Pilot Pressure Regulating Flow Control System

Supplied by Bladder Tank

Technical Data Sheet Submittal Package

for the Viking SFFF USP Foam Concentrate and Grate/Helideck Nozzle Discharge Device(s)

TECHNICAL BULLETIN

PILOT PRESSURE REGULATING FOAM/WATER DELUGE SYSTEM SUPPLIED BY A BLADDER TANK

The Viking Corporation, 5150 Beltway Dr. SE, Caledonia, MI 49316
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1. SYSTEM DESCRIPTION

The Pilot Pressure Regulating Foam/Water System Supplied by a bladder tank is a UL Listed and FM Approved system, for use with Viking supplied foam concentrate. This sprinkler system consists of a standard sprinkler system, using a Viking flow control valve with pressure regulating trim, a release solenoid for the supplemental detection system, an In-Line Balanced Pressure Proportioner ILBP (B), a hydraulically actuated Viking Halar® coated concentrate control valve (D), and foam concentrate approved for use with the Viking system.

This system was developed to provide constant discharge rates to eliminate over-discharge on deluge systems. It will provide constant pressure and water flow past the ILBP enabling the foam concentrate to be determined by the demand flow. Replace with: The Viking Pilot Pressure Regulating Foam/Water System combines the advantages of a conventional foam deluge system, but without the required supply hydraulic calculation to account for the over-discharge. Failure to consider over-discharge with traditional deluge systems will deplete the foam concentrate before the required duration.. Water supply pressure to the bladder tank must be provided from an upstream source, after the Pilot Pressure Regulating Flow Control Valve. The listed pressure differential for the pressure regulating trim is 20 PSIG (1.38 bar). This means that the inlet pressure at the desired flow rate to the pressure regulating flow control system must be 20 psi higher than the desired pressure on the discharge side of the deluge valve.

In order to obtain the pressure differential between foam/water solution and supply water pressure, the Pilot Pressure Regulating Flow Control Valve on the pressure regulating flow control trim must be adjusted to reduce the water pressure past the discharge side of the flow control valve. For best results, the pilot pressure regulating deluge valve (C) should be set using a downstream pressure gauge of the Pilot Pressure Regulating Flow Control Valve (D) and the water pressure gauge. For existing sprinkler systems that are restricted in flow and pressure capacity, this system should not be used without supplementing the available supply pressure.

2. LISTINGS AND APPROVALS

No formal approval as a system. Main component approvals are listed below.

- Pressure Regulating Flow Control Valve and Trim
  UL Listed - Guide VLFT
  FM Approved - Automatic Water Control Valves
- In-Line Balanced Pressure Proportioner (ILBP)
  UL Listed - Guide GFGV
- Model F2 or J2 Halar® Coated Concentrate Control Valve (CCV)
  UL Listed - Guide VLFT
  FM Approved - Automatic Water Control Valve as standard deluge valve. No formal approval available for coating.
- Model VFT Viking Bladder Tank - with ASME Section VIII and/or EN13455 Design Code
  UL Listed - Guide GHXV
  FM Approved - Low Expansion and High Expansion Foam Systems
- Viking ARK (3% AR-SFFF) Fluorine Free Foam Concentrate
  FM Approved
- Viking USP (3% SFFF) Fluorine Free Foam Concentrate
  UL Listed
  FM Approved

3. TECHNICAL DATA

Specifications:

Refer to individual component technical data page.

Material Standards:

Refer to individual component technical data page.

Ordering Information:

Refer to Tables 1 through 3.

Revised page replaces page Foam 30a-k, dated May 3, 2013.
(Converted to Technical Bulletin; Removed Figures 1 and 3;
replaced figure 2 with new figure 1 and misc updates)

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4. INSTALLATION

A. Discharge Devices

- Standard spray open sprinklers (refer to water/foam sprinkler data page)
- Model GN202 Grate Nozzles
- Model VFM Foam Makers
- Non-aspirating spray nozzles
- Manual monitors
- Hose reels and hand lines
- Foam Chambers
- Any open discharge device

B. General Instructions and Warnings

1. Refer to specific technical data sheets, acceptable installation standards, codes and Authority Having Jurisdiction for additional installation, operation, and maintenance instructions.
2. Inspections – The system must be inspected and tested in Accordance with NFPA 25. See Section 6 – Inspections, Tests, and Maintenance.
3. The valve, trim, bladder tank, and appurtenances must be installed in an area not subject to freezing temperatures or physical damage.

⚠ WARNING

After the proportioning system is tested or activated, foam concentrate needs to be flushed from the pipe network downstream of the concentrate control valve. Connect a water supply to the commissioning valve on the concentrate line and flush through the test header.

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C. Design And Installation

The following guidance is given with reference to the general system schematics (Figures) detailed later in this document.

⚠ WARNING

The valve, trim, bladder tank, and associated devices must be installed in an area not subject to freezing temperatures or physical damage.

⚠ 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 watch in the affected area.

1. Refer to the Special Notes section in this document.
2. Install the flow control valve with pilot pressure regulating deluge trim in accordance with the technical data sheet (also refer to Figure 1).
3. Install the Viking ILBP (B) in the riser. (See Special Note A and B, Page 7).
4. Install foam solution test valve (17) and system isolation valve (18). Test valves are required in accordance with NFPA 11.
5. Install the (CCV) and associated trim as indicated in Figure 1. FM systems require electrical supervision in accordance with FM Global Property Loss Prevention Data Sheet 4-12.
6. Install bladder tank (A) in accordance with the manufacturer's instructions with connections as shown on Figure 1, and herein described.
   a. Recommended connections are shown in Figure 1.
   b. Locate the tank as close as practical to the system riser.
   c. Allow enough room around the tank to service the bladder.
   d. Allow access to the tank for filling of foam concentrate.
   e. Install the water supply piping (13) from the riser to the bladder tank as shown in Figure 1.
   NOTE: *To eliminate water hammer effects during system activation, Viking recommends that the bladder tank water supply piping connection for a flow control system should be installed upstream of the flow control valve (C) as shown in Figure 1.*
   f. Install the piping from the tank (A) to the proportioner (B) as straight as possible to limit pressure loss.
7. All valves and devices should be located for easy access for operation and maintenance.
8. Fill bladder tank (A) with foam concentrate in accordance with the bladder tank operation manual and leave isolated from the system.

D. Placing System into Service & Removing System from Service

1. Placing the System into Service:

a. Refer to the Special Notes section on page 7.
b. Verify the following valves are in the closed position: water supply control valve (10), bladder tank water supply control valve (13), foam concentrate shut-off valve (14), foam solution test valve (17) and foam concentrate auxiliary drain valve (12), and vent valve (21).
c. Place the Pilot Pressure Regulating Flow Control valve (C.1) in service in accordance with the relevant Viking technical data page. Open the priming line valve to prime the CCV (D). Bleed off any air pressure trapped in the priming line to the CCV (D) by opening the 3-way pressure gauge valve (11). Once the air pressure has been relieved, close the 3-way valve and plug outlet. Re-open 3-way valve to maintain pressure on gauge (11). Continue placing the Pilot Pressure Regulating Flow Control valve in service.
d. The CCV (D) is closed and set when gauge (11) displays equal pressure to the system supply pressure gauge.

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e. The Pilot Pressure Regulating Flow Control system's release control system should be in service. To place the bladder tank (A) in service refer to the bladder tank operation manual for the complete start-up procedure.
f. Verify the CCV (D) is closed.
g. Verify normal valve positions and secure in correct position (see Figure 1).
h. Slowly open the shut-off valves (13) and (14).
i. IMPORTANT: Bleed air from vent valves (21).
j. Check for and repair any leaks in the foam/water system pipe network.

NOTICE
In accordance with the bladder tank operation manual, ensure that CCV (D) is closed, shut-off valves (13) and (14) are opened slowly, and the bladder tank is vented of air.

2. For System and Riser Piping Service and Maintenance:

a. Refer to the Special Notes section on page 7.
b. Close the water supply control valve (10).
c. Close the bladder tank water supply control valve (13) and foam concentrate shut-off valve (14).
d. Leave the foam system isolation valve (18) open.
e. Refer to instructions for removing the Pilot Pressure Regulating Flow Control (C.1) from service in the relevant Viking technical data page.
f. Open the main drain(s) on Pilot Pressure Regulating Flow Control valve (C.1).
g. Perform required service and maintenance on system devices or piping network.
h. Refer to instructions for returning the Pilot Pressure Regulating Flow Control valve (C.1) to service in the relevant Viking technical data page.
i. Verify the CCV (D) is closed by checking water pressure gauge (11) to ensure that it is the same as or higher than the system pressure.
j. IMPORTANT: Bleed air from vent valves (21).

NOTICE
In accordance with the bladder tank operation manual, ensure that CCV (D) is closed, shut-off valves (13) and (14) are opened slowly, and the bladder tank is vented of air.

k. Open bladder tank water supply valve (13) and foam concentrate shut-off valve (14).
l. Verify normal valve positions and secure in correct position (as detailed in Figure 1).

3. For Total System Service and Maintenance:

a. Refer to the Special Notes section on page 7.
b. Close the bladder tank water supply control valve (13) and foam concentrate shut-off valve (14).
c. Refer to instructions for removing the bladder tank (A) from service in the bladder tank operation manual.
d. Leave the foam system isolation valve (18) open.
e. Refer to instructions for removing the deluge valve (C) from service in the relevant Viking technical data page.
f. Open the main drain(s) on deluge valve (C).
g. System isolation valve may now be closed if desired. Perform required service and maintenance on system devices or piping network.
h. Refer to instructions for removing the bladder tank (A) from service in the bladder tank operation manual.
i. Perform required service and maintenance on bladder tank (A) in accordance with the bladder tank operation manual.
j. To return the system into service, follow steps 1a through 1j in above.

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4. For Bladder Tank Service and Maintenance - While Leaving System in Service:

a. Refer to the Special Notes section on page 7.
b. Close the bladder tank water supply control valve (13) and foam concentrate shut-off valve (14).
c. Refer to instructions for removing the bladder tank (A) from service in the bladder tank operation manual.
d. Perform required service and maintenance on bladder tank (A) in accordance with the bladder tank operation manual.
e. To place the bladder tank (A) in service refer to the bladder tank operation manual.
f. IMPORTANT: Bleed air from vent valves (21).

NOTICE
In accordance with the bladder tank operation manual, ensure that CCV (D) is closed, shut-off valves (13) and (14) are opened slowly, and the bladder tank is vented of air.

g. Verify normal valve positions and secure in correct position (as detailed in Figure 1).

5. For Riser Only Service and Maintenance:

a. Refer to the Special Notes section on page 7.
b. Close the water supply control valve (10) and isolate supervisory air supply to the system pipe network.
c. Close the bladder tank water supply control valve (13) and concentrate control shut-off valve (14).
d. Close the system isolation valve (18).
e. Refer to instructions for removing flow control valve (C.1) from service in the relevant Viking technical data page.
f. Open the main drain(s) on deluge valve (C).
g. Perform required service and maintenance on deluge valve (C.1).
h. Refer to instructions for returning the deluge valve (C.1) to service in the relevant Viking technical data page.
i. The CCV (D) will also be primed close as described in 1c above.
j. Verify CCV (D) is closed by checking water pressure gauge (11) to ensure that it is the same as or higher than the system pressure.
k. Open the system isolation valve (18).
l. Open tank water supply valve (13) and concentrate control shut-off valve (14).
m. IMPORTANT: Bleed air from vent valves (21).

NOTICE
In accordance with the bladder tank operation manual, ensure that CCV (D) is closed, shut-off valves (14) and (13) are opened slowly, and the bladder tank is vented of air.

n. Verify normal valve positions and secure in correct position (as detailed in Figure 1).

6. Testing the foam concentrate swing check valve:

a. After a flow test or proportioning test has been conducted, the foam concentrate swing check valve (15) should be checked to ensure that it maintains a positive seal between the CCV (D) and the preaction system riser, by following the procedure outlined below.
b. Bleed off any pressure which may have been trapped between the outlet of the chamber of the CCV (D) and the swing check valve (15) by placing a container under the foam concentrate auxiliary drain valve (12) and opening the valve slowly.
c. Drain excess foam concentrate into container. Should the leakage continue, check the priming pressure gauge (11) on the CCV (D) to ensure that the valve is primed and closed.
d. Flush the concentrate line downstream of the CCV (D)
e. If the foam concentrate auxiliary drain valve (12) continues to leak foam concentrate, then the CCV (D) must be checked for proper operation and repaired if necessary. Follow the procedure in section D.1.d and refer to component data page for repair instructions.
f. Should water continue to leak from the foam concentrate auxiliary drain valve (12), the foam concentrate swing check

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valve (15) clapper rubber and seat should be inspected or replaced. Refer to component data page for repair instructions.

5. OPERATION

Actuation of the supplemental detection system (pneumatically or electrically) will release the priming water pressure in the flow control valve's priming chamber allowing the valve to open, filling the system with water. While water flows through the flow control valve, water will flow out a ½" (13 mm) port on the discharge side of the flow control valve and pressurize the sensing end of the pressure operated relief valve (PORV), which will release the prime pressure of the Halar® coated concentrate control valve (D), allowing it to open and supply foam concentrate to the ILBP (B). Foam/water solution will be proportioned throughout the system.

The bladder tank will be pressurized by the water flowing through the piping and supply inlet to the bladder tank. System water pressure in the space between the flexible bladder and the inside surface of the tank causes the bladder to collapse, forcing foam concentrate out through the concentrate supply piping, Halar® concentrate control valve, and to the ILBP. The low venturi of the ILBP meters foam concentrate into the water stream passing by the ILBP. The listed minimum flow rate of the ILBP must be achieved before accurate proportioning will occur.

6. INSPECTION, TESTS, AND MAINTENANCE

⚠ 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.

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, FM Global Property Loss Prevention Data Sheet 4-12, LPC and VdS, which describe care and maintenance of sprinkler systems. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

It is imperative that the system be inspected and tested on a regular basis. The following recommendations are minimum requirements. The frequency of the inspections may vary due to contaminated or corrosive water supplies and corrosive atmospheres. In addition, the alarm devices or other connected equipment may require more frequent inspections. Refer to the technical data, system description, applicable codes, and Authority Having Jurisdiction for minimum requirements. Prior to testing the equipment, notify appropriate personnel.

A. Alarm Test - At least quarterly, test all connected alarm devices by opening the alarm test valve.

B. Main Drain Test - At least quarterly, perform a riser flow test. Observe and record the supply pressure gauge reading. Open the main drain valve fully. Again, observe and record the supply pressure gauge reading. Close the main drain valve. If the readings vary significantly from those previously established or from normal, check the main supply line for obstructions or closed valves and correct any problems found.

C. General - Visually inspect the valve, trim, piping, alarm devices, and connected equipment for physical damage, freezing, corrosion, or other conditions that may inhibit the proper operation of the system.

7. AVAILABILITY

The Pilot Pressure Regulating Foam/Water System Supplied by a Bladder Tank 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. GUARANTEE

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

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⚠ WARNING

If the outlet to the foam solution test valve is located closer than 5 pipe diameters, there may be turbulence at high flow rates.

SPECIAL NOTES

A. Provide a minimum of 5 pipe diameters of straight pipe on the inlet and outlet of the ILBP (B) to minimize turbulence inside the proportioner.

B. The combined total equivalent length of pipe (pipe length, plus equivalent lengths for fittings and valves) including both the water supply inlet piping and the foam concentrate discharge piping, should not exceed 165 equivalent feet (50.3 meters); specifically, 100’ (30.5 m) water supply and 65’ (19.8 m) foam concentrate piping.

C. The CCV (D) and swing check valve (15) must be connected adjacent to the ILBP using pipe nipples as short as possible.

D. The release of the concentrate control valve and the flow control valve must NOT be combined. The concentrate control valve must be primed and released separately of the pressure regulating valve to ensure open position of the concentrate control valve clapper.

E. Figure 1 is a general schematic of the required piping arrangement. Refer to the appropriate technical data page for specific information regarding the valve, tank, and related trim and devices.

F. The technical information, statements, and recommendations contained in this manual are based on information and tests that, to the best of our knowledge, we believe to be dependable. It represents general guidelines only, and the accuracy or completeness thereof, are not guaranteed since conditions of handling and usage are outside our control. The purchaser should determine the suitability of the product for its intended use and assumes all risks and liability whatsoever in connection therewith.

G. A strainer is not required in the foam concentrate discharge piping of bladder tank systems per NFPA Standards.

H. FM Global Property Loss Prevention Data Sheet 4-12 requires that the activation of the CCV must be supervised.

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A. Foam Concentrate Bladder Tank
1. Water Vent Valve – NORMALLY CLOSED
2. Safety Thermal Relief Valve
3. Foam Concentrate Vent Valve – NORMALLY CLOSED
4. Filling Vent Valve (Optional)
5. Filling Pressure Gauge (Optional)
6. Water filling/drain valve –NORMALLY CLOSED
7. Foam concentrate filling/drain valve – NORMALLY CLOSED
8. Concentrate level sight tube drain valve – NORMALLY CLOSED
9. Concentrate level sight tube

B. Proportioning Device – ILBP

C. Type of System – PILOT PRESSURE REGULATING
C.1 Pilot Pressure Regulating (Each item below sold separately)
- Flow Control Valve (Straight through or angle style)
- Pressure Regulating Flow Control Trim (Vertical)
- Release Trim (Electric or Pneumatic)
- Release Device (Solenoid valve or Pneumatic Actuator)

10. Water Supply Control Valve – NORMALLY OPEN

D. Concentrate Control Valve (CCV)
(Hydraulically activated Halar® coated straight through deluge valve)
11. CCV Priming pressure gauge
12. ½" Foam concentrate auxiliary drain valve

Accessory Trim – (Each item below sold separately)
13. Bladder tank water supply control valve – NORMALLY OPEN
14. Foam concentrate shut-off valve – NORMALLY OPEN*
15. Foam concentrate swing check valve
16. Foam solution test valve – NORMALLY CLOSED
17. Foam solution test header
18. Foam system Isolation valve – NORMALLY OPEN
19. Prime line supervision switch

Commissioning and Flushing Valves
20. 2½" Ball Valves (2) - NORMALLY CLOSED (Installed on customer-supplied outlet)

Air Vent and Drain Valves
21. ½" Air vent valves (2) - NORMALLY CLOSED (Installed on customer-supplied outlet)
22. 1" Drain valve (1) - NORMALLY CLOSED (Installed on customer-supplied outlet)

Bladder Tank Dip Valve
23. 1" Dip valve - NORMALLY CLOSED (Installed on customer-supplied outlet)

***Full port bronze body with 316 stainless steel trim and ball valve**

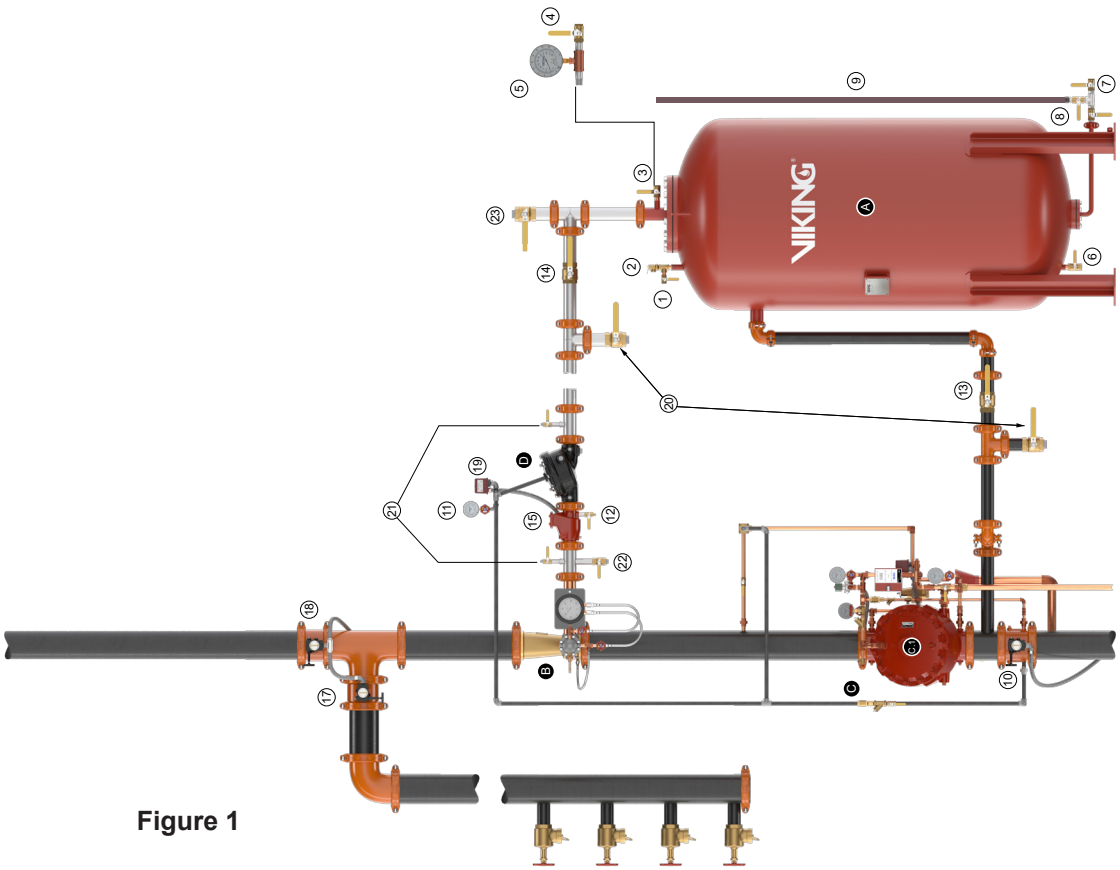

Figure 1

TECHNICAL BULLETIN

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ORDERING INSTRUCTIONS:

For complete Pilot Pressure Regulating Foam/Water Deluge System Supplied by a Bladder Tank, select 1 each of the following as well as all desired Accessories from the tables below:

- Flow Control Valve and Trim
- Release Trim
- Foam Concentrate Control Valve and Trim
- Foam Concentrate
- In-Line Balanced Proportioner
- Bladder Tank

Scan or click to visit Viking's digital system estimators.

https://digital.vikingcorp.com

DESCRIPTION		NOMINAL SIZE	PART NUMBER
Flow Control Valves - Straight Through			
Threaded	**Pipe O.D.**	**Model J-1**	**Painted Red**
	NPT 48 mm	1½"	12130
	NPT 60 mm	2"	12063
	NPT 65 mm	2½"	12405
	BSP 48 mm	DN40	12684
	BSP 60 mm	DN50	12688
	Pipe O.D.	**Model J-2**	**Halar® Coated**
	NPT 65 mm	2½"	12406Q/B
Flange/ Flange	**Flange Drilling**	**Model J-1**	**Painted Red**
	ANSI	3"	12016
	ANSI	4"	11968
	ANSI	6"	11970
	ANSI	8"	11993
	ANSI/Japan	4"	11975
	ANSI/Japan	6"	11981
	PN10/16	DN80	12028
	PN10/16	DN100	11973
	PN10/16	DN150	11971
	PN10	DN200	11997
	PN16	DN200	12001
	Flange Drilling	**Model J-2**	**Halar® Coated**
	ANSI	3"	12017Q/B
	ANSI	4"	11977Q/B
	ANSI	6"	11979Q/B
	ANSI	8"	11994Q/B
	PN10/16	DN80	12029Q/B
	PN10/16	DN100	11982Q/B
	PN10/16	DN150	11980Q/B
	PN10	DN200	11998Q/B
	PN16	DN200	12002Q/B

DESCRIPTION		NOMINAL SIZE	PART NUMBER
Flow Control Valves - Straight Through			
Flange/ Groove	**Flange Drilling / Pipe O.D.**	**Model J-1**	**Painted Red**
	ANSI / 89 mm	3"	12020
	ANSI / 114 mm	4"	11967
	ANSI / 168 mm	6"	11969
	PN10/16 / 89 mm	DN80	12031
	PN10/16 / 114 mm	DN100	11974
	PN10/16 / 165 mm	DN150	12642
	PN10/16 / 168 mm	DN150	11969
	Flange Drilling / Pipe O.D.	**Model J-2**	**Halar® Coated**
	ANSI / 89 mm	3"	12021Q/B
	ANSI / 114 mm	4"	11976Q/B
	ANSI / 168 mm	6"	11978Q/B
	PN10/16 / 89 mm	DN80	12646Q/B
	PN10/16 / 114 mm	DN100	12647Q/B
	PN10/16 / 165 mm	DN150	12643Q/B
	PN10/16 / 168 mm	DN150	11978Q/B
Groove/ Groove	**Pipe O.D.**	**Model J-1**	**Painted Red**
	48 mm	1½" / DN40	12129
	60 mm	2" / DN50	12061
	73 mm	2½" / DN65	12407
	76 mm	DN80	12731
	89 mm	3" / DN80	12024
	114 mm	4" / DN100	11516
	165 mm	DN150	11912
	168 mm	6" / DN150	11527
	219 mm	8" / DN200	11019
	Pipe O.D.	**Model J-2**	**Halar® Coated**
	48 mm	1½" / DN40	12131Q/B
	60 mm	2" / DN50	12062Q/B
	73 mm	2½" / DN65	12408Q/B
	76 mm	DN80	12732Q/B
	89 mm	3" / DN80	12025Q/B
	114 mm	4" / DN100	11517Q/B
	165 mm	DN150	11913Q/B
	168 mm	6" / DN150	11528Q/B
	219 mm	8" / DN200	11119Q/B

Table 1

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DESCRIPTION	NOMINAL SIZE	PART NUMBER	
Flow Control Pressure Regulating Trim for Straight Through Valves			
		Galvanized	**Brass**
Includes both conventional flow control trim and pilot regulator trim, as well as speed control assembly and pilot pressure regulating valve.	1½" / DN40	14768-1	14768-2
	2" / DN50	14768-1	14768-2
	2½" / DN65	14769-1	14769-2
	3" / DN80	14769-1	14769-2
	4" / DN100	14770-1	14770-2
	6" / DN150	14771-1	14771-2
	8" / DN200	14772-1	14772-2

DESCRIPTION		PART NUMBER	
Release Trim Packages			
Use with Angle or Straight Through Valves		**Galvanized**	**Brass**
	Pneumatic Release	10809	10811
	Electric Release	10830	10832

DESCRIPTION	NOMINAL SIZE	PART NUMBER
Foam Concentrate Control Valve Trim		
Use with Straight Through Valves	**Brass**	
	2½" / DN65	12929-2

DESCRIPTION		NOMINAL SIZE	PART NUMBER
Foam Concentrate Control Valve Halar Coated			
Angle Style			
Straight Through			
Groove/ Groove	Pipe O.D.	Model F-2	
	73 mm	2½" / DN65	12404Q/B

DESCRIPTION	PRESSURE RATING	TANK SIZE	DESIGN CODE	PART NUMBER
Vertical Bladder Tank	175psi (12bar)	25 to 4000 US Gallon	EN13445	VFTV****GF
Horizontal Bladder Tank	175psi (12bar)	50 to 5250 US Gallon	EN13445	VFTH****GF
Vertical Bladder Tank	232psi (16bar)	25 to 4000 US Gallon	EN13445	VFTV****GF-16
Horizontal Bladder Tank	232psi (16bar)	50 to 5250 US Gallon	EN13445	VFTH****GF-16
Vertical Bladder Tank	175psi (12bar)	25 to 4000 US Gallon	ASME Sec.VIII Div.1	VFTV****GAF
Horizontal Bladder Tank	175psi (12bar)	50 to 5250 US Gallon	ASME Sec.VIII Div.1	VFTH****GAF
Vertical Bladder Tank	232psi (16bar)	25 to 4000 US Gallon	ASME Sec.VIII Div.1	VFTV****GAF-16
Horizontal Bladder Tank	232psi (16bar)	50 to 5250 US Gallon	ASME Sec.VIII Div.1	VFTH****GAF-16
Where **** is the tank size in US Gallon				
(Example1: VFTV0025F = Model VFT Vertical 25 US Gallon Bladder Tank in accordance with EN13445 design code)				
(Example2: VFTH2000AF = Model VFT Horizonal 2000 US Gallon Bladder Tank in accordance with ASME Sec.VIII Div.1 design code)				

Table 2

TECHNICAL BULLETIN

PILOT PRESSURE REGULATING FOAM/WATER DELUGE SYSTEM SUPPLIED BY A BLADDER TANK

The Viking Corporation, 5150 Beltway Dr. SE, Caledonia, MI 49316
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

Accessories		
DESCRIPTION	NOMINAL SIZE	PART NUMBER
Foam Concentrate Swing Check Valve		
	2½" / DN65	05497C
Foam Solution Test Valve		
Grooved Butterfly Valve	2½" / DN65	01G-0250
	3" / DN80	01G-0300
	4" / DN100	01G-0400
	6" / DN150	01G-0600
	8" / DN200	01G-0800
System Isolation Valve		
Grooved Butterfly Valve	2½" / DN65	01G-0250
	3" / DN80	01G-0300
	4" / DN100	01G-0400
	6" / DN150	01G-0600
	8" / DN200	01G-0800
Water Supply Control Valve		
Grooved Butterfly Valve	2½" / DN65	01G-0250
	3" / DN80	01G-0300
	4" / DN100	01G-0400
	6" / DN150	01G-0600
	8" / DN200	01G-0800
Foam Concentrate Shut-Off Valve		
Ball Valve	2½" / DN65	23247
ACCESSORIES FOR FOAM/WATER SPRINKLER SYSTEMS		
Model D-3 PORV	½" / DN15	16970
1/8" / 3 mm Restricted Orifice	½" / DN15	06555A
Soft Seat Check Valve	½" / DN15	03945A
Y Strainer	½" / DN15	01054A
Ball Valve	½" / DN15	10355
Concentrate Control Valve Priming Connection Pkg.		
Required to connect priming chamber		10985
Bladder Tank Water Supply Control Valve		
Ball Valve	2½" / DN65	23247
Vent Valves		
Ball Valve	½" / DN15	10355
Ball Valve	1" / DN25	10356

ILBP				
Connection		Foam Type	Part Number	
Body Grooved	Foam Inlet Grooved		Nickel[1] Aluminium Bronze[2,4]	Brass[2]
3" (88.9mm)	1.5" (48.3 mm)	Viking USP, 3%	VLF089JAL	F20316L
4" (114.3mm)	2" (60.3 mm)	Viking USP, 3%	VLF114JAL	F20317L
4" (114.3mm)	2" (60.3 mm)	Viking ARK, 3%	VLF114JP	F20317P
6" (165.1mm)	2" (60.3 mm)	Viking USP, 3%	VLF165JAL	--
6" (165.1mm)	2" (60.3 mm)	Viking ARK, 3%	VLF165JP	--
6" (168.3mm)	2" (60.3 mm)	Viking USP, 3%	VLF168JAL	F20184L
6" (168.3mm)	2" (60.3 mm)	Viking ARK, 3%	VLF168JP	F20184P
8" (219.1mm)	2" (60.3 mm)	Viking USP, 3%	VLF2196JAL	--
8" (219.1mm)	2" (60.3 mm)	Viking USP, 3%	VLF2193JAL	F20185L

NOTES:
[1] Nickel Aluminium Bronze (NAB) - Standard Offering in Viking EMEA & APAC Territories. Brass available on request with longer delivery.
[2] Brass - Standard Offering in Viking Americas Territories. Nickel Aluminium Bronze available on request with longer delivery.

Foam Concentrate			
Foam Type	Part Number		
	US Gallon		
	6.5	55	265
ARK (3% AR-SFFF)	F24175-6.5	F24175-55	F24175-265
USP (3% SFFF)	F21720-6.5	F21720-55	F21720-265

Table 3

Revised page replaces page Foam 30a-k, dated May 3, 2013.
(Converted to Technical Bulletin; Removed Figures 1 and 3; replaced figure 2 with new figure 1 and misc updates)

TECHNICAL DATA

FLOW CONTROL VALVE
MODEL J-1
2-1/2" - 8" (DN65 - DN200)

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

The Viking Flow Control Valve is a quick opening, differential diaphragm flood valve with a spring loaded floating clapper. The Flow Control Valve can be used to facilitate manual or automatic on/off control. It can also be used to control water pressure or flow rates. As an on/off control valve it is used on deluge systems, sprinkler systems, or to automatically fill tanks or reservoirs.

Features

1. Field replaceable Diaphragm and Seat Rubbers
2. Designed for installation in the horizontal or vertical position
3. Compatible with Hydraulic (See Figures 2-5), Pneumatic, and/or Electric Detection Systems
4. Designed to be reset without opening the valve.
5. Can be trimmed to automatically reset electrically or manually.
6. Accessories:
   a. A Conventional Trim package for use with the Model J Flow Control Valve. The trim package includes all required trim components and all fittings and nipples shown on the Viking Model J Flow Control Valve Conventional Trim Chart for the valve used. Trim Charts are provided in trim packages and on the Viking website. For optional pre-assembled trim packages, refer to the Viking list price schedule or contact the manufacturer.
   b. Auxiliary Components are required for specific valve functions. For complete operating trim requirements refer to System Data for the system used. System Data is provided on the Viking website.
   NOTE: FOR PART NUMBERS OF ACCESSORIES, REFER TO VIKING LIST PRICE SCHEDULE.

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

2. LISTINGS AND APPROVALS:

U.L. Listed - Guide No. VLFT & VLLA
C-UL Listed
FM Approved
ABS Certificate number - 04-CH557068-X
NYC Department of Buildings - MEA 89-92-E Vol. XXXI

3. TECHNICAL DATA

Specifications:

Style: Straight through pattern
Connections available: Refer to Table 1
Water Pressure Rating: 250 PSI (17.2 bar) working water pressure
Hydrostatically tested: to 500 PSI (34.5 bar) at factory
Priming Chamber supply restriction (required): 0.125" (3.1 mm).
Color: Red
Friction Loss: Refer to Table 1
C_V Factor: Refer to Table 1

$$Q = C_V \sqrt{\frac{\Delta P}{S}}$$

Q = Flow
C_V = Flow Factor (GPM/1 PSI ΔP)
ΔP = Pressure Loss through Valve
S = Specific Gravity of Fluid

Material Standards:
Refer to Figure 6.

Ordering Information:
Refer to Table 1 for part numbers and shipping weights.

4. INSTALLATION (Refer to Figure 1 for identification of trim components.)

A. General Instruction

1. Viking Flow Control Valves may be installed in the horizontal or vertical position.
   Note: For positions other than vertical, minor modification of trim may be required to facilitate drainage from outlet chamber of the Flow Control Valve (consult manufacturer).
2. The valve must be installed in an area not subject to freezing temperatures or physical damage.
3. The valve must be trimmed according to current Viking Model J Conventional Trim Charts and appropriate instructions for the system used. Trim Charts are printed on the Viking website, and are provided with trim packages. For additional trim connections, refer to technical data describing the system being installed.
4. The priming line must be connected upstream of the system water supply main control valve or to a constant source of water at a pressure equal to the system water supply.

VIKING®

TECHNICAL DATA

FLOW CONTROL VALVE
MODEL J-1
2-1/2" - 8" (DN65 - DN200)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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Table 1: Valve Part Numbers and Specifications

Description	Nominal Size	Part Number	Friction Loss*	C_V Factor	Shipping Weight
Threaded					
Pipe O.D.					
NPT 65 mm	2½"	12405	12 ft. (3.6 m)	155	66 lbs. (30 kg)
Flange/Flange					
Flange Drilling					
ANSI	3"	12016	22 ft. (6.7 m)	198	81 lbs. (37 kg)
ANSI	4"	11968	21 ft. (6.4 m)	416	125 lbs. (57 kg)
ANSI	6"	11970	39 ft. (11.9 m)	884	235 lbs. (107 kg)
ANSI	8"	11993	57 ft. (17.4 m)	1500	405 lbs. (184 kg)
ANSI/Japan	4"	11975	21 ft. (6.4 m)	416	125 lbs. (57 kg)
ANSI/Japan	6"	11981	39 ft. (11.9 m)	884	235 lbs. (107 kg)
PN10/16	DN80	12028	22 ft. (6.7 m)	198	81 lbs. (37 kg)
PN10/16	DN100	11973	21 ft. (6.4 m)	416	125 lbs. (57 kg)
PN10/16	DN150	11971	39 ft. (11.9 m)	884	235 lbs. (107 kg)
PN10	DN200	11997	57 ft. (17.4 m)	1500	405 lbs. (184 kg)
PN16	DN200	12001	57 ft. (17.4 m)	1500	405 lbs. (184 kg)
Flange/Groove					
Flange Drilling / Pipe O.D.					
ANSI / 89 mm	3"	12020	22 ft. (6.7 m)	198	73 lbs. (33 kg)
ANSI / 114 mm	4"	11967	21 ft. (6.4 m)	416	125 lbs. (57 kg)
ANSI / 168 mm	6"	11969	39 ft. (11.9 m)	884	235 lbs. (107 kg)
PN10/16 / 89 mm	DN80	12031	22 ft. (6.7 m)	198	73 lbs. (33 kg)
PN10/16 / 114 mm	DN100	11974	21 ft. (6.4 m)	416	125 lbs. (57 kg)
PN10/16 / 165 mm	DN150	12642	39 ft. (11.9 m)	884	235 lbs. (107 kg)
PN10/16 / 168 mm	DN150	11969	39 ft. (11.9 m)	884	235 lbs. (107 kg)
Groove/Groove					
Pipe O.D.					
73 mm	2½" / 65mm	12407	12 ft. (3.6 m)	155	66 lbs. (30 kg)
76 mm	DN80	12731	12 ft. (3.6 m)	155	66 lbs. (30 kg)
89 mm	3" / DN80	12024	22 ft. (6.7 m)	198	65 lbs. (29 kg)
114 mm	4" / DN100	11516	21 ft. (6.4 m)	416	125 lbs. (57 kg)
165 mm	DN150	11912	39 ft. (11.9 m)	884	235 lbs. (107 kg)
168 mm	6" / DN150	11527	39 ft. (11.9 m)	884	235 lbs. (107 kg)
219 mm	8" / DN200	11019	57 ft. (17.4 m)	1500	405 lbs. (184 kg)

*Expressed in equivalent length of Schedule 40 pipe based on Hazen & Wililams forumula C = 120.

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5. After the Flow Control Valve is set, operation of the Flow Control Valve requires the release of priming water from the priming chamber. This may be by automatic or manual operation of the release system.
   Viking Flow Control Valves are compatible with hydraulic, pneumatic, and electric release systems. For specific Trim arrangements, refer to Trim Charts, Technical Data, and System Data describing the system being installed. Trim Charts are on the Viking website and are provided with trim packages. Technical Data and System Data sheets are on the Viking website.
   a. **Hydraulic Release Systems:** See Figures 2-5 for the maximum allowable elevation of hydraulic release piping above the Flow Control Valve. If the maximum height of hydraulic release piping exceeds the limit shown in Figures 2-5 for the valve used, use a Pneumatic or Electric Release System.
   b. **Pneumatic Release Systems:** A Viking Pneumatic Actuator is required between the release system connection provided on flow Control Trim and pneumatic release system piping.

⚠ CAUTION

When releasing devices capable of automatically resetting are used on the pneumatic release system of a Flow Control Valve, Viking Model F Deluge Valve Conventional Trim, complete with PORV, is required.

   c. **Electric Release Systems:** Solenoid Valves, Release Control Panels, and Electrical Detectors must be compatible. Consult appropriate listing and/or approval guides.
6. The Viking Flow Control Valve can be trimmed to automatically reset electrically or manually. For specific Trim arrangements refer to System Data describing the system being installed.
   NOTE: DO NOT INSTALL ANY RELEASING DEVICE, OR VALVE USED TO AUTOMATICALLY RESET THE FLOW CONTROL VALVE, ON PNEUMATIC RELEASE PIPING.
   For pneumatic release systems, any releasing valve or device used to automatically reset the Flow Control Valve must be installed in the trim piping between the Pneumatic Actuator and the priming chamber outlet.

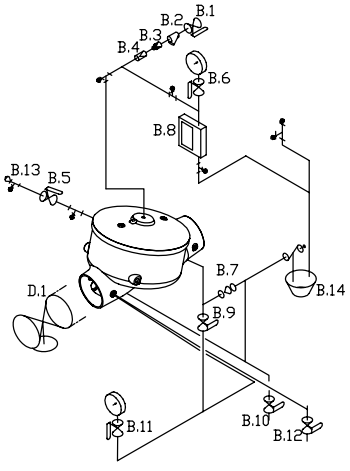
⚠ CAUTION

Operation of Viking Flow Control Valves by pressurizing the priming chamber with air or any other pressurized gas is not recommended or approved.

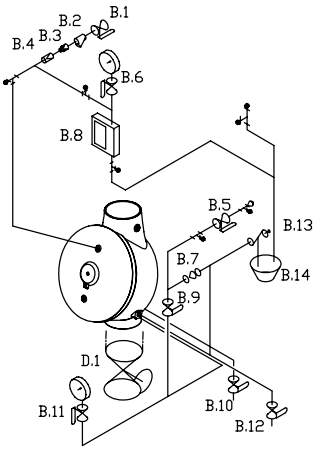
B. Placing the Valve in Service

Refer to Figure 1 and/or appropriate Trim Charts and System Data for the system used.

1. Verify:
   a. The system Main Water Supply Control Valve (D.1) is closed and the Flow Control Valve is trimmed according to current Viking Trim Charts and schematic drawings for the system used.
   b. The system has been properly drained.
   c. Auxiliary Drain (B.12) is open.



CONVENTIONAL TRIM, HORIZONTAL



CONVENTIONAL TRIM, VERTICAL

B.1 PRIMING VALVE (NORMALLY OPEN)
B.2 STRAINER
B.3 1/16" RESTRICTED ORIFICE
B.4 SPRING LOADED CHECK VALVE
B.5 ALARM SHUT-OFF VALVE (NORMALLY OPEN)
B.6 PRIMING PRESSURE WATER GAUGE AND VALVE
B.7 DRAIN CHECK VALVE
B.8 EMERGENCY RELEASE
B.9 ALARM TEST VALVE (NORMALLY CLOSED)
B.10 FLOW TEST VALVE (NORMALLY CLOSED)
B.11 WATER SUPPLY PRESSURE GAUGE AND VALVE
B.12 AUXILIARY DRAIN VALVE (NORMALLY CLOSED)
B.13 DRIP CHECK VALVE
B.14 DRAIN CUP
D.1 WATER SUPPLY CONTROL VALVE

Figure 1

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d. The Emergency Release (B.8) is closed.
e. The system water supply piping is pressurized up to the closed Main Water Supply Control Valve (D.1) and the priming line is pressurized up to the closed Priming Valve (B.1).

2. For Systems equipped with:
   a. Hydraulic Release Systems:
      i: Verify that all releasing devices are set and that any Inspector's Test Valve and/or auxiliary drain valves are closed.
      ii: Open Priming Valve (B.1). Proceed to step 3.
   b. Pneumatic Release Systems:
      i: Set the release system.
      ii: Open Priming Valve (B.1). Proceed to step 3.
   c. Electric Release Systems:
      i: Open Priming Valve (B.1).
      ii: Set the electric release system. Proceed to step 3.
3. Open Flow Test Valve (B.10).
4. Partially open Main Water Supply Control Valve (D.1).
5. When full flow develops from the Flow Test Valve (B.10), close the Flow Test Valve. Verify that there is no flow from the open Auxiliary Drain (B.12).
6. Close Auxiliary Drain (B.12).
7. Fully open and secure the Main Water Supply Control Valve (D.1).
8. Verify that the Alarm Shut-off Valve (B.5) is open and that all other valves are in their normal* operating position.
9. Depress the plunger of Drip Check (B.13). No water should flow from the Drip Check when the plunger is pushed.
10. Check for, and repair all leaks.
11. On new installations, those systems that have been placed out of service or where new equipment has been installed, trip test the system to verify that all equipment functions properly. Refer to INSPECTION, TESTS AND MAINTENANCE paragraph 6-B: ANNUAL maintenance instructions.

