove O.D.
4 Inch G x G 52-203-1-113

ANSI Flange x
4.50 inch (114,3 mm) Groove O.D.
4 Inch F x G. 52-203-1-413

ANSI Flange x ANSI Flange
4 Inch F x F 52-203-1-013

6 Inch Valves

6.62 inch (168,3 mm) Groove O.D. x
6.62 inch (168,3 mm) Groove O.D.
6 Inch G x G 52-203-1-115

ANSI Flange x
6.62 inch (168,3 mm) Groove O.D.
6 Inch F x G. 52-203-1-615

ANSI Flange x ANSI Flange
6 Inch F x F 52-203-1-015

8 Inch Valves

8.62 inch (219,1 mm) Groove O.D. x
8.62 inch (219,1 mm) Groove O.D.
8 Inch G x G 52-203-1-916

ANSI Flange x
8.62 inch (219,1 mm) Groove O.D.
8 Inch F x G. 52-203-1-816

ANSI Flange x ANSI Flange
8 inch F x F 52-203-1-016

AV-1-300 Valve Trim

Standard Order
Specify: Vertical, Closed Drain Galvanized Trim for (size) Model AV-1-300 Alarm Check Valve, P/N (specify):

Vertical Closed Drain, Galvanized
(See Figure 4)
2-1/2 Inch 52-204-4-950
4 or 6 Inch* 52-204-4-951
8 Inch* 52-204-4-952
*Provided semi-preassembled

Special Order
Specify: (Vertical or Horizontal), (Closed or Open) Drain Galvanized Trim for (size) Model AV-1-300 Alarm Check Valve, P/N (specify):

Vertical Open Drain, Galvanized
(See Figure 5)
2-1/2 Inch 52-204-4-053
4 or 6 Inch* 52-204-4-954
8 Inch* 52-204-4-955
*Provided semi-preassembled

Horizontal Closed Drain, Galvanized
(See Figure 6)
4 or 6 Inch 52-204-4-057
8 Inch 52-204-4-058

Accessories

Order the following accessories, as applicable:

Model RC-1
Retard Chamber 52-211-1-002
(Required for variable pressure water supply conditions.)

Alarm Vent Trim. 52-201-2-012
(Required when a water motor alarm is not installed.)

Model PS10-2 Potter Electric Waterflow
Pressure Alarm Switch 25710
(Required for electric signal indicating waterflow.)

Model WMA-1 Water Motor Alarm
Red Finish Gong 52-630-1-001P
Aluminum Finish Gong. 52-630-2-001P
(Required for a mechanical waterflow alarm.)

Optional 600 PSI Water
Pressure Gauge 92-343-1-004

Replacement Parts

Valve
Specify: (description) for use with (size) Model AV-1-300 Alarm Check Valve, P/N (specify, see Figure 1)

Trim
Specify: (description) for use with Model AV-1-300 Alarm Check Valve, P/N (specify, see Figure 4, 5, or 6)

Other Model AV-1-300 Configurations

Other AV-1-300 Alarm Check Valves are valves ordered with any combination of flange, threaded port, or groove outside diameter not offered under Standard AV-1-300 Alarm Check Valve offerings.

Valves with NPT threaded ports are intended for use with the AV-1-300 Valve Trim described in this data sheet. Valves with ISO threaded ports are intended for use with special order trim that is provided by local distributors to meet the specific needs of certain localities. Contact your local distributor regarding valves and valve trim for specific localities.

Specify: (size) Model AV-1-300 Alarm Check Valve with (connections) with (NPT or ISO) threaded ports, P/N (specify):

2-1/2 Inch Valves with NPT Ports

ISO (PN16) Flange x
2.88 inch (73,0 mm)
Groove O.D. 52-203-1-251

ANSI Flange x
3.00 inch (76,1 mm)
Groove O.D. 52-203-1-220

ISO (PN16) Flange x
3.00 inch (76,1 mm)
Groove O.D. 52-203-1-331

AS Flange x
2.88 inch (73,0 mm)
Groove O.D 52-203-1-611

AS Flange x
3.00 inch (76,1 mm)
Groove O.D. 52-203-4-410

JIS Flange x
2.88 inch (73,0 mm)
Groove O.D. 52-203-1-710

JIS Flange x
3.00 inch (76,1 mm)
Groove O.D. 52-203-1-810

3.00 inch (76,1 mm) Groove O.D x
3.00 inch (76,1 mm)
Groove O.D. 52-203-1-120

2-1/2 Inch Valves with ISO Ports

ISO (PN16) Flange x
2.88 inch (73,0 mm)
Groove O.D. 52-203-1-211

ISO (PN16) Flange x
3.00 inch (76,1 mm)
Groove O.D. 52-203-1-311

3.00 inch (76,1 mm) Groove O.D. x
3.00 inch (76,1 mm)
Groove O.D. 52-203-4-120

2.88 inch (73,0 mm) Groove O.D. x
2.88 inch (73,0 mm)
Groove O.D. 52-203-1-921

4 Inch Valves with NPT Ports

ISO (PN16) Flange x
4.50 inch (114,3 mm)
Groove O.D. 52-203-1-493

ISO (PN16) Flange x
ISO (PN16) Flange. 52-203-4-013

AS Flange x
AS Flange 52-203-4-313

AS Flange x
4.50 inch (114,3 mm)
Groove O.D. 52-203-4-413

JIS Flange x
JIS Flange 52-203-4-713

JIS Flange x
4.50 inch (114,3 mm)
Groove O.D. 52-203-4-813

4 Inch Valves with ISO Ports

ISO (PN16) Flange x
ISO Flange 52-203-4-113

ISO (PN16) Flange x
4.50 inch (114,3 mm)
Groove O.D. 52-203-4-213

4.50 inch (114,3 mm) Groove O.D. x
4.50 inch (114,3 mm)
Groove O.D. 52-203-1-923

6 Inch Valves with NPT Ports

ANSI Flange x
6.50 inch (165,1 mm)
Groove O.D. 52-203-1-625

ISO (PN16) Flange x
6.62 inch (168,3 mm)
Groove O.D. 52-203-1-695

ISO (PN16) Flange x
6.50 inch (165,1 mm)
Groove O.D. 52-203-5-215

ISO (PN16) Flange x
ISO (PN16) Flange. 52-203-4-015

AS Flange x
AS Flange 52-203-4-315

AS Flange x
6.62 inch (168,3 mm)
Groove O.D. 52-203-4-415

AS Flange x
6.50 inch (165,1 mm)
Groove O.D. 52-203-4-425

JIS Flange x
JIS Flange 52-203-4-715

JIS Flange x
6.62 inch (168,3 mm)
Groove O.D. 52-203-4-815

JIS Flange x
6.50 inch (165,1 mm)
Groove O.D. 52-203-5-815

6.50 inch (165,1 mm) Groove O.D. x
6.50 inch (165,1 mm)
Groove O.D. 52-203-1-124

6 Inch Valves with ISO Ports

ISO (PN16) Flange x
ISO (PN16) Flange. 52-203-4-115

ISO (PN16) Flange x
6.62 inch (168,3 mm)
Groove O.D. 52-203-4-215

ISO (PN16) Flange x
6.50 inch (165,1 mm)
Groove O.D. 52-203-4-225

6.62 inch (168,3 mm) Groove O.D. x
6.62 inch (168,3 mm)
Groove O.D. 52-203-1-925

6.50 inch (165,1 mm) Groove O.D. x
6.50 inch (165,1 mm)
Groove O.D. 52-203-1-125

8 Inch Valves with NPT Ports

ISO (PN10) Flange x
8.62 inch (219,1 mm)
Groove O.D. 52-203-1-896

ISO (PN16) Flange x
8.62 inch (219,1 mm)
Groove O.D. 52-203-4-266

ISO (PN10) Flange x
ISO (PN10) Flange. 52-203-4-016

ISO (PN16) Flange x
ISO (PN16) Flange. 52-203-4-118

AS Flange x
AS Flange 52-203-4-316

AS Flange x
8.62 inch (219,1 mm)
Groove O.D. 52-203-4-416

JIS Flange x
JIS Flange 52-203-1-716

JIS Flange x 8.62 inch (219,1 mm)
Groove O.D. 52-203-4-816

8 Inch Valves with ISO Ports

ISO (PN10) Flange x
ISO (PN10) Flange. 52-203-4-116

ISO (PN16) Flange x
ISO (PN16) Flange. 52-203-4-117

ISO (PN10) Flange x
8.62 inch (219,1 mm)
Groove O.D. 52-203-4-216

ISO (PN16) Flange x
8.62 inch (219,1 mm)
Groove O.D. 52-203-4-226

8.62 inch (219,1 mm) Groove O.D. x
8.62 inch (219,1 mm)
Groove O.D. 52-203-1-926

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TECHNICAL DATA

DRY VALVE MODEL F-1

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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1. DESCRIPTION

The Viking Model F-1 Dry Pipe Valve is a latching differential valve used to separate the water supply from the dry pipe sprinkler system. The valve combines a positive latching clapper and air plate assembly with a differential air-to-water seat design. The latching clapper and air plate assembly provides a positive mechanical seal for the air pressure in the dry pipe system. The differential design allows an air supply of moderate pressure to control a higher water supply pressure. When the air pressure in the dry pipe system is lowered sufficiently to overcome the pressure differential, the valve opens allowing water to enter the dry pipe system.

The valve is also designed to operate a water motor alarm and/or an electric pressure alarm switch. The Viking Model D-2 or E-1 Accelerator can be used to speed the operation of the valve on large capacity systems or where faster action is required.

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

2. LISTINGS AND APPROVALS

cULus Listed: VPZV

FM Approved: Dry Pipe Valves

NYC Department of Buildings: MEA 89-92-E, Vol. 22

LPCB Approved

CE Certified: Standard EN 12259-3, EC-certificate of conformity 0832-CPD-2011

VdS Approved: Certificate G4980057 - 3", G4960044 - 4", and G4960055 - 6"

3. TECHNICAL DATA

Specifications:

Rated to - 175 PSI (12.1 bar) Water Working Pressure.
Factory tested hydrostatically - 350 PSI (24.1 bar) with the clapper open.
Air pressure to water pressure area differential: Approximately 6 to 1.
Color - Red
Available Since 1993.