⚠ CAUTION

Performing a trip test results in operation of the Flow Control Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

12. After completing a trip test, perform SEMI-ANNUAL maintenance.

C. Automatic Resetting (Refer to Figure 1 for identification of trim components.)

To automatically reset the Flow Control Valve after it has operated:

1. Do NOT close the water supply main control valve (D.1). The priming valve (B.1) must be OPEN.
2. Automatically or manually reset any open devices on the hydraulic release system to stop all flow of water out of the priming chamber.

⚠ CAUTION

Resetting or closing releasing devices or valves on pneumatic release piping will NOT automatically cause the Flow Control Valve to reset. Do NOT install any releasing device or valve used to automatically reset the Flow Control Valve, on pneumatic release piping.

3. System supply pressure will enter the priming chamber through the restricted priming line connected to the priming chamber inlet.
4. When the combined force of spring pressure and system supply pressure entering the priming chamber overcomes the velocity pressure of water flowing through the valve, the clapper will close.
5. Flow through the valve will stop.
6. To reactivate the system, open a releasing device. Priming water will escape from the priming chamber faster than it is replaced through the restricted priming line, allowing the Flow Control Valve to open.

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D. Valve Removed From Service

NOTE: WHEN A VALVE HAS BEEN REMOVED FROM SERVICE AND IS SUBJECT TO FREEZING OR WILL BE OUT OF SERVICE FOR AN EXTENDED PERIOD OF TIME, ALL WATER MUST BE REMOVED FROM THE PRIMING CHAMBER, TRIM PIPING, WATER SUPPLY PIPING AND OTHER TRAPPED AREAS.

5. OPERATION (Refer to Figure 6)

The Model J-1 Flow Control valve has an inlet chamber, an outlet chamber, and a priming chamber. The inlet chamber and outlet chamber are separated from the priming chamber by the clapper (5) and diaphragm (6). System pressure enters the priming chamber through a restricted priming line (trim) equipped with a check valve.

In the SET position:

System pressure is trapped in the priming chamber to hold clapper (5) on seat (2) due to area differential of the clapper, and spring (15) pressure. Clapper (5) separates the inlet from from the outlet, keeping the system piping dry.

In fire conditions:

When the release system operates, pressure is released from the priming chamber faster than it is supplied through the restricted priming line. Water supply pressure in the inlet chamber forces the clapper (5) off from seat (2) allowing water to flow through the outlet and into the system piping and alarm devices.

To automatically reset, flow of water out of the priming chamber is stopped. This can be done manually (by closing a valve in the hydraulic release piping), or electrically (by closing a solenoid valve in the hydraulic release piping). When the combined force of spring (15) pressure and system supply pressure entering the priming chamber overcomes the velocity pressure of water flowing through the valve, the clapper (5) will close. Flow through the valve will stop.

6. INSPECTIONS, TESTS AND MAINTENANCE (Refer to Figure 1 for identification of trim components.)

A. Inspection

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 or corrosive atmospheres. Also, the alarm devices, detection systems or other connected trim may require a more frequent schedule. 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. The following recommendations are minimum requirements. (For additional information, refer to Viking Trim Charts and System Data describing systems with the release system used.)

Weekly:

Weekly visual inspection of the Viking Flow Control Valve is recommended.

1. Verify that the Main Water Supply Control Valve (D.1) is open and that all other valves are in their normal operating position and appropriately secured.
2. Check for signs of mechanical damage, leakage, and/or corrosive activity. If detected, perform maintenance as required. If necessary, replace the device.
3. Verify that the valve and trim are adequately heated and protected from freezing and physical damage.

B. Tests

Quarterly:

Quarterly testing of water flow alarms and performance of a Main Drain Test is recommended and may be required by the Authority Having Jurisdiction.

I: Water Flow Alarm Test

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. To test the local electric alarm (if provided) and/or mechanical water motor alarm (if provided), OPEN the alarm test valve (B.9) in the Flow Control 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. If equipped with remote station alarm signaling devices, verify that alarm signals were received.
3. When testing is complete, CLOSE the alarm test valve (B.9).
4. Verify:
   a. All local alarms stop sounding and alarm panels (if provided) reset.
   b. All remote station alarms reset.

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c. Supply piping to water motor alarm properly drains.

5. Verify that the alarm shut-off valve (B.5) is OPEN, and the alarm test valve (B.9) is CLOSED.
6. Verify that the outlet chamber is free of water. No water should flow from the drip check (B.13) when the plunger is pushed.
7. Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

II: Main Drain Test

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 (B.11).
3. Verify that the outlet chamber of the Flow Control Valve is free of water. No water should flow from the drip check (B.13) when the plunger is pushed.
4. Fully OPEN the Flow Test Valve (B.10).
5. When a full flow is developed from the Flow Test Valve (B.10), record the residual pressure from the water supply pressure gauge (B.11).
6. When the test is complete, SLOWLY CLOSE the Flow Test Valve (B.10).
7. Compare test results with previous flow information. If deterioration of the water supply is detected, take appropriate steps to restore adequate water supply.
8. Verify:
   a. Normal water supply pressure has been restored to the inlet chamber, the priming chamber, and the release system. The pressure on the priming chamber water pressure gauge should equal the system water supply pressure.
   b. All alarm devices, and valves are secured in normal operating position.
9. 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.

Annual - Annual Trip Tests are recommended.

⚠ CAUTION

Performing this test results in operation of the Flow Control Valve. Water will flow into the sprinkler piping and from any open sprinklers and/or nozzles. Take necessary precautions to prevent damage.

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Fully open the Flow Test Valve (B.10) to flush away any accumulation of foreign material.
3. Close the Flow Test Valve (B.10).
4. Trip the system by operating the release system. Allow a full flow to pass through the Flow Control Valve. Water flow alarms should operate.

When test is complete:

5. For Flow Control Valves equipped with:
   a. Hydraulic or Electric Release:
      i: Re-set the Release System. Pressure in the priming chamber should gradually be restored. Flow through the Flow Control Valve should stop.
      ii: Proceed to step 6.
   b. Pneumatic Release Systems:
      i: Close the Main Water Supply Control Valve (D.1) and Priming Valve (B.1).
      ii: Open Auxiliary Drain Valve (B.12).
      iii: Open all system main drains and auxiliary drains. Allow the system to drain completely. Proceed to step 6.
6. Perform SEMI-ANNUAL maintenance. Refer to paragraph 6.C.2 SEMI-ANNUAL MAINTENANCE
7. Place the system in service. Refer to Item 4.B, INSTALLATION: PLACING THE VALVE IN SERVICE.

NOTE: VALVES SUPPLIED BY BRACKISH WATER, SALT WATER, FOAM, FOAM/WATER SOLUTION, OR ANY OTHER CORROSIVE WATER SUPPLY, SHOULD BE FLUSHED WITH GOOD QUALITY FRESH WATER BEFORE BEING RETURNED TO SERVICE.

8. 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.

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C. Maintenance (Refer to Figure 1 for identification of trim components.)

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition. The Flow Control Valve must be kept from freezing conditions and physical damage that could impair its operation.

Where difficulty in performance is experienced, the valve manufacturer or authorized representative shall be contacted if any field adjustment is to be made.

⚠ WARNING

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

1. **After Each Operation:**
   a. 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.
   b. Flow Control Valves and trim that have been subjected to brackish water, salt water, foam, foam/water solution, or any other corrosive water supply, should be flushed with good quality fresh water before being returned to service.
   c. Perform SEMI-ANNUAL maintenance after every operation.
2. **Semi-Annual Maintenance:**
   a. Remove the system from service. (See release system description and technical data for additional information.)
      i: Close the Main Water Supply Control Valve (D.1) and Priming Valve (B.1).
      ii: Open the Auxiliary Drain Valve (B.12). Allow the outlet chamber of the Flow Control Valve to drain completely.
      iii: Release the pressure in the priming chamber by opening the Emergency Release Valve (B.8).
   b. Inspect all trim for signs of corrosion and/or blockage. Clean and/or replace as required.
   c. Clean and/or replace all strainer screens.
   d. Refer to Item 4-B, INSTALLATION: PLACING THE VALVE IN SERVICE.
3. **Every Fifth Year**
   a. Internal inspection of Flow Control Valves is recommended every five years unless inspections and tests indicate more frequent internal inspections are required. Refer to DISASSEMBLY instructions provided below.
   b. Internal inspection of strainers and restricted orifices is recommended every five years unless inspections and tests indicate more frequent internal inspections are required.
   c. Record and provide notification of inspection results as required by the Authority Having Jurisdiction.
4. **Removing the System from Service to Inspect and/or Repair Valve** (Refer to Figure 1)
   a. Remove the valve from service:
      i: Close the Main Water Supply Control Valve (D.1) and Priming Valve (B.1).
      ii: Open Auxiliary Drain Valve (B.12).
      iii: Release the pressure in the Priming Chamber by opening the Emergency Release Valve (B.8).
   b. Disconnect and remove trim from the Priming Chamber to gain access for removal of the cover.
5. **Removal of the Cover (4)** (Refer to Figure 6)
   a. Remove the Hex Head Cap Screws (9) from the Cover (4):
      - For 2-1/2" - 4" valves, use a Socket wrench with ¾" socket.
      - For 6" - 8" valves, use a Socket wrench with 15/16" socket.
6. **Installing the Spring (15)** (Refer to Figure 6)
   a. To install the new Spring (15), it can be difficult to hold the Spring (15) in place while replacing the Cover (4). A method to make this easier is to take the Cover (4) and place a screw driver through the Cover (4) and place the Spring (15) onto the screw driver, and re-install the Cover (4).

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7. **Replacing Parts of the Clapper Assembly** (Refer to Figure 6)

I: Replacing the Clamp Ring (3) (Refer to figure 6.)

a. To install the Clamp Ring (3):
   i. 2-1/2", 4", 6", and 8" valves: Place the Clamp Ring (3) on the Clapper (5), line up the holes and install the Screws (11).
   ii. For the 3" valve: The Clamp Ring (3) will have a grooved seat in the bottom, which needs to be installed onto the raised edge of the Upper Diaphragm (6), line up the holes in the Clamp Ring (3) with the holes in the Clapper (5) and install the Screws (11).
   - For 2-1/2" & 3" valves, use a Phillips head screwdriver.
   - For the 4" valve, use a Socket wrench with a ½" socket.
   - For the 6" valve, use a Socket wrench with a 9/16" socket.
   - For the 8" valve, use a 5/16" Allen wrench.

II: Replacing the Upper Diaphragm (6) (Refer to Figure 6)

a. To install the Upper Diaphragm (6):
   i: For 2-1/2", 4", 6", and 8" valves: Install the raised edge of the Upper Diaphragm (6) into the grooved seat of the Clapper (5). Replace the Clamp Ring (3) and re-install the Screws (11).
   ii: For 3" valves, install the Upper Diaphragm (6) onto the Clapper (5). Install the grooved seat on the Clamp Ring (3) into the raised edge on the Upper Diaphragm (6).

III: Replacing the Rubber Seat Assembly (7) (Refer to Figure 6)

a. To install the new Rubber Seat Assembly (7), place the side of the rubber that has the raised edge in the center, facing down towards the Clapper (5).
b. Install the Screws (10) into the Rubber Seat Assembly (7).
   - For 2-1/2" and 3" valves, use a Phillips head screwdriver.
   - For the 4" valve, use a Socket wrench with a ½" socket.
   - For the 6" valve, use a Socket wrench with a 9/16" socket.
   - For the 8" valve, use a 5/16" Allen wrench.

IV: Replacing the Clapper (5) (Refer to Figure 6)

a. Remove the Clamp Ring (3), Upper Diaphragm (6), and Rubber Seat Assembly (7) from the existing Clapper (5), and install them on the new Clapper (5).

8. **Replacing the Seat (2)** (Refer to Figure 6)

a. To remove the Seat (2), remove each of the Screws (12) from the Seat (2).
   - For 2-1/2" and 3" valves, use a Phillips head screwdriver.
   - For the 4" valve, use a 5/32" Allen wrench.
   - For 6" & 8" valves, use a 3/16" Allen wrench.
c. Once each of the Screws (12) are removed, the Seat (2) and O-Ring (14) can now be removed from the valve.
d. To install the new Seat (2), the Lubricant for the O-Ring (14) will need to be applied to the groove in the bottom of the Seat (2).
e. Once the Lubricant is applied, the O-Ring (14) can be installed into the groove of the Seat (2).
f. The Seat (2) can now be installed into the valve, tightening the Screws (12) in a star-shaped pattern with a Torque wrench.
   - For 2-1/2" - 4" valves, tighten to 48 in-lbs.
   - For 6" and 8" valves, tighten to 140 in-lbs.
   - For 2-1/2" and 3" valves, use a Phillips head screwdriver.
   - For the 4" valve, use a 5/32" Allen wrench.
   - For 6" and 8" valves, use a 3/16" Allen wrench.

7. AVAILABILITY

The Viking Flow Control 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.

TECHNICAL DATA

FLOW CONTROL VALVE
MODEL J-1
2-1/2” - 8” (DN65 - DN200)

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.

Maximum Allowable Pilot Heights for Select Equivalent Lengths of Hydraulic Release Piping

For Model J-1 Flow Control Valves with 1/8” (3.2 mm) Restricted Orifice

Graph is based on 1/2” (15 mm) pilot sprinklers installed on 1/2” (15 mm) schedule 40 galvanized release system piping.

If the maximum height of hydraulic release piping exceeds the limits shown on the graph, use Pneumatic or Electric Release System.

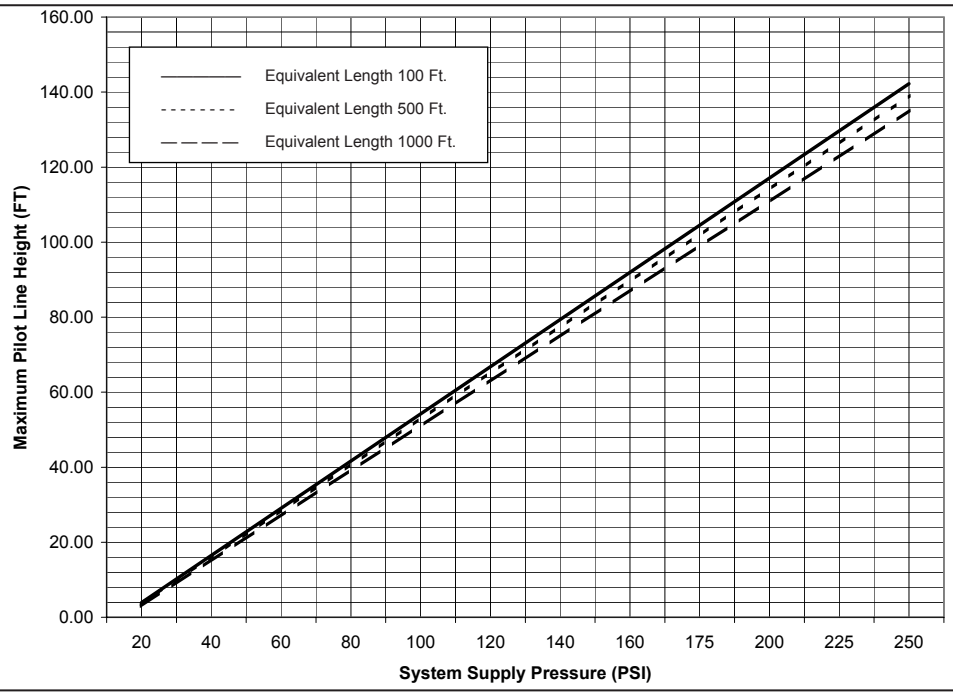

Figure 2 -
2-1/2” & 3” Valves

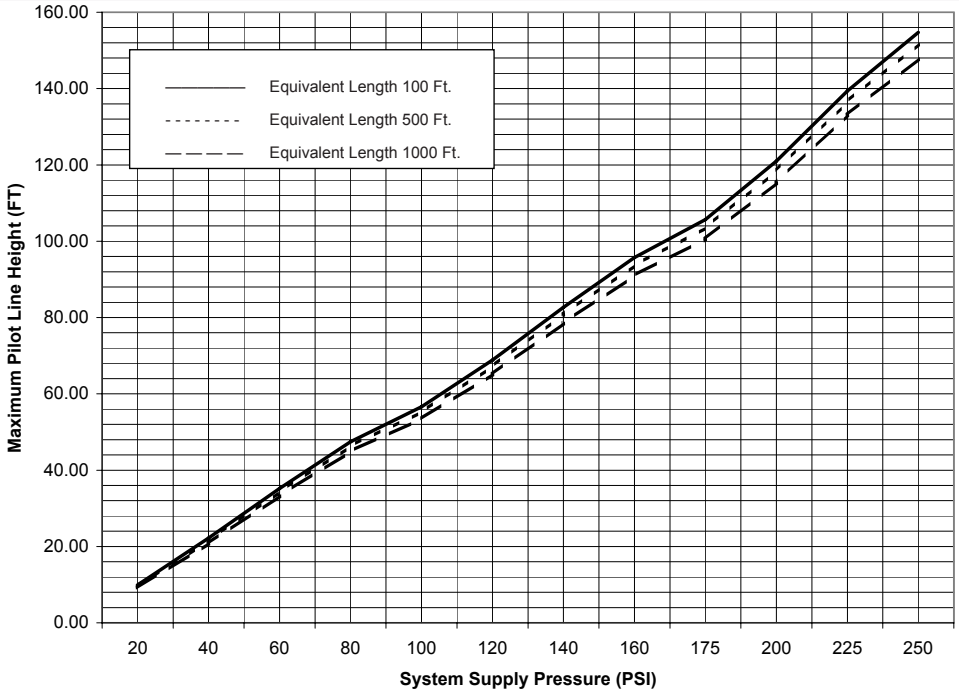

Figure 3 -
4” Valves

TECHNICAL DATA

FLOW CONTROL VALVE
MODEL J-1
2-1/2" - 8" (DN65 - DN200)

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Maximum Allowable Pilot Heights for Select Equivalent Lengths of Hydraulic Release Piping

For Model J-1 Flow Control Valves with 1/8" (3.2 mm) Restricted Orifice

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If the maximum height of hydraulic release piping exceeds the limits shown on the graph, use Pneumatic or Electric Release System.

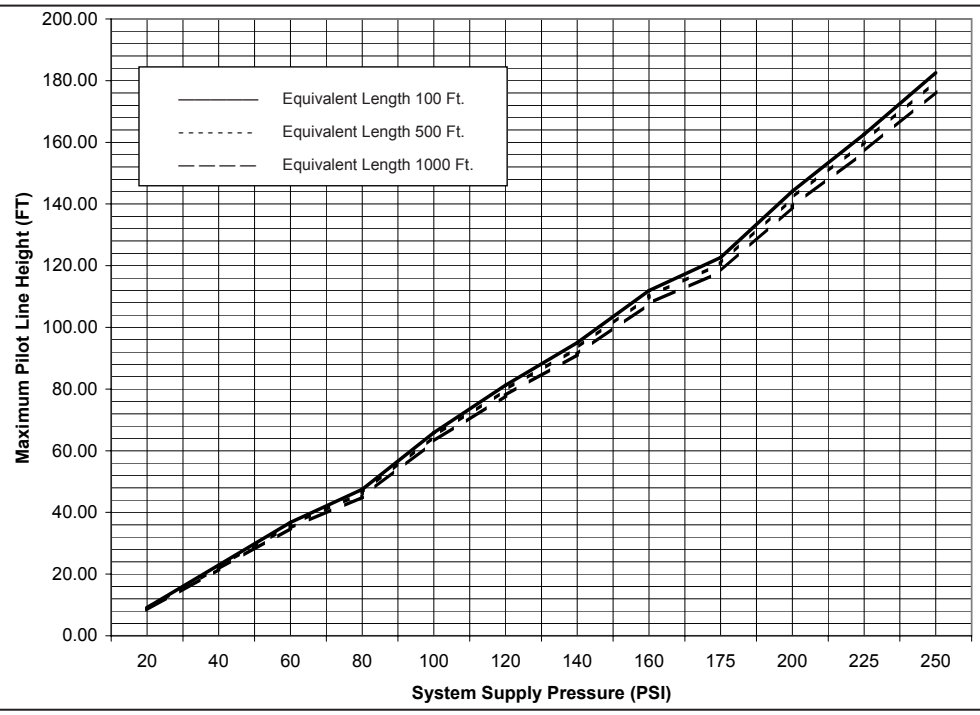

Figure 4 - 6" Valves

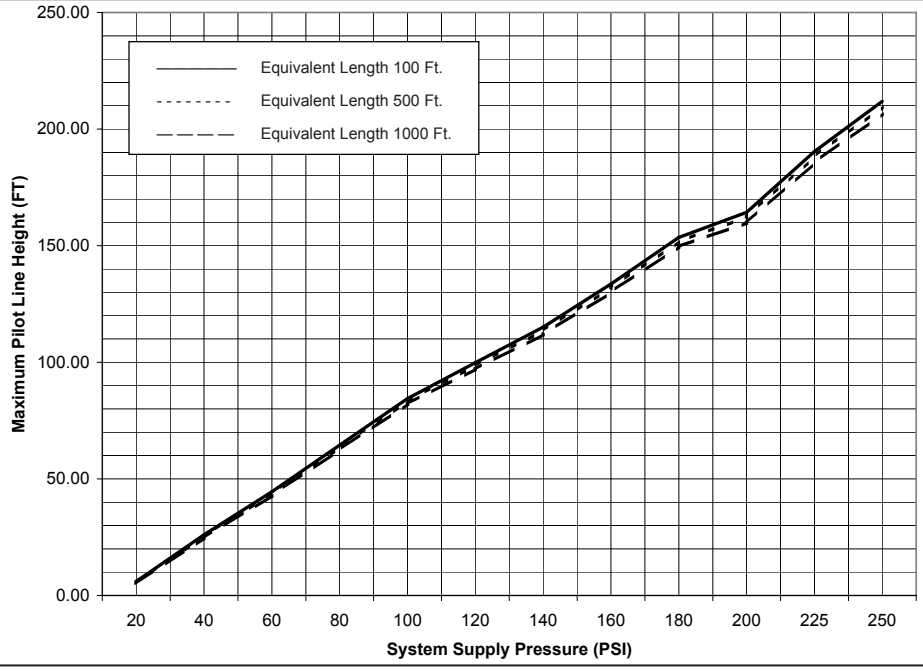

Figure 5 - 8" Valves

TECHNICAL DATA

FLOW CONTROL VALVE
MODEL J-1
2-1/2" - 8" (DN65 - DN200)

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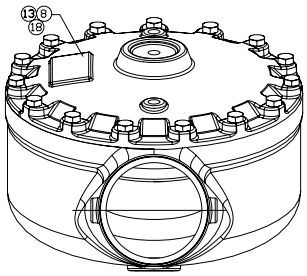

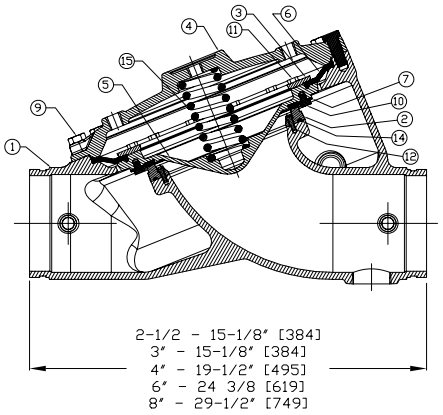

Figure 6 - Component Listing

ITEM NO.	PART NUMBER				DESCRIPTION	MATERIAL	NO. REQ'D			
	2-1/2" & 3"	4"	6"	8"			2-1/2" & 3"	4"	6"	8"
1	--	--	--	--	Body	Ductile Iron, Grade 65-45-12	1	1	1	1
2	*	*	*		Seat	Brass, UNS-C84400	1	1	1	
				*	Seat	Brass, UNS-C83600				1
3	02493B	02378B	05704B		Ring Clamp, Upper Diaphragm	Brass, UNS-C84400	1	1	1	
				10514	Ring Clamp, Upper Diaphragm	Brass, UNS-C83600				1
4	--	--	--	--	Cover	Ductile Iron, Grade 65-45-12	1	1	1	1
5	08846N	08844N	08570N	10518N/B	Clapper	Ductile Iron, Teflon Coated	1	1	1	1
6	12012	11560	11561	10510	Upper Diaphragm	EPDM - ASTM D-2000	1	1	1	1
7	02497B	02382B	02176B	10512	Rubber Seat Assembly	EPDM - ASTM D-2000	1	1	1	1
8	--	--	--	--	Data Plate	Aluminum Etched	1	1	1	1
9	02169A				Screw, H.H.C[1], 1/2-13 x 1 1/4 (32)	Steel, Low Carbon, SAE Grade 5	10			
		02200A			Screw, H.H.C[1], 1/2-13 x 1 1/2 (38)	Steel, Low Carbon, SAE Grade 2		12		
			05707A	05707A	Screw, H.H.C[1], 5/8-11 x 1 3/4 (44)	Steel, Low Carbon, SAE Grade 2			15	16
10	02496A				Screw, R.H.[3], 10-24 x 3/8 (9.5)	Stainless Steel UNS-S30200	6			
		02383A			Screw, H.H.C[1], 5/16-18 x 1/2 (13)	Stainless Steel UNS-S30400		8		
			07932		Screw, H.H.C[1], 3/8-16 x 1/2 (13)	Stainless Steel UNS-S30400			12	
				11021	Screw, S.H.C[2], 3/8-16 x 1/2 (13)	Stainless Steel UNS-S31600				12
11	02494A				Screw, R.H.[3], 10-24 x 1/2 (13)	Stainless Steel UNS-S30200	6			
		02383A			Screw, H.H.C[1], 5/16-18 x 1/2 (13)	Stainless Steel UNS-S30400		8		
			02454A		Screw, H.H.C[1], 3/8-16 x 5/8 (16)	Stainless Steel UNS-S30400			12	
				11022	Screw, S.H.C[2], 3/8-16 x 3/4 (19.1)	Stainless Steel UNS-S31600				12
12	*				Screw, R.H.[3], 10-24 x 5/8 (16)	Stainless Steel UNS-S30200	4			
		*			Screw, S.H.C[1], 10-24 x 3/4 (19)	Stainless Steel UNS-S31600		6		
			*	*	Screw, S.H.C[2], 1/4-20 x 3/4 (19)	Stainless Steel UNS-S30200			8	6
13	--	--	--	--	Tack	Tack	2	4	2	4
14	*	*	*	*	O-Ring	EPDM	1	1	1	1
15	05838A	05842A	01920A	10527	Spring	Stainless Steel	1	1	1	1
Not Shown				11570	Eye Bolt, 5/8-11-UNC	Carbon Steel				1
Not Shown				F01256	Nut, 5/8-11-UNC	Stainless Steel				1
18	--	--	--	--	Plate, PN10 Flange Identifier	Aluminum	1	1	1	1
				--	Plate, PN16 Flange Identifier					

-- Indicates no replacement part available

* Indicates part available only in sub-assembly listed below

SUB-ASSEMBLY

3, 5-7, 9-11	13488	13490	13492	13484	Clapper Assembly
2, 12, 14	14711-3	14711-4	14711-6	14711-8	Seat Replacement Kit*

[1] Hex Head Cap Screw [2] Socket Head Cap Screw, (8" Valve - #10 & 11 must be S.H.C. for clearance with seat) [3] Round Head Phillips Drive Screw

***Note:** Includes O-Ring lubricant to be added to ring groove in seat.

TECHNICAL DATA

PILOT REGULATING FLOW CONTROL TRIM

4" (DN100) MODEL J

FLOW CONTROL VALVE

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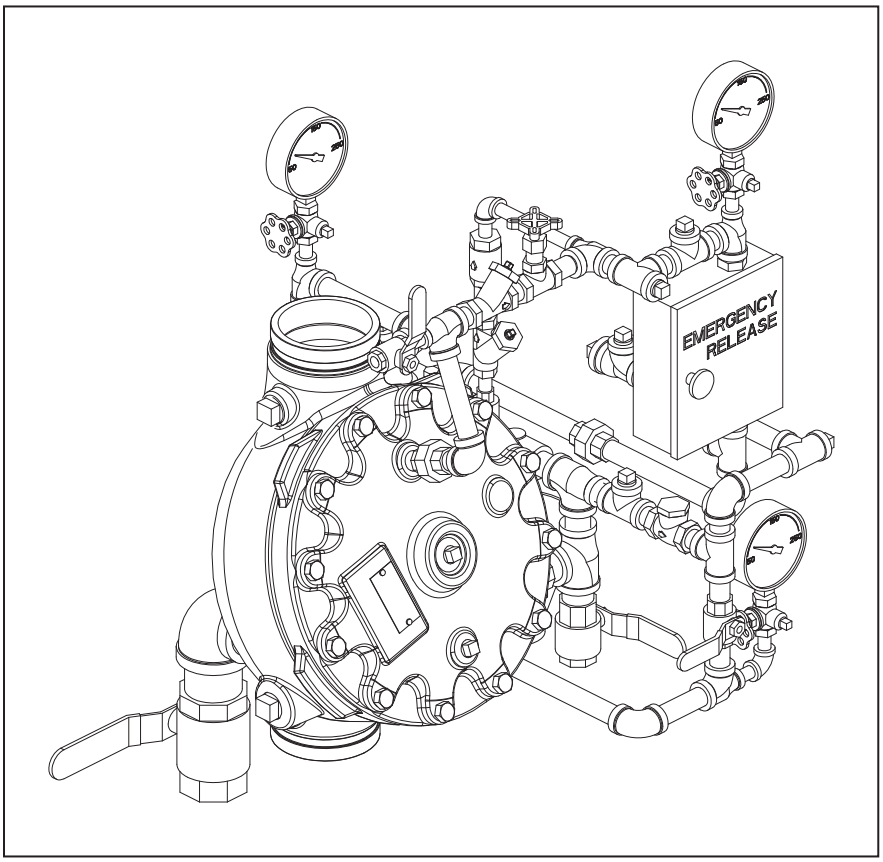


This Trim Chart is for use with the following Viking Trim Sets		
Valve Size	**Galvanized Trim Part No.**	**Brass Trim Part No.**
4" (DN100)	14770-1	14770-2
This trim is for use with the following Release Module Trim Kits		
Release Type	**Galvanized**	**Brass**
Electric	10830	10832
Note: Nipple lengths for brass trim may vary from those shown on this Trim Chart.		

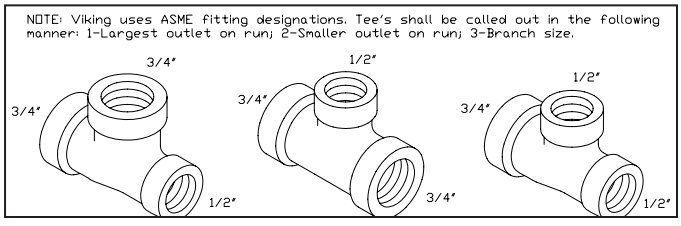
Note: When viewing this data page online, blue text represents hyper links and will open the appropriate data page when clicked.

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

Notes: For use with Trim Charts on Page 2

General Notes:

- Valve must be trimmed as shown. Any deviation from trim size or arrangement may affect the proper operation of the valve.
- Dimensions in parenthesis are millimeters.
- Viking uses ANSI tee designations (large outlet on run, small outlet on run, side outlet) in all trim call-outs.



Note 1: Release System connection.

Note 2: Alarm Connections: Connect alarm line piping to 3/4" (20 mm) NPT outlet. When using a Water Motor Alarm, a strainer is required. 1/2" (15 mm) NPT outlet is for electric Alarm Pressure Switch.

Note 3: Optional non-interruptible connection for Alarm Pressure Switch to activate electric alarm panel. Note: After the Deluge Valve trips, this location cannot be shut off. Alarms may operate until the outlet chamber of the deluge valve is de-pressurized below the set point of the Alarm Pressure Switch.

Note 4: Viking Drain Check Valve is manufactured with a 0.067" (1.7 mm) orifice to allow alarm line to drain. Do not substitute. Check label for proper orientation.

Form No. F_060708 19.07.11 19.1

Replaced Form No. F_060708, dated September 3, 2009
(Added P65 Warning. Replaced pressure relief valve with plug.)

TECHNICAL DATA

PILOT REGULATING FLOW CONTROL TRIM

4” (DN100) MODEL J

FLOW CONTROL VALVE

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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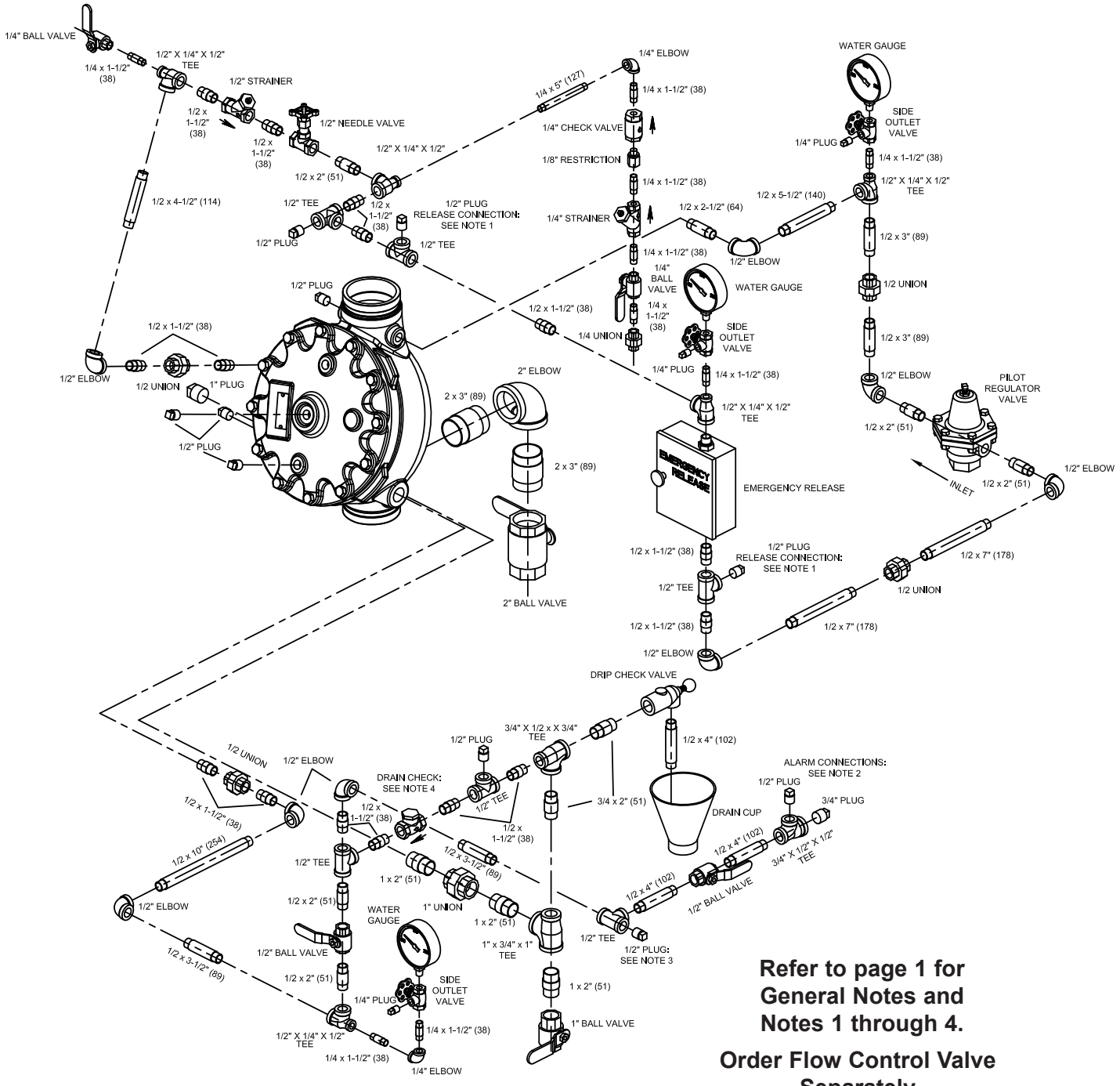

Refer to page 1 for General Notes and Notes 1 through 4.

Order Flow Control Valve Separately

Figure 1
4” Pilot Regulating Trim for Model J Flow Control Valve

VIKING®

TECHNICAL DATA

PILOT REGULATING FLOW CONTROL TRIM

4" (DN100) MODEL J

FLOW CONTROL VALVE

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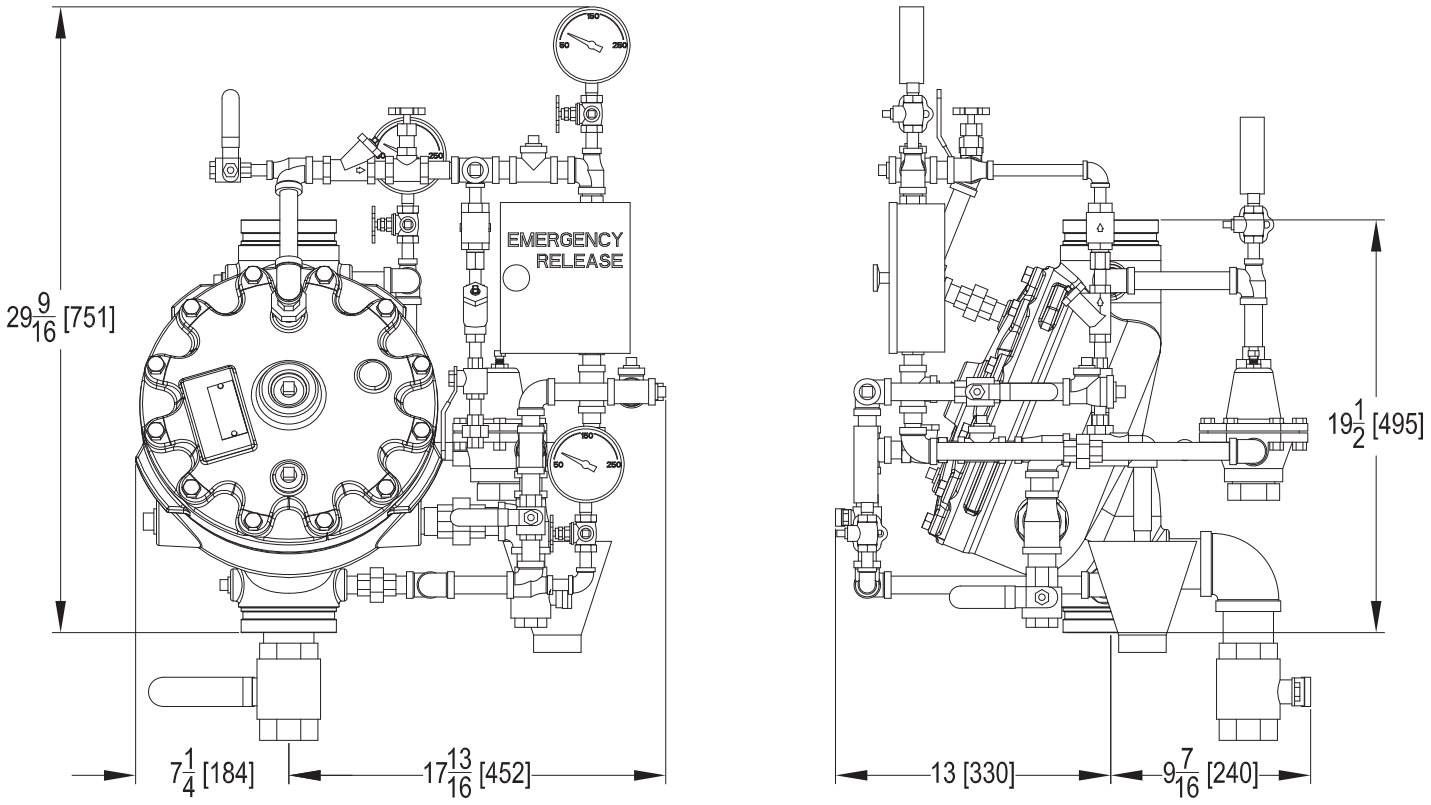

Figure 2 - Installation Dimensions

Replaced Form No. F_060708, dated September 3, 2009
(Added P65 Warning. Replaced pressure relief valve with plug.)

TECHNICAL DATA

SOLENOID VALVES
RATED TO 250 PSI (17.2 BAR)

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

The high pressure solenoid valve is a two-way type with one inlet and one outlet. It is a packless, internal pilot operated valve, suitable for use in releasing water pressure from the priming chamber of Viking Model E, F, G and VXD Series Deluge Valves and Viking Model H and J Series Flow Control Valves. The solenoid valve has floating diaphragm construction, which requires a minimum pressure drop across the valve to operate properly. The valves are available with a voltage rating of 24V DC in a normally closed or normally open configuration. These solenoid valves are for use with system control units that are listed and/or approved for releasing service for water based fire protection systems.

Features
- Normally Closed or Normally Open
- 24 VDC
- Easy to clean
- Body Style: Straight through
- NEMA 1 through 9. (See Table 1)
- Required Accessories: A 50 mesh strainer must be installed on the inlet side of the valve at the priming line connection. This strainer is included as part of the Model E, F, G and VXD Deluge Valve Trim and Model H or J Flow Control Valve Trim.

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

AVERTISSEMENT: Cancérigène et toxique pour la reproduction - www.P65Warning.ca.gov

2. LISTINGS AND APPROVALS (see table 1 for specific model approvals)

- UL Listed
- FM Approved
- CSA Certified
- CE Directives Applicable

3. TECHNICAL DATA

Specifications

Coil:
- Class F for Part Numbers 11601, 11602 and 13215.
- Class H for Part Numbers 13843 and 13844, Continuous Duty

Maximum Operating Pressure:
- 250 psi (17.2 bar) for Part Numbers 11601, 11602 and 13215.
- 300 psi (20.6 bar) for Part Numbers 13843 and 13844.

See Table 1 for enclosure descriptions and recommended ambient temperatures.