Material Specifications:

Refer to Figure 3.

Table 1: Ordering Information and Specifications

	Nominal Size (Pipe O.D.)	Part Number	Flange Drilling	Connection	Friction Loss[1]	CV Factor	Shipping Weight
VALVE ONLY	3"	09441	ANSI	Flange / Flange	3 ft. (0.91 m)	800	130 lbs. (59 kg)
	4"	07628	ANSI	Flange / Flange	5 ft. (1.52 m)	821	130 lbs. (59 kg)
	6"	08464	ANSI	Flange / Flange	49 ft. (14.9 m)	780	197 lbs. (89 kg)
	DN80	09969	PN10/16	Flange / Flange	3 ft. (0.91 m)	800	130 lbs. (59 kg)
	DN100	08841	PN10/16	Flange / Flange	5 ft. (1.52 m)	821	130 lbs. (59 kg)
	DN150	08464	PN10/16	Flange / Flange	49 ft. (14.9 m)	780	197 lbs. (89 kg)
	3"	09446	ANSI / 89 mm	Flange / Groove	3 ft. (0.91 m)	800	125 lbs. (57 kg)
	4"	07627	ANSI / 114 mm	Flange / Groove	5 ft. (1.52 m)	821	125 lbs. (57 kg)
	6"	12654[2]	ANSI / 165 mm	Flange / Groove	49 ft. (14.9 m)	780	184 lbs. (84 kg)
	6"	08491	ANSI / 168 mm	Flange / Groove	49 ft. (14.9 m)	780	184 lbs. (84 kg)
	DN80	09970	PN10/16 / 89 mm	Flange / Groove	3 ft. (0.91 m)	800	125 lbs. (57 kg)
	DN100	09538	PN10/16 / 114 mm	Flange / Groove	5 ft. (1.52 m)	821	125 lbs. (57 kg)
	DN150	12653[2]	PN10/16 / 165 mm	Flange / Groove	49 ft. (14.9 m)	780	184 lbs. (84 kg)
	DN150	08491	PN10/16 / 168 mm	Flange / Groove	49 ft. (14.9 m)	780	184 lbs. (84 kg)

Footnotes

1. Expressed in equivalent length of Schedule 40 pipe based on Hazen & Williams formula: C = 120.
2. The 6" (165mm) valve is not a standard flange size for the United States region.

VIKING®

TECHNICAL DATA

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Table 2: Trim Package Ordering Information

******* The Model F-1 Dry Pipe Valve is NOT INCLUDED with these packages ********

	Nominal Size	Part Number	Description
TRIM ONLY	3”	10158	Loose trim
	3”	10158P	Modular trim (partially assembled in sections)
	4”	08395	Loose trim
	4”	08395P	Modular trim (partially assembled in sections)
	6’	094556	Loose trim
	6’	09456P	Modular trim (partially assembled in sections)

Table 3: Pre-Trimmed Valve Ordering Information

******* These packages include a Model F-1 Dry Pipe Valve fully assembled with trim ********

	Nominal Size	Part Number	Connection	Description
PRE-TRIMMED VALVES	3”	09441PT	Flange/Flange	Fully assembled Model F-1 Dry Pipe Valve with conventional trim
	4”	07628PT	Flange/Flange	Fully assembled Model F-1 Dry Pipe Valve with conventional trim
	6”	08464PT	Flange/Flange	Fully assembled Model F-1 Dry Pipe Valve with conventional trim
	3”	09446PT	Flange/Groove	Fully assembled Model F-1 Dry Pipe Valve with conventional trim
	4”	07627PT	Flange/Groove	Fully assembled Model F-1 Dry Pipe Valve with conventional trim
	6”	08491PT	Flange/Groove	Fully assembled Model F-1 Dry Pipe Valve with conventional trim
	4”	07627PTR	Flange/Groove	Fully assembled Model F-1 Dry Pipe Valve with conventional trim, pressure switches, and OS&Y water supply control valve
	6’	08491PTR	Flange/Groove	Fully assembled Model F-1 Dry Pipe Valve with conventional trim, pressure switches, and OS&Y water supply control valve

Table 4: Accessories Ordering Information

	Part Number	Description
ACCESSORIES	08397	Model F Dry Valve Accessory package - used when Viking trim packages are not used; inlcudes drip check valve, drain cup, valve reset bar (wrench), 7/16” (5 mm) restricted orifice, 1/2” (15 mm) spring loaded check valve, 1/4” (8 mm) restricted orifice, and a tubing connector.
	09881	Model D-2 Accelerator (includes integrated anti-flood device)
	09730	Model D-2 Accelerator Trim Kit - includes trim components and air gauge required to install the accelerator
	08116	Model E-1 Accelerator and B-1 Anti-Flood Package - includes accelerator and anti-flood device
	08264	Model E-1 Accelerator Trim Kit - includes trim components and air gauge required to install the accelerator and anti-flood device
	08061	Model B-1 Anti-Flood Device
	02977BWB	Dry pipe valve wrench and reset bar

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Table 5: F-1 Dry Valve Accessory Approval Chart

Approval	Valve Size	Trim Part. No.	09881 - D-2 Accelerator	08055 - E-1 Accelerator	08061 - B-1 Anti-Flood Device	09391 - B-2 Anti-Flood Device
cULus	3”	10158	X	X	X	
	4”	08395	X	X	X	
	6”	09456	X	X	X	
FM	3”	10158	X	X	X	
	4”	08395	X	X	X	
	6”	09456	X	X	X	
LPCB	3”	LL10158	X		X	
	4”	LL08395	X		X	
	6”	LL13583	X		X	
CE	3”	LL10158	X		X	
	4”	LL08395	X		X	
	6”	LL13583	X		X	
VdS	3”	LL1070 w/Accelerator		X		X
	4”	LL1060 w/Accelerator		X		X
	6”	LL1062 w/Accelerator		X		X
	3”	LL1069 w/o Accelerator				
	4”	LL1059 w/o Accelerator				
	6”	LL1061 w/o Accelerator				

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	3" (DN80)	4" (DN100)	6" (DN150)
A	18-1/4" (464)	18-1/4" (464)	20-1/16" (510)
B	7" (178)	7" (178)	7-5/16" (186)
C	16-3/4" (425)	12-1/2" (318)	14" (356)
D	10" (254)	10" (254)	10" (254)
E	11-13/16" (300)	12" (305)	14-3/4" (375)
F	23" (584)	23" (584)	23" (584)
G	34-1/2" (876)	34-1/2" (876)	36" (914)

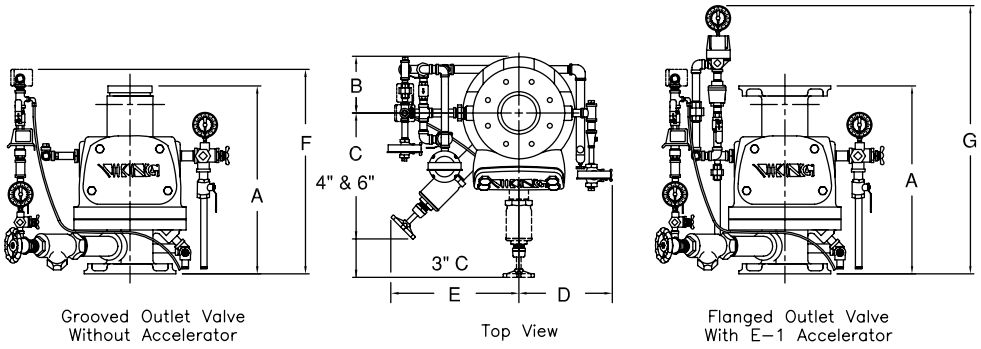

Figure 1 - Take Out Dimensions

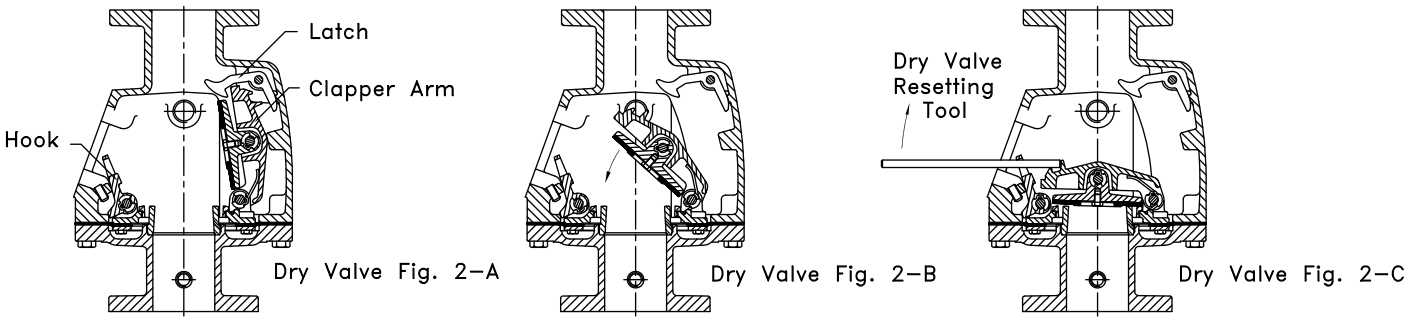

Figure 2

4. INSTALLATION

1. For proper operation and approval, the valve must be trimmed in accordance with Viking Model F-1 Dry Valve Trim Charts.
2. The Model F-1 Dry Valve must be installed in the vertical position as shown in Figure 1.
3. Air or nitrogen supply to the dry pipe system must be clean, dry, and oil free.
4. Automatic air supplies must be regulated, restricted, and from a continuous source. A Viking air maintenance device should be installed on each system equipped with an automatic air supply. Never exceed 60 PSI (4.1 bar) pressure in the system piping with the dry valve clapper closed.
5. The dry valve must be installed in an area not subject to freezing temperatures or physical damage. If required, provide a valve house (enclosure) with adequate heat around the dry valve and trim. Freezing temperatures and/or excessive pressure will damage the dry valve member assembly.
6. When corrosive atmospheres and/or contaminated water supplies are present, it is the owner's responsibility to verify compatibility with the Model F-1 Dry Valve and associated equipment.
7. Consider installation of the Viking accelerator and anti-flood device. An accelerator (quick opening device) is recommended on all differential dry pipe valves and is required on dry pipe systems of certain capacities. Refer to Installation Standards and Authorities Having Jurisdiction. If an accelerator is to be installed, verify that the appropriate Trim Chart is used.
8. Prior to installing the valve, thoroughly flush the water supply piping to verify that no foreign matter is present.