Material Standards

Body: Brass with ½" (15 mm) NPT connections
Seals and Discs: Buna N
Core Tube: 305 Stainless Steel
Core and Plugnut: 430F Stainless Steel
Springs: 302 Stainless Steel

Table 1 - Part Numbers and Specifications

Description	Model	Part Number	For Viking System	Orifice	Wattage	DC Current	Max. Ambient Temp.	Cv Factor	Listings & Approvals				
									UL	CSA	FM	LPCB	CE
Normally Closed NEMA 1,2,3,3S,4,4X [1]	24 VDC	11601	Deluge & Preaction, SureFire	3/4"	9.0 DC	338 mA	130 °F (54 °C)	4.0	Yes[2]	Yes[6]	Yes[9]	Yes[9]	Yes[10]
Normally Closed Explosion Proof NEMA 3,3S,4,4X,6,6P,7,9 [1]	24 VDC	11602		3/4"	9.0 DC	338 mA	130 °F (54 °C)	4.0	Yes[3]	Yes[7]	Yes[9]	Yes[9]	--
Normally Open NEMA 1,2,3,3S,4,4X [1]	24 VDC	13215	Surefire	3/4"	9.0 DC	338 mA	130 °F (54 °C)	4.0	Yes[4]	Yes[6]	Yes[9]	Yes[9]	Yes[10]
Normally Closed NEMA 1,2,3,3S,4,4X [1]	24 VDC	13843	Deluge & Preaction	5/8"	1.5 DC	140 mA	140 °F (60 °C)	4.0	Yes[5]	Yes[8]	Yes[9]	--	Yes[10]
Normally Closed Explosion Proof NEMA 3,3S,4,4X [1]	24 VDC	13844		5/8"	1.5 DC	140 mA	140 °F (60 °C)	4.0	Yes[5]	Yes[8]	Yes[9]	--	--

Footnotes

1. Enclosure types: 1 - General Purpose, 2 - Drip-Proof, 3 and 3s - Rain Tight, 4 and 4X - Water Tight, 6 and 6P - Submersible, 7 - Explosion Proof Class I Groups A, B, C and D, 9 - Dust Ignition Proof Class II Groups E, F & G.
2. UL Listed – VLTR file MP618 Ordinary, under ASCO, L.P. HV274060007
3. UL Listed – YTSX file E25549 Hazardous, under ASCO, L.P. HV274060008
4. UL Listed – YIOZ file MP618 Ordinary, under ASCO, L.P. HV283852001
5. UL Listed - VLTR EX1130
6. cCSAus Certified - file 10381, Ordinary, under ASCO, L.P. HV274060007 and HV283852001
7. cCSAus Certified - file 13976, Hazardous, under ASCO, L.P. HV274060008
8. cCSAus Certified
9. FM and LPCB Approved - as part of Viking Deluge Valves
10. CE Directives Applicable (EMC 2014/30/EU)

Replaces Form No. F_020101 Rev 19.1 (Updated Wattage/DC Current and Fig 1 dimensions on 13843 & 13844, added G and VXD valve reference)

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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4. INSTALLATION

1. Check nameplate for correct unit, including voltage and mode of operation. Follow all installation and maintenance instructions enclosed with the valve.
2. Standard solenoids may be mounted in any position. However, for optimum life and performance, solenoids should be mounted vertically and upright with the coil upright.
3. A 50 mesh strainer is required on the inlet side of the valve at the priming line connection. This strainer is included as part of the Model E, F, G and VXD Deluge Valve Trim and Model H or J Flow Control Valve Trim. Install the strainer as indicated on Viking's trim drawing. Install the solenoid according to markings on the valve body. Apply pipe-joint compound sparingly to male pipe threads only. If applied to valve threads, it may enter the valve and cause operation difficulty or leakage. Avoid putting pipe compound on first two male threads as well.
4. The unit must be wired in accordance with local and national electrical codes. For valves equipped with water tight enclosures, the electrical fittings must be approved for use in the hazardous location.
5. Upon completing the installation, the entire system must be tested for proper operation. See system description and testing instructions for additional information.

5. OPERATION

The solenoid valve is an internal pilot operated valve with pilot and bleed orifices utilizing line pressure for operation. Normally closed, de-energized valves open when energized. Power is applied to the solenoid coil, causing the solenoid core to lift, opening the pilot orifice to the outlet side of the valve. This relieves pressure on the top side of the diaphragm and allows the line pressure to open the valve. When de-energized, the solenoid core reseals the pilot orifice, allowing the line pressure to build above the diaphragm, closing the valve.

Normally closed solenoid valves are commonly used as releases for Viking deluge and flow control valves. Opening the solenoid valve allows the deluge or flow control valve to open.

NOTE: When using a normally closed solenoid valve as a release, a system will not operate automatically on total loss of power. For this reason, it is recommended and normally required that an emergency battery back-up, supervised power supply be provided to maintain fire protection during interruptions of the main power system and to meet the requirements of appropriate Authorities Having Jurisdiction.

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. Failure to follow these instructions could cause improper system operation, resulting in serious personal injury and/or property damage.

⚠ AVERTISSEMENT

Toute maintenance du système nécessitant la mise hors service d'une vanne de régulation ou d'un système de détection altérera les capacités de protection contre l'incendie de ce système. Avant de poursuivre, les procédures de fonctionnement en mode dégradé appropriées selon la norme NFPA 25 doivent être suivies avec l'information de toutes les autorités compétentes. Il faudrait envisager de faire appel à une patrouille de pompiers dans les zones touchées.

Si ces instructions ne sont pas respectées, cela pourrait entraîner un fonctionnement incorrect du système, entraînant des blessures graves et / ou des dégâts matériels.

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⚠ WARNING

Prior to operating the solenoid valve, be sure to close the system control valve to avoid unintentional operation of the deluge valve.

⚠ AVERTISSEMENT

AVANT D'UTILISER L'ELECTROVANNE, ASSUREZ-VOUS DE FERMER LA VANNE DE CONTRÔLE DU SYSTÈME POUR ÉVITER LE FONCTIONNEMENT NON INTENTIONNEL DE LA VANNE DELUGE.

Inspections:
It is imperative that the system is inspected and tested on a regular basis in accordance with NFPA 25. The frequency of the inspections may vary due to contaminated water supplies, corrosive water supplies, or corrosive atmospheres. In addition, the alarm devices, detection systems, or other connected trim may require a more frequent schedule. Refer to the system description and applicable codes for minimum requirements.

1. The valve must be operated at least monthly. The valve must open and close freely. When open, the water flow must be clear and clean at the proper flow rate. When closed, a total water shut-off must be observed. After the test, the strainer must be cleaned. Prior to cleaning the strainer, the priming line valve must be closed and the priming line depressurized. After the strainer is cleaned, the priming line valve must be reopened.
2. The valve must be inspected at least monthly for cracks, corrosion, leakage, etc., and cleaned, repaired, or replaced as necessary.
3. At least annually, the valve diaphragms and seats must be inspected and, if necessary, repaired or replaced.

⚠ WARNING

Close system control valve, turn off power supply, and depressurize valve before disassembling valve. It is not necessary to remove the valve from the pipe line to make inspections.

⚠ AVERTISSEMENT

FERMEZ LA VANNE DE COMMANDE DU SYSTÈME, COUPEZ L'ALIMENTATION ÉLECTRIQUE ET DÉPRESSURISEZ LA VANNE AVANT DE LA DÉMONTER. IL N'EST PAS NÉCESSAIRE D'ENLEVER LA VANNE DE LA TUYAUTERIE POUR FAIRE DES INSPECTIONS.

4. When lubricating valve components, use a high grade silicone grease (Dow Corning® 111 Compound Lubricant or equal).
5. When reassembling, tighten parts to torque values indicated in ASCO's maintenance instructions (packed with valve).
6. After maintenance is completed, operate the valve a few times to be sure of proper operation. A metallic "click" signifies the solenoid is operating.
7. It is recommended that the valve be replaced at seven-year intervals. Shorter intervals may be required if the valve is subject to corrosive water supplies or atmospheres.
8. All service must be performed by qualified personnel. Upon completion of inspections or replacement of the valve, the entire system must be checked for proper operation. See appropriate system description and testing instructions for additional information.

7. AVAILABILITY

The Viking Solenoid 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. GUARANTEE

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

TECHNICAL DATA

SOLENOID VALVES
RATED TO 250 PSI (17.2 BAR)

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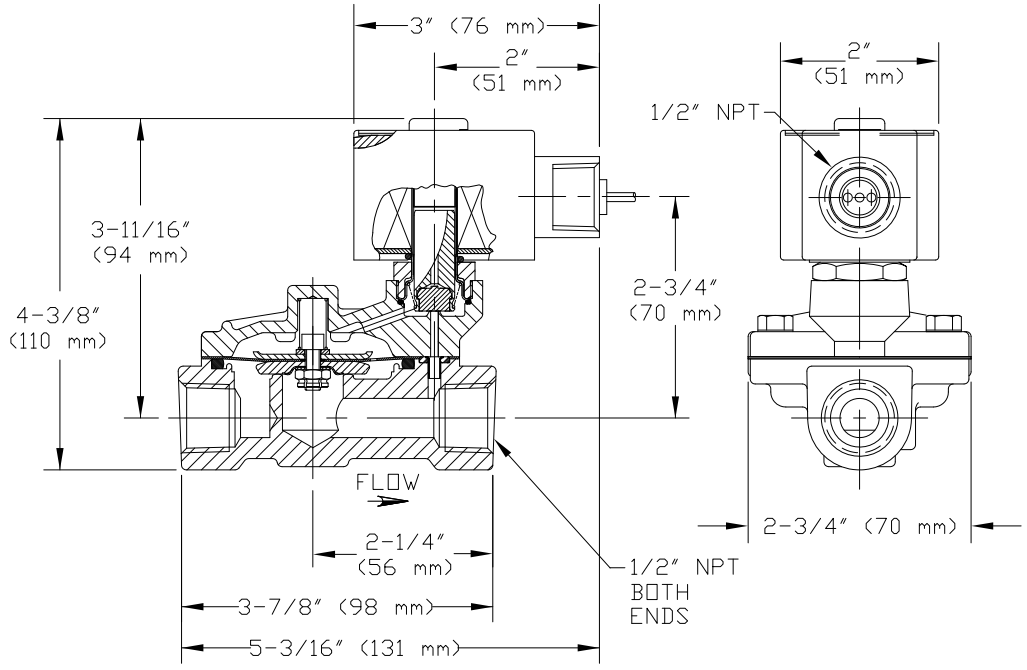

Figure 1
Dimensions for Part Numbers 11601, 11602 and 13215

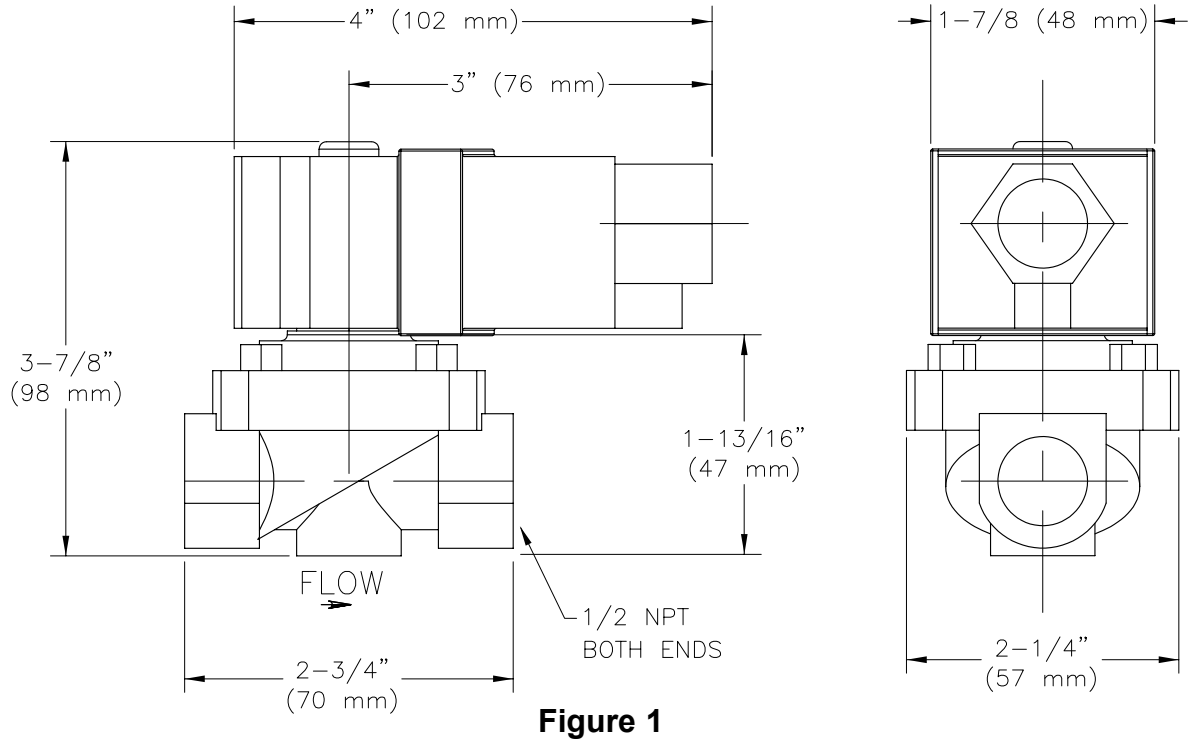

Figure 1
Dimensions for Part Numbers 13843 and 13844

Form No. F_020101 21.03.17 Rev. 21.1

Replaces Form No. F_020101 Rev 19.1 (Updated Wattage/DC Current and Fig 1 dimensions on 13843 & 13844, added G and VXD valve reference)

TECHNICAL DATA

VERTICAL AND HORIZONTAL BLADDER TANKS MODEL VFT ASME Sec.VIII Div.1 - U-1A

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1. GENERAL DESCRIPTION

The bladder tank is a carbon steel pressure vessel containing an elastomeric bladder between the water and foam concentrate. The bladder permits water pressure to be transferred to the foam concentrate without the two fluids mixing together.
This Technical Data Page is intended for trained experts. It contains basic information needed to use the product described. Legally binding is the product operation and maintenance manual which must be observed.
For further information, please contact the appropriate sales office in Section 5 Availability or refer to the technical documentation.
The contents of this publication are subject to modifications without notice.

2. LISTINGS AND APPROVALS

The bladder tank is FM Approved and/or UL Listed as part of a fire extinguishing system combining designated foam concentrates, specific proportioning equipment, and discharge devices. Approved and Listed system components can be found at www.approvalguide.com and https://iq.ulprospector.com

FM Approved – Low Expansion Foam Systems (FM5130)

UL Listed – Guide GFGV.EX27255 & GHXV.EX5002 (UL162)

Constructed according to ASME Boiler and Pressure Vessel Code (BPVC) Sec.VIII Div.1 with U-1A (“U” Stamp certification process.

CE marked according to the PED Directive 2014/68/EU (Europe Only)

NOTE: Other international approval certificates may be available upon request.

“SFFF compatible” refers to this product as being part of a SFFF Foam system that has been tested to recognized standards. Not all configurations are available. Please consult technical data and/or the Approval/Listing for usage requirements.

Photographs are for illustration purposes only. Refer to drawings for actual design details.

SFFF compatible

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

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3. TECHNICAL DATA

3.1 Construction Features

- Vertical tanks on legs or horizontal tanks on saddles
- Legs and saddles are provided with mounting brackets/holes.
- Approved system design pressure of 175 PSI (12.1 bar) or 232 PSI (16.0 bar)
- 100% pressure tested according to the applied design code
- Shell and heads in ASME SA-516 Gr.70
- Lockable corrosion resistant brass tank trim/service ball valves (UL Listed / FM Approved)
- Inspection flange available on left or right side of horizontal tanks (left as standard)
- Machine welded circumferential and longitudinal seams for maximum quality and durability
- Welded lifting lugs to facilitate safe handling operations
- Earth lug for electrical safety
- Safety thermal valve for water side of bladder to prevent slow overpressure and relieve thermal fluctuations
- Bladder equipped with cast rubber caps to ensure water & foam integrity under constant pressure
- Bladder specifically tested for compatibility with foams shown in FM Approval and UL Listing
- Oversized to permit concentrate thermal expansion (volume expansion allowance)
- Tank equipped with inside protection at any opening to ensure no damage to the bladder
- Internal PVC foam concentrate distribution pipe ensures optimal foam concentrate usage
- Internal water distribution channel to equalize the water pressure everywhere avoiding damage to the bladder and to drain the tank during service and maintenance
- Nameplate holder to avoid undetected corrosion on the tank's shell behind the plate
- Sight Tube level indicator
- External epoxy zinc rich primer with aliphatic polyurethane finish tested by FM and UL for corrosive atmosphere (salt fog)

3.2 Standard Materials

Table 3.2.1 - Standard Materials	
Tank shell and heads:	ASME SA-516 Gr. 70
Bladder:	Reinforced NBR and EPDM
Trim valves:	Brass
Safety thermal relief valve:	Brass
Level indicator:	Sight Tube: PVC
Paint:	Epoxy zinc rich primer with aliphatic polyurethane finish
Standard colour:	Flame Red RAL3000
Connection:	Grooved (2.5" available with 73.0 or 76.1 mm - specify upon ordering)

3.3 Standard Design Specifications

Table 3.3.1 - Standard Design Specifications	
Design pressure:	175 PSI / 12.1 bar (1.2MPa) **or** 232 PSI /16.0 bar (1.6MPa)
Operating temperature range*:	35°F to 120°F (1.7°C to 49°C)
Capacity:	See tables
Empty weight:	See tables
Proportioning range:	See Ratio Controller data sheet
(*) Refer to the appropriate proportioner for faom concentrate being used.	

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3.4 Ordering Information

The following information is provided to ensure that the correct design requirements are provided during the order and manufacturing process. Mandatory information is required in every case. Optional information is required in case of special project or specification requirements.

Table 3.4.1: Ordering Information

	Ref	Criteria	Option
Mandatory Information (required for quote/order processing)	1a	Configuration	a) Vertical b) Horizontal
	1b	Capacity	a) 25 to 4000 US Gallons Vertical b) 50 to 5250 US Gallons Horizontal (see tables for available sizes)
	1c	Design Code	ASME Bolier and Pressure Vessel (BPVC) Code with U-1A Manufacturer Data Report
	1d	Standby Pressure Rating	a) 175 PSI / 12.1 bar (1.2 MPa) b) 232 PSI /16.0 bar (1.6 MPa)
	1e	Inspection Flange	a) Left (Standard) b) Right (required for Horizontal Tanks only)
	1g	Language	Select Bladder Tank Manual Language (see Table 12.1.2)
Optional	2a	Design Temperature	Contact technical department
	2b	Corrosion Allowance	Contact technical department
	2c	Radiographic Test Report (*)	Contact technical department
	2d	Liquid Penetrant Test Report (*)	Contact technical department
Pre-Assembled with Ratio Controller	3a	Ratio Controller Size(s)	2”, 2.5”, 3”, 4”, 6”, 8”
	3b	Direction of Flow	a) Left to right b) Right to left (direction of flow as you face the tank)
	3c	Water Line Piping	Carbon Steel
	3d	Foam Line Piping	a) Brass b) Stainless Steel
	3e**	Foam Concentrate Type(**)	a) 3% xMAX b) Viking ARK 3% c) Viking USP 3%
	3f	Concentrate Control Valve	Viking Halar CCV (FM|UL) or Hydraulic Ball Valve

(*) With additional cost
(**) These foam concentrates have been tested for bladder compatibility as per UL162 and/or FM5130. The long term compatibility of other foams concentrates cannot be verified.

INFORMATION

Some of the available options may be not covered by the UL Listing or FM Approval. Please always make reference to the appropriate approval directory or guides or contact the appropriate sales office in Section 5 Availability for further assistance.

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4. SCOPE OF DELIVERY

Ensure that all components are complete and in good condition.
The bladder tank is supplied in or on a suitable wooden pallet skid or shipping crate in the horizontal position.
All bladder tanks have lifting lugs to allow safe maneuverability on site.
Tank is supplied empty with pre-installed bladder.
Small trim valves and contents level device are supplied pre-assembled to the tank as standard.
Safety thermal relief valve supplied as standard, unmounted from tank. UV marked Safety Valve according to ASME BPVC Sec. VIII Div.1 available for an additional cost.
Anchor fixing bolts are not part of our supply scope.

Table 4.1.1 - Documentation

Standard Documentation	Optional Documentation *
Warranty Certificate	Dimensional Drawings
PED Declaration or Conformity	Material Certificates according to ASME Code Specifications
Safety Thermal Relief Valve Declaration of Conformity	Certificate of Conformity Type 2.1 to EN10204
Hydrostatic Pressure Test Certificate	Design Structural Calculations
Bladder Pneumatic Test Certificate	Spot or Full Radiographic Examination with Report (when not mandatorily required by design parameters)
Painting Inspection Certificate	Spare Parts List
Final Inspection Certificate	Copy of Procedure Qualification Record (PQR) and Welding Procedure Specification (WPS) according to tank construction code
Operating, Filling and Maintenance Manual (English)	Operating, Filling and Maintenance Manual (Language)
Manufacturer Data Report Form U-1A	
(*) Contact the sales office listed in section 5 for further information and price.	

5. AVAILABILITY

The Viking Corporation, 210 N. Industrial Park Drive, Hastings,Michigan 49058, Toll free phone: (800) 968-9501

6. PRODUCT VARIANTS

6.1 Options

- Flanged connections (ANSI or PN16)
- Special coatings for salt-water applications or harsh environmental conditions
- Nameplate in corrosion resistant material
- Increased wall thickness for corrosion allowance
- Internal coatings such as epoxy tar
- 232 PSI /16.0 bar (1.6 MPa) design pressure rating with UL Listing and FM Approval
- Other design pressure and seismic ratings
- Ladders | Work Platform | Sunshield
- Full bladder tank stainless steel construction
- Heat tracing and/or insulation
- Bladder tank pre-installed on base frame or containerized to customer requirements
- Various colors and painting cycles with UL Listing and FM Approval (120-300 microns)
- Nondestructive examinations
- Factory acceptance test, notified body or third party inspections
- Special sea freight and fumigated packaging
- UV certified Safety Valve according to ASME BPVC Code Sec.VIII Div.1

Please contact us for further details, pricing and availability

INFORMATION *Some of the available options may be not covered by the UL Listing or FM Approval. Please always make reference to the appropriate approval directory or guides or contact us for further assistance.*

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6.2 General bladder tank layout and P&ID

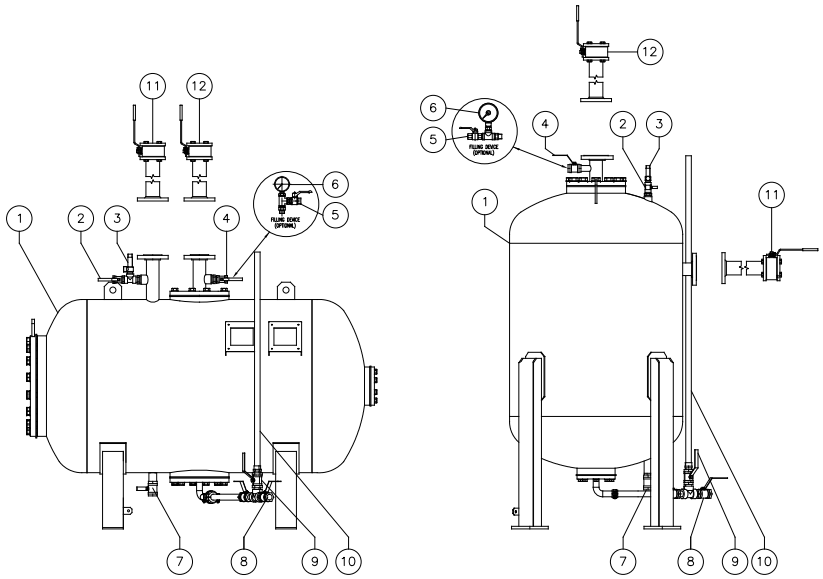

Figure 6.2.1
Vertical and Horizontal Bladder Tanks

Table 6.2.2 - General Bladder Tank Layout and P&ID

Item	Description	Item	Description
1	Bladder Tank	7	Water Filling/Drain Valve (NPT)
2	Water Vent Valve (NPT)	8	Foam Concentrate Filling/Drain Valve (NPT)
3	Safety Thermal Relief Valve	9	Concentrate Level Indicator Drain Valve
4	Foam Concentrate Vent Valve (NPT)	10	Concentrate Level Indicator
5	Filling Vent Valve (Optional)	11	Water Shut Off Valve (to be ordered separately)
6	Filling Pressure Gauge 1-10 kpa (Optional)	12	Foam Concentrate Shut Off Valve (to be ordered separately)
Note: Item 10 shown with Sight Tube. Level Gauge also available and connected at position 10.			

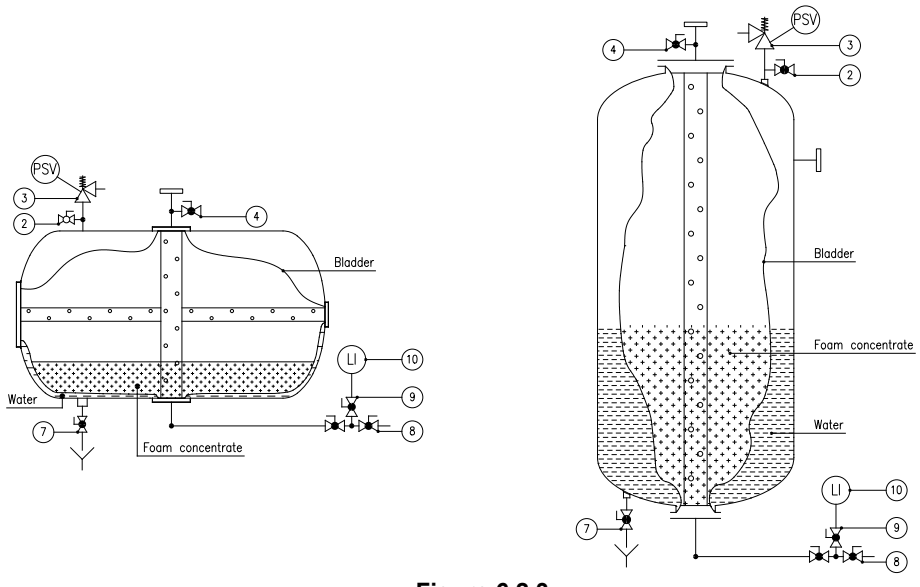

Figure 6.2.3

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6.3 Dimensions

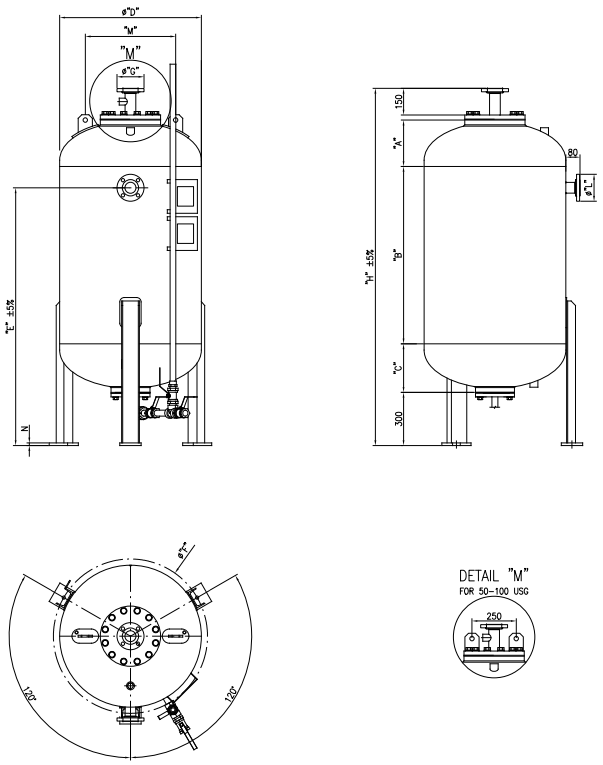

Figure 6.3.1
Vertical Bladder Tank: 25 to 200 US gallons

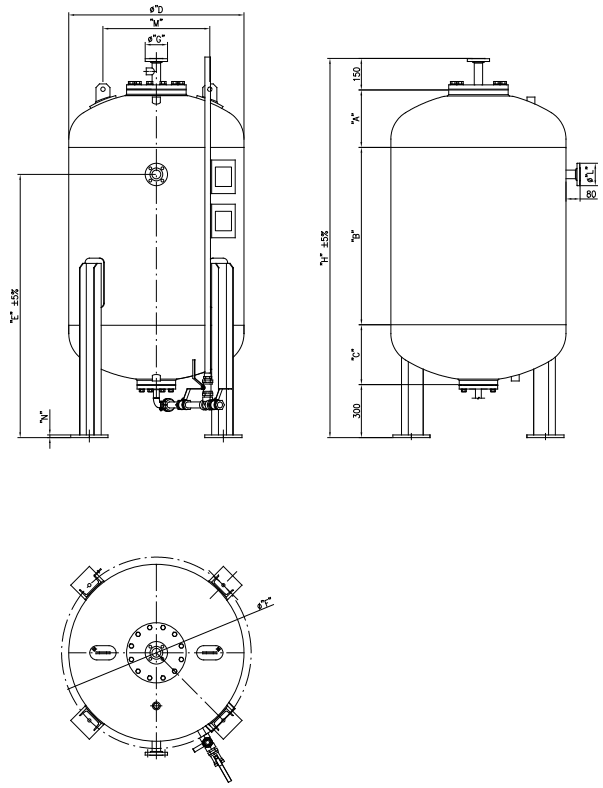

Figure 6.3.2
Vertical Bladder Tank: 250 to 4000 US gallons

TECHNICAL DATA

VERTICAL AND HORIZONTAL BLADDER TANKS MODEL VFT ASME Sec.VIII Div.1 - U-1A

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Table 6.3.3 - Vertical Bladder Tank Dimensions (ASME Sec VIII Design Code)

ASME Sec VIII Design Code		Capacity		Weight		A	B	C	ØD	E	ØF	ØG	H	ØL	M	N
175 PSI / 12.1 bar	232 PSI / 16.0 bar	USG	Litres	LBS	KG	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
						mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
VFTV0025U	VFTV0025U-16	25	94	221	100	6.4	15.7	7.0	19.7	30.2	22.4	2	48.1	2	9.8	0.6
						163	400	178	500	768	570	50	1221	50	250	15
VFTV0036U	VFTV0036U-16	36	136	309	140	6.4	23.6	7.0	19.7	38.1	22.4	2	55.9	2	9.8	0.6
						163	600	178	500	968	570	50	1421	50	250	15
VFTV0050U	VFTV0050U-16	50	189	411	186	7.4	27.6	8.0	23.6	44.5	26.4	2	61.8	2	9.8	0.6
						187	700	203	600	1130	670	50	1570	50	250	15
VFTV0075U	VFTV0075U-16	75	283	450	204	7.4	35.4	8.0	23.6	44.5	26.4	2	69.7	2	9.8	0.6
						187	900	203	600	1130	670	50	1770	50	250	15
VFTV0100U	VFTV0100U-16	100	378	528	239	7.4	49.2	8.0	23.6	64.6	26.4	2	83.4	2	9.8	0.59
						187	1250	203	600	1640	670	50	2120	50	250	15
VFTV0150U	VFTV0150U-16	150	567	850	385	10.3	39.4	10.8	31.5	57.1	34.3	2	79.4	2	9.8	0.6
						262	1000	274	800	1450	870	50	2016	50	510	15
VFTV0200U	VFTV0200U-16	200	757	938	425	10.3	51.2	10.8	31.5	57.1	34.3	2	91.2	2	9.8	0.6
						262	1300	274	800	1450	870	50	2316	50	510	15
VFTV0250U	VFTV0250U-16	250	946	940	426	12.9	39.4	13.2	39.4	59.7	42.6	2.5	84.3	2.5	24.0	0.6
						327	1000	336	1000	1516	1082	65	2142	65	610	15
VFTV0300U	VFTV0300U-16	300	1135	1091	494	12.9	51.2	13.2	39.4	71.5	42.6	2.5	96.1	2.5	24.0	0.6
						327	1300	336	1000	1816	1082	65	2442	65	610	15
VFTV0350U	VFTV0350U-16	350	1324	1113	504	12.9	55.1	13.2	39.4	75.4	42.6	2.5	100.1	2.5	24.0	0.6
						327	1400	336	1000	1916	1082	65	2542	65	610	15
VFTV0400U	VFTV0400U-16	400	1514	1150	521	12.9	65.0	13.2	39.4	85.3	42.6	2.5	109.9	2.5	24.0	0.6
						327	1650	336	1000	2166	1082	65	2792	65	610	15
VFTV0450U	VFTV0450U-16	450	1703	1823	826	13.0	59.1	13.3	43.3	79.4	46.5	2.5	104.1	2.5	24.0	0.6
						329	1500	337	1100	2017	1181	65	2645	65	610	15
VFTV0500U	VFTV0500U-16	500	1892	2004	908	13.0	70.9	13.3	43.3	91.2	46.5	2.5	115.9	2.5	24.0	0.6
						329	1800	337	1100	2317	1181	65	2945	65	610	15
VFTV0600U	VFTV0600U-16	600	2271	2267	1027	13.0	65.0	14.5	47.2	84.6	51.2	3	110.5	3	37.4	0.6
						330	1650	368	1200	2148	1300	80	2807	80	950	15
VFTV0700U	VFTV0700U-16	700	2649	2514	1139	14.1	65.0	15.5	51.2	86.4	55.3	3	113.4	3	33.5	0.6
						358	1650	394	1300	2194	1405	80	2881	80	850	15
VFTV0800U	VFTV0800U-16	800	3028	2695	1221	14.1	78.7	15.5	51.2	100.2	55.3	3	127.2	3	33.5	0.6
						358	2000	394	1300	2544	1405	80	3231	80	850	15
VFTV0900U	VFTV0900U-16	900	3406	3907	1770	15.3	78.7	16.5	55.1	100.0	59.3	3	129.4	3	36.6	0.6
						388	2000	420	1400	2540	1505	80	3287	80	930	15
VFTV1000U	VFTV1000U-16	1000	3785	3583	1623	15.8	74.8	17.1	57.1	96.6	61.2	3	126.6	3	36.6	0.6
						402	1900	434	1450	2454	1555	80	3215	80	930	15
VFTV1100U	VFTV1100U-16	1100	4163	3764	1705	15.8	82.7	17.1	57.1	104.5	61.2	3	134.4	3	36.6	0.6
						402	2100	434	1450	2654	1555	80	3415	80	930	15
VFTV1200U	VFTV1200U-16	1200	4542	3817	1729	16.4	82.7	17.6	59.1	105.0	63.2	3	135.5	3	37.4	0.6
						416	2100	447	1500	2667	1605	80	3442	80	950	15
VFTV1300U	VFTV1300U-16	1300	4921	4276	1937	17.4	78.7	18.5	63.0	102.0	67.1	3	133.6	3	41.3	0.6
						443	2000	471	1600	2591	1705	80	3393	80	1050	15
VFTV1400U	VFTV1400U-16	1400	5299	4358	1974	17.4	88.6	18.5	63.0	111.9	67.1	3	143.4	3	41.3	0.6
						443	2250	471	1600	2841	1705	80	3643	80	1050	15
VFTV1500U	VFTV1500U-16	1500	5678	4525	2050	19.6	74.8	20.6	68.9	100.1	73.2	3	133.8	3	45.3	0.6
						497	1900	522	1750	2542	1860	80	3398	80	1150	15
VFTV1600U	VFTV1600U-16	1600	6056	4636	2100	19.6	78.7	20.6	68.9	104.0	73.2	3	137.7	3	45.3	0.6
						497	2000	522	1750	2642	1860	80	3498	80	1150	15
VFTV1700U	VFTV1700U-16	1700	6435	4724	2140	20.5	78.7	21.5	70.9	103.4	75.2	3	139.6	3	45.3	0.6
						521	2000	547	1800	2627	1910	80	3547	80	1150	15
VFTV1800U	VFTV1800U-16	1800	6813	5347	2422	22.6	59.1	23.5	78.7	88.5	83.5	3	121.3	3	51.2	0.8
						575	1500	598	2000	2248	2120	80	3082	80	1300	20
VFTV1900U	VFTV1900U-16	1900	7192	5501	2492	22.6	63.0	23.5	78.7	92.4	83.5	3	125.3	3	51.2	0.8
						575	1600	598	2000	2348	2120	80	3182	80	1300	20
VFTV2000U	VFTV2000U-16	2000	7570	5722	2592	22.6	68.9	23.5	78.7	98.3	83.5	3	131.2	3	51.2	0.8
						575	1750	598	2000	2498	2120	80	3332	80	1300	20
VFTV2200U	VFTV2200U-16	2200	8327	6459	2926	22.6	82.7	23.5	78.7	112.1	83.5	3	145.0	3	51.2	0.8
						575	2100	598	2000	2848	2120	80	3682	80	1300	20
VFTV2400U	VFTV2400U-16	2400	9084	6691	3031	22.6	88.6	23.5	78.7	119.2	83.5	3	150.9	3	51.2	0.8
						575	2250	598	2000	3028	2120	80	3832	80	1300	20
VFTV2600U	VFTV2600U-16	2600	9842	6954	3150	22.6	102.4	23.5	78.7	131.8	83.5	3	164.6	3	51.2	0.8
						575	2600	598	2000	3348	2120	80	4182	80	1300	20
VFTV2800U	VFTV2800U-16	2800	10599	7605	3445	22.6	114.2	23.5	78.7	143.6	83.5	3	176.5	3	51.2	0.8
						575	2900	598	2000	3648	2120	80	4482	80	1300	20
VFTV3000U	VFTV3000U-16	3000	11356	7901	3579	22.6	122.0	23.5	78.7	151.5	83.5	3	184.3	3	51.2	0.8
						575	3100	598	2000	3848	2120	80	4682	80	1300	20
VFTV3200U	VFTV3200U-16	3200	12113	8442	3824	22.6	133.9	23.5	78.7	163.3	83.5	3	196.1	3	51.2	0.8
						575	3400	598	2000	4148	2120	80	4982	80	1300	20
VFTV3400U	VFTV3400U-16	3400	12870	8881	4023	22.6	145.7	23.5	78.7	175.1	83.5	3	208.0	3	51.2	0.8
						575	3700	598	2000	4448	2120	80	5282	80	1300	20
VFTV3600U	VFTV3600U-16	3600	13627	9113	4128	22.6	151.6	23.5	78.7	181.0	83.5	3	213.9	3	51.2	0.8
						575	3850	598	2000	4598	2120	80	5432	80	1300	20
VFTV3800U	VFTV3800U-16	3800	14384	9629	4362	22.6	165.4	23.5	78.7	194.8	83.5	3	227.6	3	51.2	0.8
						575	4200	598	2000	4948	2120	80	5782	80	1300	20
VFTV4000U	VFTV4000U-16	4000	15141	9916	4492	22.6	173.2	23.5	78.7	202.7	83.5	3	235.5	3	51.2	0.8
						575	4400	598	2000	5148	2120	80	5982	80	1300	20

TECHNICAL DATA

VERTICAL AND HORIZONTAL BLADDER TANKS MODEL VFT ASME Sec.VIII Div.1 - U-1A

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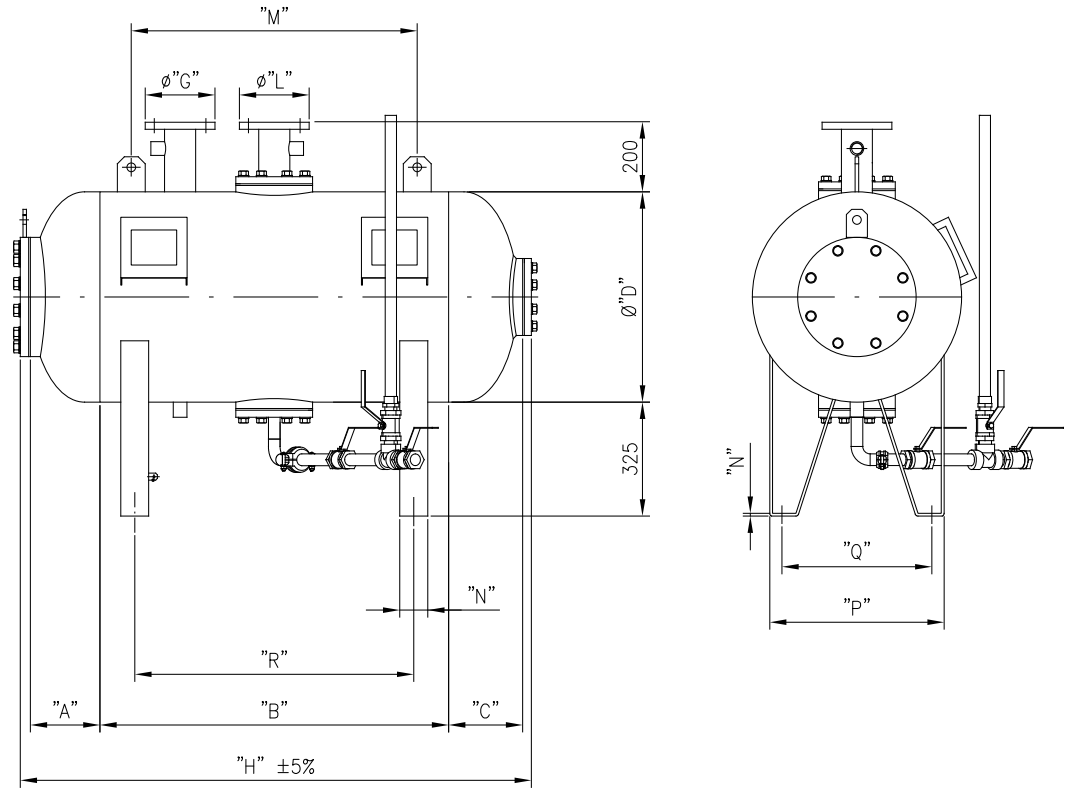

Figure 6.3.4
Horizontal Bladder Tank: 50 to 100 US Gallons

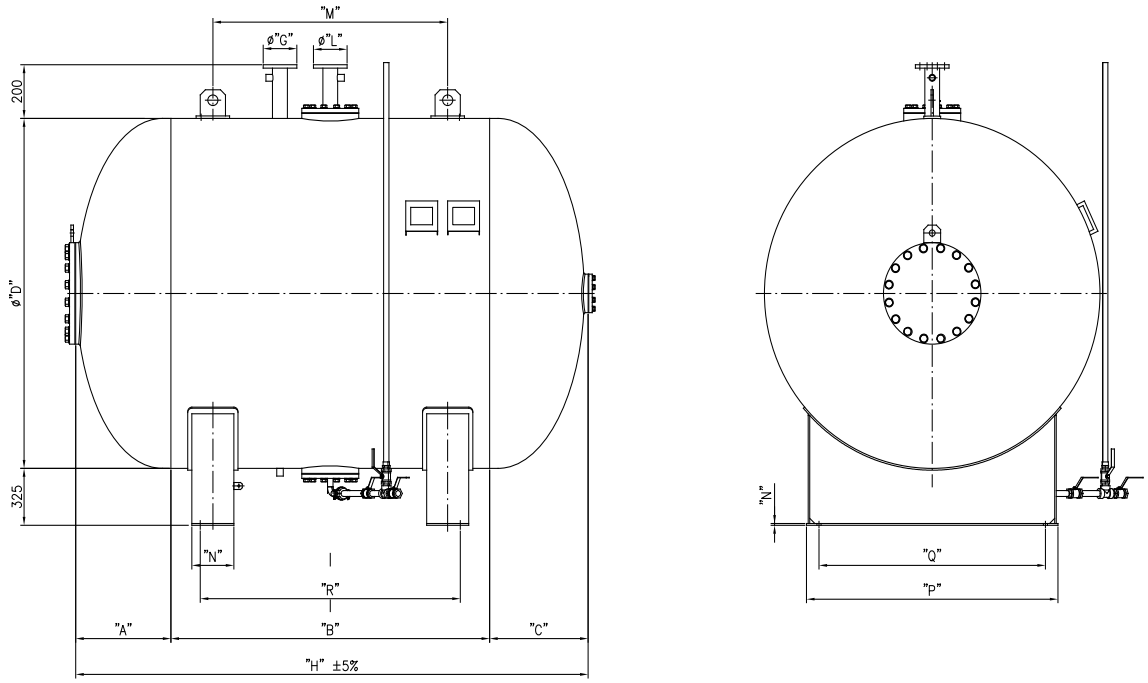

Figure 6.3.5
Horizontal Bladder Tank: 150 to 5250 US Gallons

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Table 6.3.6 - Horizontal Bladder Tank Dimensions (ASME Sec VIII Design Code)

Bladder Tank : ASME Sec VIII Design Code		Capacity		Weight		A	B	C	ØD	ØG	H	ØL	M	N	O	P	Q	R
175 PSI / 12.1 bar	232 PSI / 16.0 bar	USG	Litres	LBS	KG	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
						mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
VFTH0050U	VFTH0050U-16	50	189	574	260	8.0	39.4	8.0	19.7	2	55.4	2	32.3	0.3	7.9	16.7	13.8	32.3
						203	1000	203	500	50	1406	50	820	8	200	425	350	820
VFTH0075U	VFTH0075U-16	75	283	640	290	9.0	39.4	9.0	23.6	2	57.3	2	32.3	0.3	7.9	19.7	16.9	32.3
						228	1000	228	600	50	1456	50	820	8	200	500	430	820
VFTH0100U	VFTH0100U-16	100	378	684	310	9.0	49.2	9.0	23.6	2	67.2	2	42.1	0.3	7.9	19.7	16.9	40.2
						228	1250	228	600	50	1706	50	1070	8	200	500	430	1020
VFTH0150U	VFTH0150U-16	150	567	828	375	10.3	39.4	10.8	31.5	2	60.5	2	51.0	0.3	7.9	19.7	15.7	32.3
						262	1000	274	800	50	1536	50	1295	8	200	500	400	820
VFTH0200U	VFTH0200U-16	200	757	883	400	10.3	51.2	10.8	31.5	2	72.3	2	62.8	0.3	7.9	19.7	15.7	42.1
						262	1300	274	800	50	1836	50	1595	8	200	500	400	1070
VFTH0250U	VFTH0250U-16	250	946	1258	570	11.3	39.4	13.2	39.4	2.5	63.9	2.5	51.0	0.3	7.9	27.6	23.6	32.3
						288	1000	336	1000	65	1624	65	1295	8	200	700	600	820
VFTH0300U	VFTH0300U-16	300	1135	1391	630	11.3	51.2	13.2	39.4	2.5	75.7	2.5	39.4	0.3	7.9	27.6	23.6	42.1
						288	1300	336	1000	65	1924	65	1000	8	200	700	600	1070
VFTH0350U	VFTH0350U-16	350	1324	1453	650	11.3	55.1	13.2	39.4	2.5	79.7	2.5	39.4	0.3	7.9	27.6	23.6	42.1
						288	1400	336	1000	65	2024	65	1000	8	200	700	600	1070
VFTH0400U	VFTH0400U-16	400	1514	1479	670	11.3	65.0	13.2	39.4	2.5	89.5	2.5	51.2	0.3	5.9	27.6	23.6	53.5
						288	1650	336	1000	65	2274	65	1300	8	150	700	600	1360
VFTH0450U	VFTH0450U-16	450	1703	2137	968	11.6	59.1	13.2	43.3	2.5	83.9	2.5	45.3	0.3	5.9	31.5	27.6	48.0
						294	1500	336	1100	65	2130	65	1150	8	150	800	700	1220
VFTH0500U	VFTH0500U-16	500	1892	2318	1050	11.6	70.9	13.2	43.3	2.5	95.7	2.5	57.1	0.3	5.9	31.5	27.6	59.8
						294	1800	336	1100	65	2430	65	1450	8	150	800	700	1520
VFTH0600U	VFTH0600U-16	600	2271	2377	1077	12.7	65.0	14.2	47.2	3	91.9	3	53.5`	0.3	5.9	35.4	31.5	56.7
						322	1650	361	1200	80	2333	80	1360	8	150	900	800	1440
VFTH0700U	VFTH0700U-16	700	2649	2651	1201	13.8	65.0	15.2	51.2	3	94.0	3	58.3	0.3	5.9	35.4	31.5	56.7
						351	1650	386	1300	80	2387	80	1480	8	150	900	800	1440
VFTH0800U	VFTH0800U-16	800	3028	2898	1313	13.8	78.7	15.2	51.2	3	107.8	3	63.0	0.3	5.9	35.4	31.5	66.1
						351	2000	386	1300	80	2737	80	1600	8	150	900	800	1680
VFTH0900U	VFTH0900U-16	900	3406	3680	1667	15.3	78.7	16.3	55.1	3	110.3	3	63.0	0.3	5.9	39.4	33.5	66.1
						389	2000	413	1400	80	2801	80	1600	8	150	1000	850	1680
VFTH1000U	VFTH1000U-16	1000	3785	3592	1627	15.8	74.8	16.8	57.1	3	107.4	3	63.0	0.4	5.9	39.4	33.5	62.2
						402	1900	426	1450	80	2728	80	1600	10	150	1000	850	1580
VFTH1100U	VFTH1100U-16	1100	4163	3777	1711	15.8	82.7	16.8	57.1	3	115.3	3	63.0	0.4	5.9	39.4	33.5	66.1
						402	2100	426	1450	80	2928	80	1600	10	150	1000	850	1680
VFTH1200U	VFTH1200U-16	1200	4542	4159	1884	16.5	82.7	17.3	59.1	3	116.4	3	66.9	0.4	5.9	39.4	33.5	70.1
						418	2100	439	1500	80	2957	80	1700	10	150	1000	850	1780
VFTH1300U	VFTH1300U-16	1300	4921	4355	1973	17.5	78.7	18.3	63.0	3	114.6	3	63.0	0.4	5.9	43.3	37.4	68.1
						445	2000	465	1600	80	2910	80	1600	10	150	1100	950	1730
VFTH1400U	VFTH1400U-16	1400	5299	4629	2097	17.5	88.6	18.3	63.0	3	124.4	3	70.9	0.4	5.9	43.3	37.4	76.0
						445	2250	465	1600	80	3160	80	1800	10	150	1100	950	1930
VFTH1500U	VFTH1500U-16	1500	5678	4525	2050	19.6	74.8	20.6	68.9	3	115.0	3	61.0	0.4	5.9	47.2	41.3	63.4
						498	1900	522	1750	80	2920	80	1550	10	150	1200	1050	1610
VFTH1600U	VFTH1600U-16	1600	6056	4746	2150	19.6	78.7	20.6	68.9	3	118.9	3	61.0	0.4	5.9	47.2	41.3	65.4
						498	2000	522	1750	80	3020	80	1550	10	150	1200	1050	1660
VFTH1700U	VFTH1700U-16	1700	6435	4967	2250	20.2	78.7	21.1	70.9	3	120.0	3	61.0	0.4	5.9	47.2	41.3	66.1
						513	2000	535	1800	80	3047	80	1550	10	150	1200	1050	1680
VFTH1800U	VFTH1800U-16	1800	6813	5700	2582	22.3	59.1	23.1	78.7	3	104.4	3	47.2	0.4	5.9	59.1	53.1	49.2
						566	1500	586	2000	80	2652	80	1200	10	150	1500	1350	1250
VFTH1900U	VFTH1900U-16	1900	7192	5854	2652	22.3	63.0	23.1	78.7	3	108.3	3	52.4	0.4	5.9	59.1	53.1	49.2
						566	1600	586	2000	80	2752	80	1330	10	150	1500	1350	1250
VFTH2000U	VFTH2000U-16	2000	7570	6086	2757	22.3	68.9	23.1	78.7	3	114.3	3	52.4	0.4	5.9	59.1	53.1	55.1
						566	1750	586	2000	80	2902	80	1330	10	150	1500	1350	1400
VFTH2200U	VFTH2200U-16	2200	8327	6581	2981	22.3	82.7	23.1	78.7	3	128.0	3	63.0	0.4	5.9	59.1	53.1	68.9
						566	2100	586	2000	80	3252	80	1600	10	150	1500	1350	1750
VFTH2400U	VFTH2400U-16	2400	9084	6823	3091	22.3	88.6	23.1	78.7	3	133.9	3	68.9	0.4	5.9	59.1	53.1	74.8
						566	2250	586	2000	80	3402	80	1750	10	150	1500	1350	1900
VFTH2600U	VFTH2600U-16	2600	9842	7362	3335	22.3	102.4	23.1	78.7	3	147.7	3	82.7	0.4	5.9	59.1	53.1	88.6
						566	2600	586	2000	80	3752	80	2100	10	150	1500	1350	2250
VFTH2800U	VFTH2800U-16	2800	10599	7870	3565	22.3	114.2	23.1	78.7	3	159.5	3	94.5	0.4	5.9	59.1	53.1	100.4
						566	2900	586	2000	80	4052	80	2400	10	150	1500	1350	2550

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Table 6.3.6 - Horizontal Bladder Tank Dimensions (ASME Sec VIII Design Code) (cont.)

Bladder Tank : ASME Sec VIII Design Code		Capacity		Weight		A	B	C	ØD	ØG	H	ØL	M	N	O	P	Q	R
175 PSI /12.1 bar	232 PSI / 16.0 bar	USG	Litres	LBS	KG	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
						mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
VFTH3000U	VFTH3000U-16	3000	11356	8177	3704	22.3	122.0	23.1	78.7	3	167.4	3	102.4	0.4	5.9	59.1	53.1	108.3
						566	3100	586	2000	80	4252	80	2600	10	150	1500	1350	2750
VFTH3200U	VFTH3200U-16	3200	12113	8618	3904	22.3	133.9	23.1	78.7	3	179.2	3	114.2	0.4	5.9	59.1	53.1	120.1
						566	3400	586	2000	80	4552	80	2900	10	150	1500	1350	3050
VFTH3400U	VFTH3400U-16	3400	12870	8925	4043	22.3	141.7	23.1	78.7	3	187.1	3	126.0	0.4	5.9	59.1	53.1	131.9
						566	3600	586	2000	80	4752	80	3200	10	150	1500	1350	3350
VFTH3600U	VFTH3600U-16	3600	13627	9311	4218	22.3	151.6	23.1	78.7	3	196.9	3	139.8	0.4	5.9	59.1	53.1	145.7
						566	3850	586	2000	80	5002	80	3550	10	150	1500	1350	3700
VFTH3800U	VFTH3800U-16	3800	14384	9631	4363	22.3	159.4	23.1	78.7	3	204.8	3	139.8	0.4	5.9	59.1	53.1	145.7
						566	4050	586	2000	80	5202	80	3550	10	150	1500	1350	3700
VFTH4000U	VFTH4000U-16	4000	15141	10170	4607	22.3	173.2	23.1	78.7	3	218.6	3	139.8	0.4	5.9	59.1	53.1	145.7
						566	4400	586	2000	80	5552	80	3550	10	150	1500	1350	3700
VFTH4250U	VFTH4250U-16	4250	16088	10631	4816	22.3	185.0	23.1	78.7	3	230.4	3	139.8	0.4	5.9	59.1	53.1	145.7
						566	4700	586	2000	80	5852	80	3550	10	150	1500	1350	3700
VFTH4500U	VFTH4500U-16	4500	17034	11095	5026	22.3	196.9	23.1	78.7	3	242.2	3	139.8	0.4	5.9	59.1	53.1	151.6
						566	5000	586	2000	80	6152	80	3550	10	150	1500	1350	3850
VFTH4750U	VFTH4750U-16	4750	17980	11634	5270	22.3	210.6	23.1	78.7	3	256.0	3	139.8	0.4	5.9	59.1	53.1	151.6
						566	5350	586	2000	80	6502	80	3550	10	150	1500	1350	3850
VFTH5000U	VFTH5000U-16	5000	18927	12097	5480	22.3	222.4	23.1	78.7	3	267.8	3	139.8	0.4	5.9	59.1	53.1	159.4
						566	5650	586	2000	80	6802	80	3550	10	150	1500	1350	4050
VFTH5250U	VFTH5250U-16	5250	19873	12636	5724	22.3	236.2	23.1	78.7	3	281.6	3	139.8	0.4	5.9	59.1	53.1	159.4
						566	6000	586	2000	80	7152	80	3550	10	150	1500	1350	4050

7. INSTALLATION

Refer to appropriate Installation Standards (i.e. NFPA, VdS, LPCB, etc.) and / or FM applicable FM Global Property Loss Prevention Data Sheets such as 4-12, Foam-Water Sprinkler Systems.

The Installation, Operation and Maintenance Bladder Tank Manual shall also be referenced.

NOTICE

When designing a bladder tank into your fire protection system, please give consideration to future maintenance activities. Ensure that adequate clearance above a vertical bladder tank or at the inspection flange end of a horizontal tank is allowed. For further guidance contact us.

8. OPERATION

1. Foam concentrate is stored inside the bladder. When used in conjunction with a Ratio Controller it proportions foam concentrate accurately into the water stream.
2. During system activation, the outer side of the bladder is pressurized by the system water supply which forces foam concentrate to the proportioner or a ratio controller.
3. Simultaneously, as water flows through the venturi area of the wide range proportioner or ratio controller, a metered pressure drop draws foam concentrate into the system water stream creating a foam solution mixed to the appropriate ratios.
4. The foam solution flows through the system pipework and out of any open sprinklers, nozzles or other discharge devices.
5. As the foam concentrate continues to flow from the inside of the bladder, system water enters the bladder tank on the outside of the bladder keeping a balanced pressure system.

9. GUARANTEE

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

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10. INSPECTION, TESTS AND MAINTENANCE

⚠ WARNING

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

Refer to respective requirements, according to the relevant standards for Inspection, Testing and Maintenance.

If applicable, refer to FM Global Property Loss Prevention Datasheet 4-12 for specific test and commissioning criteria.

In addition, the “Authority Having Jurisdiction” (AHJ) may have additional maintenance, testing and inspection requirements that must be followed.

11. DISPOSAL

At end of use the product described here should be disposed of via the national recycling system.
Upon request the manufacturer can take back and properly dispose of the electrical equipment and electronic devices.

12. ACCESSORIES AND SPARE PARTS

Contact the appropriate sales office in Section 5 Availability for further assistance.

Table 12.1.1 - Optional / Standard Spare Parts

Description	Material	Connection	Part Number	
			175 PSI (12 bar) Tanks	16 bar Tanks
Safety Thermal Relief Valve	Brass	1/2"	B10C12.1	B10C16
ASME Safety Valve	Carbon Steel	3/4"	EUV34CS-12.1	EUV34CS-16.0
ASME Safety Valve	Stainless Steel 316	3/4"	EUV34SS-12.1	EUV34SS-16.0
Filling Device & KPA Gauge	Carbon Steel	1"	FILLDEVICE	
Replacement Bladder	Various	Contact us with tank serial number		
Sight tube replacement kit	Various	Contact us with tank serial number		

Table 12.1.2 - Bladder Tank Manual

Language	Part Number	Language	Part Number
English	F032216-EN	Dutch	F032216-NL
German	F032216-DE	Polish	F032216-PL
Spanish	F032216-ES	Swedish	F032216-SV
French	F032216-FR	Turkish	F032216-TR
Italian	F032216-IT	--	--

13. DECLARATION OF CONFORMITY

If required, contact the appropriate sales office in ***Section 5 Availability*** for further assistance.

TECHNICAL DATA

VIKING USP SFFF FLUORINE FREE FOAM CONCENTRATE

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1. DESCRIPTION

The Viking USP concentrate concentrate is specially designed and tested to be an effective fluorine free fire protection system foam alternative. This concentrate is approved for use with fresh water when proportioned at 3%.

Features:
- New generation hydrocarbon risk fluorine free foam (SFFF)
- For Class A & B fires
- 100% Biodegradable

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

2. LISTINGS AND APPROVALS

This product must be used in accordance with the certifications listed below. Approved and listed system components can be found at www.approvalguide.com and https://iq.ulprospector.com

FM Approved

FM Approved Refer to the FM Approval guide for systems and devices that are approved for use with this concentrate. Refer to the system and device data sheets from Viking, NFPA, FM Global Property Loss Prevention Data Sheets, and relevant local codes and/or standards for correct system design. FM Approval of the foam extinguishing system is contingent upon the design, installation, testing and maintenance performed in accordance with NFPA and/or FM Global Property Loss Prevention Data Sheet 4-12, Foam/ Water Sprinkler Systems.

UL Listed – GFGV.EX27255

Underwriters Laboratories, UL 162 7th Edition Refer to the UL Listing for systems and devices that are approved for use with this concentrate. Refer to the system and device data sheets from Viking, NFPA, and relevant local codes and/or standards for correct system design.

"SFFF compatible" refers to this product as being part of a SFFF Foam system that has been tested to recognized standards. Not all configurations are available. Please consult technical data and/or the approval/ listing for usage requirements.

The following additional approvals are in the name of the manufacturer.
- EN 1568 Part 1 / EN 1568 Part 2 / EN 1568 part 3, Class 1A fresh water*
- ICAO Level B*
- GESIP approved for hydrocarbon fuels*
- IMO 1312*
- MED Module B and D*
- Boeing Specification Support Standard BSS 7432*

3. TECHNICAL DATA

Physical Data

Appearance	Clear to yellowish liquid
Specific gravity at 68 °F (20 °C)	1.04 +/- 0.01 g/mll
Viscosity	Pseudoplasitc*
pH	6.5 to 8.5
Freezing point	12 °F (-11 °C)
Recommended storage temperature	32 °F to 131 °F (0 to 55°C)
FM Approved storage temperature	35 °F to 120 °F (1.7 to 49 °C)
Suspended sediment (v/v)	Less than 0.2%

*see detailed viscosity data in section 16

VIKING®	TECHNICAL DATA	VIKING USP SFFF FLUORINE FREE FOAM CONCENTRATE

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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TABLE 1: ORDERING INFORMATION

Volume	Packaging	Part Number	Approximage Shipping Weight*		Dimensions* In (mm)		Sales Region
			Lbs.	Kg	Inches	mm	
25 Litres	Can	V-SFFFUSP/25	59**	26.7**	11x10x17	295x260x441	EMEA/APAC
200 Litres	Drum	V-SFFFUSP/200	469**	212.5**	23x23x37	581x581x935	EMEA/APAC
1000 Litres	IBC Tote	V-SFFFUSP/1000	2381	1080	47x39x45	1200x1000x1150	EMEA/APAC
6.5 US Gallons	Can	F21720-6.5	62**	28**	11x10x29	295x260x737	AMERICAS
55 US Gallons	Drum	F21720-55	487**	220.7**	23x23x37	581x581x935	AMERICAS
265 US Gallons	IBC Tote	F21720-265	2389	1083.6	47x39x45	1200x1000x1150	AMERICAS
Bulk	Bulk tanker deliveries available by special request. Contact Viking for availability.						

*Shipping weight and dimensions are approximate. **Weight does not include pallet.

4. ENVIRONMENTAL IMPACT

The Viking USP concentrate is formulated using specially selected raw materials for their fire performance and their environmental profile. The product contains no intentionally added fluorinated surfactants, polymers, and other organohalogens. The Viking USP concentrate is biodegradable and contains NO PFOS NOR PFOA. The handling of foam concentrate or foam solution spills should be in accordance with local regulations. Sewage systems should have no processing issues with foam solution based on the Viking USP concentrate but local sewage operators should be consulted in this respect. The Viking USP concentrate is formulated without the use of fluorinated surfactants. Full details can be found in the Safety Data Sheet (SDS).

5. APPLICATION

The Viking USP concentrate is intended for use on class B hydrocarbon fuel fires such as oil, diesel, aviation fuel and gasoline. It is also suitable for class A fires such as wood, paper, textiles etc. The Viking USP concentrate is especially suited whenever a fluorine-free alternative with high fire performance is required. The Viking USP concentrate is tested for use in sprinkler systems. Refer to listing or approval for further details of approved use combinations.
Note: Not for use as a premixed solution.

6. PROPORTIONING

The Viking USP concentrate can be proportioned at the correct dilution using conventional equipment like bladder tanks and proportioners. Refer to the FM Approval or UL Listing for proportioning equipment approved for use with this concentrate.

7. FIRE PERFORMANCE & FOAMING

The fire performance of this product has been measured and documented according to “International Approvals” stated in this document. The foaming properties are depending on equipment used and other variables such as water and ambient temperatures.

8. SPRINKLER APPLICATION

Sprinkler applications are especially challenging for any foam due to the low operating pressure and the very low expansion reached. Applying foam through a sprinkler is a forceful application method and requires foam that can handle direct application and partial submersion into the fuel without losing its fire performance and burnback resistance. Foams that shall be regarded as suitable for sprinkler applications shall also be able to withstand limited time of water deluge directly onto the foam blanket and still maintain the burnback properties. The Viking USP concentrate has passed above described tests showing very good extinguishing and burnback properties. Refer to the FM Approval Guide or UL Product iQ for acceptable system configurations used with this concentrate and specific sprinkler SINs and their associated minimum application densities.

VIKING®	TECHNICAL DATA	VIKING USP SFFF FLUORINE FREE FOAM CONCENTRATE

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9. STORAGE / SHELF LIFE

Stored in original unbroken packaging the product will have a long shelf life. Shelf life in excess of 10 years will be found in temperate climates. As with all foams, shelf life will be dependent on storage temperatures and conditions.

10. SCOPE OF DELIVERY

We supply this product in 25 litre and 6.5 US gallon cans, 200 litre and 55 US gallon drums, 1000 litre and 265 US gallon IBC containers and in bulk on special request.

11. INSPECTIONS, TESTS AND MAINTENANCE

The foam concentrate should be tested annually. Refer to respective requirements, according to the relevant codes and/or standards for Inspection, Testing and Maintenance. If applicable, refer to FM Global Property Loss Prevention Datasheet 4-12 for specific test and commissioning criteria. In addition, the “Authority Having Jurisdiction” (AHJ) may have additional maintenance, testing and inspection requirements that must be followed

12. DISPOSAL

At the end of use the product packaging should be disposed of via the national recycling system. Some IBC Tote containers maybe part of a national collection scheme. Details will be attached to the IBC Tote if this service is available. Foam Concentrate should be disposed of according to local regulations.

13. AVAILABILITY

The product is available directly from Viking and official distributors only.

Americas:
The Viking Corporation
5150 Beltway SE
Caledonia, MI 49316
Tel.: (800) 968–9501
Fax: 269–818–1680
Technical Services: 1–877–384–5464
techsvcs@vikingcorp.com

EMEA:
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21, Z.I, Haneboesch
L–4562 Differdange / Niederkorn
Tel.: +352 58 37 37 – 1
Fax: +352 58 37 36
vikinglux@viking–emea.com

Asia Pacific (APAC) Main Office:
The Viking Corporation (Far East) Pte. Ltd.
69 Tuas View Square
Westlink Techpark, Singapore 637621
Tel: (+65) 6 278 4061
Fax: (+65) 6 278 4609
vikingAPAC@vikingcorp.com

14. GUARANTEE

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

15. COMPATIBILITY

Contact Viking with questions regarding the compatibility of this product.

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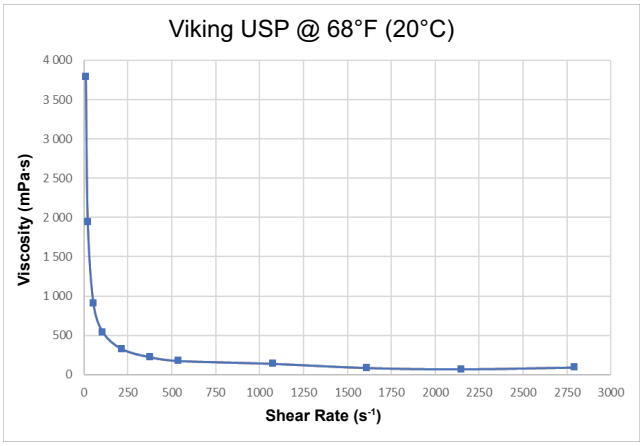
16. VISCOSITY

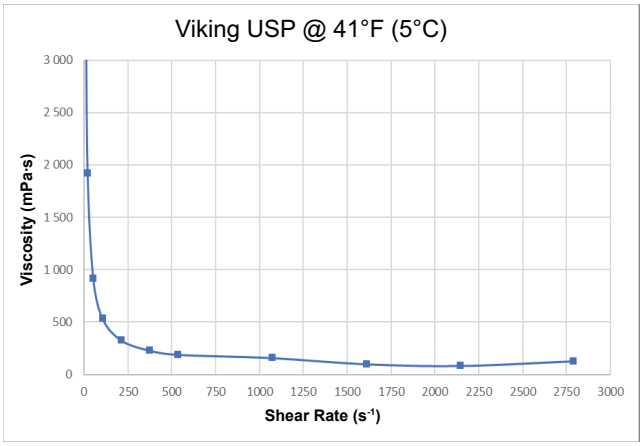
The viscosity flow curves are determined by Brookfield RST rheometer from low to high shear rates. The viscosity curves below are determined by calculating the average value of at least 8 different measurements and add a safety margin of three standard deviations to the average. The viscosity curves are determined for 68 °F and 41 °F (20 °C and 5 °C). In the table below the kinematic viscosity (mm²/s) is calculated as dynamic viscosity (mPa·s) divided by the specific gravity of the concentrate.

TABLE 2: Viscositiy Information

RPM	Shear Rate (s^{-1})	Dynamic Viscosity (mPa/s)		Kinetic Viscosity (mm^2/s)	
		68 °F (20 °C)	41 °F (5 °C)	68 °F (20 °C)	41 °F (5 °C)
5	10.7	3793	3716	3647	3573
10	21.5	1948	1921	1873	1847
25	53.7	910	916	875	881
50	107.4	541	531	521	510
100	214.8	328	325	316	312
175	375.0	224	229	215	220
250	537.0	176	189	169	182
500	1074.0	139	158	134	152
750	1611.0	86	99	82	96
1000	2148.0	70	83	67	80
1300	2792.2	91	128	88	123

Viscosity vs Shear Rate





TECHNICAL DATA

IN-LINE BALANCED PRESSURE PROPORTIONER MODEL VLF

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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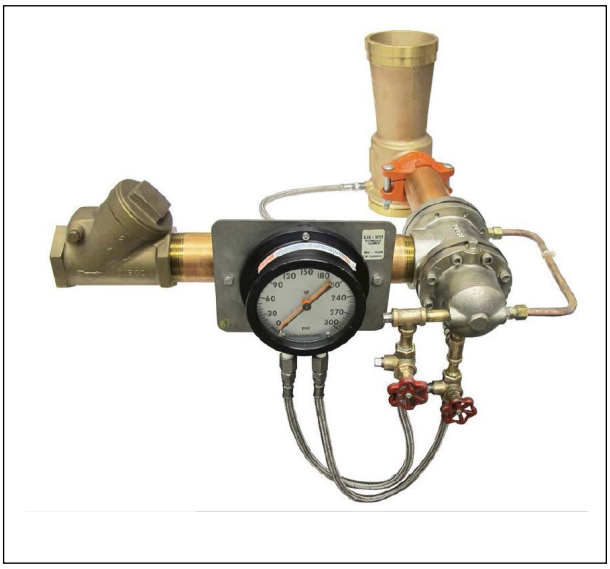
1. GENERAL DESCRIPTION



The In-Line Balanced Pressure (ILBP) Proportioner is a foam proportioning device which is used to balance the higher foam concentrate pressure to the lower system water pressure on Pilot Pressure Regulating Systems or Foam Pump Proportioning Systems.
The ILBP is particularly useful in providing accurate proportioning at multiple riser locations that are situated remotely from the central foam concentrate storage tank.
Different sizes of ILBP can be installed on the same foam concentrate supply system to ensure the most appropriate size and demand combination is used. The ILBP is tested and approved to work at different pressure and flow rates and will automatically adjust to give accurate proportioning across its working range.
This Technical Data is intended for trained experts.
For further information, please contact the appropriate sales office in ***Section 5 Availability*** or refer to the technical documentation.
The contents of this publication are subject to modifications without notice.

2. LISTINGS AND APPROVALS

The ILBP is FM Approved and UL Listed as part of a fire extinguishing system combining designated foam concentrates, bladder tanks and discharge devices.
FM Approved and UL Listed system components can be found at www.approvalguide.com and https://iq.ulprospector.com

FM Approved – Low Expansion Foam Systems (FM5130)

UL Listed – Guide GHXV.EX5002 (UL162)

SFFF compatible

"SFFF compatible" refers to this product as being part of a SFFF Foam system that has been tested to recognized standards. Not all configurations are available. Please consult technical data and/or the Approval/Listing for usage requirements.

NOTE: Other international approval certificates may be available upon request.

3. TECHNICAL DATA

3.1 Construction Features

- Available in 3" (DN80), 4" (DN100), 6" (DN150), 8" (DN200)
- Brass construction or Nickel Aluminium Bronze construction for superior corrosion protection
- Suitable for Horizontal or Vertical Installation
- Direction of flow indicator on body
- For use with Fresh or Salt Water
- Identification tag plate

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3.2 Standard Materials

Table 3.2.1 - Standard Materials	
Nickel Aluminum Bronze Version	
Body & Nozzle	Nickel Aluminum Bronze UNS C95800 — ASTM B148
Orifice	UNS-C36000 or C46400 or C95800
Fittings	Stainless Steel
Spool Assembly	See ***Table 6.2.2***
Brass Version	
Body & Nozzle	Cast Brass UNS C84400 — ASTM B584
Orifice	UNS-C36000
Fittings	Stainless Steel
Spool Assembly	See ***Table 6.2.2***
*See notes in **Table 3.4.1** for ordering information*	

3.3 Standard Design Specifications

Table 3.3.1 - Standard Design Specifications	
All Versions	
Design pressure	250 PSI / 17.2 bar (1.7MPa)
Design temperature range	14 °F to 120 °F (-10 °C to 49 °C)*
Operating temperature range	35 °F to 120 °F (1.7 °C to 49 °C)
Minimum operating inlet pressure	30 PSI / 2.1 bar (0.2MPa)
Maximum operating Inlet pressure	150 PSI / 10.3 bar (1.03MPa)
Proportioning range	Refer to ***Table 3.4.1***
Foam inlet pressure	Minimum 15 PSI above system water supply pressure
Maximum static pressure	250 PSI / 17.2 bar (1.7MPa)
*Riser must be installed in an area maintained at or above 40 °F (4.4 °C)	

3.4 Ordering Information

Table 3.4.1 - Ordering information[6]

Connection		Foam Type[5]	Part Number		Orifice Inches (mm)		FM Approved				UL Listed			
							Minimum Flow Rate[1]		Maximum Flow Rate[1]		Minimum Flow Rate		Maximum Flow Rate	
Body Grooved	Foam Inlet Grooved		Nickel Aluminium Bronze[2,4]	Brass[3]	In	mm	GPM	L/min	GPM	L/min	GPM	L/min	GPM	L/min
3" (88.9mm)	1.5" (48.3 mm)	3% XMAX	VLF089JAN	F20316N	0.362	9.19	--	--	--	--	150	568	750	2839
		Viking USP, 3%	VLF089JAL	F20316L	0.370	9.40	180	681	760	2877	--	--	--	--
4" (114.3mm)	2" (60.3 mm)	3% XMAX	VLF114JAN	F20317N	0.485	12.32	--	--	--	--	287	1507	1244	4709
		Viking USP, 3%	VLF114JAL	F20317L	0.488	12.40	455	1722	1275	4826	420	1590	1515	5735
		Viking ARK, 3%	VLF114JP	F20317P	0.488	12.40	523	1980	1273	4819	--	--	--	--
6" (165.1mm)	2" (60.3 mm)	3% XMAX	VLF165JAN	--	0.700	17.78	--	--	--	--	742	2809	2428	9191
		Viking USP, 3%	VLF165JAL	--	0.737	18.72	1240	4694	2640	9993	1512	5724	2740	10372
		Viking ARK, 3%	VLF165JP	--	0.700	17.78	1050	3975	2315	8763	--	--	--	--

TECHNICAL DATA

IN-LINE BALANCED PRESSURE PROPORTIONER MODEL VLF

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Table 3.4.1 - Ordering information[6]

Connection		Foam Type[5]	Part Number		Orifice Inches (mm)		FM Approved				UL Listed			
							Minimum Flow Rate[1]		Maximum Flow Rate[1]		Minimum Flow Rate		Maximum Flow Rate	
Body Grooved	Foam Inlet Grooved		Nickel Aluminium Bronze[2,4]	Brass[3]	In	mm	GPM	L/min	GPM	L/min	GPM	L/min	GPM	L/min
6" (168.3mm)	2" (60.3 mm)	3% XMAX	VLF168JAN	F20184N	0.700	17.78	--	--	--	--	742	2809	2428	9191
		Viking USP, 3%	VLF168JAL	F20184L	0.737	18.72	1240	4694	2640	9993	1512	5724	2740	10372
		Viking ARK, 3%	VLF168JP	F20184P	0.737	18.72	1050	3975	2315	8763	--	--	--	--
8" (219.1mm)	2" (60.3 mm)	3% XMAX	VLF2196JAN	--	0.975	24.77	--	--	--	--	1953	7393	4459	16879
		Viking USP, 3%	VLF2196JAL	--	0.952	24.18	1650	6246	4250	16088	2330	8820	4130	15634
8" (219.1mm)	2" (60.3 mm)	3% XMAX	VLF2193JAN	F20185N	0.975	24.77	--	--	--	--	1953	7393	4459	16879
		Viking USP, 3%	VLF2193JAL	F20185L	0.952	24.18	1650	6246	4250	16088	2330	8820	4130	15634

NOTES:

[1] Please refer to graphs in section 7.2 for specific flow rate parameters.
[2] Nickel Aluminium Bronze (NAB) - Standard Offering in Viking EMEA & APAC Territories. Brass available on request with longer delivery.
[3] Brass - Standard Offering in Viking Americas Territories. Nickel Aluminium Bronze available on request with longer delivery.
[4] NAB 219mm with 73mm foam inlet are non standard and could be subject to additional lead time and price.
[5] All foam types comply with the requirements of the EPA 2010/2015 PFOA Stewardship Program.
[6] A seal kit for the spool valve is available to purchase separately. See section 13.

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4. SCOPE OF DELIVERY

Ensure that all components are complete and in good condition.
The ILBP is supplied boxed, with a data plate and an integral sized orifice disc specific to its approved/listed concentrate.
The ILBP comes part assembled in the EMEA and APAC ordering territories as detailed in Section 8 and Figure 8.1. In the Americas ordering territory, the ILBP is supplied totally pre-assembled as detailed in Section 6.2. The ILBP is supplied with these main components:

- Balanced spool type balancing valve
- Brass swing check valve
- Duplex gauge which indicates both water pressure (black needle) and foam pressure (red needle)
- Flexible braided sensing lines
- Interconnecting brass nipples as indicated on the detailed drawings

5. AVAILABILITY

The product is available directly from Viking and official distributors only.

Americas:
The Viking Corporation
5150 Beltway SE
Caledonia, MI 49316
Tel.: (800) 968–9501
Fax: 269–818–1680
Technical Services: 1–877–384–5464
techsvcs@vikingcorp.com

6. PRODUCT VARIANTS

6.1 Options

- Suitable for Viking Foam Concentrate: 3% XMAX
- Nickel Aluminum Bronze UNS C95800 or Brass UNS C84400 (see table 3.4.1)
- Pre-Assembled with Bladder Tank and water/foam pipe work

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6.2 Dimensions and Equivalent Length

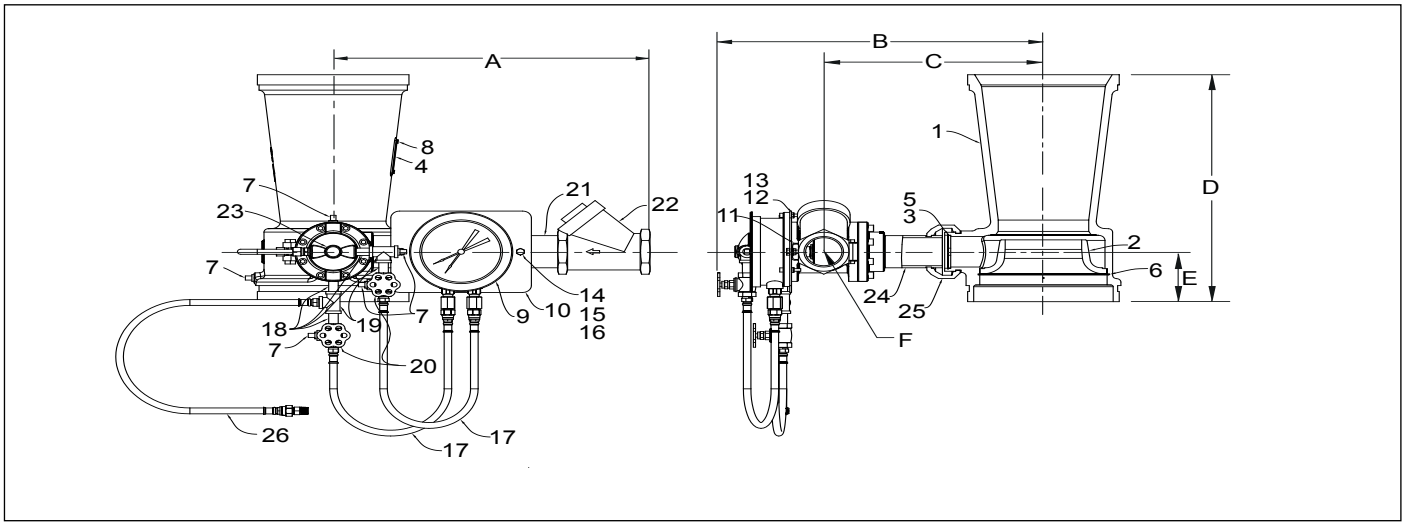

Table 6.2.2 - ILBP Assembly Components

Item	Description	Qty	Replacement Part	Item	Description	Qty	Replacement Part
1	Ratio Controller	1	N/A	14	Bolt	2	N/A
2	Nozzle	1	N/A	15	Lock Washer	2	N/A
3	Orifice Plate	1	N/A	16	Nut	2	N/A
4	Data Plate	1	N/A	17	Sensing Line Assembly	2	F09565
5	Retaining Ring	1	N/A	18	Nipple	4	N/A
6	Retaining Ring	1	N/A	19	Tee	2	N/A
7	1/4” Plug	5	14BRPLUG	20	Side Outlet Valve	2	03952A
8	Rivet	2	N/A	21	Nipple	1	N/A
9	Gauge	1	F09646	22	Swing Check Valve (NPT)	1	F09664 (1-1/2”) F09665 (2”)
10	Mounting Plate	1	N/A	23	Spool Valve	1	N/A
11	Pipe Clamp	1	N/A	24	Nipple	1	N/A
12	Screw	3	N/A	25	Grooved Coupling	1	N/A
13	Nut	3	N/A	26	Sensing Line Assembly	1	F09615

Table 6.2.3 - Equivalent Length, Weight and Dimension Data

Nominal Size (Grooved)	Equivalent Length (friction loss)*		Approximate Weight				Approximate Dimensions											
			NAB Version		Brass Version		A		B		C		D		E		Foam Inlet (F)	
	Feet	Metre	LBS	KGs	LBS	KGs	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
3” (DN80)	31	9.45	41.1	18.6	43.5	19.7	17-5/16	440	16	406	9-15/16	252	9-1/4	235	2-15/16	75	1-1/2	40
4” (DN100)	37	11.28	47.5	21.5	58.5	26.5	18	458	16-3/8	415	10-2/8	261	11	279	3-5/16	84	2	50
6” (DN150)	88	26.82	64.2	29.1	70.5	32.0	18	458	17-7/16	442	11-3/8	289	15	381	3-5/16	84	2	50
8” (DN200)	114	34.75	85.7	38.8	96.5	43.8	18	458	18-7/16	468	12-3/8	314	16-3/4	425	3-11/16	94	2	50

* Expressed in equivalent length of schedule 40 pipe based on Hazen & Williams C=120

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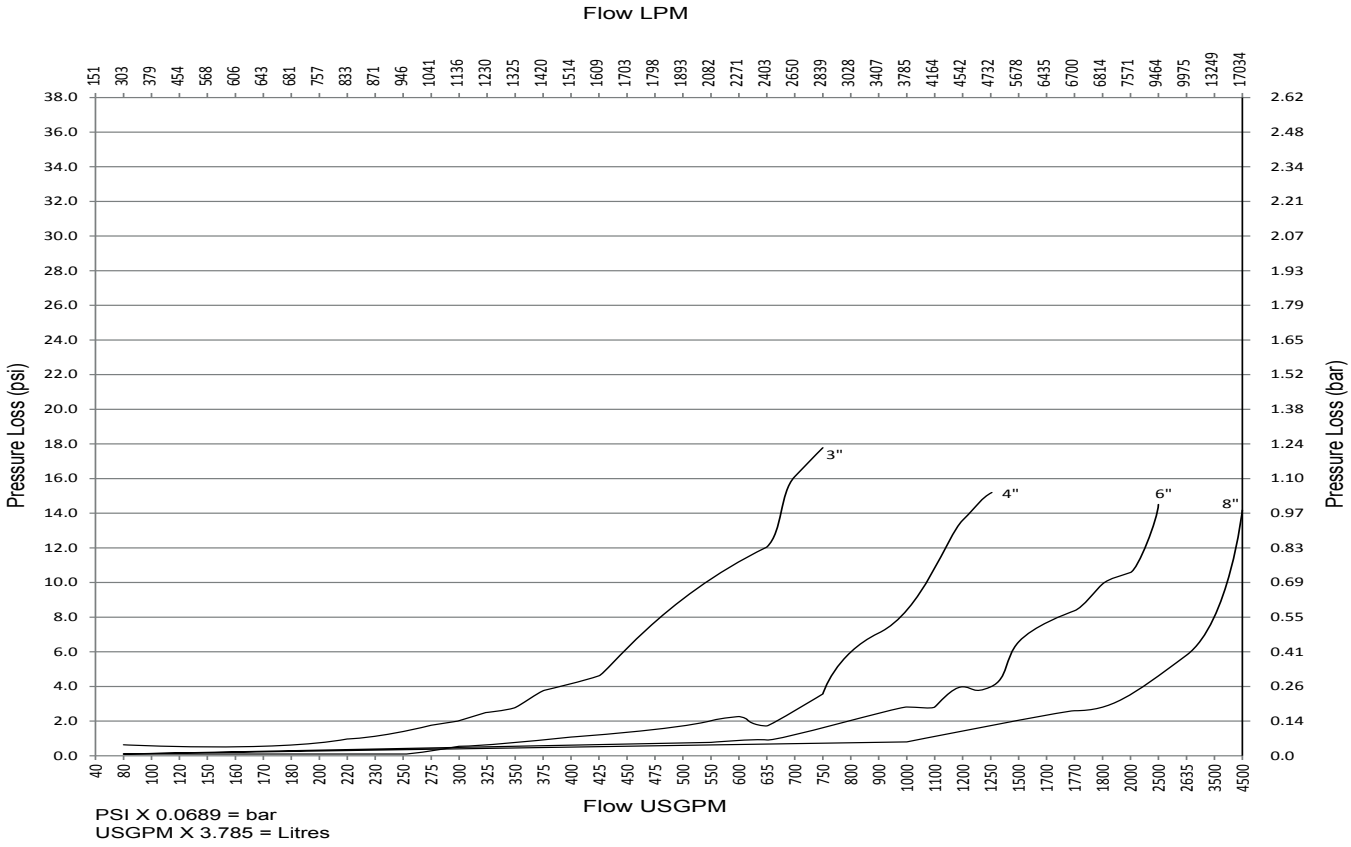
7. PERFORMANCE DATA

7.1 Friction Loss vs Foam Solution Flow



Graph 7.1.1 - Friction Loss vs Foam Solution Flow

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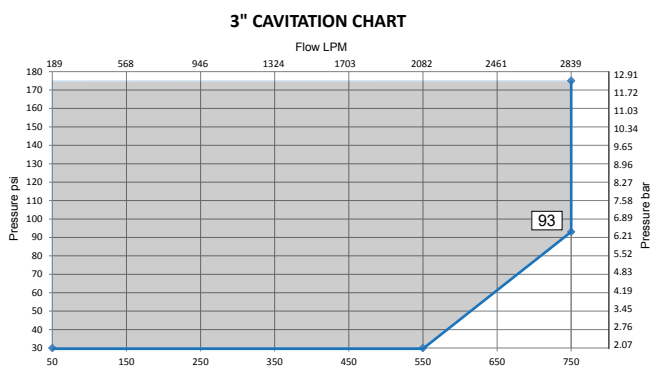
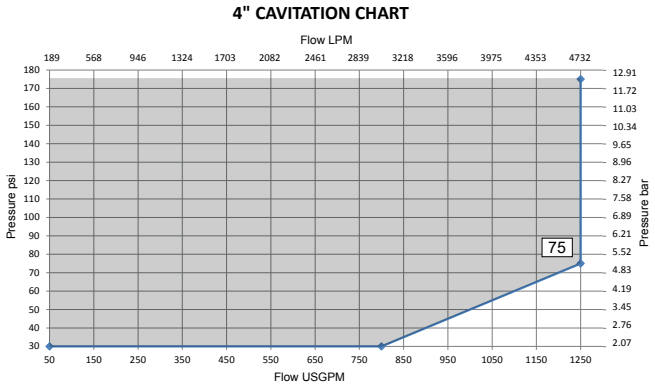
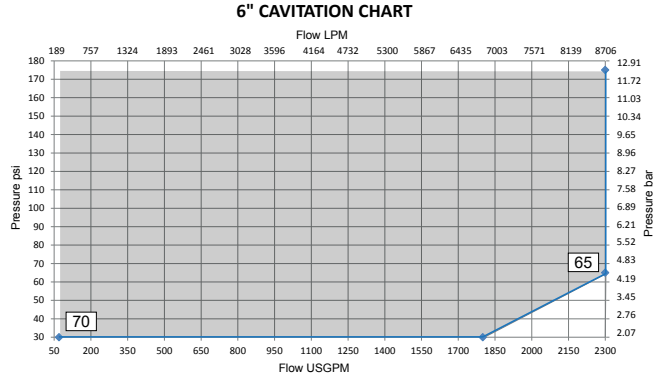
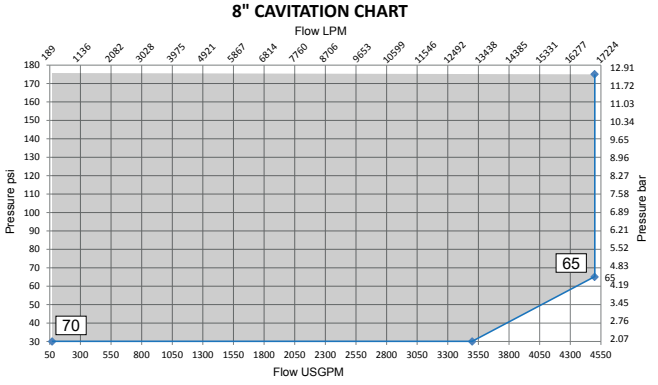
7.2 Inlet Pressure vs Foam Solution Flow

The ILBP must be used within the shaded flow and pressure conditions.