A. General Installation Instructions

1. Verify that necessary Trim Charts and Technical Data for the dry valve and associated equipment are available.
2. Remove all plastic thread protectors from the openings of the dry valve.
3. Apply a small amount of pipe-joint compound or tape to the external threads of all pipe connections required. Take care not to allow any compound, tape, or other foreign matter inside any of the nipples or openings of the dry valve or trim components.
4. Install the Model F-1 Dry Valve and trim piping according to the current Model F-1 Dry Valve Trim Chart provided with the Trim Package and the *Viking website*. The Model F-1 Dry Valve must be installed in the vertical position.
5. When installing a Viking accelerator and anti-flood device in conjunction with the Model F-1 Dry Valve, refer to the appropriate Viking E-1 Accelerator Trim Chart provided with the Accelerator Trim Package and the *Viking website*.

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a. When a Viking accelerator is installed on the Model F-1 Dry Valve, the dry system air supply must be connected as shown on the Model E-1 Accelerator Trim Chart.
b. The Viking external anti-flood device is required when a Viking Model E-1 Accelerator is installed on a dry valve according to the Model E-1 Accelerator Trim Chart.

Hydrostatic Test:

⚠ CAUTION

The dry valve clapper must be latched open during performance of the hydrostatic test (See Fig. 2-A)

DO NOT perform a 200 PSI (13.8 bar) hydrostatic system test with the dry valve clapper in the closed (set) position (see Fig. 2-C). Never exceed 60 PSI (4.1 bar) air pressure in the system piping with the dry valve clapper closed.
DO NOT expose the Viking accelerator to the hydrostatic test. For warnings and considerations regarding hydrostatic testing of the Viking accelerator and other system components, refer to Technical Data for the equipment used.

B. Placing the Valve in Service (Refer to Figure 2)

When the dry pipe system is ready to be placed in service, verify that all equipment is adequately heated and protected to prevent freezing and physical damage.

1. Verify that the water supply main control valve supplying the dry valve is closed.
2. Open the main drain valve (located on the inlet of the dry valve).
3. Drain all water from the dry pipe system. If the system has operated, or if water has entered the system, open all auxiliary drains and the system test valve. Allow enough time to completely drain the system. Perform steps 4 through 10 to set the dry valve and/or inspect the internal operating parts of the dry valve.
4. Verify that the dry pipe system is not pressurized.
5. Use the dry valve reset bar/wrench, part number 02977BWB, to loosen and remove hand-hole cover bolts (21). Remove hand-hole cover (24).

⚠ CAUTION

Clapper arm assembly (8) and clapper assembly (5) are spring loaded to open. NEVER place hands inside the dry valve if the clapper assembly is latched closed.

To release a latched clapper assembly for service:

a. Insert the re-setting tool through the hole-in-hook assembly (15), across the fulcrum cast on top of clapper arm assembly (8) until the re-setting tool contacts the stopping boss on top of clapper arm assembly (8) (see Figure 3).
b. Apply a downward force on the end (outside the valve) of the re-setting tool. Hook assembly (15) will slide toward the hand-hole and off clapper arm assembly (8). Clapper arm assembly (8) and clapper assembly (5) will forcefully open, impact against the latch (2), and latch in the open position.

NOTE: INSPECTION AND CLEANING PROCEDURE STEP 6 BELOW IS CONSIDERED PART OF THE ANNUAL TRIP TEST.

6. Inspect and clean the internal parts of the valve. Give special consideration to the water seat (16), air seat (20) and clapper rubber (19). Wipe away all contaminants, dirt, and mineral deposits. DO NOT use solvents or abrasives. Operate all parts to test freedom of movement. Renew or replace damaged or worn parts as required.

⚠ CAUTION

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

7. To set the dry valve clapper (refer to Figures 2 and 3):
   a. Raise the latch (2) to release spring-loaded clapper arm assembly (8) from the latched open position.
   b. Move the clapper arm assembly (8) down toward the horizontal position (see Figure 2-B).
   c. While holding spring loaded clapper arm assembly (8) down, insert the re-setting tool through the hole-in-hook assembly (15), across the fulcrum cast on top of clapper arm assembly (8) until the re-setting tool contacts the stopping boss as shown in Figure 2-C.
   d. Apply a sharp upward force at the end of the re-setting tool. Hook assembly (15) will slide forward on the re-setting bar and latch the clapper closed with a positive setting action (see Figure 2-C).
8. Priming water is not required and may not be desirable where clean, good-quality fresh water is not available. If priming water is desired, fill the dry valve with water to the bottom of the hand-hole.
   a. Verify that the intermediate chamber of the dry valve is free of water. No water should flow from the drip check when the plunger is pushed.
9. Visually inspect hand-hole cover gasket (25). Verify that it is in good condition.
10. Re-install hand-hole cover (24), gasket (25), and hand-hole cover bolts (21). Tighten the bolts using the dry valve reset bar/wrench, part number 02977BWB.

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11. Close all auxiliary drains, the system test valve, and the priming water level test valve on the dry valve trim. The main drain (located on the inlet of the dry valve) should remain open.
12. If equipped with a Viking accelerator and external anti-flood device:
    a. Close the ½" (15 mm) anti-flood isolation valve.
    b. Observe the air pressure gauge on top of the accelerator. The gauge must read zero before the accelerator will automatically reset. It may be necessary to loosen, remove, and re-install (use the appropriate wrench) the air gauge to vent trapped air pressure from the upper chamber.
13. Open the dry system air supply and establish desired system pressure. See Table 3 for suggested air pressure to water pressure settings. NEVER EXCEED 60 PSI (4.1 bar) AIR PRESSURE.
14. Verify that the intermediate chamber of the dry valve is free of water. No water should flow from the drip check when the plunger is pushed.
15. If equipped with a Viking accelerator and external anti-flood device: When pressure on the accelerator air pressure gauge equals the system set pressure, OPEN and secure the ½" (15 mm) anti-flood isolation valve.
16. Slowly open the water supply main control valve.
17. When flow is developed from the main drain, CLOSE the main drain valve.
18. Fully open the water supply main control valve.
19. Secure all valves in their normal operating position.
20. Notify Authorities Having Jurisdiction and those in the affected area that the system is in service.

Table 3 - Air Pressure Settings

Maximum Water Pressure		Minimum		Maximum	
PSI	**bar**	**PSI**	**bar**	**PSI**	**bar**
50	3.45	15	1.03	25	1.72
75	5.17	20	1.38	30	2.07
100	6.90	25	1.72	35	2.41
125	8.62	30	2.07	45	3.10
150	10.34	35	2.41	50	3.45
175	12.07	45	3.10	60	4.14

5. OPERATION (Refer to Figure 3)

The clapper (5) and air plate (11) assemblies combine to form a floating member assembly. With the clapper assembly (5) latched closed, system air pressure forces the member assembly down, sealing the water seat (16) from the intermediate chamber. When a sprinkler operates, the system air pressure is reduced. When system air pressure is reduced to the differential tripping point of the valve, water supply pressure in the inlet chamber lifts the member assembly off the water seat (16) and flows into the intermediate chamber. As the member assembly continues to rise, the hook assembly (15) is forced against socket set screw (23), which causes the hook assembly (15) to pivot on hook rod (6b) and unlatch the clapper. The clapper is spring loaded and swings to a full-open locked position (see Figure 2-A).

When using the optional accelerator, the accelerator senses the system air pressure drop and trips. Upon tripping, the accelerator allows the system air pressure to enter the dry valve intermediate chamber. This immediately overcomes the differential causing the member assembly to rise faster.

The intermediate chamber is normally at atmospheric pressure and is connected to the alarm line. When the valve trips, the intermediate chamber and alarm line are pressurized with system water pressure, activating alarms connected to the dry valve trim.

6. INSPECTIONS, TESTS AND MAINTENANCE

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition. For minimum maintenance and inspection requirements, refer to recognized standards such as those produced by NFPA, LPC, and VdS which describe care and maintenance of sprinkler systems. In addition, the Authority Having Jurisdiction (AHJ) may have additional maintenance, testing and inspection requirements which must be followed.

⚠ WARNING

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

The Viking Model F-1 Dry Valve and trim must be kept free of foreign matter, freezing conditions, corrosive atmospheres, contaminated water supplies, and any condition that could impair its operation or damage the device.

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

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I. INSPECTION

Weekly inspection is recommended. If the system is equipped with a low air (or nitrogen) alarm, monthly inspections may be adequate.

1. Check pressure gauges located on the supply side and system side of the dry valve. Verify that the proper ratio of air (or nitrogen) pressure to water supply pressure is being maintained (refer to Table 3).
2. Verify that the intermediate chamber of the dry valve is free of water. No water should flow from the drip check when the plunger is pushed.
3. If equipped with a Viking accelerator:
   a. Check the air pressure gauge located on the top of the accelerator. Air pressure in the upper chamber of the accelerator should equal the pneumatic pressure maintained in the system.

NOTE: STANDARD TOLERANCE ALLOWANCE IN PRESSURE GAUGE CALIBRATION MAY RESULT IN A SLIGHT VARIATION WHEN PRESSURE READINGS FROM ANY TWO GAUGES ARE COMPARED. A DIFFERENCE IN PRESSURES OTHER THAN SLIGHT VARIATION DUE TO GAUGE CALIBRATION TOLERANCE MAY INDICATE MAINTENANCE IS REQUIRED. REFER TO TECHNICAL DATA FOR THE ACCELERATOR USED.

   b. or dry systems with Viking Accelerators installed according to the Viking Model E-1 Accelerator Trim Chart, verify that the ½" (15 mm) anti-flood isolation valve is OPEN and secured.
4. Verify that the water supply main control valve is open and all trim valves are in their normal operating position.
5. Check for signs of mechanical damage and/or corrosive activity. If detected, perform maintenance as required or, if necessary, replace the device.
6. Verify that dry valve and trim are adequately heated and protected from freezing and physical damage.

II. TESTS

Quarterly Tests

A. Water Flow Alarm Test

Quarterly testing of water flow alarms is recommended and may be required by the Authority Having Jurisdiction.

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.

NOTE: VIKING CONVENTIONAL TRIM PROVIDES A CONNECTION FOR INSTALLATION OF A NON-INTERRUPTIBLE PRESSURE SWITCH. ALARMS AND/OR ELECTRIC PANELS CONTROLLED BY AN ALARM PRESSURE SWITCH INSTALLED IN THAT CONNECTION CANNOT BE INTERRUPTED.

(See Dry Valve Trim Chart.)

2. Fully open the main drain (located on the base of the dry valve) to flush away any accumulation of foreign material.
3. Close the main drain.
4. To test the local electric alarm (if provided) and/or mechanical water motor gong (if provided), OPEN the alarm test valve in the dry valve trim.
   a. Electric alarm pressure switches (if provided) should activate.
   b. Electric local alarms should be audible.
   c. The local water motor gong should be audible.
   d. Verify that (if provided) remote station alarm signals were received.
5. When testing is complete, close the alarm test valve.
6. Verify:
   a. All local alarms stop sounding and alarm panels (if provided) reset.
   b. All remote station alarms reset.
   c. All supply piping to water motor properly drains.
7. Verify that the alarm shut-off valve in the dry valve trim is OPEN, and the alarm test valve is CLOSED.
8. Verify that the intermediate chamber of the dry valve is free of water. No water should flow from the drip check when the plunger is pushed.
9. Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

B. Main Drain Test

Quarterly performance of the Main Drain Test is recommended and may be required by Authorities Having Jurisdiction to verify integrity of the water supply.

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Record pressure reading from the water supply pressure gauge.
3. Verify that the intermediate chamber of the dry valve is free of water. No water should flow from the drip check when the plunger is pushed.

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4. Verify that the dry pipe system is pressurized at or above the minimum pressure recommended in Table 3 for the water supply pressure available.
5. Fully OPEN the main drain located on the base of the dry valve.
6. When a full flow is developed from the main drain, record the residual pressure from the water supply pressure gauge.
7. When the test is complete, SLOWLY CLOSE the main drain.
8. Compare test results with previous flow information. If deterioration of the water supply is detected, take appropriate steps to restore adequate water supply.
9. Verify that normal water supply pressure and system pneumatic pressure have been restored, and that all alarm devices and valves are secured in normal operating position.
10. Notify the Authority Having Jurisdiction that the test is complete. Record and/or provide notification of test results as required by the Authority Having Jurisdiction.

C. Priming Water Level, and Low Air Alarm Test

Quarterly testing is recommended to verify that water is NOT present above the Priming Level Test Valve in the dry valve trim. Quarterly testing of low air alarms is recommended.

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Close the water supply main control valve supplying the dry valve.
3. Open the main drain valve (located on the inlet of the dry valve).

If the dry valve being tested is equipped with a Viking accelerator and external anti-flood device installed according to Viking Model E-1 Accelerator Trim Charts, performing steps 6 or 7 of this test will cause the accelerator to operate. A burst of air from the vent in the bottom of the accelerator will indicate operation of the accelerator. However, with the water supply main control valve CLOSED and the main drain valve OPEN, operation of the accelerator should not trip the dry valve.

6. Dry valve priming water level test:
   a. Verify that the water supply main control valve is closed and the main drain valve is open.
   b. Fully open the priming level test valve in the dry valve trim to check for the presence of water. If an accelerator is installed, this may cause the dry valve to trip. If the presence of water is detected, the system may not have been properly drained. Perform steps 1 through 3, and 11 through 15 of section 4-B PLACING DRY VALVE IN SERVICE, and repeat this dry valve priming water level test.
   c. If/when no water is detected and the test is complete, continue to step 8.
7. Low Air Alarm Test:
   a. Verify that the water supply main control valve is closed and the main drain valve is open.
   b. Gradually open the priming level test valve in the trim of the dry valve to simulate operation of the dry system. Observe and record the pressure at which the low air alarm operates.
8. Close the priming level test valve.
9. If the dry valve being tested is equipped with a Viking accelerator and external anti-flood device:
   a. Close the ½" (15 mm) NPT anti-flood isolation valve.

NOTE: AIR WILL CONTINUE TO FLOW FROM THE ACCELERATOR AFTER IT HAS OPERATED UNTIL STEP "B" BELOW IS PERFORMED.

   b. Loosen (use the appropriate wrench), and remove the accelerator air gauge to release pressure from the upper chamber of the accelerator. When the accelerator re-sets, re-install the accelerator air gauge.
10. Perform steps 13 through 20 of section 4-B PLACING DRY VALVE IN SERVICE.

TRIP TESTS

Partial Flow Trip Tests are conducted with the water supply main control valve partially closed to minimize the amount of water entering the system during the test. Performance of a Partial Flow Trip Test is recommended during warm weather at least annually except when a Full Flow Trip Test is conducted. Partial Flow Trip Tests may verify operation of equipment and devices but do not simulate operation of the system in fire conditions.

Full Flow Trip Tests are conducted with the water supply main control valve fully open. The dry valve is operated by opening the system test valve to simulate the opening of a sprinkler in fire conditions. When the dry valve operates, the sprinkler piping will be flooded with water. Performance of a Full Flow Trip Test is recommended during warm weather at least once every three years. More frequent testing may be required by the Authority Having Jurisdiction.

A. Full Flow Trip Test

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.

NOTE: ALARMS AND ELECTRIC PANELS CONTROLLED BY AN ALARM PRESSURE SWITCH INSTALLED IN THE "ELECTRIC ALARM PANEL CONNECTION" CANNOT BE INTERRUPTED (SEE DRY VALVE TRIM CART).

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2. Fully open the main drain (located on the base of the dry valve) to flush away any accumulation of foreign material.
3. Close the main drain.
4. Record water supply pressure and system pneumatic pressure.
5. Open the remote system test valve to simulate operation of the dry system.
   Record:
   a. Elapsed time from opening of the test valve to operation of the dry valve.
   b. System pressure when the dry valve operated.
   c. Elapsed time from opening of the test valve to development of full flow of water from the system test connection.
   d. Any other information required by the Authority Having Jurisdiction.
6. Verify that alarms operate properly.
7. Allow water to flow from the system test connection until it appears clear and clean.
8. When test is complete, close the water supply main control valve.
9. Perform steps 1 through 20 of section 4-B PLACING DRY VALVE IN SERVICE.
10. Verify that the water supply main control valve is open, and all other valves are in their normal operating position. If equipped with an external anti-flood device, the ½" anti-flood isolation valve must be OPEN and secured.

B. Partial Flow Trip Test

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.

NOTE: VIKING CONVENTIONAL TRIM PROVIDES A CONNECTION FOR INSTALLATION OF A NON-INTERRUPTIBLE PRESSURE SWITCH. ALARMS AND ELECTRIC PANELS CONTROLLED BY AN ALARM PRESSURE SWITCH INSTALLED IN THE "ELECTRIC ALARM PANEL CONNECTION" CANNOT BE INTERRUPTED (SEE DRY VALVE TRIM CHART).

2. Record water supply pressure and system pneumatic pressure.
3. Fully open the main drain (located on the base of the dry valve) to flush away any accumulation of foreign material.
4. CLOSE the water supply main control valve as far as possible while maintaining full flow from the main drain. CLOSE the main drain.
5. Open the priming level test valve to simulate operation of the system.
6. Note (for records) water supply pressure and system pneumatic pressure when the dry valve operates.
7. CLOSE the water supply main control valve and OPEN the main drain IMMEDIATELY when test is complete.
8. Perform steps 1 through 20 of paragraph 4-B PLACING DRY VALVE IN SERVICE.
9. Verify that the water supply main control valve is open, all other valves are in their normal operating position. If equipped with an external anti-flood device, the ½" anti-flood isolation valve must be OPEN and secured.

III. MAINTENANCE (See Figure 3)

⚠ WARNING

Prior to servicing internal operating parts of the dry valve, take the following precautions.

1. Close the water supply main control valve, placing the system out of service.
2. Open the main drain located in the base of the dry valve.
3. Close the air (or nitrogen) supply to the dry system piping.
4. Relieve all pressure from the dry system piping. If the system has operated, open all auxiliary drains and the system test valve to allow the system to drain completely.
5. Use dry valve reset bar/wrench part number 02977BWB to loosen and remove hand-hole cover bolts (21) and remove hand-hole cover (24).

⚠ CAUTION

Clapper arm assembly (8) and clapper assembly (5) are spring loaded to open. NEVER place hands inside the dry valve if the clapper assembly is latched closed.

6. Release latched (set) clapper assembly for service:
   a. Insert the re-setting tool through the hole in hook assembly (15), across the cast fulcrum on top of clapper arm assembly (8) until the re-setting tool contacts the stopping boss on top of clapper arm assembly (8).
   b. Apply a downward force on the end (outside the valve) of the re-setting tool. Hook assembly (15) will slide toward the hand-hole and off clapper arm assembly (8). The clapper arm assembly (8) and clapper assembly (5) will forcefully open, impact against latch (2), and be trapped in the open position.

⚠ CAUTION

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

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Recommended practice: When performing maintenance inside the dry valve with the clapper in the open position, cover the opening to prevent tools or parts from dropping onto the seat or into the waterway.