Graph 7.2.1 - Inlet Pressure vs Foam Solution Flow

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8. INSTALLATION

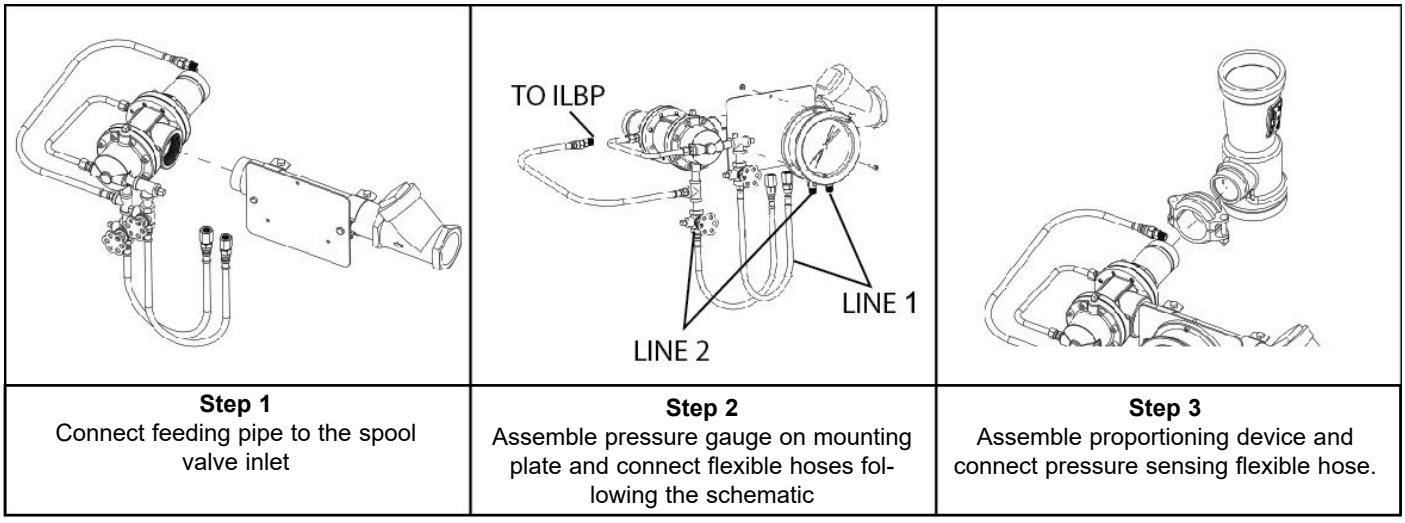
Refer to appropriate Installation Standards (i.e. NFPA, VdS, LPCB, etc.) and / or applicable FM Global Property Loss Prevention Data Sheets such as 4-12, Foam-Water Sprinkler Systems. Do not alter the piping without consulting a system design representative. Before installing a ratio controller, check the system design drawing to ensure the controller location does not create excessive head pressure or frictional losses.

(Refer to Section 6.2 for identification of ILBP components.)

NOTE: On a Viking Low Flow Bladder Tank System, the water supply flowing pressure at the inlet of the ratio controller and the discharge outlet of the Viking pressure regulating valve must be set at a minimum of 15 PSI lower than the system flowing pressure at the inlet to the Viking pressure regulating valve. (Refer to the website for instructions on how to adjust the outlet pressure on the Viking Pilot Operated Pressure Control Valve, Model A-2 or B-1, under a flowing condition.)

For Foam Pump Systems, the foam concentrate pressure must be a minimum of 15 PSI higher than the system water pressure at the inlet of the ratio controller.

The Viking ILBP is a partially pre-assembled proportioning device, complete with a duplex water and foam pressure gauge, spool valve, concentrate controller, check valve, sensing lines and associated brass piping. It is an integral part of the Viking Low Flow Foam System, and must be installed in accordance with the following instructions.



Step 1	**Step 2**	**Step 3**
Connect feeding pipe to the spool valve inlet	Assemble pressure gauge on mounting plate and connect flexible hoses following the schematic	Assemble proportioning device and connect pressure sensing flexible hose.

Figure 8.1 - Assembling the Viking ILBP
(EMEA and APAC ordering territories only.
Viking Americas product is shipped fully assembled)

The ratio controller section of the ILBP is installed in the riser, on the system side of the Viking Pressure Regulating Valve assembly (on Viking Low Flow Foam Bladder Tank Systems).

The ILBP unit is shipped with the foam pressure sensing line already installed at the end of the spool valve. The water sensing line must be field installed following the schematics above. The foam concentrate supply line from the Viking Halar® coated concentrate valve is then connected to the inlet of the swing check valve. Refer to the appropriate Viking technical data pages for instructions as to completing the system installation and testing of the Low Flow Foam System or foam pump system.

- The ILBP (ratio controller) must be installed with the arrow pointing in the direction of the water flow
- The ILBP (ratio controller) can be installed in the vertical or horizontal position
- The balancing spool valve must always lie horizontally (Fig 8.2)
- The foam concentrate supply line diameter may need to be increased above the foam inlet size (“F” Fig 6.2.1) due to friction loss in piping from the riser back to the foam source
- In Deluge and Preaction systems a removable section of pipe should be installed between the Concentrate Control Valve and ILBP foam inlet to allow the flushing of foam concentrate after system activation or testing
- A foam concentrate supply pressure gauge is recommended adjacent to foam inlet of the CCV
- If installed in a horizontal header, the check valve (“22” Fig 6.2.1) must be oriented so that the clapper is perpendicular to the floor and access hole is facing up (as shown below)
- Straight piping equal to a minimum of five (5) pipe diameters should be installed before and after the ILBP (ratio controller) to help ensure proportioning accuracy

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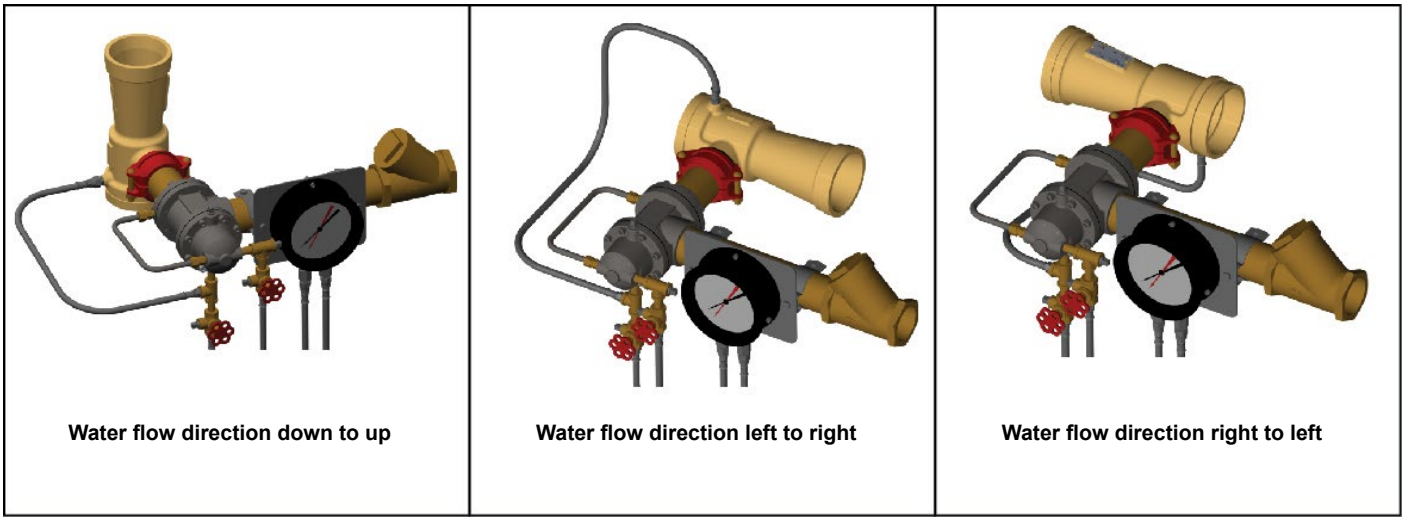

Water flow direction down to up | **Water flow direction left to right** | **Water flow direction right to left**

Figure 8.2 - Typical Proportioning Device Orientations

9. OPERATION

The system water pressure, under a water flow condition, must be at least 15 PSI lower than the foam concentrate pressure at the ratio controller (1).

- The reduction in system water pressure for a Viking Low Flow Bladder Tank System is accomplished by the use of the Viking Pilot Pressure Regulating Valve, which is also a component of the Viking Low Flow Foam System.
- For foam pump systems, the foam pressure at the ILBP must be at least 15 PSI higher than the water pressure.

Upon system actuation, water begins to flow through the piping network, including the ILBP.

The ILBP water sensing line (connected upstream of the ratio controller by installer) and foam sensing line are connected to upper and lower side of internal hydraulic piston. The piston is integrally attached to the balanced spool of the pressure balancing valve.

As the foam concentrate discharge pressure from the spool valve increases above the inlet water pressure, the spool valve closes over the discharge ports of the balancing valve until the foam pressure equals water pressure. This allows the correct balanced pressure foam concentrate to flow through the metering orifice of the ratio controller.

As the discharge foam concentrate pressure is lowered below the water supply pressure due to increase in flow and metering pressure drop caused by the venturi of the ratio controller, the piston and spool valve open to allow more flow as required. When the foam concentrate inlet pressure is equal to the water inlet pressure of the ratio controller, the proper mixture of foam solution is developed at the minimum and maximum flow rates shown for each size ILBP and foam concentrate being applied.

Due to the foam concentrate pressure being supplied at a higher pressure than the water supply, a positive injection of foam concentrate occurs. This will cause rich foam solution below the minimum flow rates shown or at the initial fire condition where a small discharge flow rate occurs where only a few sprinklers have opened. As additional sprinklers operate and flow increases, the metering pressure drop across the ratio controller's venturi matches the sized foam concentrate metering orifice thus producing the desired solution of water and foam mixture as indicated in ***Table 3.4.1***.

10. GUARANTEE

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

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11. INSPECTION, TESTS AND MAINTENANCE

Refer to respective requirements, according to the relevant standards for Inspection, Testing and Maintenance.
If applicable, refer to FM Global Property Loss Prevention Datasheet 4-12 for specific test and commissioning criteria.
In addition, the “Authority Having Jurisdiction” (AHJ) may have additional maintenance, testing and inspection requirements that must be followed.

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition. The Pilot Operated Pressure Control Valve must be kept from freezing conditions and physical damage that could impair its operation.

⚠ 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.

12. DISPOSAL

At end of use the product described here should be disposed of via the national recycling system.

13. ACCESSORIES AND SPARE PARTS

Seal Kit for Spool Valve: Part No. F22821
See Table 6.2.2 for additional spare parts.

14. DECLARATION OF CONFORMITY

If required, contact the appropriate sales office in ***Section 5 Availability*** for further assistance.

VIKING®	TECHNICAL DATA	GRATE NOZZLES MODEL GN202 360°, 180°, AND 90°

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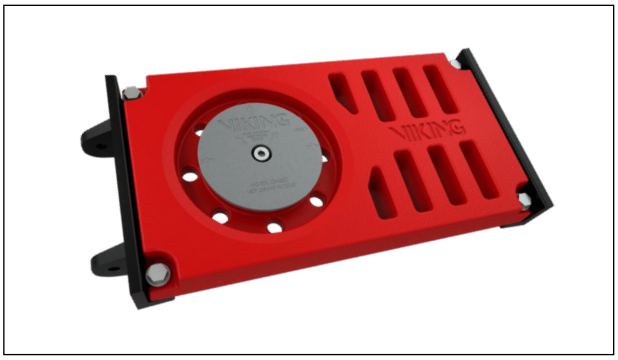
1. GENERAL DESCRIPTION

The Grate Nozzles are designed to protect aircraft hangars and helipads. They are available with a 360°, 180°, or 90° discharge pattern and 26", 20" and 555 mm widths to meet design requirements. The Grate Nozzles are low expansion foam discharge devices that deliver a uniform discharge pattern with a maximum spacing of 50' x 25' (15.2 m x 7.6 m). The nozzles are installed flush with the floor of the protection area within the trench drain. The companion trench drain grate is specially engineered to receive the Grate Nozzle® and serve as a cover for the drain trench.



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

2. LISTINGS AND APPROVALS

The Grate Nozzle is FM Approved as part of a fire suppression system combining designated foam concentrates, proportioning devices and bladder tanks. Approved system components can be found at www.approvalguide.com.

FM Approved – Low Expansion Foam Systems (FM5130) Approved with the following foam concentrates:

- Viking USP, 3%

US DOD Acceptance

SFFF compatible" refers to this product as being part of a SFFF Foam system that has been tested to recognized standards. Not all configurations are available. Please consult technical data and/or the Approval for usage requirements.

SFFF compatible

3. TECHNICAL DATA

3.1 Features

Grate Nozzle

- Floor level distribution
- 2" grooved inlet for simple installation and removal
- Durable construction
- No moving parts
- Discharge recouping - if a nozzle within a system is obstructed during discharge (by aircraft tires, barrels, hoses, construction materials or other items), flow rates to the other in-line nozzles will increase and recoup the loss.
- Multiple uses including floor washdowns and system flow tests (without foam)
- Maximum 18" height of spray pattern

Trench drain grate

- Acts as a receiver for the Grate Nozzle.
- Slotted design allows drainage into trench drain system.
- Integrates seamlessly into new and existing trench drain grate systems.
- Matches typical trench grate designs.

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3.2 Materials of Construction

Table 3.2.1 - Standard Materials	
Grate Nozzle:	UNS S31600 Stainless Steel
Grate:	Ductile Iron, ASTM A536 Grade 80-55-06
"X" Frame Supports:	Ductile Iron, ASTM A536 Grade 80-55-06
Paint:	Epoxy powder coating
Standard color:	Red

3.3 Standard Design Specifications

Table 3.3.1 - Standard Design Specifications

Model	Discharge Pattern	K-factor		Working Pressure [1]				Flow Range				Approvals [2]
				Minimum		Maximum		Minimum		Maximum		
		Imperial	Metric	PSI	bar	PSI	bar	GPM	LPM	GPM	LPM	
GN202	360°	23.2	331	40	2.76	70	4.82	147	555	194	735	FM
	180°	12.5	179	40	2.76	70	4.82	79	299	105	396	FM
	90°	6.8	97	40	2.76	70	4.82	43	163	57	215	FM

Footnotes

1. Working pressure at inlet of the Grate Nozzle.
2. The listed working pressure and flow ranges are specific to the tested foam concentrate.

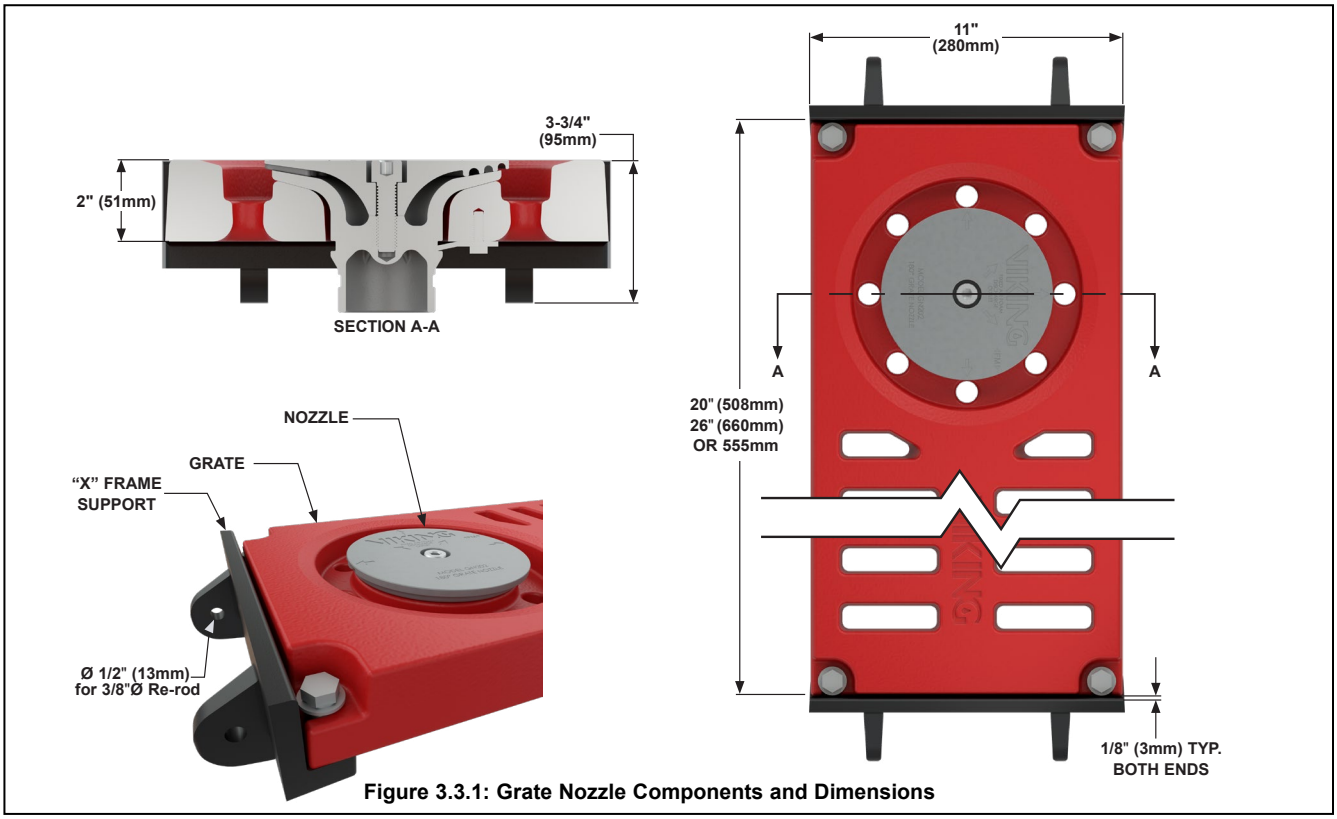

Figure 3.3.1: Grate Nozzle Components and Dimensions

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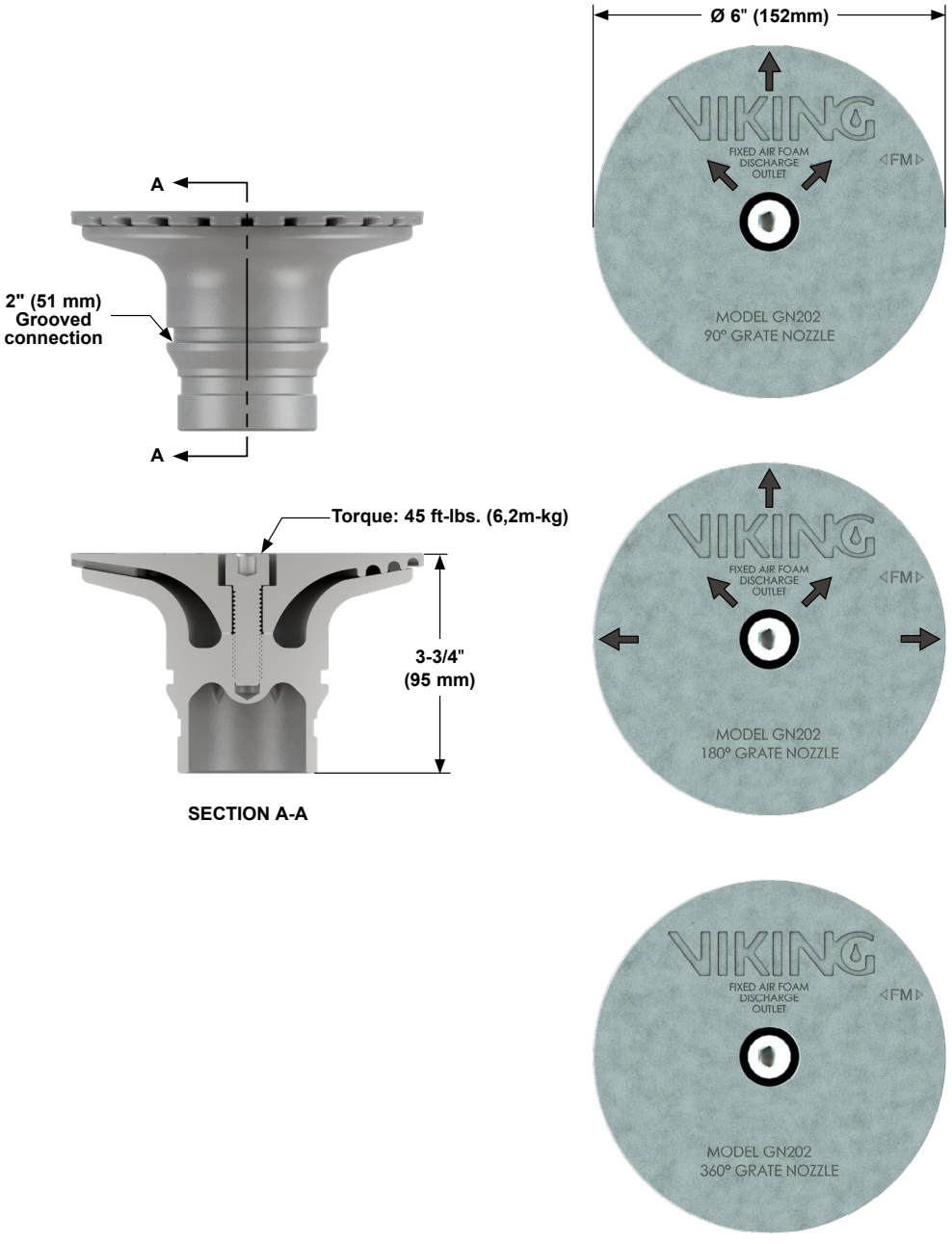

Figure 3.3.2: Nozzle Assembly Dimensions

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3.4 Availability

Please contact your local Viking sales office for further information.
The product is available directly from Viking and official distributors only.
EMEA: Viking SA, ZI Haneboesch, L-4562 Differdange / Niederkorn, Tel.: +352 58 37 37 - 1, Fax: +352 38 37 36, vikinglux@viking-emea.com
Americas: The Viking Corporation, 210 N. Industrial Park Drive, Hastings,Michigan 49058, Toll free phone: (800) 968-9501
APAC: The Viking Corporation (Far East) Pte. Ltd., 69 Tuas View Square, Westlink Techpark, Singapore 637621
Tel: (+65) 6 278 4061, Fax: (+65) 6 278 4609, Email: vikingsingapore@vikingcorp.com

3.5 Ordering Information

The Viking Grate Nozzles can be ordered with or without the X-Frame support or separately to allow installation of the X-Frame prior to the Grate Nozzles. See the table below for ordering information.

NOTE: Grooved couplings are not inlcuded but required for installation.

Table 3.5.1 - Ordering Information

Description	Discharge Pattern	Part Number	Size		Shipping Weight	
			Inches	Millimeters	Lbs	Kg
Grate Nozzle Packages (includes Grate Nozzle and two X-Frame supports with mounting hardware)	360°	F24812	26	--	130	59
		F24811	20	--	105	48
		F24833	--	555	110	50
	180°	F24809	26	--	130	59
		F24808	20	--	105	48
		F24832	--	555	110	50
	90°	F24806	26	--	130	59
		F24805	20	--	105	48
		F24831	--	555	110	50
Grate Nozzles (X-Frame not included)	360°	F24830	26	--	Contact Viking	
		F24829	20	--		
		F24836	--	555		
	180°	F24827	26	--		
		F24826	20	--		
		F24835	--	555		
	90°	F24824	26	--		
		F24823	20	--		
		F24834	--	555		
X-Frame Kit (includes two X-Frame supports and hardware)	--	17525	--	--		

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4. PERFORMANCE DATA

4.1 Spacing of Grate Nozzles

Refer to Figures 4.1.1 through 4.1.4 for examples of Grate Nozzle spacing. Standard practice is to locate the Grate Nozzles so that the maximum distance between nozzles in a trench is 25' and that trench drains are not located in excess of 50' on center, (20' maximum from walls). Configurations other than this may be acceptable, contact Viking for designs other than what is indicated.

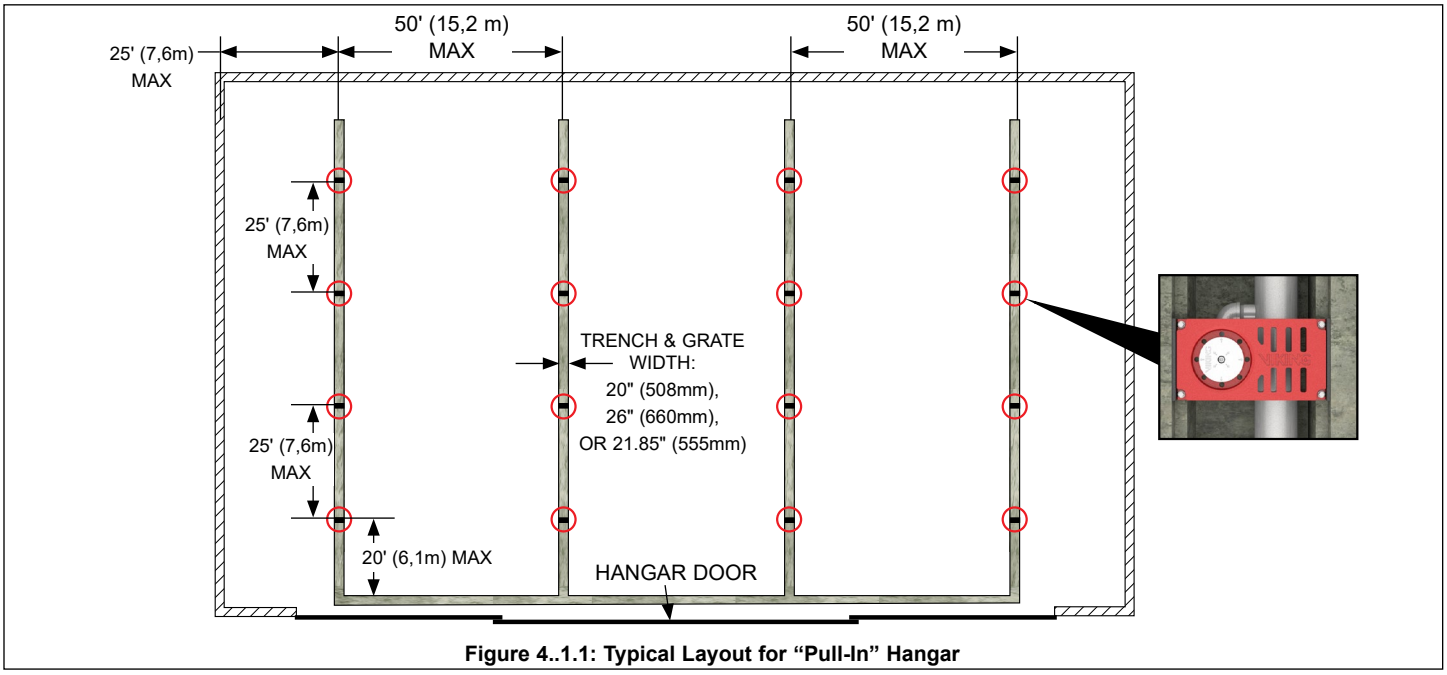

Figure 4..1.1: Typical Layout for "Pull-In" Hangar

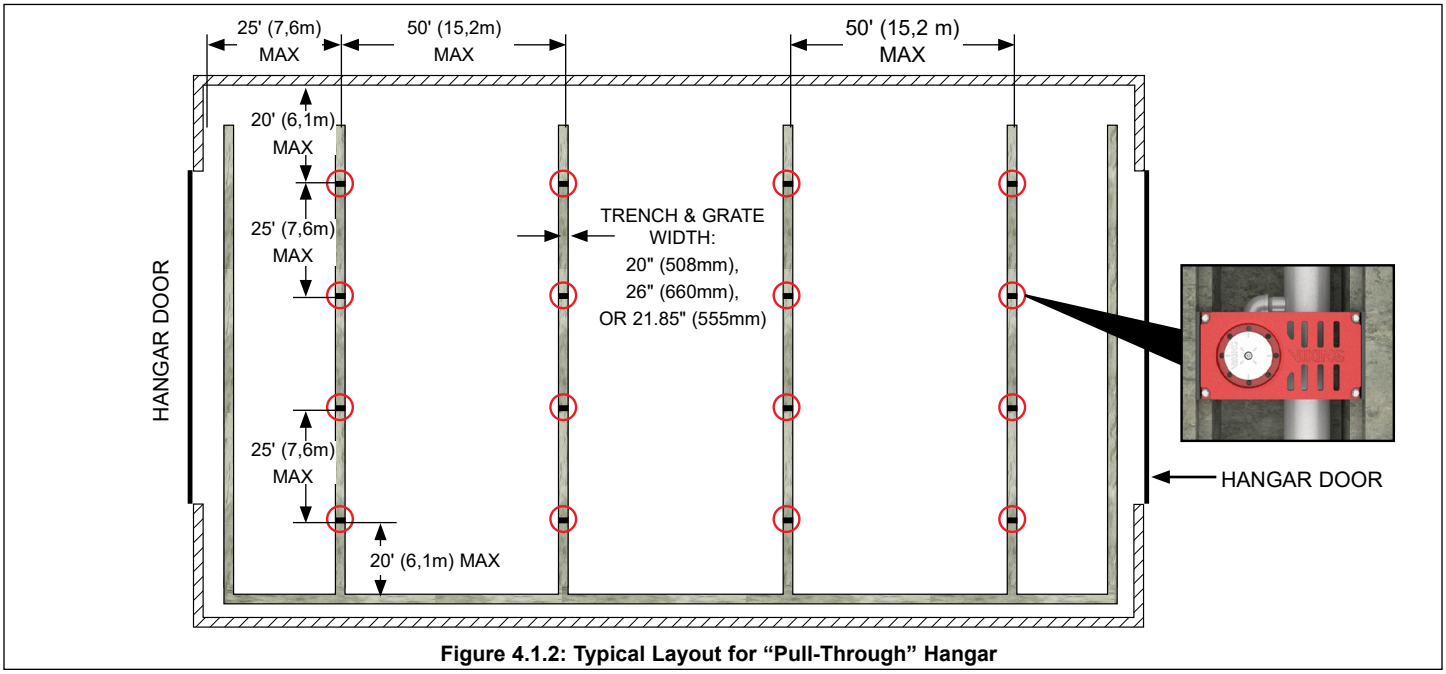

Figure 4.1.2: Typical Layout for "Pull-Through" Hangar

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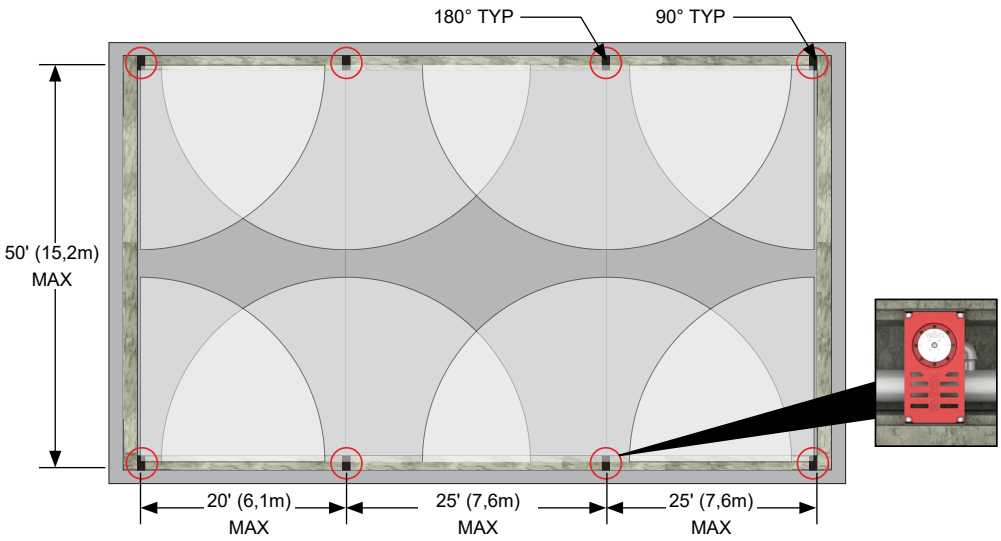

Figure 4.1.3: Typical Nozzle and Trench Heliport using 90° Nozzles in Corners and 180° Nozzles on Centers

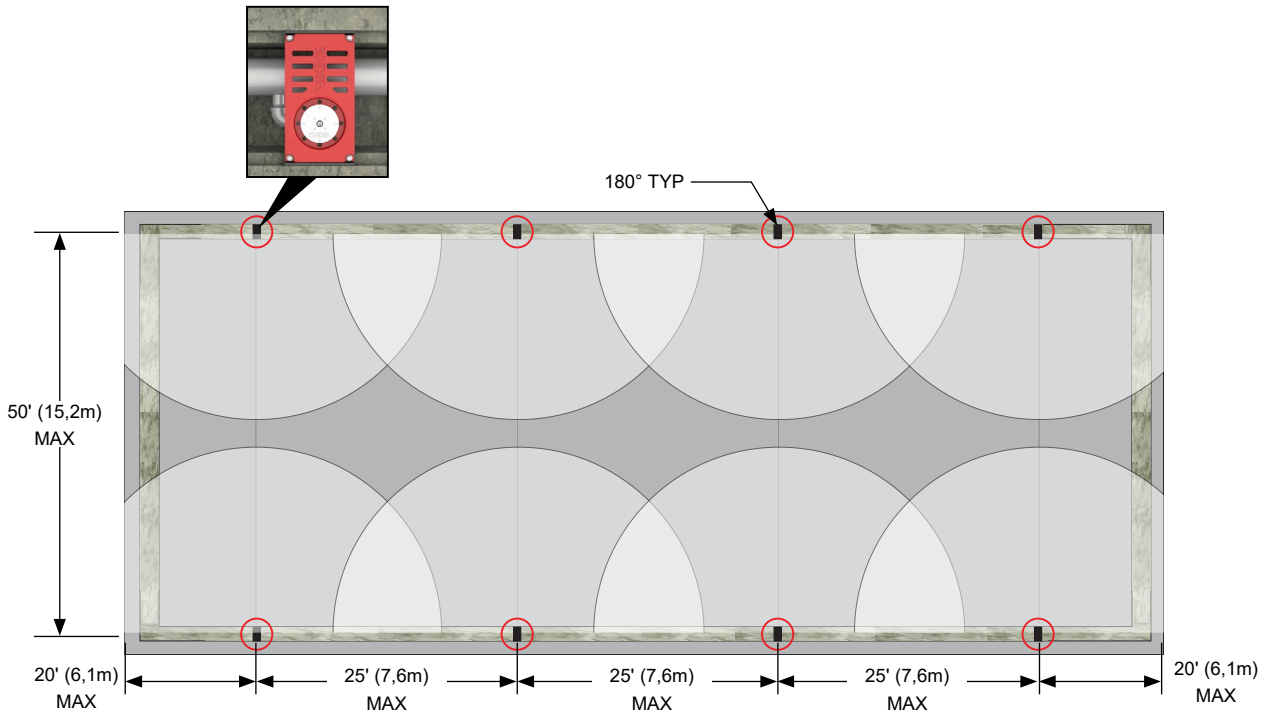

Figure 4.1.4: Typical Nozzle and Trench Heliport using 180° Nozzles

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5. INSTALLATION

5.1 General Notes

NOTICE

Minimum concrete grade shall be 4500 PSI compression load. This is to withstand the maximum design load of the grate assembly. To prevent over discharge of foam solution, care should be taken to achieve the pressure range defined in Table 3.3.1 at the inlet to the Grate Nozzle. It is therefore recommended to use a Pressure Regulating Flow Control Valve on larger systems.