7. To Remove Clapper Rubber (19):
   a. Use a 9/16" wrench to remove hex-head screw (17) and rubber retainer (18).
   b. Remove the clapper rubber (19) for inspection. If the clapper rubber shows signs of wear, such as cracking, cuts, or excessively deep grooves where the rubber contacts the air or water seat, replace the rubber.
8. To Re-install Clapper Rubber (19):
   a. Place a new clapper rubber (19), over the center hub of rubber retainer (18).
   b. Position retainer (18) (with rubber in place) against clapper assembly (5) as shown in figure 2.
   c. Replace and tighten hex-head screw (17). DO NOT over-tighten.
9. To Remove Clapper Assembly (5):
   a. While holding spring loaded clapper arm assembly (8) down, remove a retaining ring (7) from one end of the clapper rod (6a).
   b. Release the spring-loaded clapper arm assembly (8) and allow it to latch in the open position.
   c. Slide the rod (6a) out of the clapper arm assembly (8) to free the clapper assembly (5).
   d. Remove the clapper assembly (5) for inspection or replacement.
10. To Re-install Clapper Assembly (5):
    a. Reverse disassembly procedures a through d in step 9 above.
11. To Remove the Latch (2):
    a. Remove the ½" NPT pipe plug (4) (outside of the valve) to expose the latch pin (3).
    b. While holding the latch (2) with one hand, remove the latch pin (3).
    c. Remove the latch (2).
12. To Re-install the Latch (2) and Latch Pin (3), reverse disassembly procedures a through c in step 11 above.

The internal member assembly of the dry valve consists of several sub-assemblies. To service these sub-assemblies, it is necessary to disassemble the dry valve.

13. To Disassemble The Dry Valve:
    a. Disconnect the trim and remove the valve from the system piping.
    b. Use dry valve reset bar/wrench, part number 02977BWB, to remove hand-hole cover bolts (21) from the base (22).
    c. Remove the housing (1) from the base (22). Member assembly components (5-15), and (17-19, 21, 25) are accessible for replacement.
    d. When inspection and/or replacement of member assembly components is complete, re-assemble the dry valve.
14. To Re-assemble the Dry Valve:
    a. Reverse disassembly procedures a through c in step 13 above.
    b. The socket-set screw (23) will need adjustment. After the valve has been completely reassembled, latch the clapper in place. With a 1/4" (6.35 mm) Allen wrench, turn the screw clockwise until it contacts the hook assembly (15). Then, turn the screw one complete turn counter-clockwise. Set the system and trip test the valve to verify proper operation of the valve.
15. To Remove the Hook Assembly (15):
    a. Remove a retaining ring (7) from one end of the hook rod (6b).
    b. Slide the rod (6b) out of the bushings in the air plate assembly (11) to free the hook assembly (15).
    c. Remove the hook assembly (15).
16. To Re-install the Hook Assembly (15):
    a. Reverse the disassembly procedures a through c in step 15 above.
17. To Remove the Clapper Arm Assembly (8) and Spring (9):
    a. Remove a retaining ring (7) from one end of the clapper arm rod (10).
    b. Slide the clapper arm rod (10) out of the bushings in the air plate assembly (11) to free the clapper arm assembly (8), taking care to retrieve the spring (9).
    c. Remove the clapper arm assembly (8), and spring (9).
18. To Re-install the Clapper Arm Assembly (8):
    a. Reverse disassembly procedures a through c in step 17 above.
19. To remove the Diaphragm (12) and Diaphragm Retainer (13):
    a. Use a 9/16" wrench to remove the hex-head screws (14).
    b. Remove the diaphragm retainer (13) and diaphragm (12) for replacement. If the diaphragm rubber shows signs of wear, such as cracking or cuts, replace the rubber diaphragm.
20. To Re-install the Diaphragm (12) and Diaphragm Retainer (13):
    a. Reverse disassembly procedures a and b in step 19 above.
    b. When re-installing the diaphragm retainer (13), cross tighten hex-head screws (14) to 20 ft. lbs. of torque for even compression of the diaphragm (12).
    c. When assembling the base (22) to the housing (1):

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i. Invert the housing (1) on a work bench so the holes for the hand-hole cover bolts (21) are facing up.
ii. Position the complete member sub-assembly (5-15 & 17-19, 21, 25) with the screw holes in the diaphragm (12), aligned with the screw holes in the inverted housing (1). Use care to align the screw holes so the hook assembly (15) properly aligns with the set screw (23).
iii. Position the base (22) over the inverted housing (1) with the member assembly (5-15 & 17-19, 21, 25). Align the screw holes so the ½" (15 mm) NPT trim connection in the base (22) aligns with the ½" (15 mm) NPT trim connection in the housing (1).
iv. Install the hand-hole base bolts (21) finger tight only.
v. Cross-tighten all hand-hole base bolts (21), to 90 ft. lbs. of torque to evenly compress the diaphragm (12) and maintain proper alignment of the member sub-assembly (5-15 & 17-19, 21, 25).

7. AVAILABILITY

The Viking Model F-1 Dry Pipe Valve is available through a network of domestic and international distributors. See the Viking Corp. Web site for closest distributor or contact The Viking Corporation.

8. GUARANTEES

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

Table 4 - Troubleshooting Guide

Condition:	Possible causes:	Suggested action:
The valve trips when no sprinkler has fused	Loss of air pressure in the system	Check the system for leaks and check for proper air supply. A Viking Air Maintenance Device should be installed on each system equipped with an automatic air supply. Consider adding a maintenance air compressor.
	An extreme pressure surge in the water supply	Increase the air pressure on the system. The maximum limit is 60 PSI (4.1 bar). Note: Increasing system pressure may increase trip time of the dry valve.
Water constantly passing through the drip check when the valve is in the SET position	Water leaking over the water seat into the intermediate chamber	Inspect and clean the water seat and clapper rubber (see paragraph 4-B Placing the Valve in Service). Consider replacing the clapper rubber. If the water seat has been pitted or damaged by debris, it may be necessary to replace the base assembly.
	Alarm test valve in the bypass connection of the dry valve trim not tightly closed	Verify that water is not getting past alarm test valve.
Air constantly passing through the drip check when the valve is in the SET position	Air leaking over the air seat into the intermediate chamber	Inspect and clean the air seat and clapper rubber (see paragraph 4-B Placing the Valve in Service). Consider replacing the clapper rubber. If the air seat has been pitted or damaged by debris, it may be necessary to replace the air plate assembly.
	Air leaking past the rubber diaphragm	Inspect the rubber diaphragm for deterioration. If necessary, replace the diaphragm.
Clapper will not latch	Incorrect resetting tool	Verify that the re-setting tool used is smooth and of the proper strength and diameter* to provide the required force at the appropriate angle to cause the latching hook to slide over the clapper arm when setting the dry valve. * The Viking re-setting tool is a 3/4" (19 mm) diameter cold rolled steel bar, chamfered at one end and a standard 15/16" hex-socket on other end (PN 02977BWB).
	The hook not sliding on the re-setting tool	File or grind the re-setting tool. Remove any rough spots to provide a smooth sliding surface and proper clearance.
	Clapper rubber worn	Replace the clapper rubber.
	Internal parts damaged by accidental application of high pressure	Replace the valve member assembly.
The valve latches but will not remain set	Improper resetting procedure	See paragraph 4-B Placing the Valve in Service.
	Inadequate air supply	See paragraph 4-B Placing the Valve in Service.
	Air pressure and priming water passing through the intermediate chamber and out of the drip check	Clean the air seat and the clapper rubber. Replace the clapper rubber, if worn.

TECHNICAL DATA

DRY VALVE MODEL F-1

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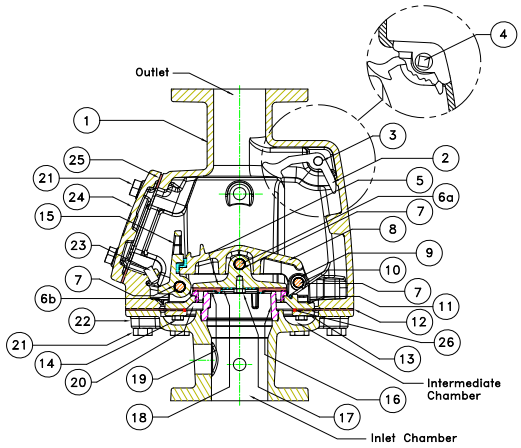
Figure 3 - Replacements Parts



ITEM NO.	3" & 4"	6"	DESCRIPTION	MATERIAL	NO. REQ'D	
					3" & 4"	6"
1	--	--	Housing	Ductile Iron 65-45-12	1	1
2	07641	07641	Latch	Brass UNS-C84400	1	1
3	08449	08449	Latch Pin	Brass UNS-C36000	1	1
4	--	--	1/2" NPT Pipe Plug	Steel	1	1
5	*	*	Clapper Assembly	Ductile Iron 65-45-12	1	1
			(includes bushings)	PTFE Coated Steel	2	2
6a	*	*	Clapper Rod	Brass UNS-C36000	1	1
6b	*	*	Hook Rod	Brass UNS-C36000	1	1
7	*	*	Retaining Ring	Stainless Steel UNS-S15700	6	6
8	*	*	Clapper Arm Assembly	Ductile Iron 65-45-12	1	1
			(includes bushings)	PTFE Coated Steel	4	4
9	*	*	Spring	Type 302 Stainless Steel Wire	1	1
10	*	*	Clapper Arm Rod	Brass: UNS-C36000	1	1
11	*	*	Air Plate Assembly	Ductile Iron 65-45-12	1	1
			(includes bushings)	PTFE Coated Steel	4	4
12	*	*	Diaphragm	Nylon Reinforced Neoprene	1	1
13	*	*	Diaphragm Retainer	Ductile Iron 65-45-12	1	1
14	*	*	3/8"-16 x 3/4" (19.1 mm) lg. Hex Head Cap Screw	Zinc Plated Steel	10	12
15	*	*	Hook Assembly	Ductile Iron 65-45-12	1	1
			(includes bushings)	PTFE Coated Steel	2	2
16	--	--	Water Seat	Brass UNS-C84400	1	1
17	07932	07932	3/8"-16 x 1/2" (12.7 mm) lg. Hex Head Cap Screw	Stainless Steel UNS-S30400	1	1
18	07659	07659	Rubber Retainer	Stainless Steel UNS-S30400	1	1
19	07651	08487	Clapper Rubber	Ethylene Propylene	1	1
20	*	*	Air Seat	Brass UNS-C84400	1	1
21	02079A	02079A	5/8"-11 x 2" (50.8 mm) lg. Hex Head Cap Screw**	Steel	14	16
22	--	--	Base	Ductile Iron 65-45-12	1	1
23	08056	08056	1/2"-13 x 1" (25.4 mm) lg. Socket Set Screw	Brass UNS-C36000	1	1
24	05436C	05436C	Cover	Ductile Iron 65-45-12	1	1
25	04187B	04187B	Cover Gasket	EPDM ASTM D-2000	1	1
26	*	*	Square Cut Ring	EPDM	1	1
--Indicates replacement part not available						
* Indicates replacement part only available in a Sub-Assembly listed below.						
**This screw can be used on the base or the cover.						
SUB-ASSEMBLIES						
5-15, 17-21, 25, 26	14027	14028	Member Assembly Kit			
5, 17-19	08324	08490	Clapper Assembly			

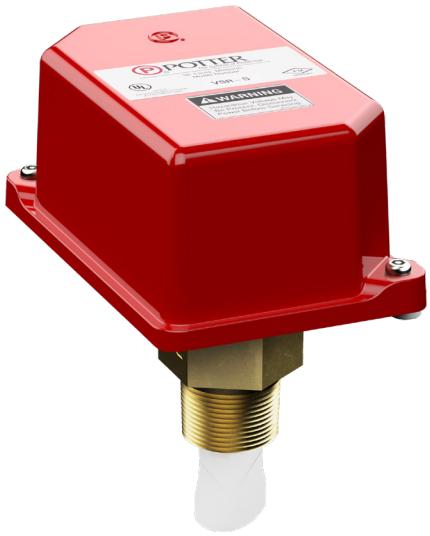
POTTER
The Symbol of Protection

VSR-S

Vane Type Waterflow Alarm Switch With Retard

Features

- Assembled in USA
- 0-90 second field replaceable time delay retard
- Easy to read retard time delay adjustment knob
- Fits 1" to 2" CPVC, copper, brass, or iron pipe
- Comes with all necessary paddles
- Two SPDT (form C) contacts
- Weatherproof
- Easy to read wire terminal designations
- 5 year warranty



⚠ CAUTION

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

Important: This document contains important information on the installation and operation of the VSR-S waterflow switches. Please read all instructions carefully before beginning installation. A copy of this document is required by NFPA 72 to be maintained on site.

Description

The Model VSR-S is a vane type waterflow switch for use on wet sprinkler systems that use 1" (25mm), 1¼" (32mm), 1½" (38mm) or 2" (50mm) pipe size. The unit may also be used as a sectional waterflow detector on large systems.

The unit contains two single pole double throw snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 gallons per minute (38 LPM) or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

Enclosure

The VSR-S switches and retard device are enclosed in a weather/UV/flame resistant high impact composite plastic. The cover is held in place with two tamper resistant screws which require a special key for removal. A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover. See bulletin number 5401103 for installation instructions of this switch.

⚠ WARNING

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

Technical Specifications

Service Pressure	300 PSI (20,68 BAR) - UL
Flow Required for Alarm	10 GPM (38 LPM) To ensure minimum flow of 10 gpm, a minimum pressure is required at all sprinklers with a k-factor of 3 or less. K-3: 10 PSI K-2.8: 12 PSI
Maximum Surge	18 FPS (5,5 m/s)
Enclosure	Cover - Weather/UV/Flame Resistant High Impact Composite Base - Die-cast aluminum
Contact Ratings	Two sets of SPDT (Form C) 10.0 Amps at 125/250VAC 2.0 Amps at 30VDC Resistive 10 mAmps min. at 24VDC
Conduit Entrances	Two 1/2" conduit connections provided. Individual switch compartments suitable for dissimilar voltages.
Usage	Listed plastic, copper, schedule 40 iron pipe and unlisted riser assemblies approved by Potter . Fits pipe sizes - 1", 1¼", 1½" and 2" ***Note:*** 12 paddles are furnished with each unit, one for each pipe size of threaded and sweat TEE, one for 1" CPVC, one for 1" CPVC (Central), one for 1" threaded Nibco CPVC, and one for 1½" threaded (Japan).
Environmental Specifications	• NEMA 4/IP54 Rated Enclosure suitable for indoor or outdoor use with factory installed gasket when used with appropriate conduit fitting. • Temperature Range: 40°F - 120°F, (4.5°C - 49°C) - UL
Service Use	Automatic Sprinkler NFPA-13 One or two family dwelling NFPA-13D Residential occupancy up to four stories NFPA-13R National Fire Alarm Code NFPA-72

*Specifications subject to change without notice.

Installation

These devices may be mounted in horizontal or vertical pipe. On horizontal pipe they should be installed on the top side of the pipe where they will be accessible. The units should not be installed within 6" (15cm) of a fitting which changes the direction of the waterflow or within 24" of a valve or drain. Select the proper paddle for the pipe size and type of TEE used see Fig. 2 for instructions on changing paddle. The unit has a 1" NPT bushing for threading into a TEE. See Fig. 1 for proper TEE size, type and installation. Use no more than three wraps of teflon tape.

Screw the device into the TEE fitting as shown in Fig. 1. Care must be taken to properly orient the device for the direction of waterflow.

The vane must not rub the inside of the TEE or bind in any way. The stem should move freely when operated by hand.

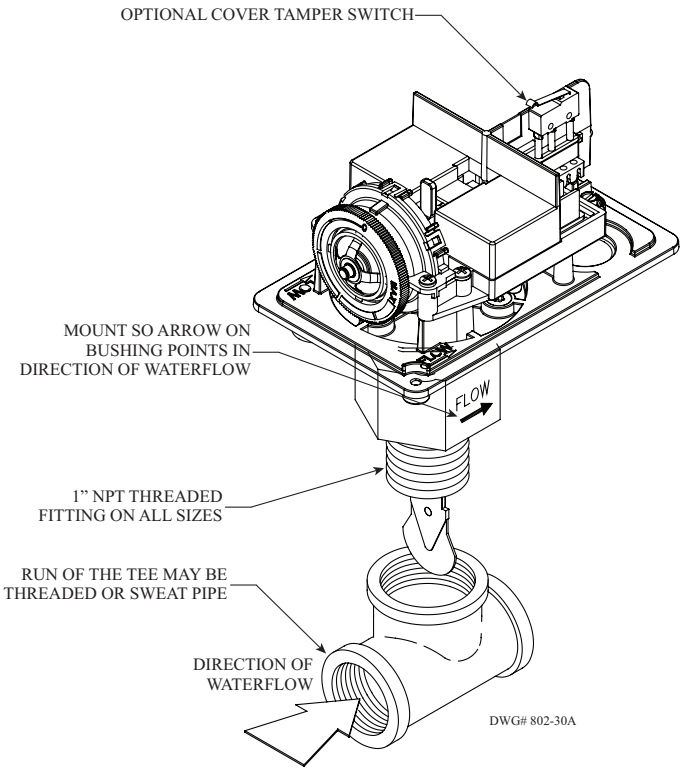
The device can also be used in copper or plastic pipe installations with the proper adapters so that the specified TEE fitting may be installed on the pipe run.

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

⚠ WARNING

Do not trim the paddle. Failure to follow these instructions may prevent the device from operating and will void the warranty. Do not obstruct or otherwise prevent the trip stem of the flow switch from moving when water flows as this could damage the flow switch and prevent an alarm. If an alarm is not desired, a Flowswitch Bypass Switch should be used (refer to Potter data sheet 5401554), or a qualified technician should disable the alarm system.

Fig 1

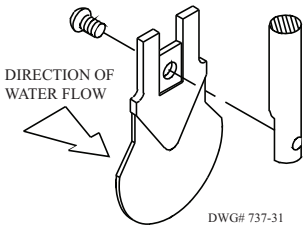


Retard Adjustment

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

Paddle Selection

Fig 2



⚠ WARNING

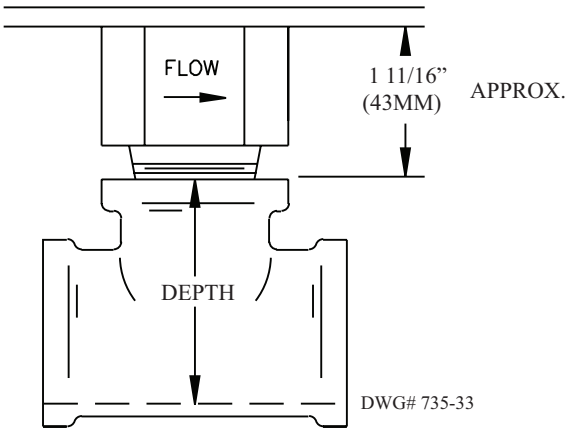
There are 12 paddles furnished with each unit. One for each size of threaded, sweat or plastic TEE as described in Fig. 3. These paddles have raised lettering that shows the pipe size and type of TEE that they are to be used with. The proper paddle must be used. The paddle must be properly attached (see drawing) and the screw that holds the paddle must be securely tightened. Do not trim the paddle.

Note: For National Fire Products risers, use paddle marked SWEAT for corresponding size riser.

TEE Specifications

Screw the fitting into the TEE fitting as shown in Fig. 3.