A. The water or foam/water solution supply to Grate Nozzles must be continuous, clean, and obstruction free. It is recommended that all nozzle deflectors are removed and the pipework flushed prior to commissioning.
B. Ensure that the deflector is orientated in the correct direction on the 180° and 90° types.
C. When removing and replacing the nozzle deflector, the deflector retaining bolt must be tightened to a minimum torque of 45 ft-lbs
D. The Viking Grate Nozzle can only be installed with the accompanying Viking Drain Trench Grate to form the Grate Nozzle Assembly. This combination has been designed and tested together for assured performance.
E. Installation of the Grate Nozzle assembly and standard drain trench grates require that adequate drain trench sizing has been accounted for. (see Figure 5.1.1) Trench drain size should be defined by the architect or project engineer at an early stage and prior to installation.
F. The Grate Nozzle is provided with a 2” grooved inlet for ease of installation and removal.
G. Supply piping must be located in the trench. A 2” supply pipe should be piped horizontally from the supply main located in the trench, and then vertically to the Grate Nozzle. The 2” supply must terminate in a grooved connection to allow for installation to the Grate Nozzle. (see Figure 5.1.1)
H. The supply piping must be self-supporting.
I. Install wye-type strainers with isolation valves upstream of the riser. Strainers are to be Stainless Steel with a mesh screen no greater than 1/8" perforation.
J. Grate Nozzles should be installed so that a particular building feature such as a column or raised floor does not cause an obstruction to discharge to the Grate Nozzle.
K. The “X” frame furnished with the Grate Nozzle assembly shall be set in concrete using re-rod as shown in Figure 5.1.2.
L. Positioning must be flush with floor, aligned for bolting of grate to frame and placed to accommodate the remaining grate drainage system. (see Figure 5.1.2 and 5.1.3)

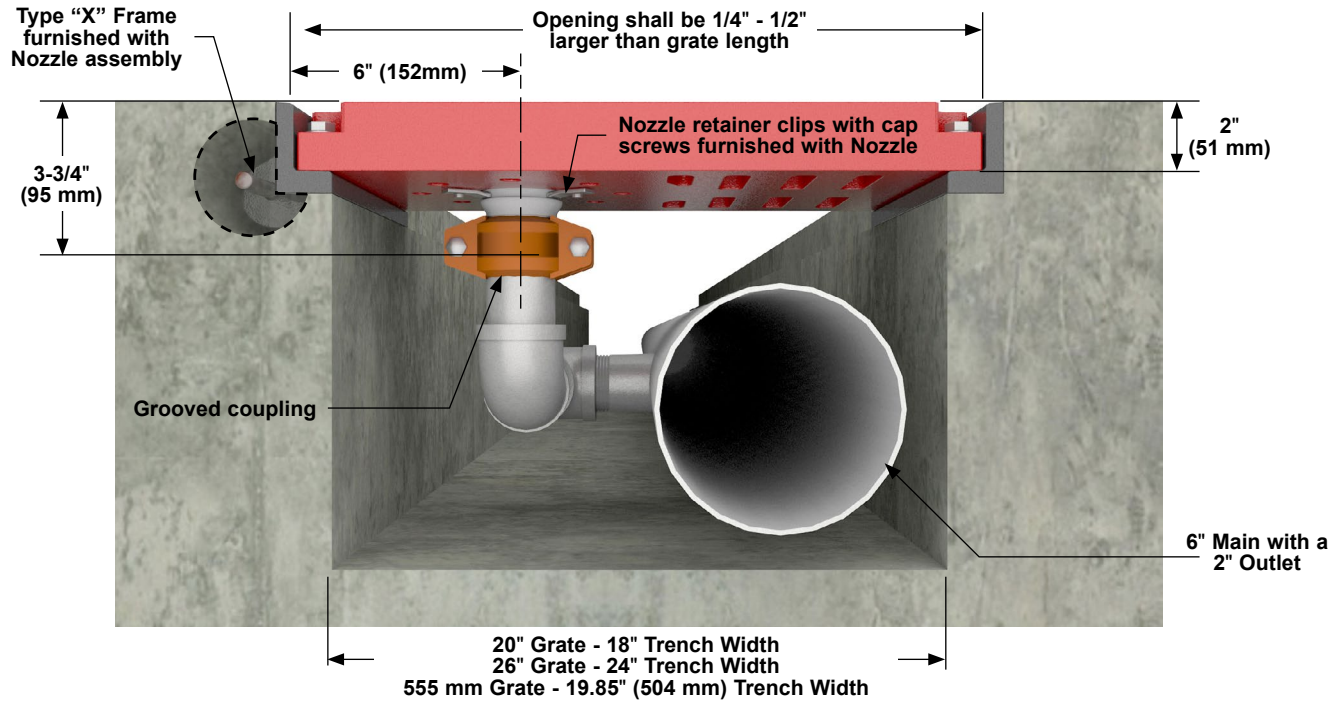

Figure 5.1.1: Installation Cross Section

VIKING®

TECHNICAL DATA

GRATE NOZZLES
MODEL GN202
360°, 180°, AND 90°

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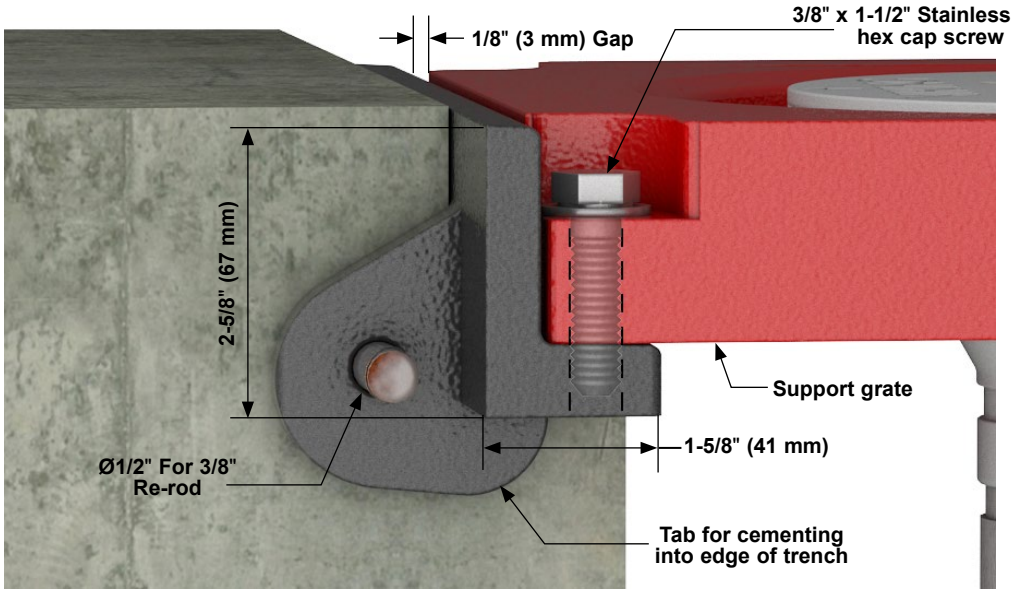
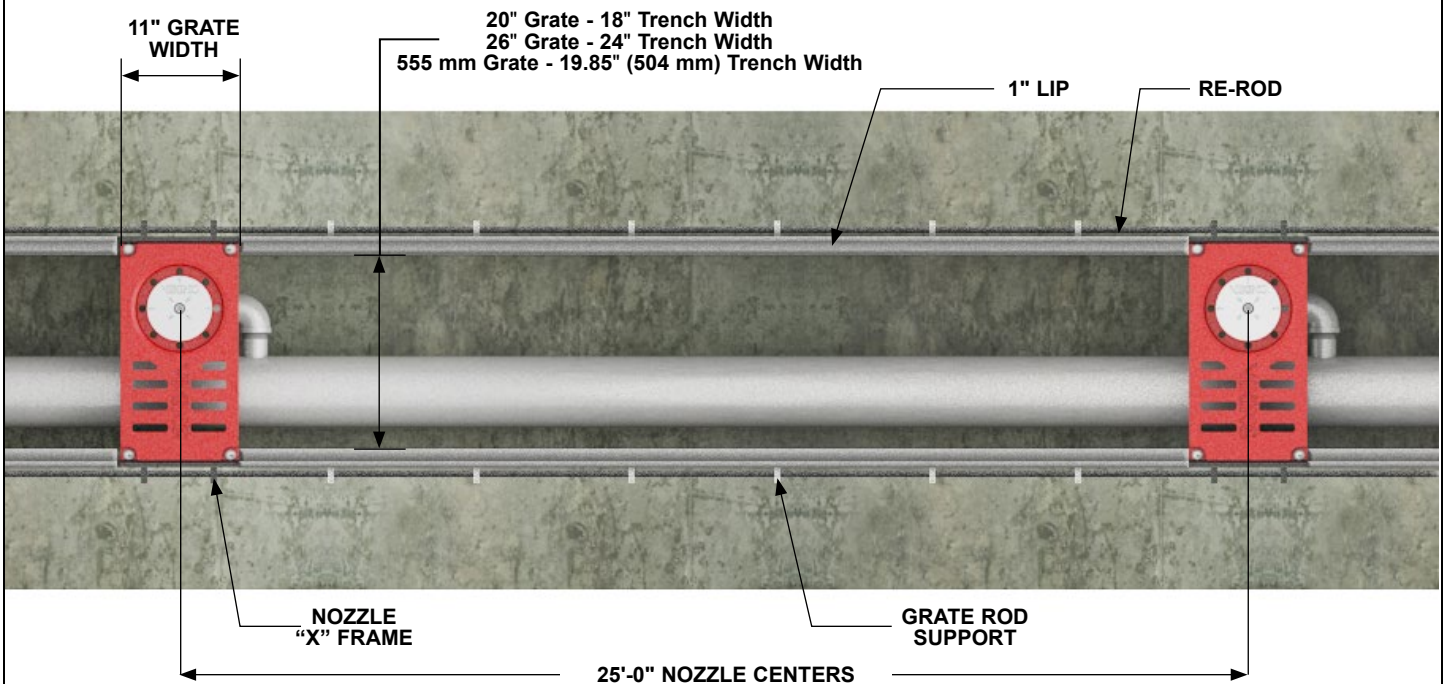


Figure 5.1.2: "X"-Frame Installation Dimensions



Typical layout trench nozzle location with 20" wide grates 18" trench width and 1" wide lip on both sides. 25'-0" space is nominal to allow clearance of standard grating for trench.

Use an "X" frame and re-rod system that matches typical drainage grate system approved for aircraft hangar use.

Maintain a 2" depth.

Figure 5.1.3: Typical Layout Trench Nozzle Locations

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6. OPERATION

The Grate Nozzle is a deluge discharge device located at the floor level of an aircraft hangar. Grate Nozzles provide floor coverage by discharging foam solution at the floor level in a fixed 90°, 180°, or 360° pattern. The discharge pattern has a 25' radius for all models. Grate Nozzles are installed into a trench drain grate. Grate Nozzles are supplied from a pressure regulating deluge or flow control system. Refer to appropriate Viking technical data pages.

7. GUARANTEES

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

8. INSPECTIONS, TESTS AND MAINTENANCE

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.

Refer to respective requirements, according to the relevant standards for Inspection, Testing and Maintenance. If applicable, refer to FM Global Property Loss Prevention Datasheet 4-12 for specific test and commissioning criteria.

In addition, the "Authority Having Jurisdiction" (AHJ) may have additional maintenance, testing and inspection requirements that must be followed. Grate Nozzles are open discharge devices and require inspection, per NFPA 25, be conducted at least annually. As the nozzles are part of a deluge system, system testing and maintenance shall be that of NFPA 25 and the manufacturer's recommendations.

If Grate Nozzles are installed in an area subject to freezing, frequent inspections may be required to ensure particles of ice have not formed in front of the discharge ports of the Grate Nozzle.

9. DISPOSAL

At end of use the product described here should be disposed of via the national recycling system.

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10. ACCESSORIES AND SPARE PARTS

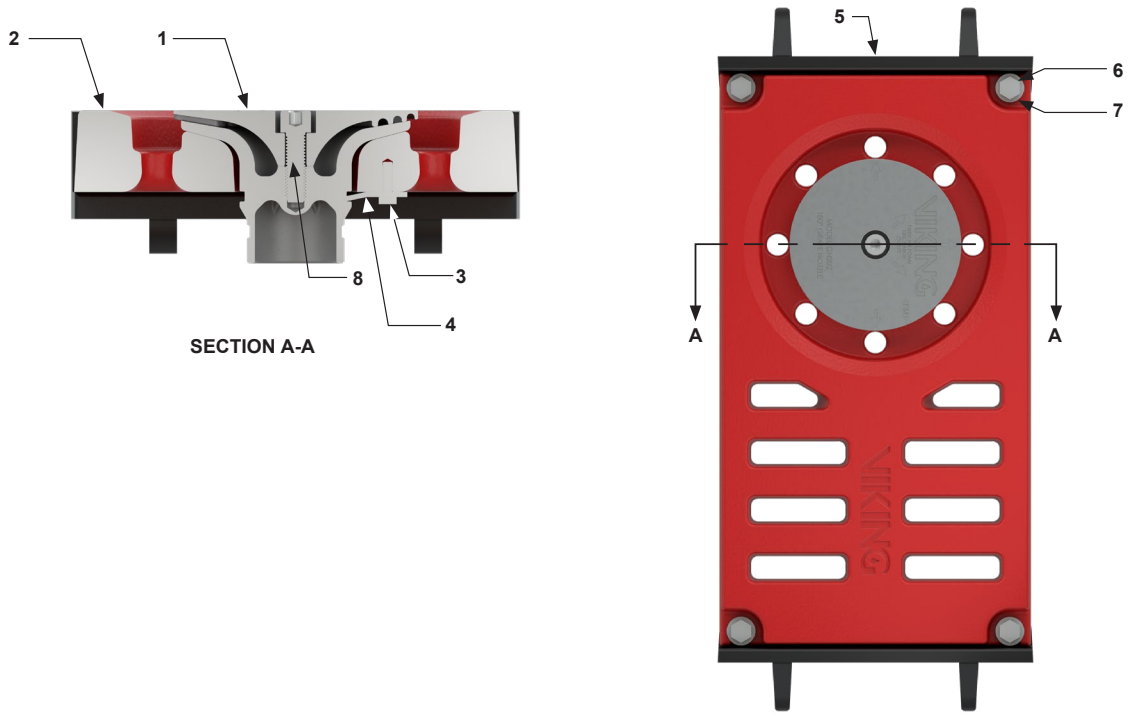


Figure 10.1.1: Replacement Parts

Ref.	PART NUMBER			DESCRIPTION	MATERIAL	No. req'd
	20" Grate	26" Grate	555mm Grate			
1	F24803			Nozzle Assembly - 360°	316 Stainless Steel	1
	F24802			Nozzle Assembly - 180°		
	F24801			Nozzle Assembly - 90°		
2	F02020/Q08	F02003/Q08	F21998/Q08	Grate	80-55-06 Ductile Iron	1
3	01761A			Screw, H.H.C., 1/4-20 x 1/2" Lg.	18-8 Stainless Steel	3
4	F02008			Spring Clip	316 Stainless Steel	3
5	17525*			"X" Frame Support Package	Class 35B Cast Iron	1
6	10949			Screw, H.H.C., 3/8-16 x 1-1/2 Lg.	18-8 Stainless Steel	4
7	10951			3/8 Flat Washer	316 Stainless Steel	4
8	F02007			PTFE Washer	PTFE	1

* Part Number 17525 is a package that includes 2 "X" Frame supports and necessary hardware.

PS10 Series

Pressure Switch

Features

- One or two switch models available
- Independent switch adjustment on two switch models, no tools needed
- Two 1/2” conduit/cable entrances
- Separate isolated wiring chambers
- Non-corrosive pressure connection
- VdS version available
- Non-Conductive enclosure

NOTICE

This document contains important information on the installation and operation of PS10 pressure switches. Please read all instructions carefully before beginning installation. A copy of this document is required by NFPA 72 to be maintained on site.

Installation

The Potter PS10 Series Pressure Actuated Switches are designed for the detection of a waterflow condition in automatic fire sprinkler systems of particular designs such as wet pipe systems with alarm check valves, dry pipe, preaction, or deluge valves. The PS10 is also suitable to provide a low pressure supervisory signal; adjustable between 4 and 15 psi (0,27 and 1,03 bar).

1. Apply Teflon tape to the threaded male connection on the device. (Do not use pipe dope)
2. Device should be mounted in the upright position (threaded connection down).
3. Tighten the device using a wrench on the flats on the device.

Wiring Instructions

1. Remove the tamper resistant screw with the special key provided.
2. Carefully place a screwdriver on the edge of the knockout and sharply apply a force sufficient to dislodge the knockout plug. See Fig 9.
3. Run wires through an approved conduit connector and affix the connector to the device. NEMA 4 rated conduit and fittings are required for outdoor use.
4. Connect the wires to the appropriate terminal connections for the service intended. See Figures 2,4,5, and 6. See Fig. 7 for two switch, one conduit wiring.

Technical Specifications

Conduit Entrances	Two knockouts for 1/2” conduit provided. Individual switch compartments and ground screw suitable for dissimilar voltages
Contact Ratings	SPDT (Form C) 10.1 Amps at 125/250VAC, 2.0 Amps at 30VDC One SPDT in PS10-1, Two SPDT in PS10-2
Cover Tamper	Cover incorporates tamper resistant fastener that requires a special key for removal. One key is supplied with each device.
Differential	2 psi (0,13 bar) typical
Dimensions	3.78”(9,6cm)Wx3.20”(8,1cm)Dx4.22”(10,7cm)H
Enclosure	Cover: Weather/UV/Flame Resistant High Impact Composite Base: Die Cast All parts have corrosion resistant finishes
Environmental Limitations	-40º F to 140ºF (-40ºC to 60ºC) NEMA 4/IP66 Rated Enclosure indoor or outdoor when used with NEMA 4 conduit fittings
Factory Adjustment	4 - 8 psi (0,27 - 0,55 bar)
Maximum System Pressure	300 psi (20,68 bar)
Pressure Connection	Nylon 1/2” NPT male
Pressure Range	4-15 psi (0,27 - 1,03 bar)
Service Use	NFPA 13, 13D, 13R, 72

*Specifications subject to change without notice.

Testing and Adjustment

NOTE: Testing the PS10 may activate other system connected devices. The operation of the pressure alarm switch should be tested upon completion of installation and periodically thereafter in accordance with the applicable NFPA codes and standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently). There should be no need to adjust the PS10 when it is used as a pressure type waterflow indicator. It is factory set to comply with UL and FM standards.

Wet System

Method 1: When using PS10 and control unit with retard - connect PS10 into alarm port piping on the input side of retard chamber and electrically connect PS10 to control unit that provides a retard to compensate for surges. Insure that no unsupervised shut-off valves are present between the alarm check valve and PS10.

Method 2: When using the PS10 for local bell application or with a control that does not provide a retard feature - the PS10 must be installed on the alarm outlet side of the retard chamber of the sprinkler system.

Testing: Accomplished by opening the inspector's end-of-line test valve. Allow time to compensate for system or control retard.

NOTE: Method 2 is not applicable for remote station service use, if there is an unsupervised shut-off valve between the alarm check valve and the PS10.

Wet System With Excess Pressure

Connect PS10 into alarm port piping extending from alarm check valve. Retard provisions are not required. Insure that no unsupervised shut-off valves are present between the alarm check valve and the PS10.

Testing: Accomplished by opening the water by-pass test valve or the inspector's end-of-line test valve. When using end-of-line test, allow time for excess pressure to bleed off.

Dry System

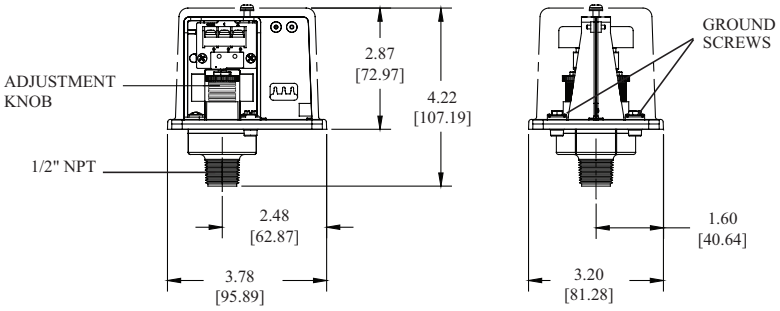
Connect PS10 into alarm port piping that extends from the intermediate chamber of the alarm check valve. Install on the outlet side of the in-line check valve of the alarm port piping. Insure that no unsupervised shut-off valves are present between the alarm check valve and the PS10.

Testing: Accomplished by opening the water by-pass test valve.

NOTE: The above tests may also activate any other circuit closer or water motor gongs that are present on the system.

Dimensions

Fig 1

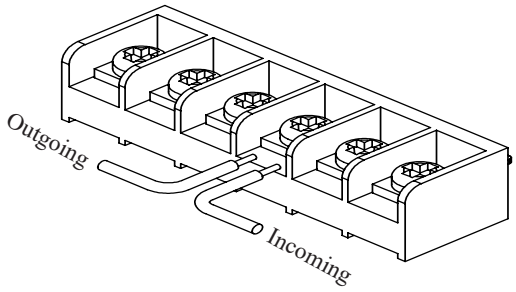


NOTE: To prevent leakage, apply Teflon tape sealant to male threads only.

DWG# 930-1

Switch Clamping Plate Terminal

Fig 2

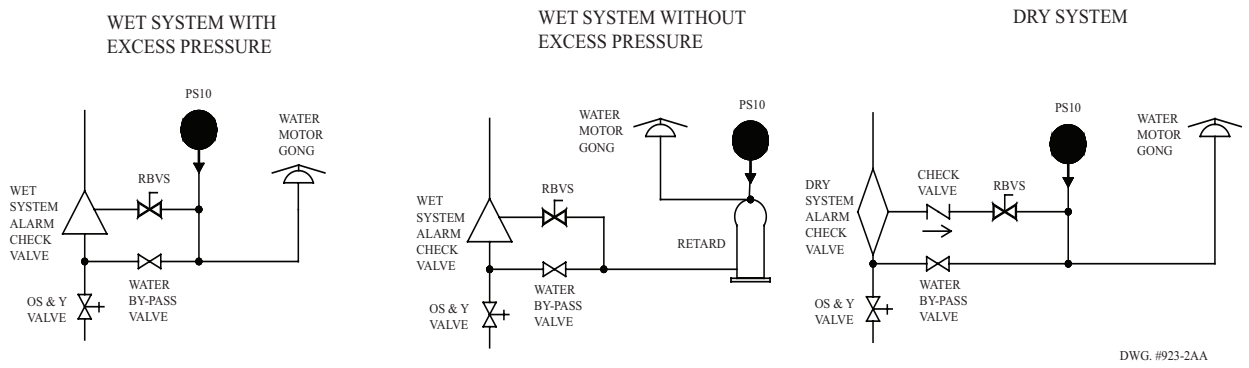


⚠ WARNING

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 becomes dislodged from under the terminal.

Typical Sprinkler Applications

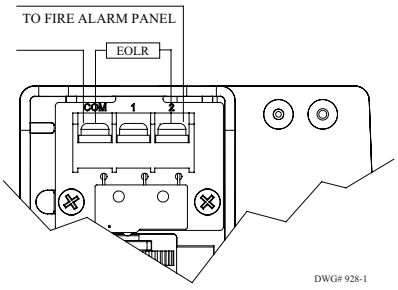
Fig 3



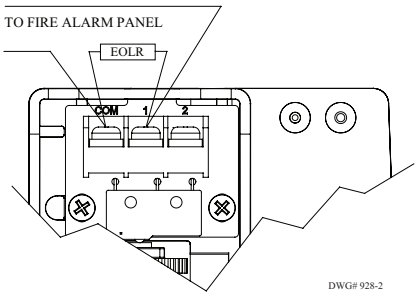
⚠ CAUTION

Closing of any shutoff valves between the alarm check valve and the PS10 will render the PS10 inoperative. To comply with NFPA-72 any such valve shall be electrically supervised with a supervisory switch such as Potter Model RBVS.

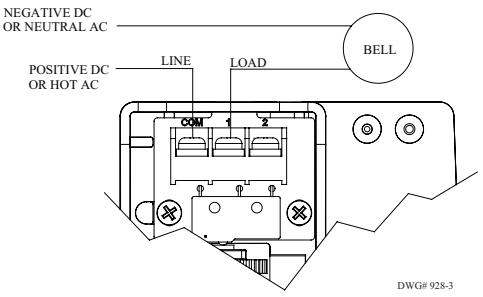
Low Pressure Signal Connection
Fig 4



Waterflow Signal Connection
Fig 5



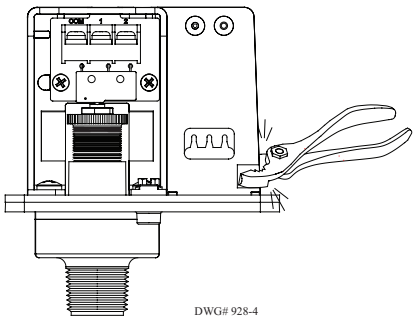
Local Bell For Waterflow Connection
Fig 6



One Conduit Wiring

Fig 7

Break out thin section of divider to provide path for wires when wiring both switches from one conduit entrance.

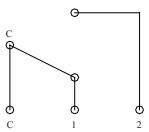


Switch Operation

Fig 8

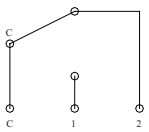
Terminal
C: Common
1: Closed when installed under normal system pressure.
2: Open when installed under normal system pressure. Closes on pressure drop. Use for low pressure supervision.

W/ PRESSURE APPLIED



Terminal
1: Open with no pressure supplied. Closes upon detection of pressure. Use for waterflow indication.
2: Closed with no pressure applied.

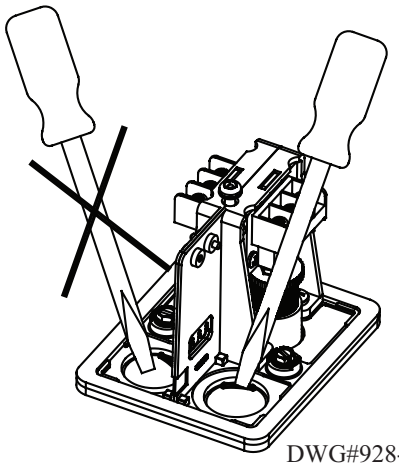
W/O PRESSURE APPLIED



DWG#928-6

Removing Knockouts

Fig 9



DWG#928-5

Engineer/Architect Specifications Pressure Type Waterflow Switch

Pressure type waterflow switches; shall be a Model PS10 as manufactured by Potter Electric Signal Company, St Louis MO., and shall be installed on the fire sprinkler system as shown and or specified herein.

Switches shall be provided with a ½" NPT male pressure connection and shall be connected to the alarm port outlet of; Wet Pipe Alarm Valves, Dry Pipe Valves, Pre-Action Valves, or Deluge Valves. The pressure switch shall be actuated when the alarm line pressure reaches 4 - 8 psi (0,27 - 0,55 bar).

Pressure type waterflow switches shall have a maximum service pressure rating of 300 psi (20,68 bar) and shall be factory adjusted to operate on a pressure increase of 4 - 8 psi (0,27 - 0,55 bar)

Pressure switch shall have one or two form C contacts, switch contact rating 10.1 Amps at 125/250 VAC, 2.0 Amps at 30 VDC.

Pressure type waterflow switches shall have two conduit entrances one for each individual switch compartment to facilitate the use of dissimilar voltages for each individual switch.

The cover of the pressure type waterflow switch shall be Weather/UV/ Flame Resistant High Impact Composite with rain lip and shall attach with one tamper resistant screw. The Pressure type waterflow switch shall be suitable for indoor or outdoor service with a NEMA 4/IP66 rating.

The pressure type waterflow switch shall be UL Ulc and CSFM listed, FM and LPC approved and NYMEA accepted.

⚠ 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.
- Read all instructions carefully and understand them before starting installation. Save instructions for future use. Failure to read and understand instructions could result in improper operation of device resulting in serious injury or death.
- Risk of explosion. Not for use is hazardous locations. Serious injury or death could result.

⚠ CAUTION

- Do not tighten by grasping the switch enclosure. Use wrenching flats on the bushing only. Failure to install properly could damage the switch and cause improper operation resulting in damage to equipment and property.
- To seal threads, apply Teflon tape to male threads only. Using joint compounds or cement can obstruct the pressure port inlet and result in improper device operation and damage to equipment.
- Do not over tighten the device, standard piping practices apply.

Ordering Information

Model	Description	Part Number
PS10-1	Pressure switch with one set SPDT contacts	1340103
PS10-2	Pressure switch with two sets SPDT contacts	1340104
Hex Key		5250062
Cover Tamper Switch Kit		0090200

Tamper

Cover incorporates tamper resistant fastener that requires a special key for removal. One key is supplied with each device. For optional cover tamper switch kit, order Stock No. 0090200. See bulletin #5401200 PSCTSK.

NOTICE

Pressure switches have a normal service life of 10-15 years. However, the service life may be significantly reduced by local environmental conditions.

TECHNICAL DATA

DELUGE VALVE, MODEL F-1 STRAIGHT THROUGH STYLE

2-1/2" (DN65) - 8" (DN200)

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

The Viking Model F-1 Deluge Valve is a quick opening, differential diaphragm and flood valve with one moving mechanism. The Deluge Valve is used to control water flow in Deluge and Preaction sprinkler systems. The valve is held closed by system water pressure trapped in the priming chamber; keeping the outlet chamber and system piping dry. In fire conditions, when the releasing system operates, pressure is released from the priming chamber. The Deluge Valve clapper opens to allow water to flow into the system piping.

Features:

1. Field replaceable Diaphragm and Seat Rubbers
2. Designed for installation in the horizontal or vertical position
3. Designed to be reset without opening the valve
4. Compatible with Hydraulic, Pneumatic and/or Electric Release Systems

NOTE: FOR PART NUMBERS OF ACCESSORIES, REFER TO VIKING LIST PRICE SCHEDULE.

2. LISTINGS AND APPROVALS:

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

U.L. Listed - Guide No. VLFT & VLJH
C-UL Listed
FM Approved - Deluge Sprinkler Systems, Preaction Sprinkler Systems, Refrigerated Area Sprinkler Systems
American Bureau of Shipping (ABS) - Certificate No. 15-HS1332725-PDA
NYC Department of Buildings - MEA 89-92-E Vol XXXI
CE - Pressure Equipment Directive 97/23/EC

3. TECHNICAL DATA

Specifications:

Maximum Working Water Pressure: 250 PSI (17.4 bar)
Style: Straight through
Connections: See Table 1.
Factory tested: to 500 psi (34.5 bar)
Valve differential: 2:1 (priming chamber to inlet chamber)
Priming chamber supply restriction (required): 0.0625" (1.6 mm)
Color of Valve: Red
Friction loss: Refer to Table 1.
Cv Factor: Refer to Table 1.

Material Standards:

Refer to Figure 2.

Ordering Information:

Part Numbers - Refer to Table 1
8" - Manufactured since 2002
4" & 6" - Manufactured since 2003
2-1/2" & 3" - Manufactured since 2004

ACCESSORIES:

Refer to Current VIKING PRICE LIST for Part Numbers.

1. A Conventional Trim Trim package for use with the Model F-1 Deluge Valve. The trim package includes the VALVE ACCESSORY PACKAGE and the fittings and nipples shown on the Viking Deluge Valve Conventional Trim Chart Trim Chart for the valve used. Trim Charts are provided in trim packages and the Viking website. For optional factory assembled "modular" trim packages, refer to the Viking list price schedule or contact the manufacturer.
2. A Deluge VALVE ACCESSORY PACKAGE includes required trim components. This package is needed when Viking Trim Packages are not used.
3. Auxiliary Components are required for specific valve functions. For complete operating trim requirements, refer to system data for the system used. System data is provided on the Viking website.

Additional accessories are available and may be required for system operation or supervision. Refer to the system description and technical data for complete operating trim requirements for the system used.

VIKING®

TECHNICAL DATA

DELUGE VALVE, MODEL F-1 STRAIGHT THROUGH STYLE

2-1/2" (DN65) - 8" (DN200)

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DESCRIPTION	Nominal Size	Part Number	Friction Loss*	Cv Factor	Shipping Weight
Threaded					
Pipe O.D.					
NPT 65 mm	2½"	12401	12 ft. (3.6 m)	155	67 lbs. (30 kg)
Flange/Flange					
Flange Drilling					
ANSI	3"	12014	12 ft. (3.6 m)	155	82 lbs. (37 kg)
ANSI	4"	11953	21 ft. (6.5 m)	428	146 lbs. (66 kg)
ANSI	6"	11955	39 ft. (11.9 m)	839	271 lbs. (123 kg)
ANSI	8"	11991	57 ft. (17.4 m)	1577	466 lbs. (212 kg)
ANSI/Japan	6"	11964	39 ft. (11.9 m)	839	271 lbs. (123 kg)
PN10/16	DN80	12026	12 ft. (3.6 m)	155	82 lbs. (37 kg)
PN10/16	DN100	11965	21 ft. (6.5 m)	428	127 lbs. (58 kg)
PN10/16	DN150	11956	39 ft. (11.9 m)	839	271 lbs. (123 kg)
PN10	DN200	11995	57 ft. (17.4 m)	1577	418 lbs. (190 kg)
PN16	DN200	11999	57 ft. (17.4 m)	1577	466 lbs. (212 kg)
Flange/Groove					
Flange Drilling / Pipe O.D.					
ANSI / 89 mm	3"	12018	12 ft. (3.6 m)	155	75 lbs. (34 kg)
ANSI / 114 mm	4"	11952	21 ft. (6.5 m)	428	136 lbs, (62 kg)
ANSI / 168 mm	6"	11954	39 ft. (11.9 m)	839	261 lbs. (118 kg)
PN10/16 / 89 mm	DN80	12030	12 ft. (3.6 m)	155	75 lbs. (34 kg)
PN10/16 / 114 mm	DN100	11958	21 ft. (6.5 m)	428	136 lbs. (62 kg)
PN10/16 / 165 mm	DN150	12640	39 ft. (11.9 m)	839	261 lbs. (118 kg)
PN10/16 / 168 mm	DN150	11954	39 ft. (11.9 m)	839	261 lbs. (118 kg)
Groove/Groove					
Pipe O.D.					
73 mm	2½" / DN65	12403	12 ft. (3.6 m)	155	67 lbs. (30 kg)
76 mm	DN80	12729	12 ft. (3.6 m)	155	67 lbs. (30 kg)
89 mm	3" / DN80	12022	12 ft. (3.6 m)	155	64 lbs. (29 kg)
114 mm	4" / DN100	11513	21 ft. (6.5 m)	428	127 lbs. (58 kg)
165 mm	DN150	11910	39 ft. (11.9 m)	839	245 lbs. (111 kg)
168 mm	6" / DN150	11524	39 ft. (11.9 m)	839	245 lbs. (111 kg)
219 mm	8" / DN200	11018	57 ft. (17.4 m)	1577	403 lbs. (183 kg)

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

$$Q = Cv \sqrt{\frac{\Delta P}{S}}$$

Q= Flow
Cv= Flow Factor (GPM/1 PSI ΔP)
ΔP= Pressure Loss through Valve
S= Specific Gravity of Fluid

Table 1 - Valve Part Numbers and Specifications

4. INSTALLATION (Refer to Figure 1 identification of trim components.)

A. General Instruction

1. Viking Straight Through Deluge Valves may be installed in the horizontal or vertical position.
2. The valve must be installed in an area not subject to freezing temperatures or physical damage.
3. The valve must be trimmed according to current Viking Trim Charts and appropriate instructions for the system used. Trim Charts are printed in the *Viking Engineering and Design Data* book, and are provided with trim packages.
   a. Remove all plastic protectors from the openings of the Deluge Valve.
   b. Apply a small amount of pipe joint compound or tape to the external threads of all pipe connections required. Take care not to allow any compound, tape, or other foreign matter inside any of the nipples or openings of the valve or trim components.
   c. Viking Model F-1 Deluge Valve Conventional Trim Charts are provided with Trim Packages and in the *Viking Engineering and Design Data* book.
   d. Verify that all system components are rated for the water working pressure of the system.

Hydrostatic Test:

The Model F-1 Deluge Valve is manufactured and listed for use at a maximum Water Working Pressure of 250 PSI (17.2 bar). The valve is factory tested at 500 PSI (34.5 bar). Model F-1 Deluge Valves may be hydrostatically tested at 300 PSI (20.7 bar) and/or 50 PSI (3.4 bar) above the normal Water Working Pressure, for limited periods of time (two hours), for the purpose of acceptance by the Authority Having Jurisdiction. If air testing is required, do not exceed 60-PSI (4.1 bar) air pressure.

NOTE: NEVER CONDUCT THE HYDROSTATIC TEST AGAINST THE PRESSURE OPERATED RELIEF VALVE. (P.O.R.V.) TEMPORARILY REMOVE THE P.O.R.V. FROM THE TRIM AND PLUG TRIM OPENINGS WHILE CONDUCTING THE HYDROSTATIC TEST.

TRIM NOTE: DISCHARGE PIPING FROM THE AUXILIARY DRAIN VALVE, THE FLOW TEST VALVE, AND ALL SYSTEM DRAINS SHOULD BE KEPT SEPARATE. DO NOT CONNECT THE OUTLET OF THE DRIP CHECK TO ANY OTHER DRAIN.

4. The priming line must be connected upstream of the system water supply main control valve or to a constant source of water at a pressure equal to the system water supply.

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5. After the Deluge Valve is set, operation of the Deluge Valve requires the release of priming water from the priming chamber. This may be by automatic or manual operation of the release system. Viking Deluge Valves are compatible with hydraulic, pneumatic, and electric release systems. For specific Trim arrangements refer to Trim Charts and System Data describing the system being installed. Trim Charts are printed in the *Viking Engineering and Design Data* book, and are provided with trim packages. System Data sheets are printed in the *Viking Engineering and Design Data* book.
   a. Hydraulic Release Systems: See Figures 3-6 for the maximum allowable elevation of hydraulic release piping above the Deluge Valve. If the maximum height of hydraulic release piping exceeds the limit shown in Figures 3-6 for the valve used, use a Pneumatic or Electric Release System.
   b. Pneumatic Release Systems: A Viking Pneumatic Actuator is required between the release system connection provided on deluge valve trim and pneumatic release system piping.
   c. Electric Release Systems: Solenoid Valves, System Control Panels, and Electrical Detectors must be compatible. Consult appropriate listing and/or approval guides.

NOTE: FOR OPERATION AT WATER PRESSURES IN EXCESS OF 175 PSI (12.1 BAR), A 250 PSI (17.2 BAR) RATED SOLENOID VALVE MUST BE USED. REFER TO APPROPRIATE VIKING TECHNICAL DATA PAGE FOR TYPE OF SYSTEM USED.

⚠ CAUTION

Operation of Viking Deluge Valves by pressurizing the priming chamber with air pressure or any other pressurized gas is not recommended or approved.

B. Placing the Valve in Service

For Deluge Valves equipped with Conventional Deluge Valve Trim, follow steps 1 through 10 (and 11 & 12 if applicable) below.

1. Verify:
   a. The system Main Water Supply Control Valve (D.1) is closed and the Deluge Valve is trimmed according to current Viking Trim Charts and schematic drawings for the system used.
   b. The system has been properly drained.
   c. Auxiliary Drain (B.13) is open.
   d. The Emergency Release (B.9) is closed.
   e. The system water supply piping is pressurized up to the closed Main Water Supply Control Valve (D.1) and the priming line is pressurized up to the closed Priming Valve (B.1).
2. For Systems equipped with:
   a. Hydraulic Release Systems:
      i. Verify that all releasing devices are set and that any Inspector's Test Valve and/or auxiliary drain valves are closed.
      ii. Open Priming Valve (B.1).Allow the hydraulic release system to fill. When priming pressure gauge (B.7) indicates that the release piping and priming chamber pressure is equal to system supply pressure, proceed to step 3.
      iii. Proceed to step 3.
   b. Pneumatic Release Systems:
      i. Set the release system.
      ii. Open Priming Valve (B.1).
      iii. Proceed to step 3.
   c. Electric Release Systems:
      i. Open Priming Valve (B.1).
      ii. Set the electric release system.
      iii. Proceed to step 3.
3. Open Flow Test Valve (B.11).
4. Partially open Main Water Supply Control Valve (D.1).
5. When full flow develops from the Flow Test Valve (B.11), close the Flow Test Valve. Verify that there is no flow from the open Auxiliary Drain (B.13).
6. Close Auxiliary Drain (B.13).
7. Fully open and secure the Main Water Supply Control Valve (D.1).
8. Verify that the Alarm Shut-off Valve (B.6) is open and that all other valves are in their normal** operating position.
9. Depress the plunger of Drip Check (B.14). No water should flow from the Drip Check when the plunger is pushed.
10. Check for, and repair all leaks.
11. On new installations, those systems that have been placed out of service, or where new equipment has been installed, trip test the system to verify that all equipment functions properly. Refer to INSPECTION, TESTS AND MAINTENANCE paragraph 6-II-C: ANNUAL Trip Test instructions.

⚠ CAUTION

Performing a trip test results in operation of the Deluge Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

TECHNICAL DATA

DELUGE VALVE, MODEL F-1
STRAIGHT THROUGH STYLE
2-1/2" (DN65) - 8" (DN200)

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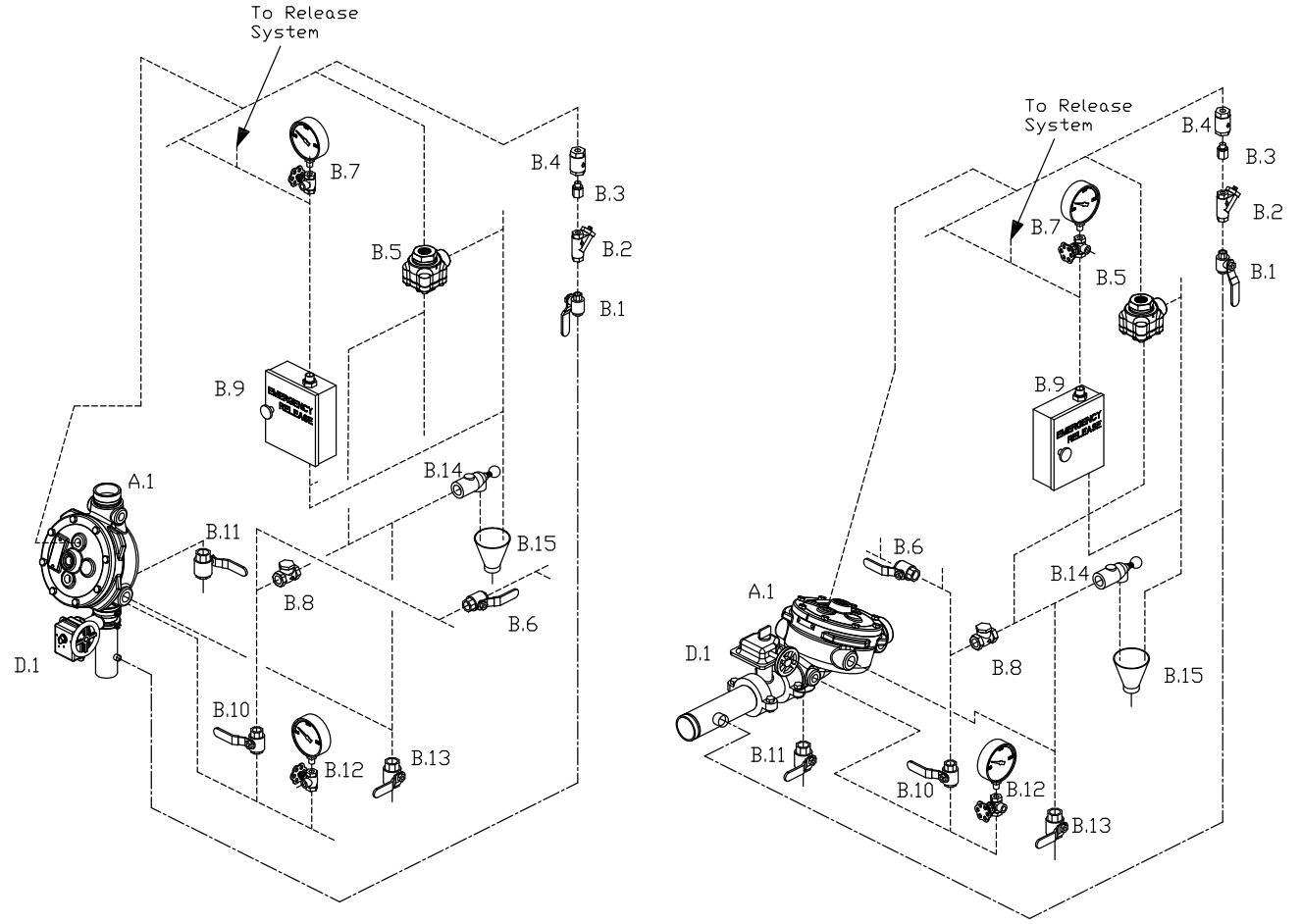

Vertical Valve **Horizontal Valve**

– – – – – Dashed lines indicate nipples and fittings included with trim.
—·—·— Phantom lines indicate piping required, but not included with trim.

Figure 1 - Conventional Trim Components

A.1	Deluge Valve	B.9	Emergency Release
B.1	Priming Valve (Normally Open)	B.10	Alarm Test Valve (Normally Closed)
B.2	Strainer	B.11	Flow Test Valve (Normally Closed)
B.3	1/16" Restricted Orifice	B.12	Water Supply Pressure Water Gauge and Valve
B.4	Spring Loaded Check Valve	B.13	Auxiliary Drain Valve (Normally Closed)
B.5	Pressure Operated Relief Valve (PORV)	B.14	Drip Check Valve
B.6	Alarm Shut Off Valve (Normally Open)	B.15	Drain Cup
B.7	Priming Pressure Water Gauge and Valve	D.1	Water Supply Control Valve
B.8	Drain Check Valve		

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After completing a trip test, perform SEMI-ANNUAL maintenance.

C. Valve Removed From Service

NOTE: WHEN A VALVE HAS BEEN REMOVED FROM SERVICE AND IS SUBJECT TO FREEZING OR WILL BE OUT OF SERVICE FOR AN EXTENDED PERIOD OF TIME, ALL WATER MUST BE REMOVED FROM THE PRIMING CHAMBER, TRIM PIPING, WATER SUPPLY PIPING AND OTHER TRAPPED AREAS.

5. OPERATION (Refer to Figure 2.)

The Viking Model F-1 Deluge Valve has an inlet chamber, an outlet chamber and a priming chamber. The inlet chamber and outlet chamber are separated from the priming chamber by the clapper (5) and diaphragm (6).

In the set condition:

System pressure is supplied to the priming chamber through a restricted priming line (trim) equipped with a check valve. System water supply pressure trapped in the priming chamber holds the clapper (5) on seat (2) due to area differential design. Clapper (5) separates the inlet chamber from the outlet chamber, keeping the outlet chamber and system piping dry.

In fire conditions:

When the release system operates, pressure is released from the priming chamber faster than it is supplied through the restricted priming line. Water supply pressure in the inlet chamber forces the clapper (5) off from seat (2), allowing water to flow through the outlet and into the system and alarm devices.

For Deluge Valves equipped with Conventional Trim:

When the deluge valve operates, the air side of the PORV looses pressure, causing the PORV to operate. When the PORV operates, it continually vents the priming chamber to prevent the deluge valve from resetting even if the open releasing devices close. The deluge valve can only be reset after the system is taken out of service, and the outlet chamber of the deluge valve and associated trim piping is depressurized and drained.

6. INSPECTIONS, TESTS AND MAINTENANCE

I. Inspection

It is imperative that the system is inspected and tested on a regular basis. The frequency of the inspections may vary due to contaminated water supplies, corrosive water supplies or corrosive atmospheres. Also, the alarm devices, detection systems or other connected trim may require a more frequent schedule. 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. The following recommendations are minimum requirements. (For additional information, refer to Viking Trim Charts and System Data describing systems with the release system used.)

A. Weekly:

Weekly visual inspection of the Viking Deluge Valve is recommended.

1. Verify that the Main Water Supply Control Valve (D.1) is open and that all other valves are in their normal** operating position and appropriately secured.
2. Check for signs of mechanical damage, leakage, and/or corrosive activity. If detected, perform maintenance as required. If necessary, replace the device.
3. Verify that the valve and trim are adequately heated and protected from freezing and physical damage.

II. Tests

A. Quarterly Water Flow Alarm Test

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. To test the local electric alarm (if provided) and/or mechanical water motor alarm (if provided), OPEN the alarm test valve (B.10) in the deluge 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. If equipped with remote station alarm signaling devices, verify that alarm signals were received.
3. When testing is complete, CLOSE the alarm test valve (B.10).
4. Verify:
   a. All local alarms stop sounding and alarm panels (if provided) reset.
   b. All remote station alarms reset.
   c. Supply piping to water motor alarm properly drains.
5. Verify that the alarm shut-off valve (B.6) is OPEN, and the alarm test valve (B.10) is CLOSED.
6. Verify that the outlet chamber is free of water. No water should flow from the drip check (B.14) when the plunger is pushed.
7. Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

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B. Quarterly Main Drain Test

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 (B.12).
3. Verify that the outlet chamber of the deluge valve is free of water. No water should flow from the drip check (B.7) when the plunger is pushed.
4. Fully OPEN the flow test valve (B.11).
5. When a full flow is developed from the flow test valve (B.11), record the residual pressure from the water supply pressure gauge (B.12).
6. When the test is complete, SLOWLY CLOSE the flow test valve (B.11).
7. Compare test results with previous flow information. If deterioration of the water supply is detected, take appropriate steps to restore adequate water supply.
8. Verify:
   a. Normal water supply pressure has been restored to the inlet chamber, the priming chamber, and the release system. The pressure on the priming chamber water pressure gauge should equal the system water supply pressure.
   b. All alarm devices, and valves are secured in normal** operating position.
9. 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.

** For normal operating position, refer to Figure 1 and/or Trim Charts and System Data for the system used.

C. Annual Trip Test:

⚠ CAUTION

Performing this test results in operation of the Deluge Valve. Water will flow into the sprinkler piping and from any open sprinklers and/or nozzles. Take necessary precautions to prevent damage.

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Fully open the flow test valve (B.11) to flush away any accumulation of foreign material.
3. Close the flow test valve (B.11).
4. Trip the system by operating the release system. Allow a full flow to pass through the deluge valve. Water flow alarms should operate.
5. When test is complete:
   a. Close the main water supply control valve (D.1).
   b. Close the priming valve (B.1).
   c. Open the auxiliary drain valve (B.13).
   d. Open all system main drains and auxiliary drains. Allow the system to drain completely.
6. Perform SEMI-ANNUAL maintenance. Refer to paragraph 6.III.B SEMI-ANNUAL MAINTENANCE.
7. Place the system in service. Refer to Item 4.B, INSTALLATION: PLACING THE VALVE IN SERVICE.

NOTE: DELUGE VALVES SUPPLIED BY BRACKISH WATER, SALT WATER, FOAM, FOAM/WATER SOLUTION, OR ANY OTHER CORROSIVE WATER SUPPLY, SHOULD BE FLUSHED WITH GOOD QUALITY FRESH WATER BEFORE BEING RETURNED TO SERVICE.

8. 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.

III. Maintenance

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition. The Deluge Valve must be kept from freezing conditions and physical damage that could impair its operation.

⚠ WARNING

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

Where difficulty in performance is experienced, the valve manufacturer or authorized representative shall be contacted if any field adjustment is to be made.

A. After Each Operation:

1. 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.
2. Deluge Valves and trim that have been subjected to brackish water, salt water, foam, foam/water solution, or any other corrosive water supply should be flushed with good quality fresh water before being returned to service.
3. Perform SEMI-ANNUAL maintenance after every operation.

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B. Semi-Annual Maintenance:

1. Remove the system from service. (Refer to Deluge or Preaction System Data that describes systems with the release system used for additional information.)
   a. Close the Main Water Supply Control Valve (D.1) and Priming Valve (B.1).
   b. Open the Auxiliary Drain Valve (B.13).
   c. Relieve pressure in the priming chamber by opening the Emergency Release Valve (B.9).
4. Inspect all trim for signs of corrosion and/or blockage. Clean and/or replace as required.
5. Clean and/or replace all strainer screens (including B.2).
6. Refer to Item 4-B, INSTALLATION: PLACING THE VALVE IN SERVICE.

C. Every Fifth Year

1. Internal inspection of Deluge Valves is recommended every five years unless inspections and tests indicate more frequent internal inspections are required. Refer to DISASSEMBLY instructions provided below.
2. Internal inspection of strainers and restricted orifices is recommended every five years unless inspections and tests indicate more frequent internal inspections are required.
3. Record and provide notification of inspection results as required by the Authority Having Jurisdiction.

D. Valve Disassembly (Refer to Figure 2)

1. Remove the valve from service (see the release system description and Technical Data for additional information). Close the main control valve and open the main drain valve. Release the pressure in the priming chamber by opening the Emergency Release Valve.
2. Remove trim as required to allow removal of cover (4).
3. Remove screws (9).
4. Lift cover (4) from body (1).
5. Remove clapper assembly (No. 3, 5, 6, 7, 9, 10, 11) by lifting it from the body (1).
6. Inspect seat (2). If replacement is necessary, remove screws (12). Remove old seat (2) and o-ring (13). Replace with new seat (2) and o-ring (13). Replace screws (12).
7. To replace the diaphragm rubber (6), remove the circle of screws (10). Remove the clamp ring (3) and remove the diaphragm rubber (6).
8. To replace the seat rubber assembly (7), clapper assembly (3, 5, 6, 7, 9, 10, 11) must be removed from the valve. Remove the circle of screws (12). Seat rubber assembly (7) can be removed.

NOTE: PRIOR TO INSTALLING A NEW CLAPPER RUBBER (6) OR SEAT RUBBER ASSEMBLY (7), MAKE CERTAIN THAT ALL SURFACES ARE CLEAN AND FREE OF FOREIGN MATTER. THE PLATED SEAT (2) MUST BE SMOOTH AND FREE OF NICKS, BURRS OR INDENTATIONS.

E. Valve Reassembly

1. Prior to reassembly, flush the valve of all foreign matter.
2. To reassemble, reverse disassembly procedure.

7. AVAILABILITY

The Viking Model F-1 Deluge 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.

TECHNICAL DATA

DELUGE VALVE, MODEL F-1 STRAIGHT THROUGH STYLE

2-1/2" (DN65) - 8" (DN200)

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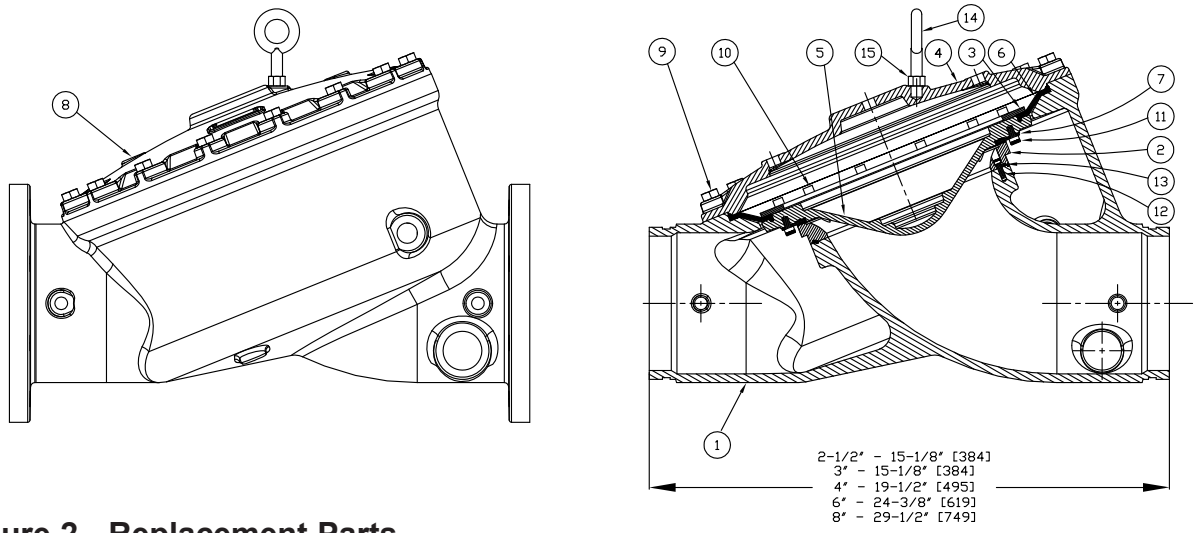

Figure 2 - Replacement Parts

ITEM NO.	PART NUMBER				DESCRIPTION	MATERIAL	NO. REQ'D.			
	2-1/2" (DN65) & 3" (DN80)	4" (DN100)	6" (DN150)	8" (DN200)			2-1/2" (DN65) & 3" (DN80)	4" (DN100)	6" (DN150)	8" (DN200)
1	--	--	--	--	Body	Ductile Iron	1	1	1	1
2	*	*	*	*	Seat	Brass	1	1	1	1
3	02493B	02378B	05704B	10514	Ring Clamp, Upper Diaphragm	Brass Casting	1	1	1	1
4	--	--	--	--	Cover	Ductile Iron 65-45-12	1	1	1	1
5	08846N	08844N	08570N	10518N/B	Clapper	Ductile Iron 65-45-12, PTFE Powder Coated	1	1	1	1
6	12012	11560	11561	10510	Upper Diaphragm	EPDM - ASTM D-2000	1	1	1	1
7	02497B	02382B	02176B	10512	Rubber Seat Assembly	EPDM - ASTM D-2000	1	1	1	1
8	--	--	--	--	Data Plate	Aluminum Etched	1	1	1	1
9	02169A				Screw, H.H.C.[1], 1/2-13 x 1-1/4 (32)	Steel, SAE-Grade 5, ASTM A449	10			
		02200A			Screw, H.H.C[1]., 1/2-13 x 1 1/2 (38)	Steel, SAE-Grade 5, ASTM A307-90		12		
			05707A	05707A	Screw, H.H.C[1]., 5/8-11 x 1 3/4 (44)	Steel, SAE Grade 5, ASTM A307-90			15	16
10	02496A				Screw, R.H.[3]., 10-24 x 3/8 (9.5)	Stainless Steel UNS-S30200	6			
		02383A			Screw, H.H.C[1]., 5/16-18 x 1/2 (13)	Stainless Steel UNS-S30400		8		
			07932		Screw, H.H.C[1]., 3/8-16 x 1/2 (13)	Stainless Steel UNS-S30400			12	
				11022	Screw, S.H.C[2]., 3/8-16 x 3/4 (19.1)	Stainless Steel UNS-S31600				12
11	02494A				Screw, R.H.[3]., 10-24 x 1/2 (12.7)	Stainless Steel UNS-S30200	6			
		02383A			Screw, H.H.C[1]., 5/16-18 x 1/2 (13)	Stainless Steel UNS-S30400		6		
			02454A		Screw, H.H.C[1]., 3/8-16 x 5/8 (16)	Stainless Steel UNS-S30400			12	
				11021	Screw, S.H.C[2]., 3/8-16 x 1/2 (12.7)	Stainless Steel UNS-S30400				12
12	*				Screw, R.H.[3]., 10-24 x 5/8 (16)	Stainless Steel UNS-S30200	4			
		*			Screw, H.H.C[1]., 5/16-18 x 1/2 (13)	Stainless Steel UNS-S30400		8		
			*	*	Screw, S.H.C[2]., 1/4-20 x 3/4 (19.1)	Stainless Steel UNS-S31600			8	6
13	*	*	*	*	O-Ring	EPDM	1	1	1	1
14	--	--	--	11570	Eye Bolt, 5/8-11-UNC	Carbon Steel				1
15				F01256	Nut, 5/8-11-UNC	Stainless Steel				1
-- Indicates replacement part not available										
* Indicates part available only in sub-assembly listed below										
SUB-ASSEMBLY										
2, 12, 13	14711-3	14711-4	14711-6	14711-8	Seat Replacement Kit*					
3, 5-7, 9-11	13488	13490	13492	13484	Clapper Assembly Kit					

***Note:** Includes o-ring lubricant to be added to ring groove in seat.

[1] Hex Head Cap Screw [2] Socket Head Cap Screw, (8" Valve - #10 & 11 must be S.H.C. for clearance with seat) [3] Round Head, Phillips Drive Screw

VIKING®

TECHNICAL DATA

DELUGE VALVE, MODEL F-1 STRAIGHT THROUGH STYLE

2-1/2" (DN65) - 8" (DN200)

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.

Maximum Allowable Pilot Heights for Select Equivalent Lengths of Hydraulic Release Piping.
For valves with 1/16" (1.6 mm) Restricted Orifice
Graphs are based on 1/2" (15 mm) pilot sprinklers installed on 1/2" (15 mm) Schedule 40 galvanized released piping.
If the maximum height of hydraulic release piping exceeds the limits shown on the graph, use pneumatic or electric release system

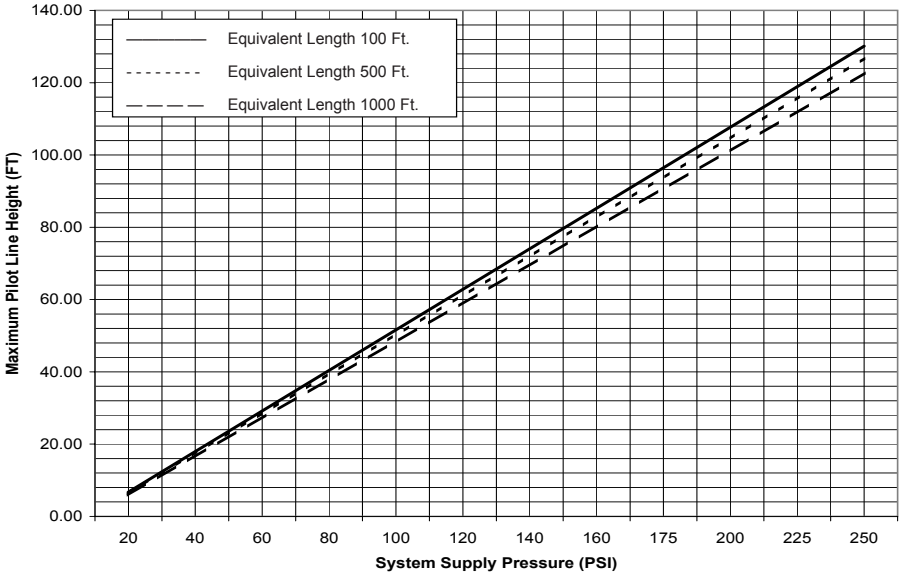

Figure 3 - 2-1/2" (DN65) & 3" (DN80) Model F-1 Deluge Valves

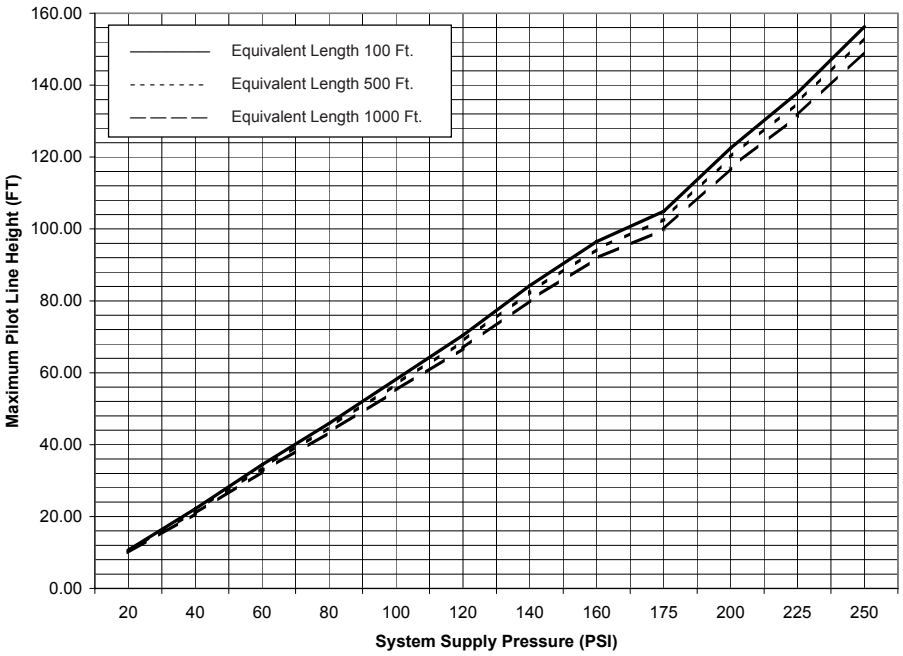

Figure 4 - 4" (DN100) Model F-1 Deluge Valves

VIKING®

TECHNICAL DATA

DELUGE VALVE, MODEL F-1 STRAIGHT THROUGH STYLE

2-1/2" (DN65) - 8" (DN200)

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Maximum Allowable Pilot Heights for Select Equivalent Lengths of Hydraulic Release Piping.

For valves with 1/16" (1.6 mm) Restricted Orifice

Graphs are based on 1/2" (15 mm) pilot sprinklers installed on 1/2" (15 mm) Schedule 40 galvanized released piping.

If the maximum height of hydraulic release piping exceeds the limits shown on the graph, use pneumatic or electric release system

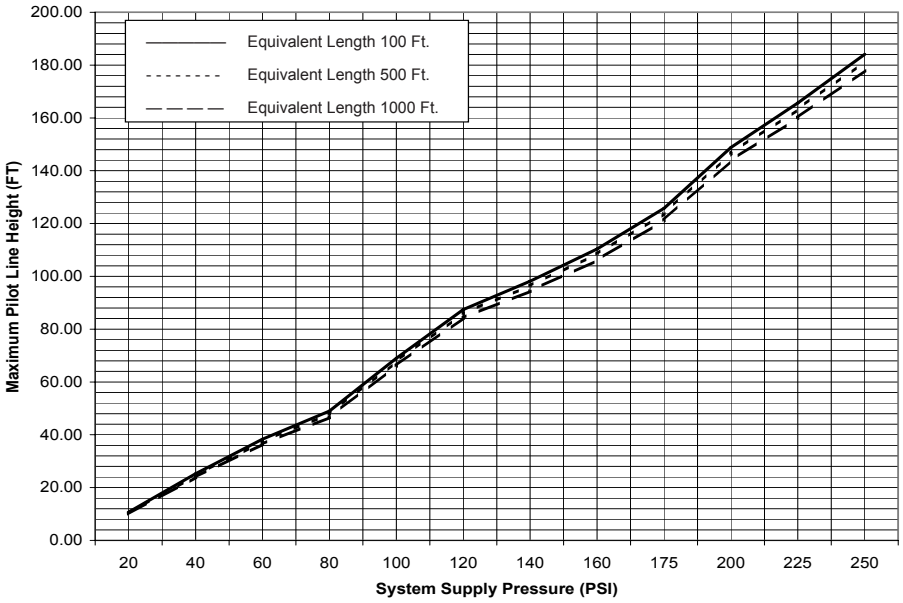

Figure 5 - 6" (DN150)
Model F-1 Deluge Valves

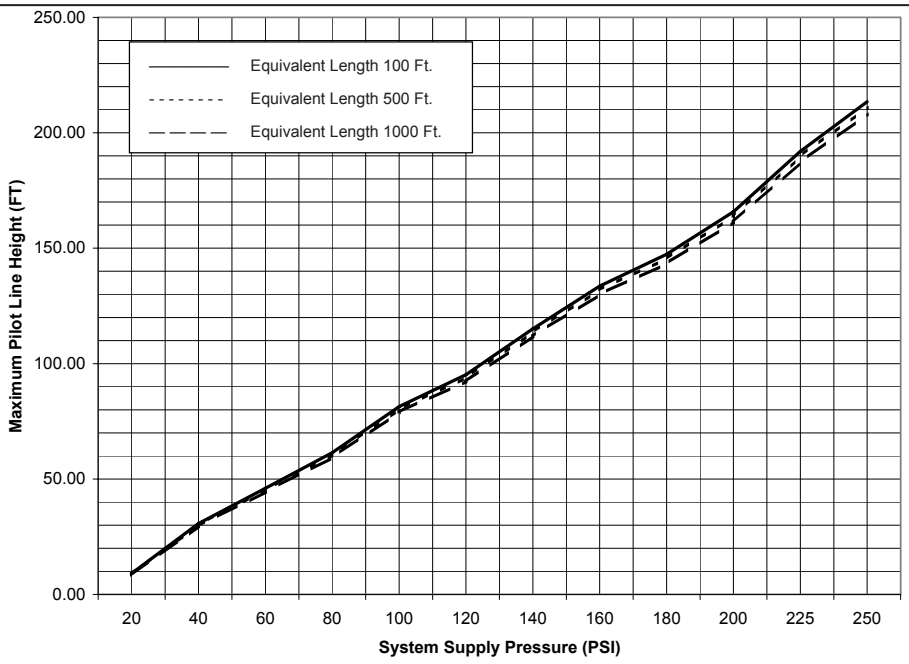

Figure 6 - 8" (DN200)
Model F-1 Deluge Valves

TECHNICAL DATA

CONCENTRATE CONTROL VALVE APPLICATIONS, PRIMING CONNECTIONS, AND TRIMS

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1. GENERAL DESCRIPTION

The Halar® Coated Concentrate Control Valve (CCV) is utilized in Viking foam systems as a positive shut-off valve for the foam concentrate supplied either from a bladder tank or a foam pump. The CCV valve opens automatically when there is a water flow in the sprinkler system. This allows concentrate to flow through the proportioning device to create foam solution.

A. Standard Foam Deluge, Foam Preaction, and Foam Flow Control Systems (See Figure 4)

The CCV valve is a straight through Halar® coated deluge. The priming connection can be part of the riser control valve trim, (conventional deluge or flow control trim). When the priming connection to the CCV is located on the primary riser valve trim, the priming supply connection to the CCV is located prior to the release trim. The actual supply inlet to the CCV should be connected to an open connection port on the cover of the deluge or flow control valve. The 1/2” pipe plugs installed in the cover of the deluge or flow control valve may be removed and piping from the valve cover can be connected to the priming chamber of the CCV or an outlet can be created prior to the release device (solenoid or pneumatic actuator) on the valve trim. When the deluge or flow control valve activates, the priming water in the deluge or flow control valve and the CCV are released simultaneously allowing both valves to open. Priming water pressure will be drained through the deluge or flow control valve trim. The valves will remain open until the system is reset. Refer to design data pages for re-setting instructions.

B. Wet Foam Systems (See Figure 3)

The CCV valve is a straight through Halar® coated deluge or flow control valve. Where the CCV is used in conjunction with a wet foam system a separate primary priming connection is required. The separate priming connection will consist of a ½” ball valve, ½” “Y” strainer, 1/8” restricted orifice, ½” spring loaded check valve, and Pressure Operated Relief Valve (PORV). The priming water supply to the CCV is taken upstream of the riser control valve. The priming supply feeds through the system to the priming chamber of the CCV. The sensing side of the PORV is connected to the alarm connection of the Alarm Valve. When water flow is present through the sprinkler riser, water flows from the alarm connection to the sensing side of the PORV, the PORV opens which drains the CCV priming chamber allowing it to open. Foam concentrate will discharge from the CCV to the proportioning device until water pressure is removed from the sensing side of the PORV. Note that the PORV ½” drain will operate when the system is activated. The PORV must be piped to an open drain.

2. LISTINGS AND APPROVALS

UL Listed - Deluge Valve EX2006
FM Approved - FM5130, 1020
LPCB
Refer to the individual technical data sheets for the components within the system.

3. TECHNICAL DATA

3.1 Specifications:

Refer to individual component techincal data pages for PORV, Pressure Switch, Solenoid Valve, and Deluge Valves.

3.2 Material Standards:

Refer to individual component technical data page.

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3.3 Ordering Information:

Table 3.3.1: Ordering Information

HALAR® COATED CONCENTRATE CONTROL VALVES											TRIM KIT PART NUMBERS	
Valve Style	Valve Model	Deluge Part No.	Valve Size Nominal	Inlet Type	Outlet Type	Pipe O.D. Actual	Flange Drilling	Friction Loss*	Cv Factor	Shipping Weight	Galvanized & Brass	Brass only
Straight Through	F-2	12127Q/B	1½" (DN40)	Grooved	Grooved	1 29/32" (48.3 mm)	--	7 ft. (2.1 m)	66	36 lbs. (16.3 kg)	12848-1	12848-2
	F-2	12058Q/B	2" (DN50)	Grooved	Grooved	2 3/8" (60.3 mm)	--	13 ft. (3.9 m)	93	36.5 (16.5 kg)	12848-1	12848-2
	F-2	12404Q/B	2½" (DN65)	Grooved	Grooved	2 7/8" (73 mm)	--	12 ft. (3.6 m)	155	66 lbs. (30 kg)	12929-1	12929-2
	F-2	12730Q/B	DN65	Grooved	Grooved	76 mm	--	12 ft. (3.6 m)	155	66 lbs. (30 kg)		
	F-2	12015Q/B	3" (DN80)	Flanged	Flanged	3½" (88.9 mm)	ANSI B16.42 Class 150	12 ft. (3.6 m)	228	82 lbs. (37 kg)		
	F-2	12019Q/B	3" (DN80)	Flanged	Grooved	3½" (88.9 mm)	ANSI B16.42 Class 150	12 ft. (3.6 m)	228	73 lbs. (33.1 kg)		
	F-2	12023Q/B	3" (DN80)	Grooved	Grooved	88.9 mm		12 ft. (3.6 m)	228	64 lbs. (29 kg)		

* Expressed in equivalent length of pipe based on Hazen & Williams Formula C=120.

4. INSTALLATION

Refer to specific technical data sheets, acceptable installation standards, codes and Authority Having Jurisdiction for additional installation, operation and maintenance instructions.

5. OPERATION

Refer to individual component technical data page.

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 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.

It is imperative that the system is inspected and tested on a regular basis. The frequency of the inspections may vary due to contaminated or corrosive water supplies and corrosive atmospheres. In addition, the alarm devices or other connected equipment may require more frequent inspections. Refer to the technical data, system description, applicable codes and Authority Having

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Jurisdiction for minimum requirements.

7. AVAILABILITY

The product is available directly from Viking and official distributors only.

Americas:
The Viking Corporation
5150 Beltway SE
Caledonia, MI 49316
Tel.: (800) 968–9501
Fax: 269–818–1680
Technical Services: 1–877–384–5464
techsvcs@vikingcorp.com

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Viking S.A.
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L–4562 Differdange / Niederkorn
Tel.: +352 58 37 37 – 1
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vikinglux@viking–emea.com

Asia Pacific (APAC) Main Office:
The Viking Corporation (Far East) Pte. Ltd.
69 Tuas View Square
Westlink Techpark, Singapore 637621
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Fax: (+65) 6 278 4609
vikingAPAC@vikingcorp.com

8. GUARANTEE

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

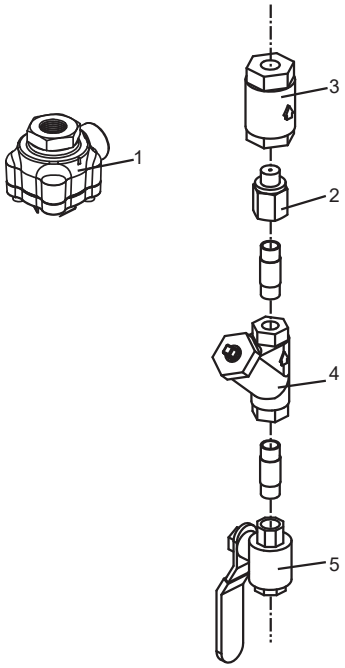

Figure 1 - Priming Connection Package Components
NOTE: All components shown here are included with the Priming Connection Package (PN 10985)

Table 2: Priming Line Connection Package (PN 10985) Components

REF.	DESCRIPTION
1	1/2" Pressure Operated Relief Valve (PORV)
2	1/8" Restricted Orifice
3	1/2" Swing Check Valve
4	1/2" Y-Strainer
5	1/2" Ball Valve

TECHNICAL DATA

CONCENTRATE CONTROL VALVE APPLICATIONS, PRIMING CONNECTIONS, AND TRIMS

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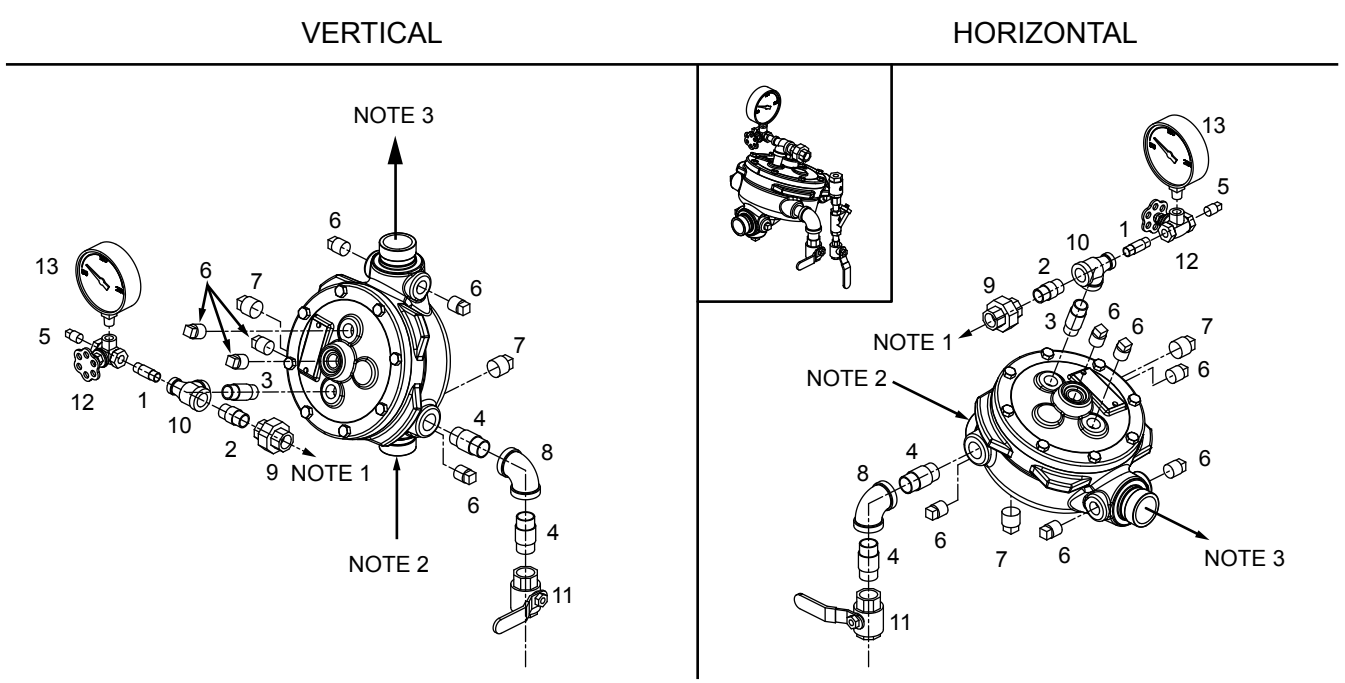

Figure 2 - Straight Through CCV Valve Trim

NOTE: 1-1/2" & 2" (DN40 & DN50) Shown; 2-1/2" & 3" (DN 65 &DN80) Also available

Table 1: CCV and Trim Components and Material Identification

REF.	SIZE (INCH)	DESCRIPTION	MATERIAL G = Galvanized, B = Brass, ST = Stainless steel	
			On Galvanized Trim	On Brass Trim
1	1/4 X 1-1/2	NIPPLE	G	B
2	1/2 X 1-1/2	NIPPLE	G	B
3	1/2 X 2	NIPPLE	G	B
4	3/4 X 2	NIPPLE	B	B
5	1/4	PLUG	G	B
6	1/2	1/2 PLUG	ST	B
7	3/4	3/4 PLUG	B	B
8	3/4	3/4 ELBOW	B	B
9	1/2	1/2 UNION	G	B
10	1/2 X 1/4 X 1/2	TEE	G	B
11	3/4	SHUTOFF VALVE	-	-
12	1/4	SIDE OUTLET VALVE	-	-
13	1/4-	WATER GAUGE	-	-

Note 1: Field pipe to hydraulic release of system control valve or PORV as determined by system type.

Note 2: Foam concentrate inlet from bladder tank.

Note 3: To foam proportioner device.

TECHNICAL DATA

CONCENTRATE CONTROL VALVE APPLICATIONS, PRIMING CONNECTIONS, AND TRIMS

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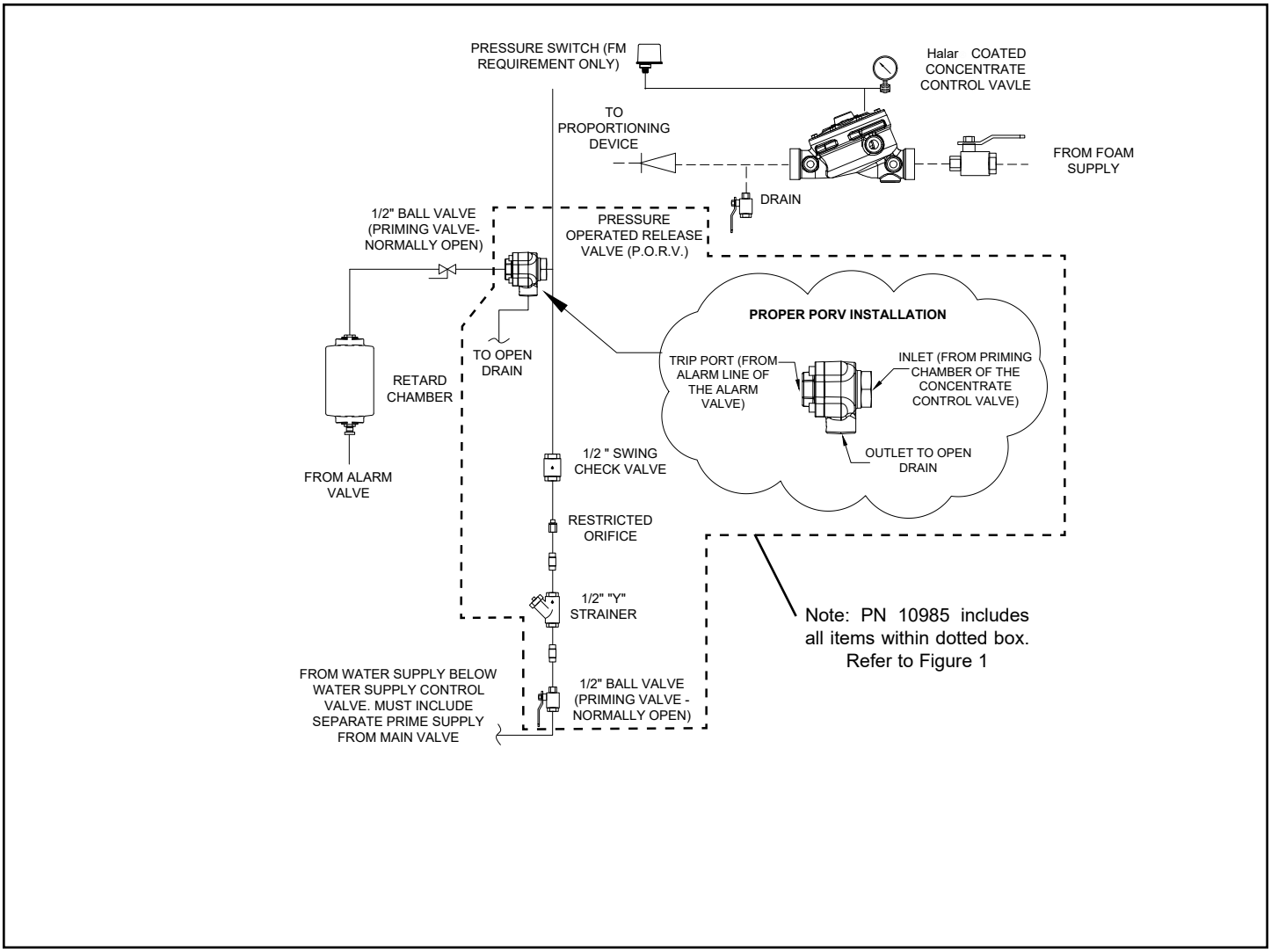

Figure 3 - Wet Pipe Foam Systems

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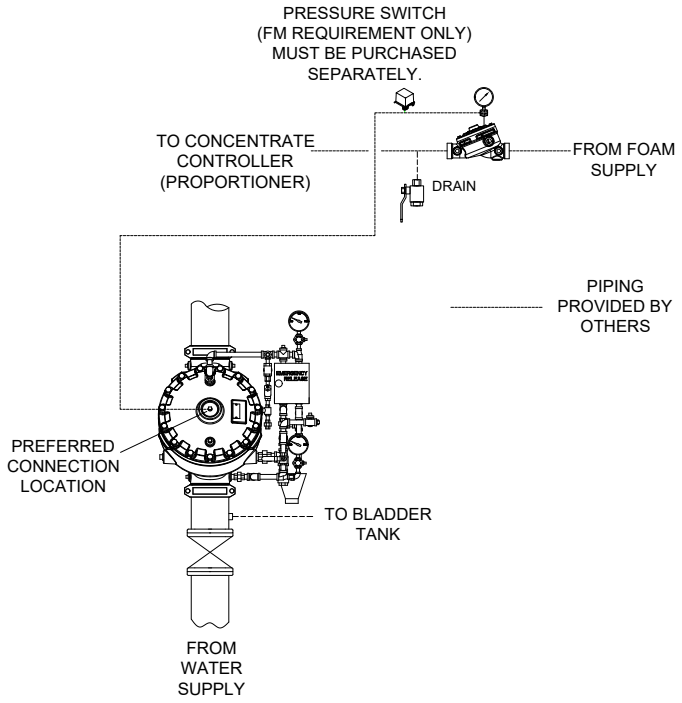

Figure 4 - Deluge and Preaction Systems

TECHNICAL DATA

SWING CHECK VALVE
MODEL D-1 & G-1

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

1. DESCRIPTION

The Viking Swing Check Valve is a general purpose rubber-faced check valve approved for use in fire protection systems. The Swing Check Valve is manufactured with a ductile iron body, brass seat, and a rubber-faced clapper assembly, hinged to a removable access cover for easy inspection and maintenance.

The valve may be installed vertically or horizontally with access cover facing up. For availability of flanged-flanged and grooved-grooved options, refer to Table 1. Tapped openings (with plugs) and gauge connections are provided on both the inlet and outlet chambers of the valve.

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

FEATURES

A. Ductile iron body for less weight and extra strength.
B. Rated to 300 psi (20.7 bar) water working pressure.
C. Rubber-faced clapper hinged to access cover for quick removal and easy servicing. All moving parts can be serviced without removing the valve from the installed position.
D. With the cover/clapper assembly removed, the clapper rubber replacement requires removal of only one screw.
E. Can be installed vertically or horizontally with access cover facing up.

2. LISTINGS AND APPROVALS

cULus Listed: Guide No. HMER
FM Approved: Single Check Valves
NYC Department of Buildings: MEA 89-92-E, Vol. XI

3. TECHNICAL DATA

Specifications:

Rated to 300 psi (20.7 bar) water working pressure.
Factory tested hydrostatically to 600 psi (41.4 bar).
Standard Flanged Connections: ANSI B16.42 Class 150 (mates with ANSI Class 125 and Class 150 flanges).
Standard Grooved Connections: ANSI/AWWA C606
Tapped Bosses: 2-1/2" (DN65), 3" (DN80) and 4" (DN100): Two 1/2" (15 mm) NPT
6" (DN150) and 8" (DN200): Two 3/4" (20 mm) NPT

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

Material Standards: Refer to Figure 1.

Ordering Information: Refer to Table 1 for part numbers and shipping weight.

Table 1

Size Valve Nominal	Inlet Type	Outlet Type	Friction Loss*	Shipping Weight	Part No.
2-1/2" (DN65)	Groove	Groove	6 ft.(1.8 m)	16 lbs. (7 kg)	05497C
3" (DN80)	Goove	Groove	10 ft. (3.1 m)	20 lbs. (9 kg)	08536
4" (DN100)	Flange	Flange	13 ft. (4.0 m)	47 lbs. (21 kg)	08538
4" (DN100)	Groove	Groove	13 ft. (4.0 m)	27 lbs. (12 kg)	08539
6" (DN150)	Flange	Flange	20 ft. (6.0 m)	75 lbs. (34 kg)	08542
6" (DN150)	Groove	Groove	20 ft. (6.0 m)	51 lbs. (23 kg)	08543
8" (DN200)	Flange	Flange	23 ft. (7.0 m)	135 lbs. (61 kg)	08546
8" (DN200)	Groove	Groove	23 ft. (7.0 m)	106 lbs. (48 kg)	08547

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

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

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

4. INSTALLATION

The Swing Check Valve must be installed in an area not subject to physical damage. When corrosive atmospheres and/or contaminated water supplies are present, it is the owner's responsibility to verify compatibility with the Swing Check Valve and associated equipment. Prior to installing the valve, thoroughly flush the water supply piping to verify that no foreign matter is present. The Swing Check Valve may be installed in the vertical position with direction of flow up, or in the horizontal position with the access cover up.

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

5. OPERATION (Refer to Figure 1)

Flow through the Viking Swing Check Valve lifts the rubber-gasketed clapper (8, and 9) off the seat (12) to enter the sprinkler piping. When flow through the valve stops, the clapper (8) closes quickly. The rubber gasket (9) forms a tight seal against the brass water seat (12), trapping pressure above the clapper and preventing reverse flow from sprinkler piping.

Hydrostatic Test:

The Swing Check Valve is manufactured and listed for use at a maximum water working pressure of 300 psi (20.7 bar). The valve is factory tested at 600 psi (41.4 bar). Check Valves may be hydrostatically tested (in accordance with NFPA 13) at 350 psi (24.1 bar) and/or 50 psi (3.4 bar) above the normal water working pressure for limited periods of time (two hours) for the purpose of acceptance by the Authority Having Jurisdiction. If air testing is required, do not exceed 40 psi (2.8 bar) air pressure.

6. INSPECTIONS, TESTS AND MAINTENANCE

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

The Viking Swing Check Valve must be kept free of foreign matter, freezing conditions (when used on wet systems), corrosive atmospheres, contaminated water supplies, and any condition that could impair its operation or damage the device.

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

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

6-A. Five-Year Internal Inspection

Internal inspection of Swing Check Valves is recommended every five years unless inspections and tests indicate more frequent inspections are required.

(Refer to Figure 1)

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

7. When Internal inspection of the Check Valve is complete, perform step 6 of paragraph 11. VALVE MAINTENANCE to reinstall the cover/clapper assembly (2-11).