Fig 3



The depth to the inside bottom of the TEE should have the following dimensions:

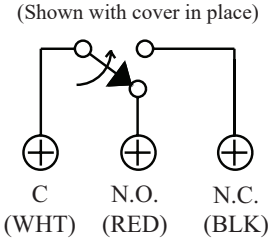
Approximate Depth Requirement			
Tee Size	Threaded	Sweat	CPVC
1" x 1" x 1"	2 1/16"	1 3/4"	2 7/16"
1 1/4" x 1 1/4" x 1"	2 7/16"	2 7/16"	N/A
1 1/2" x 1 1/2" x 1"	2 11/16"	2 1/4"	N/A
2" x 2" x 1"	3 3/16"	2 3/4"	N/A

NOTICE

Use only factory TEE's with a 1" NPT bull. Threaded bushings, reducing bushings, mechanical TEE's and weld-o-lets are not allowed unless they comply with the dimensions listed in the chart in Fig. 3 and have been factory approved by Potter. Apply teflon tape to the 1" NPT fitting. Do not use more than three wraps of teflon tape. Do not use any other type of sealant.

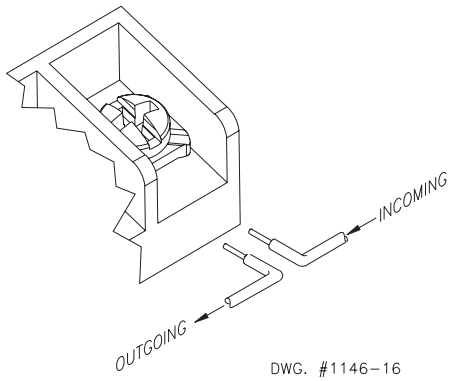
Cover Tamper Switch Wiring

Fig 4



Switch Terminal Connections Clamping Plate Terminal

Fig 5



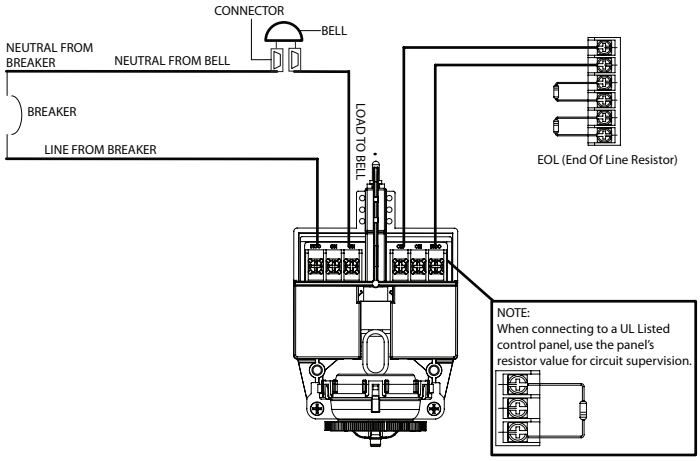
WARNING

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

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

Typical Electrical Connections

Fig 6



⚠ CAUTION

The VSR-S does not require power to operate. Do not connect AC power directly to the terminals as this will damage the switch.

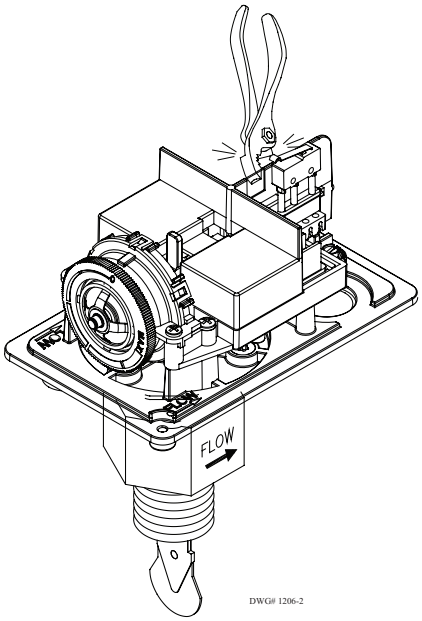
The terminals are for switching power to an indicating appliance such as a bell or strobe. Similar to how a light switch is used to switch power to a light. The terminals can also be used to connect to a fire/security panel.

Notes:

1. The Model VSR-S has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other contact is used to operate a local audible or visual annunciator.
2. For supervised circuits, see "Switch Terminal Connections Clamping Plate Terminal" drawing and warning note (Fig. 5).

Fig 7

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



Testing

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

If provided, the inspector's test valve shall always be used for test purposes. If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR-S is not recommended or advisable.

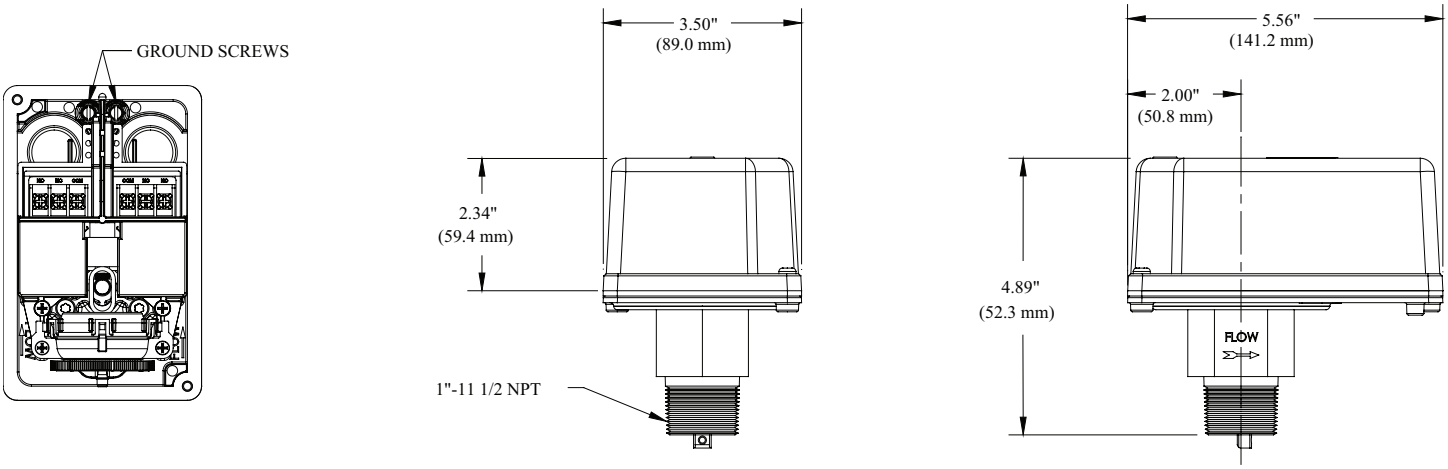
A minimum flow of 10 GPM (38 LPM) is required to activate this device.

NOTICE

Please advise the person responsible for testing of the fire protection system that this system must be tested in accordance with the testing instructions. Do not obstruct or otherwise prevent the trip stem of the flow switch from moving when water flows as this could damage the flow switch and prevent an alarm. If an alarm is not desired, a Flowswitch Bypass Switch should be used (refer to Potter data sheet 5401554), or a qualified technician should disable the alarm system.

Mounting Dimensions

Fig 8



Maintenance

Inspect detectors monthly for leaks. If leaks are found, replace the detector. The VSR-S waterflow switch should provide years of trouble-free service. The retard and switch assembly are easily field replaceable. In the unlikely event that either component does not perform properly, please order replacement retard switch assembly stock number 1029030. There is no maintenance required, only periodic testing and inspection. Vane type watearflow switches have a normal service life of 10-15 years. However, the service life may be significantly reduced by local environmental conditions.

Vane-Type Waterflow Switch for Small Pipe Specification

UL, CUL Listed, LPCB Approved and CE Marked vane type waterflow switches shall be furnished and installed at each sprinkler system connection to the wet pipe main where indicated on the drawings and plans and as required by applicable local and national codes and standards. The device shall consist of a 1" NPT threaded brass bushing for installation into tees and approved manifolds, gasket and non-corrosive vane and trip stem assembly as well as a field replaceable adjustable time delay / switch mechanism to prevent false alarms from water surges. All wetted parts of the waterflow switch shall be non-corrosive to resist being affected by or contributing to corrosion. The waterflow switch enclosures shall be NEMA 4 rated and the cover shall be held captive by tamper resistant screws. It shall be possible to install an optional cover tamper switch to detect removal of the enclosure. The field replaceable instantly recycling adjustable pneumatic retard shall provide a 0-90 second time delay and visual indication of activation. Expiration of the retard time shall result in the simultaneous operation of two sets of single pole double throw (SPDT) switch contacts rated at 10A, 125VAC and 2A, 30VDC. Each switch contact shall have a separate wiring chamber and separate conduit entrance to comply with the NEC requirements for separation of power limited and non power limited conductors without the need for special wire or wire methods. The device shall be listed for pressures up to 300 psi, maximum water surges of 18 fps and alarm activation by a continuous flow of 10gpm. The device shall be Listed for installation on CPVC, brass, copper and iron tees and manifolds from 1" - 2" size. The waterflow switch shall be a model VSR-S manufactured by Potter Electric Signal Company LLC.