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

6-B. Valve Maintenance

(Refer to Figure 1)

1. Perform steps 1 through 5 of paragraph 6.A - FIVE-YEAR INTERNAL INSPECTION.
2. To remove clapper rubber (9):
   a. Use the appropriate wrenches to loosen and remove the button-head socket screw (11), hex nut (6), sealing washer (7), and rubber retainer (10).
   b. Remove the clapper rubber (9) for inspection. If the clapper rubber shows signs of wear, such as cracking, cuts, or excessively deep grooves where the rubber contacts the water seat, replace the rubber.
3. To re-install clapper rubber (9):
   a. Place the clapper rubber (9) over the center hub of the rubber retainer (10).
   b. Position the retainer (10) (with rubber in place) against the clapper (8) as shown in Figure 1.
   c. Replace and tighten the button-head socket screw (11), sealing washer (7), and hex nut (6). The sealing washer (7) and hex nut (6) must be located on the top side of the clapper as shown in Figure 1. Do not over-tighten.
4. To remove clapper (8), and/or hinge pin (4):
   a. Remove the hinge pin retaining rings (5) to free the hinge pin (4) for removal. After the hinge pin (4) is removed, the clapper (8) can be removed.
5. To re-install clapper (8), and/or hinge pin (4):
   a. Verify that the clapper rubber (9) is in good condition and that it is properly installed.
   b. Position the clapper (8) with the elongated hinge holes aligned between the holes of the hinge bracket welded inside the cover (2). The system (top) side of the clapper (8) must face the direction indicated by the flow arrow stamped inside the cover (2).
   c. Insert the hinge pin (4) through the holes at one end of the hinge assembly. Continue to push the hinge pin (4) through the holes at the remaining end of the hinge assembly.
   d. Re-install the hinge pin retaining rings (5).
6. To re-install cover/clapper assembly (2-11):
   a. Verify that cover gasket (13) is in position and in good condition.
   b. Slide the cover/clapper assembly (2-11) into the Swing Check Valve so that the clapper rubber (9) contacts the water seat (12).
   c. Replace the cover screws (14). Use the appropriate wrench to cross-tighten all screws to the torque value shown in Table 2 for the valve used. DO NOT over-tighten.

7. AVAILABILITY

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

8. GUARANTEES

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

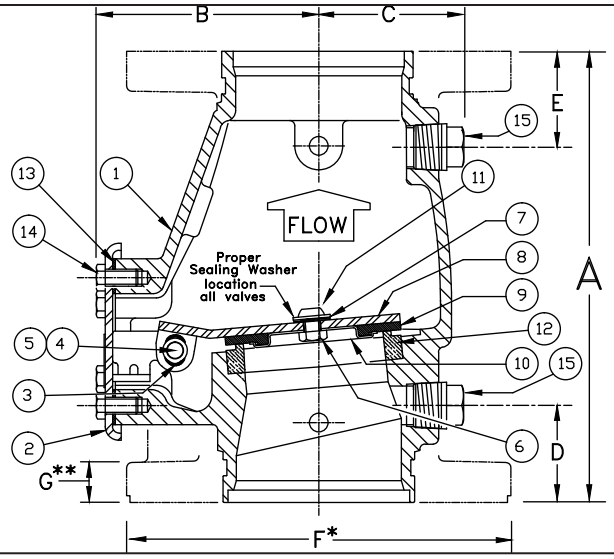
Table 2: Torque Values for Viking Swing Check Valve Cover Screws

Valve Size	Screw Size	Torque Values
2-1/2" (DN65)	3/8"-16 HHC	19 ft-lbs 2.63 kg-m
3" (DN80)	3/8"-16 HHC	19 ft-lbs 2.63 kg-m
4" (DN100)	3/8"-16 HHC	19 ft-lbs 2.63 kg-m
6" (DN150)	1/2"-13 HHC	45 ft-lbs 6.23 kg-m
8" (DN200)	5/8"-11 HHC	93 ft-lbs 12.9 kg-m

TECHNICAL DATA

SWING CHECK VALVE
MODEL D-1 & G-1

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



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

Dimensions shown in parentheses are millimeters.

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

Figure 1

ITEM NO.	PART NUMBER D-1 2-1/2" (DN65)	G-1 3" (DN80)	G-1 4" (DN100)	G-1 6" (DN150)	G-1 8" (DN200)	DESCRIPTION	MATERIAL	NO. REQ'D 2-1/2"	3"	4"	6"	8"
1	--	--	--	--	--	Body	Ductile Iron, ASTM A536 (65-45-12)	1	1	1	1	1
2	--	--	--	--	--	Cover Assembly, 300 PSI WWP	E-Coated HSLA Steel, A715 and Stainless Steel, UNS-S30400	1	1	1	1	1
3	07576	07576	07576	07576	None	Bushing	Lubricomp 189 Ryton	2	2	2	2	0
4	05355A	05355A	04900A	04991A	05334A	Clapper Hinge Pin	Stainless Steel, UNS-S30400	1	1	1	1	1
5	05445A	05445A	05445A	05445A	05369A	Hinge Pin Retaining Ring	Stainless Steel, UNS-S15700	2	2	2	2	2
6	01755A					Clapper Hex Jam Nut #10-24 UNC	Stainless Steel, UNS-S30400	1	0	0	0	0
		08159	08159			Clapper Hex Jam Nut 3/8"-24 UNF	Stainless Steel, UNS-S30400	0	1	1	0	0
				08144	08144	Clapper Hex Jam Nut ½"-20 UNC	Stainless Steel, UNS-S30400	0	0	0	1	1
7	06595A	08158	08158	08143	08143	Sealing Washer	EPDM and Stainless Steel	1	1	1	1	1
8	*	*	*	*	*	Clapper	Teflon® Coated HR Steel UNS-G10180	1	1	1	1	1
9	*	*	*	*	*	Clapper Rubber	EPDM, ASTM D2000	1	1	1	1	1
10	*	*	*	*	*	Clapper Rubber Retainer	Stainless Steel, UNS-S30400	1	1	1	1	1
11	06595A					H.H.C. Screw #10-24 UNC x 1/2" (12.7 mm) lg.	Stainless Steel, UNS-S30400	1	0	0	0	0
		10194	10194			Screw, Button Head, Socket, 3/8" - 24 UNF x 1/2"	Stainless Steel, UNS-S30400	0	1	1	0	0
				10308		Screw, Button Head, Socket, 1/2" - 20 UNF x 3/4" (19.1 mm) lg.	Stainless Steel, UNS-S30400	0	0	0	1	1
					10686	Screw, Button Head, Socket, 1/2" - 20 UNF x 7/8"	Stainless Steel, UNS-S30400	0	0	0	0	1
12	--	--	--	--	--	Seat	Brass, UNS-C84400	1	1	1	1	1
13	05354B	05354B	04649B	04992B	05339C	Cover Gasket	EPDM, ASTM D2000	1	1	1	1	1
14	01517A	01517A	01517A			H.H.C. Screw 3/8"-16 UNC x 3/4" (19,1 mm) lg.	Steel, Zinc Plated	4	4	6	0	0
				04993A		H.H.C. Screw ½"-13 UNC x 7/8" (22.2 mm) lg.	Steel, Zinc Plated	0	0	0	6	0
					01922A	H.H.C. Screw 5/8"-11 UNC x 1-1/4" (31.8 mm) lg.	Steel, Zinc Plated	0	0	0	0	6
15	--	--	--			1/2" (15 mm) NPT Pipe Plug	Steel	2	2	2	0	0
				--	--	3/4" (20 mm) NPT Pipe Plug	Steel	0	0	0	2	2

-- Indicates replacement part is not available

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

Sub-Assemblies

3, 6-11	05499B	08518	08519	08520	08521	Clapper Assembly
9, 10	--	14864	14865	14866	--	Replacement Clapper Rubber Kit*

*Clapper rubbers are different on 3", 4", & 6" G-1 valve than original manufacture. If clapper rubber requires replacement, order replacement rubber kit.

Bronze Ball Valves

Dezincification Resistant

Three-Piece Body • Full Port • 316SS Trim • Blowout-Proof Stem • Vented Ball

600 PSI/41.4 bar non-shock cold working pressure
150 PSI/10.3 bar saturated steam♦

CONFORMS TO MSS SP-110

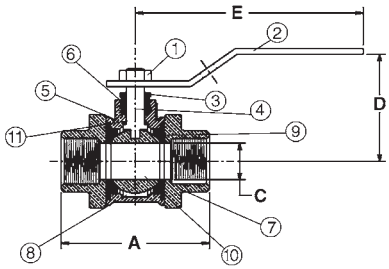
MATERIAL LIST

	PART	SPECIFICATION
1.	Handle Nut	Stainless Steel 300 Series
2.	Handle	Zinc Plated Steel Clear Chromate Plastisol Coated
3.	Threaded Pack Gland	Brass ASTM B 16 Alloy C36000
4.	Stem	Stainless Steel ASTM A 276 Type 316
5.	Body	Bronze ASTM B 584 Alloy C84400
6.	Packing	PTFE
7.	Body End (2)	Cast Bronze ASTM B 584 Alloy C84400
8.	O-Ring Seal (2)	Fluorocarbon Rubber
9.	Seat Ring (2)	PTFE
10.	Ball (Vented)	Stainless Steel ASTM A 276 Type 316 or ASTM A 351 Type CF8M
11.	Thrust Washer	Reinforced PTFE
12.	Body Bolts	Zinc Dichromate Plated Steel ASTM A 449 Grade 5
13.	Body Nuts	Zinc Dichromate Plated Steel ASTM A 449 Grade 5

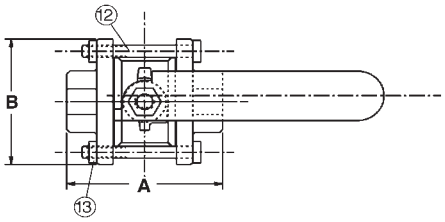
Note: valves are static grounded by a grounding washer. (not shown)

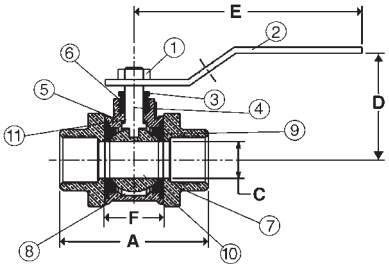
T-595-Y-66
Threaded

S-595-Y-66
Solder



T-595-Y-66
NPT x NPT





S-595-Y-66
C x C

DIMENSIONS—WEIGHTS—QUANTITIES

Size In.	Size mm.	T-595-Y-66 A In.	T-595-Y-66 A mm.	S-595-Y-66 A In.	S-595-Y-66 A mm.	Dimensions B In.	B mm.	C In.	C mm.	D In.	D mm.	E In.	E mm.	S-595-Y-66 F In.	F mm.	T-595-Y-66 Lbs.	T-595-Y-66 Kg.	S-595-Y-66 Lbs.	S-595-Y-66 Kg.	Master Ctn. Qty.
¼	8	2.50	64	1.69	43	1.81	46	.38	10	1.69	43	3.91	99	.875	29	1.03	.47	.89	.40	50
⅜	10	2.50	64	1.81	46	1.81	46	.38	10	1.69	43	3.91	99	.875	29	.98	.44	.89	.40	50
½	15	2.50	64	2.06	52	1.81	46	.50	13	1.69	43	3.91	99	.875	29	1.03	.47	.89	.40	50
¾	20	3.00	76	2.94	75	1.94	49	.75	19	2.00	51	4.66	118	1.190	37	1.70	.77	1.59	.72	30
1	25	3.69	94	3.66	93	2.50	64	1.00	25	2.25	57	4.66	118	1.563	47	2.82	1.28	2.55	1.15	20
1 ¼	32	4.09	104	3.91	99	2.69	68	1.25	32	2.75	70	6.69	170	1.750	50	3.96	1.80	3.61	1.64	10
1 ½	40	4.56	116	4.60	117	3.00	76	1.50	38	2.97	75	6.69	170	2.125	60	5.68	2.57	5.31	2.41	10
2	50	6.16	156	5.78	147	4.00	102	2.00	51	3.63	92	6.69	170	2.640	78	11.40	5.17	10.60	4.81	4
2 ½	65	6.84	174	6.94	176	5.00	127	2.50	64	4.09	104	8.00	203	3.463	102	21.07	9.56	19.30	8.75	2

LEAD FREE* OPTION AVAILABLE

OXYGEN SERVICE OPTION AVAILABLE

♦For detailed operating pressure, refer to pressure temperature chart on page 41.

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

*Weighted average lead content ≤ 0.25%

Visit our website for the most current information.

KENNEDY VALVE

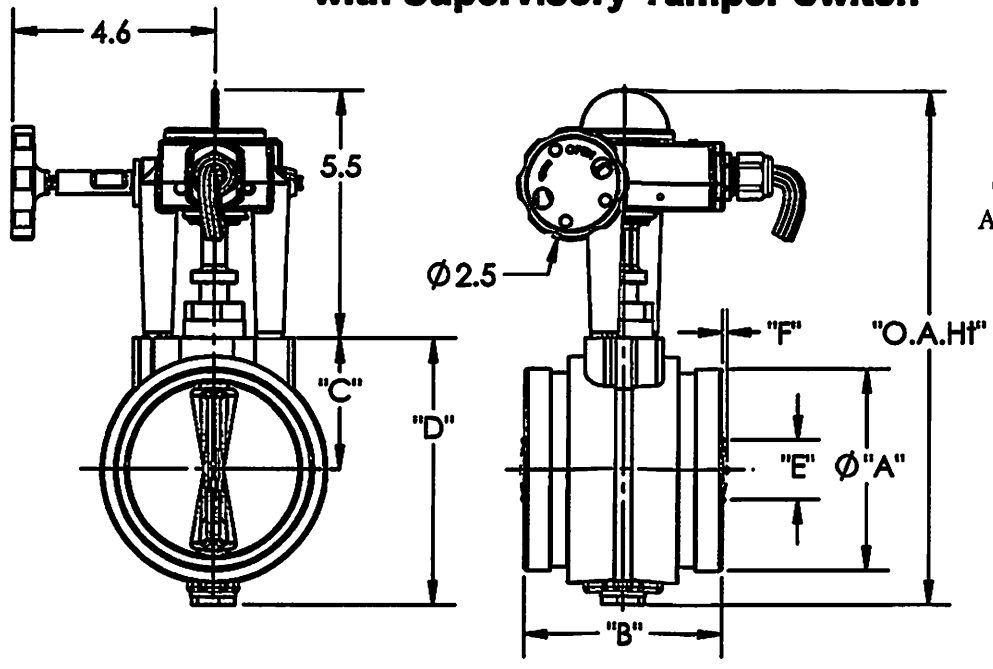
UL/FM BUTTERFLY VALVES

Designed for the Fire Protection Industry

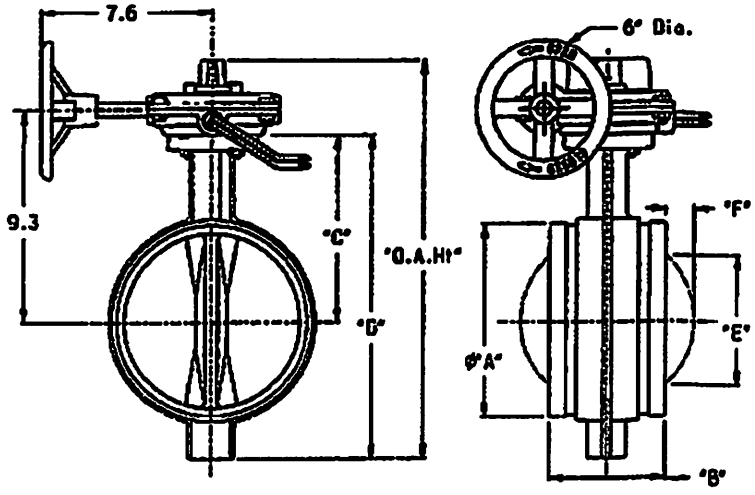
Sizes: 2-1/2",3",4",6",8"
300 PSI Rated
Double Seal Design for Bubble Tight Shut Off
Outdoor Rated
CA. State Fire Marshall Accepted
Lightweight
Fusion Bonded Coated Body
Low Torque Operation
Easy to Read Flag Type Indicator

KENNEDY VALVE
Division of McWane, Inc.
1021 East Water St., Elmira,NY 14901 (607) 734-2211

Grooved End Butterfly Valves 2 1/2" to 8"
Figure G300/G300C & 01G 300 psi
with Supervisory Tamper Switch



Sizes 2 1/2"- 6"
G300/G300C
Outdoor Rated UL/FM
Available Normally Open
and Normally Closed



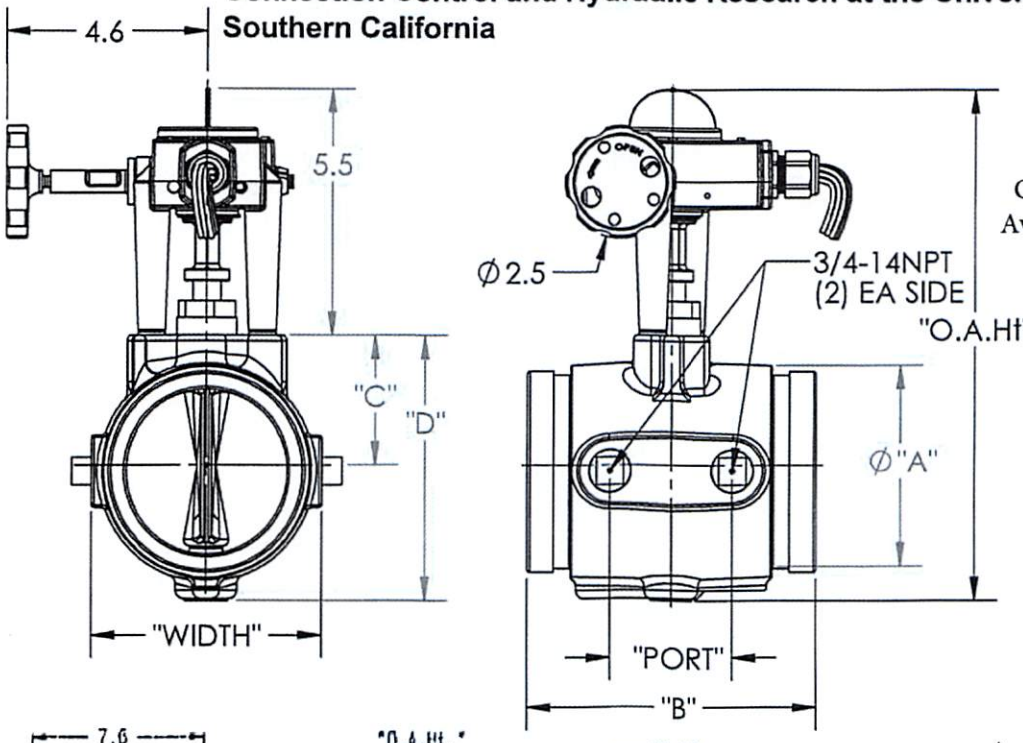
Size 8" Only
OIG
Outdoor Rated UL
Available Normally Open
and Normally Closed

1. UPPER AND LOWER SHAFTS 410SS/416SS					
2. BODY COATING: EPOXY					
3. DISC ENCAPSULATION MTL: EPDM					
	G300				01G
SIZE	2 1/2"	3"	4"	6"	8"
A	2.85	3.47	4.47	6.61	8.6
B	3.8	3.8	4.5	5.8	5.2
C	2.2	2.4	2.9	4.0	8.2
D	4.3	4.8	5.9	8.1	14.3
E	N/A	N/A	N/A	1.7	5.9
F	N/A	N/A	N/A	1	1.3
O.A. HT	10.0	10.4	11.6	13.8	17.6
WT.#	8.8	10.1	13.5	24.6	44

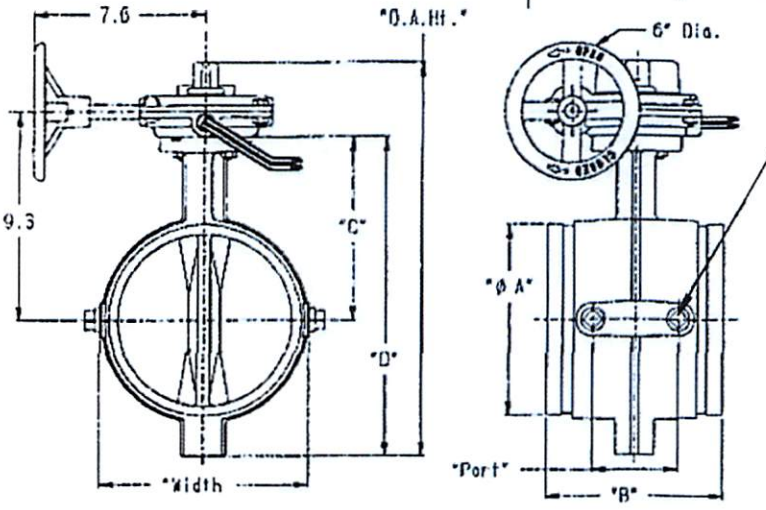
Note: "E will be MINIMUM allowed pipe I.D.
Exercise care handling and installing

KENNEDY VALVE
Division of McWane, Inc.
1021 East Water St., Elmira,NY 14901 (607) 734-2211
Grooved End Butterfly Valves 2 1/2" to 8"
Figure G300E/G300EC & 02G 300 psi
with Supervisory Tamper Switch

- **Extended Length Valves Equipped with Four 3/4" NPT Ports**
- **4"-8" Sizes Approved for Cross Connection**
- **NSF61 Certified**
- **Connection Control and Hydraulic Research at the University of Southern California**



Sizes 2 1/2 " - 6"
G300E / G300EC
Outdoor Rated UL/FM
Available Normally Open
and Normally Closed

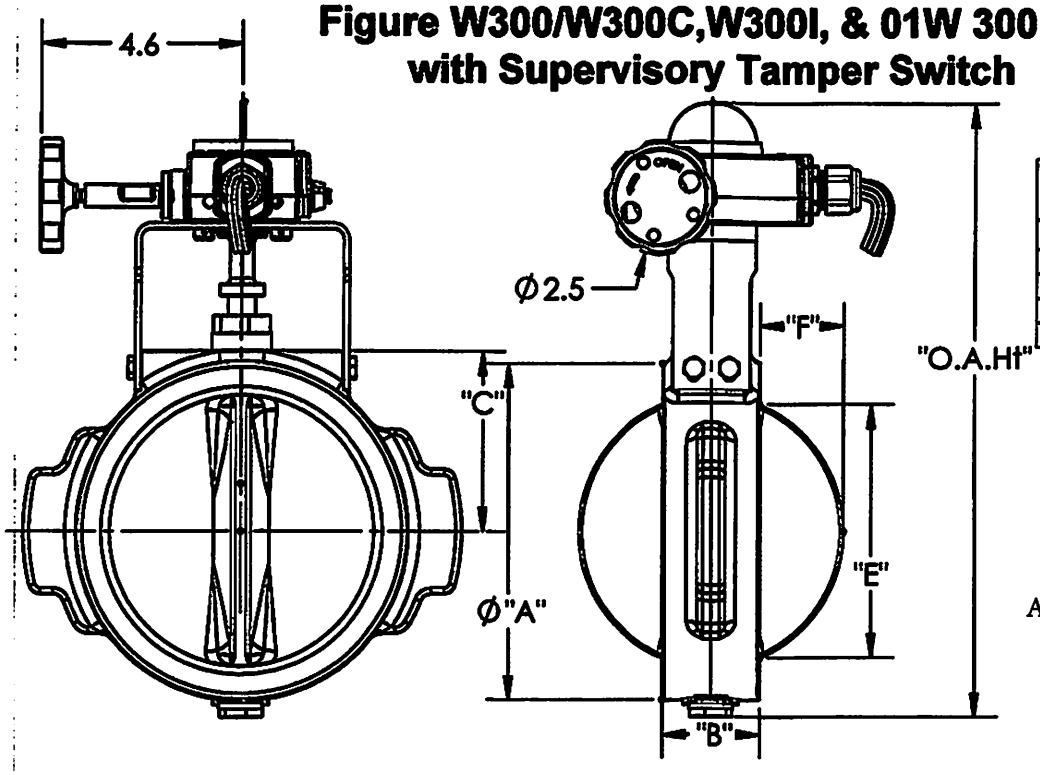


8" Only
02G
Outdoor Rated UL
Available Normally Open
and Normally Closed

1. UPPER AND LOWER SHAFTS 410SS/416SS					
2. BODY COATING: EPOXY					
3. DISC ENAPSULATION MTL: EPDM					
	G300E				02G
SIZE	2 1/2"	3"	4"	6"	8"
A	2.85	3.47	4.47	6.61	8.6
B	6.0	6.3	6.6	6.9	7.9
C	2.2	2.4	2.9	4.0	8.2
D	4.3	4.8	5.9	8.1	14.3
WIDTH	3.7	4.2	5.2	7.4	9.3
PORT	2.3	2.6	2.8	3.1	2.3
O.A. HT	10.0	10.4	11.6	13.8	17.6
Wt.#	12.5	14.5	18	28	55

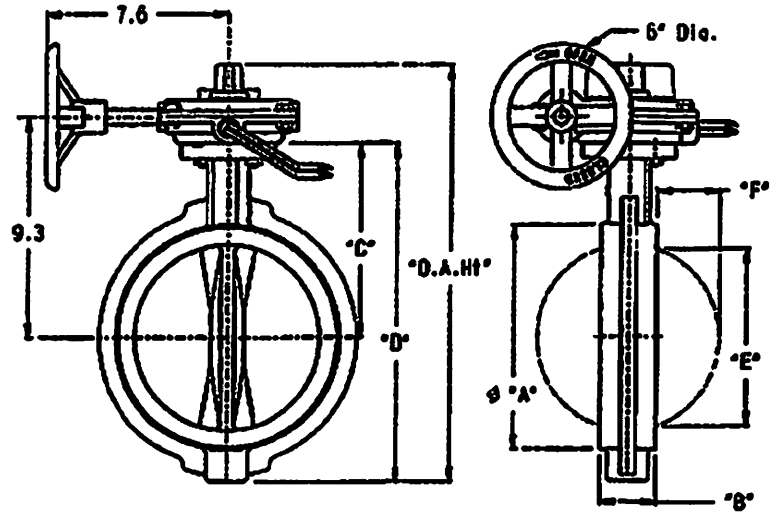
Note:Disc does not protrude past the "B" dimension of the body on any size in the open position. Exercise care handling and during installation

KENNEDY VALVE
Division of McWane, Inc.
1021 East Water St., Elmira,NY 14901 (607) 734-2211
Wafer Butterfly Valves 2 1/2" to 8"
Figure W300/W300C,W300I, & 01W 300 psi
with Supervisory Tamper Switch



Valve Selection for ISO PN16 Flange	
Flange Size	KV Model
65MM	2 1/2" W300
80MM	3" W300I
100MM	4" W300I
150MM	6" W300

Sizes 2 1/2"- 6"
W300/W300C/W3001
Outdoor Rated UL /FM
Available Normally Open and
Normally Closed



8" Size Only
02G
Outdoor Rated UL Available
Normally Open and
Normally Closed

WAFER BOLTING					
SIZE	2-1/2"	3"	4"	6"	8"
Number of Studs	4	4	8	8	8
Stud Size (inch)	5/8	5/8	5/8	3/4	3/4
Stud Length Min (inch)	5.5	5.5	6.5	7	7.5
Recommended Min Torque (Ft Lbs)	30	30	30	40	50

1. UPPER AND LOWER SHAFTS 410SS/416SS					
2. BODY COATING: EPOXY					
3. DISC ENAPSULATION MTL: FPDM					
	W300, W300I				01W
SIZE	2 1/2"	3"	4"	6"	8"
A	4.2	4.4	5.3	7.5	9.5
B	1.8	1.8	2.0	2.2	2.4
C	2.2	2.4	2.9	4.0	8.2
D	4.3	4.8	5.9	8.1	14.3
E	1.7	4.2	3.3	5.6	9.3
F	.4	.6	.9	1.9	2.7
O.A. HT	10.0	10.4	11.6	13.8	17.6
WT.#	10.5	11.1	13.8	20.5	44

Dimenions B,D, and E are referenced in Installation Instructions
"E" is MINIMUM allowed Pipe I.D.
Exercise care handling and during Installation

KENNEDY VALVE

Division of McWane, Inc.

1021 East Water St. Elmira, NY 14901

UL/FM BUTTERFLY VALVES

INSTALLATIONS INSTRUCTIONS FOR INDOOR & OUTDOOR USE

CAUTION

PRIOR TO INSTALLATON OF SUPERVISORY SWITCHS IN FIRE PROTECTION SYSTEMS, REFER TO THE FOLLOWING STANDARDS:

1) NFPA 13: STANDARDS FOR THE INSTALLATION OF SPRINKLER SYSTEMS
2) NFPA 25: INSPECTION, TESTING, MAINTENANCE OF WATER BASED FIRE PROTECTION SYSTEMS
3) NFPA 70: NATIONAL ELECTRICAL CODE
4) NFPA 72 NATIONAL FIRE ALARM CODE

WARNING

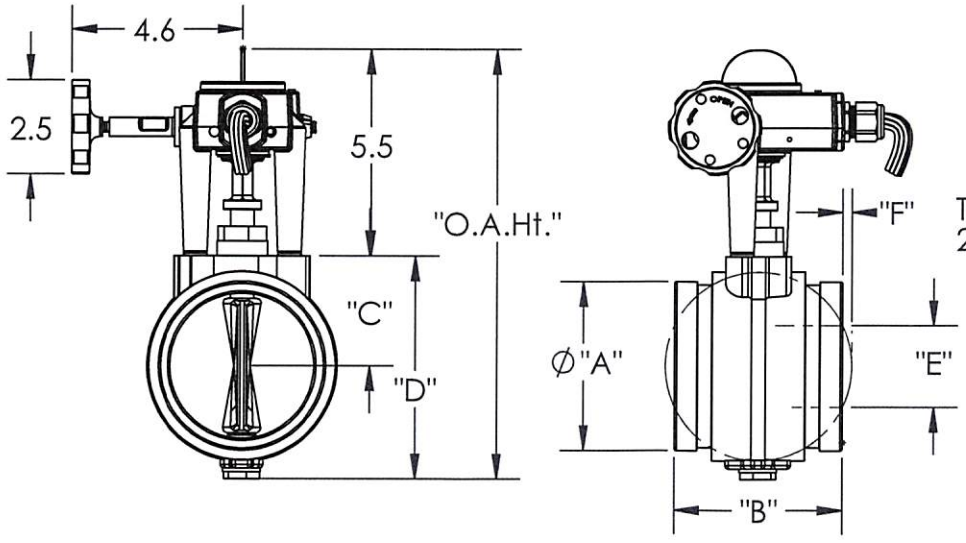
1) REMOVE CORD GRIP FROM GEARBOX BEFORE INSTALLING CONDUIT
2) METALLIC CONDUIT REQUIRED BY NEC FOR PROPER GROUNDING
3) CONDUIT JOINTED MUST BE SEALED WITH CONDUIT SEALANT
4) INSTALL SWITCH IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND/OR LOCAL ORDINANCES
5) ASSURE ALL DEVISES ARE PROPERY GROUNDED

G300, G300E, 01G, 01GC
G300C, G300EC, 02G, 02GC
W300,W300C, 01W, 01WC

INSTALATION INSTRUCTIONS FOR INDOOR & OUTDOOR USE

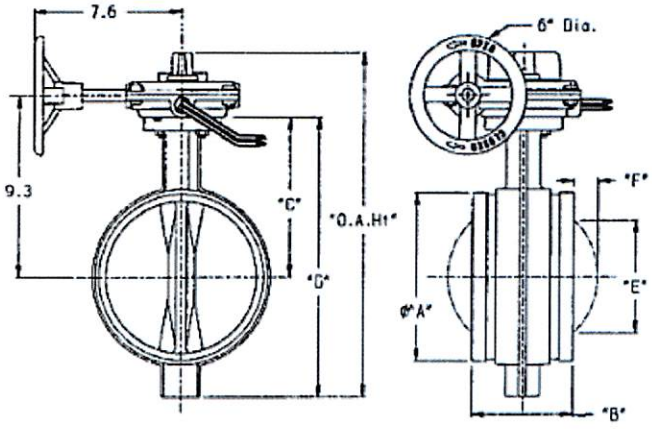
FM APPROVED

c UL us



G300
6" SHOWN

THIS STYLE AVAILABLE ON
2.5", 3", 4", 6" & 8" SIZES



01G
8" SHOWN

NOTE:
INTEGRAL GEARBOX
STYLE APPROVED 2015

FIRE PROTECTION PRODUCT IS NOT NSF CERTIFIED. FOR ACQUIRING NSF61 CERTIFICATION OR USC LISTINGS, CONTACT THE KENNEDY VALVE SALES DEPART.

1. UPPER AND LOWER SHAFTS 410SS/416SS
2. BODY COATING: EPOXY
3. DISC ENAPSULATION MTL: EPDM

	G300				01G	W300				01W
SIZE	2.5"	3"	4"	6"	8"	2.5"	3"	4"	6"	8"
A	2.85	3.47	4.47	6.61	8.6	4.2	4.4	5.3	7.5	9.5
B	3.8	3.8	4.5	5.8	5.2	1.8	1.8	2.0	2.2	2.4
C	2.2	2.4	2.9	4.0	8.2	2.2	2.4	2.9	4.0	8.2
D	4.3	4.8	5.9	8.1	14.3	4.3	4.8	5.9	8.1	14.3
E	N/A	N/A	N/A	1.7	5.9	1.7	4.2	3.3	5.6	9.3
F	N/A	N/A	N/A	.1	1.3	.4	.6	.9	1.9	2.7
O.A. HEIGHT	10.0	10.4	11.6	13.8	17.6	10.0	10.4	11.6	13.8	17.6
WT.(POUNDS)	8.8	10.1	13.5	24.6	44	10.5	11.1	13.8	20.5	44

GROOVED END CONNECTIONS: FOR USE WITH STEEL GROOVED END PIPE (IPS)
MATING PIPE AND COUPLINGS TO CONFORM TO IPS STEEL PIPE DIMENSIONS
FOR OUTSIDE GROOVE AND GASKET SEATING DIMENSIONS.
SEE DIAGRAM DIM "E" FOR MINIMUM INSIDE DIAMETER OF PIPE.

PIPE CONNECTION SPECIFICATIONS-ALL VALVES RATED 300 PSI

SUPERCEDES		KENNEDY VALVE DIVISION OF MCWANE. INC. TECHNICAL SERVICE MANUAL	ISSUED		DRAWING
DATE	PAGE		BY	DATE	32271-04
N/A	N/A		PJD	2/16/21	(PAGE 1/2)

BUTTERFLY VALVES

Models: G300/G300E/G300C/G300EC/W300/W300E/W300C/W300EC/W30001/01G/02G/01W

SUPPLEMENTARY INSTALLATION INSTRUCTIONS

Information shown here is intended to supplement, not to replace, instructions that are shipped with each valve. Dimensional information regarding minimum pipe I.D. and disc protrusion are shown on dimensional page for particular valve. Exercise care handling and during assembly.

Grooved Body

For use with IPS grooved end.
see valve dimensional information for min. pipe I.D. (dimension E)
Valves shall be installed by person(s) certified to install grooved end fittings in a fire protection system by authority having jurisdiction:

*Follow grooved coupling manufacturers latest published directions.

Wafer Body

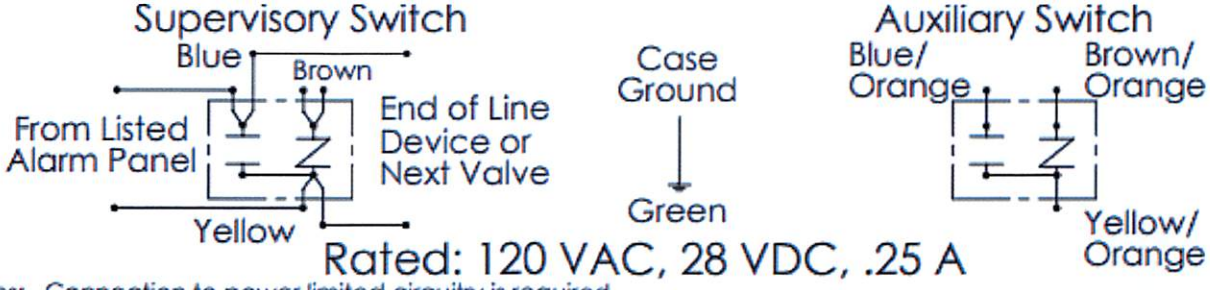
For installation between two ANSI B16.1, 125lb. flanges see valve dimensional information for min. pipe I.D. (dimension E)

1. Two flanged mating pieces should be placed at a distance apart that is slightly more than the thickness of the body (dimension B on wafer table)
2. A minimum of 2 studs shall be placed through adjacent flange holes so that the lower trunnion of the valve can fit between them. Normally this is the bottom 2 holes if the valves will be vertical with open/ closed indicator on top
3. Place the valve between the flanges taking care to not disturb the body gaskets.
4. Place remaining studs around the valve and tighten using an alternating pattern until desired torque is reached.
5. O-ring gaskets are shipped with valve to help facilitate installation against ANSI class flanges. When mating to grooved flange adapters the o-ring gaskets can be discarded.

Switch Wiring

1. Valve has internal switches that operate from the OPEN position. Normally Closed valves are an option(W300C/G300C/G300EC), and operate from CLOSED position
2. One switch has dual leads that is for connection to the SUPERVISORY circuit of an alarm panel. The other switch has single leads and is intended to be connected to AUXILIARY equipment
3. Tuck unused leads into junction box (not provided)
4. Always comply with national codes, local codes and NFPA 13/71 and 72

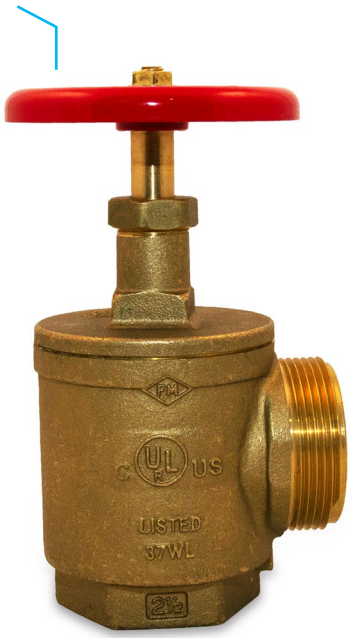
G300,G300E,W300E WIRING 2 1/2"- 8" VALVE NORMALLY OPEN (G300,G300E,W300,01G,02G,01W) OR VALVE NORMALLY CLOSED (G300C,W300C,G300EC,01GC,02GC,01WC



Wiring Notes: Connection to power limited circuitry is required.
Auxiliary switch connections are not intended for electrical supervision.
Switches are checked at factory, check continuity with valve fully open (or closed for normally closed valves),switches activates within 2 turns of handwheel from open.

Kennedy Valve
A Division of McWane Inc
www.kennedyvalve.com
2020
1021 E Water St. Elmira, NY 14901
P.O. Box 981
Phone (607) 734-2211 Fax: 1-800-952-4771

Angle Hose Valves
Fig. 07-000



Description

Angle hose valves feature all brass* construction with forged or cast bodies for rigidity and light weight. Typical uses are in rack assemblies or any other application which requires a listed fire hose valve. Available in rough brass or polished chrome finish with a red hand wheel. UL, ULc Listed, FM Approved. Rated 300psi.

Installation

Install in accordance with customary installation practices. Use an approved thread sealant such as PipeFit® Thread Sealing Paste with PTFE on the male threads to which the valve is being installed.

DO NOT OVER TIGHTEN. Over tightening of the valve during installation to the male pipe threads may crack or deform the valve body. Only use tools suitable for the installation of this product. Do not use pipe wrench extenders to increase leverage on pipe wrenches. This may result in valve damage as well as personal injury.

Specifications

Nomenclature and Material:

Material:
Cast or Forged Brass* Body

Finish:
Rough Brass
Polished Chrome*

Threads:

2 ½"	FNPT	x FNPT
		x MNST
		x MBCT
		x MQST
		x MONT
		x MPHX
		x MTEM
		x MCLV
		x MNYFD
		x MDET
		x MCF
		x MRCH
2 ½"	GRV	x FNPT
		x MNST
		x MQST
		x MNYFD
2 ½"	FNPT	x 3 MNST
1 ½"	FNPT	x FNPT
		x MNST

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

c UL us 37WL

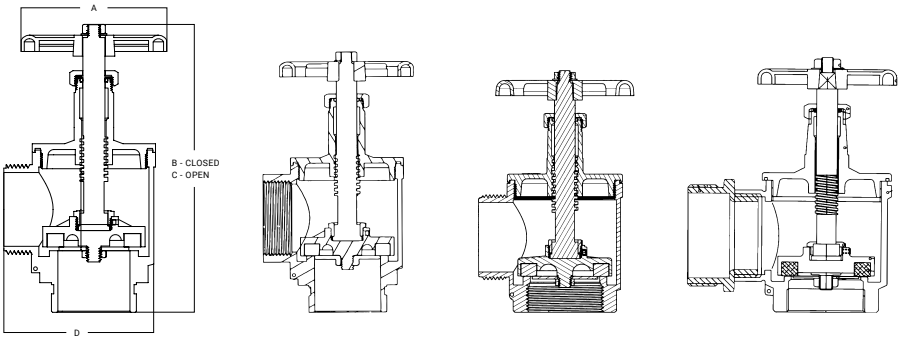
FM APPROVED

FPPI
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:	

ASC Engineered Solutions

Angle Hose Valves
Fig. 07-000



Item Number	Configuration	A (IN)	A (MM)	B (IN)	B (MM)	C (IN)	C (MM)	D (IN)	C (MM)
07-000-00	2 1/2" FNPT X MNST	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-000-10	2 1/2" FNPT X MNST (PC)	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-001-00	2 1/2" GRV X MNST	5"	127	9.42"	239.3	11.2"	284.3	5.12"	130
07-001-02	2 1/2" GRV X MQST	5"	127	9.42"	239.3	11.2"	284.3	5.12"	130
07-001-03	2 1/2" GRV X MNYFD	5"	127	9.42"	239.3	11.2"	284.3	5.12"	130
07-002-00	2 1/2" FNPT X MBCT/ NYCORP	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-003-00	2 1/2" FNPT X MNYFD	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-004-00	2 1/2" FNPT X MQST	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-005-00	2 1/2" FNPT X MRCH	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-006-00	2 1/2" FNPT X MONT	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-008-00	2 1/2" FNPT X MPHX	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-010-00	2 1/2" FNPT X MTEM	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-012-00	2 1/2" FNPT X MCLV	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-014-00	2 1/2" FNPT X MDET	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-016-00	2 1/2" FNPT X MCF	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-020-00	2 1/2" FNPT X FNPT	5"	127	8.64"	219.5	10.41"	264.5	5.2"	132
07-021-00	2 1/2" GRV X FNPT	5"	127	9.42"	239.3	11.2"	284.3	5.12"	130
07-022-00	1 1/2" FNPT X MNST	3.89"	98.8	6.71"	170.4	7.81	198.5	3.84"	97.5
07-024-00	1 1/2" FNPT X FNPT	3.89"	98.8	6.71"	170.4	7.81	198.5	3.84"	97.5
07-050-00	2 1/2" FNPT X 3 MNST	5"	127	8.64"	219.5	10.41"	264.5	7.74"	196.5

FPPI
An ASC Engineered Solution

Hose Valve Caps – Plastic (ABS) with Chain
Fig. 07–280

Specifications

Materials:
Cap: Injection Molded ABS
Chain: Zinc plated steels

Sizes:
2 1/2" NST
1 1/2" NST

Color
Red

Inscription:
Do Not Pressurize

Description

Plastic hose valve caps are intended to be used in place of brass or bronze caps. Because of the plastic materials low scrap value, theft and vandalism are significantly reduced. Both size caps feature rocker lug design and are provided with an attaching chain.

Installation

INTENDED ONLY FOR USE WITH NST THREADS. Make sure valve threads are free from debris. Thread correct size cap onto the valve until tight. Attach chain to the valve body at the point provided by the valve manufacturer. CAUTION: PLASTIC HOSE VALVE CAPS ARE FOR PROTECTION OF THE MALE THREAD ONLY. DO NOT PRESSURIZE PLASTIC HOSE VALVE CAPS. SERIOUS BODILY INJURY CAN OCCUR.

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