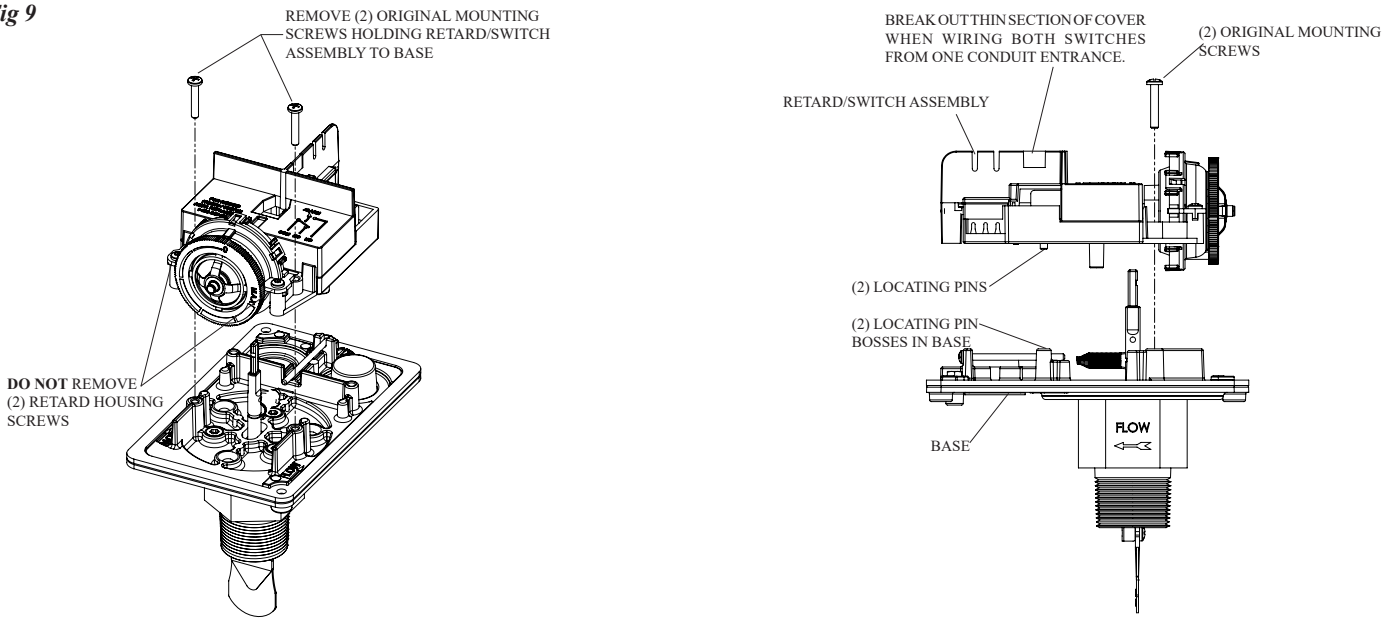
Retard/Switch Assembly Replacement

NOTICE

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

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

Fig 9



Removal of Waterflow Switch

- To prevent accidental water damage, all control valves should be shut tight and the system completely drained before waterflow detectors are removed or replaced.
- Turn off electrical power to the detector, then disconnect wiring.
- Use a wrench on the flats of the bushing. Turn the switch counterclockwise to disengage the pipe threads.
- Gently lift with your fingers, roll the vane so it will fit through the hole while continuing to lift the waterflow detector.
- Lift detector clear of pipe.

Ordering Information

Model	Description	Stock Number
VSR-S	VSR-S WATER FLOW INDICATOR	1144440

Replaceable Components: Retard/Switch Assembly, stock no. 1029030
Paddle Tree, stock no. 5559001
Paddle Retention Screw, stock no. 5490374

Optional Components: Cover Tamper Switch, stock no. 0090148
FSBS - Flowswitch Bypass Switch , stock no. 3001006
DG-B-R Surface Mount Double Gang Box - Red F/ FSBS, stock no. 1000484

GENERAL AIR PRODUCTS

Wall Mount Nitrogen Generators

General Air Products Wall Mount Nitrogen Generators are specifically designed to provide on-site, high purity nitrogen for use in dry and pre-action fire sprinkler systems. Utilizing a simple, low-profile design ready to be connected to a new or existing fire sprinkler system. Each Wall Mount Nitrogen Generator includes an integrated fire protection air compressor specifically designed to fill the sprinkler system to supervisory pressure within 30 minutes per NFPA 13. General Air Products Wall Mount Nitrogen Generators provide a reliable and efficient method of producing a minimum of 98% nitrogen at the point of usage which will inhibit corrosion and improve the life of the sprinkler system.

- Turn-key Design for Easy Installation
- Premium Nitrogen Membrane Technology
- 98%+ Nitrogen Purity Standard
- PLC Controller for Data Recording & Simplified Operation
- Bypass & Leak Detection Alarms
- Contacts for Tie-in to Building Monitoring System
- **Lifetime Customer Service & Technical Support**

Included With Every Wall Mount Nitrogen Generator:

Fire Protection Air Compressor

10 Gallon N2 Storage Tank

Portable N2 Analyzer

30” Stainless Steel Flex Hose

Vibration Isolation Pads

Maintenance Capacity (gal) @ 40 PSI	Model Number	Fill Capacity (gal)		Compressor		Electrical Specifications				N2 Tank (gal)	Unit Weight (lbs)		
		@ 40 PSI	@ 20 PSI	Type	HP	Hz	Phase	Volts	Amps		Cabinet	Horizontal Tank	Vertical Tank
1275	**NGP-WM300-1A**	277	500	Oil-Less	1/3	60	Single	115	6.0	10	135	50	40
1275	**NGP-WM300-3A**	277	500	Oil-Less	1/3	60	Single	208-230	3.0	10	135	50	40
3880	**NGP-WM600-1A**	600	1150	Oil-Less	3/4	60	Single	115	12.0	10	155	50	40
3880	**NGP-WM600-3A**	600	1150	Oil-Less	3/4	60	Single	208-230	6.0	10	155	50	40

- N2 storage tanks come in horizontal or vertical configurations. Specify when ordering.
- 50 Hz units also available. Contact factory for details.

⚠ WARNING: Cancer and Reproductive Harm - www.p65warnings.ca.gov

Nitrogen Generator System Accessories:

Air Maintenance Device (AMD-1)

Required to regulate the volume of air being delivered to the sprinkler system. General Air Products Air Maintenance Devices are UL listed & FM approved.

Purge Vent / Sampling Port (NGP-PV-1)

Provides a simple and reliable way to purge oxygen from the sprinkler system during the nitrogen fill process and monitor the nitrogen purity throughout the entire fire sprinkler system.

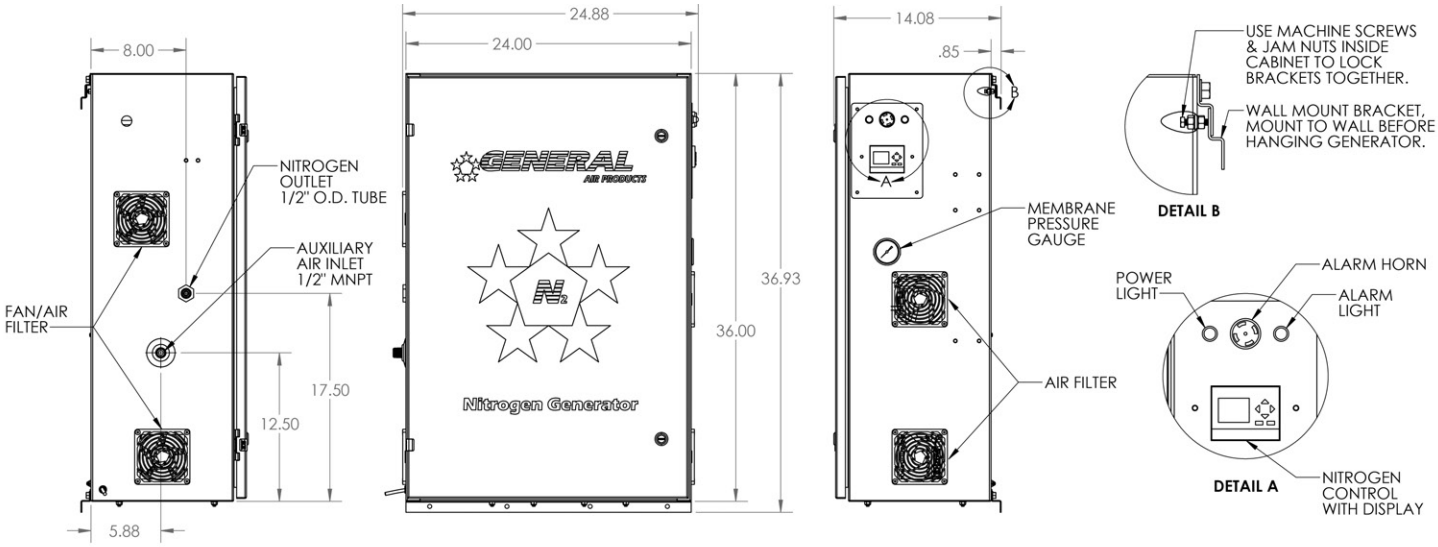
GENERAL AIR PRODUCTS

Wall Mount Nitrogen Generators

for Dry Pipe & Pre-Action Fire Sprinkler Systems

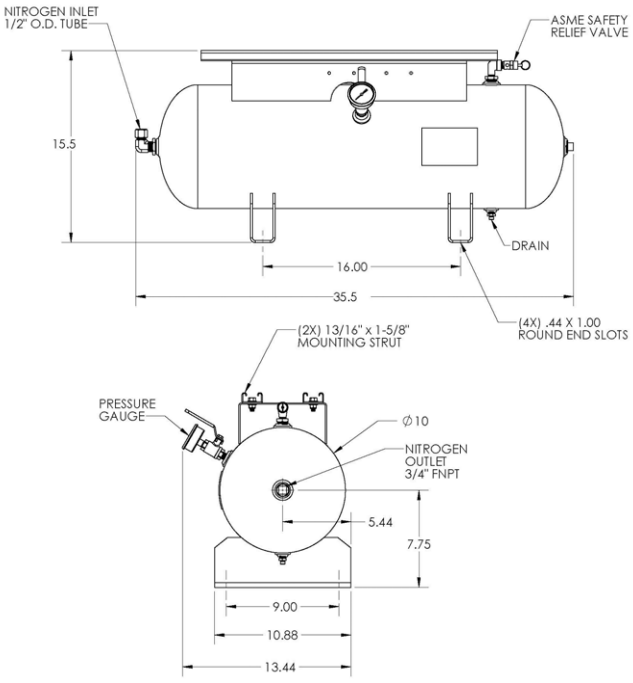
Wall Mount Nitrogen Generator Cabinet Details

- The nitrogen generator cabinet can be mounted to a wall, floor or the horizontal N2 storage tank.



10 Gallon Nitrogen Storage Tank Details (Horizontal & Vertical Tanks Available)

Horizontal Tank



Vertical Tank