TECHNICAL DATA

WET PIPE LOW FLOW FOAM/WATER SYSTEM

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 Viking Low Flow Foam/Water proportioning system, is a UL Listed and FM Approved system, for use with Viking supplied foam concentrates. This system consists of a standard wet pipe sprinkler system, using a Viking alarm check valve, complete with variable pressure trim and retard chamber (C), a factory assembled and tested Viking pilot operated pressure control valve (F), an in-line balanced pressure foam concentrate proportioning assembly (ILBP) (B), bladder tank with trim (A), a hydraulic actuated Viking Halar® coated concentrate control deluge valve (D) and foam agent UL Listed and FM Approved for use with the Viking system.

This system was developed to provide an accurate foam/water solution at much lower flow ranges than what a conventional concentrate controller is capable of. The low flow foam system will also provide positive foam injection throughout the full range of system flows. It will provide a rich foam solution at low flows below the listed and approved minimum flow rates, which makes it ideal for use on closed head wet pipe sprinkler systems. Therefore, it is now possible to obtain the desired concentrate percentage at lower flows, which results in the operation of fewer sprinklers on the wet pipe systems, to achieve the desired foam/water solution percentage.

The Viking low flow foam system combines the advantages of a conventional foam pump/ILBP system, but without the additional maintenance or cost of a foam pump. Although the system cannot be re-filled while it is in operation, it requires less service than a foam pump, while maintaining the dependability of a bladder tank system. The Viking Wet Pipe Low Flow Foam System also allows for the use of multiple foam discharge points with variable pressure, and the capability of sizing the proportioner specifically for the area of application, while only using a single source of foam concentrate supply. Water supply pressure to the bladder tank must be provided from an upstream source, prior to the pilot regulating control valve, preferably near main fire water supply source, pump, or centrally located bladder tank. The inlet foam concentrate pressure to balancing valve (42) must be 15-20 PSI (1.03-1.37 BAR) higher for Viking ILBP Assembly than the water inlet pressure to the concentrate controller (B) at each proportioner location. The balancing valve (42) senses inlet water pressure and balances the foam concentrate pressure to match water pressure at inlet of foam concentrate to metering orifice of concentrate controller. At initial flow conditions of the sprinkler system (low flow), the foam/water mixture is rich in foam concentrate, approximately 6% for 3% mixtures, until the flow rate reaches the indicated minimum flow rate of the concentrate controller. In order to obtain the pressure differential between foam concentrate and water pressure, the pilot operated pressure control valve (F) must be adjusted to reduce the pressure to the concentrate controller (B) to meet the required pressure differential, between gauges (38 & 30).

For best results the pilot pressure control valve should be set using the downstream dual pressure gauge (30) of the pressure control valve (B) and the water supply pressure gauge (38) pilot operated pressure control valve (F). For existing sprinkler systems that are restricted in flow and pressure capacity this system should not be used. The minimum recommended water supply pressure to concentrate controller (B) is 40 PSI (2.75 BAR) in flowing condition, which requires 55-60 PSI (3.79-4.13 BAR) for Spool ILBP foam concentrate pressure, at point of usage.

NOTE : This system requires a minimum Δ P, also a maximum Δ P of 50 PSIG (3.44 BAR) between foam concentrate pressure vs. water pressure is recommended. If this Δ P is exceeded, the foam/water solution will proportion rich (higher than 3.9%) at low flows listed..

2. LISTINGS AND APPROVALS

- As a Complete Viking System
  - UL Listed - Guide GHXV
  - FM Approved - Low Expansion Foam Systems
- Alarm Check Valve and Trim
  - UL Listed - Guide VPLX
  - FM Approved - Waterflow Alarm Valves
- Model VLF In-line Balalanced Pressure Proportioner (ILBP)
  - UL Listed - Guide GFGV
  - FM Approved - Low Expansion Foam Systems
- Model E2, F2, H2 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 ASME Sect. VIII Certified
  - UL Listed - Guide GHXV
  - FM Approved - Low Expansion Foam Systems
- Model A-1 or B-2 Pilot Operated Pressure Control Valve
  - UL Listed Category VLMT
  - FM Approved (with this system) Category Low Expansion Foam Systems Foam Concentrate
- Viking AFFF 1%S C6, AFFF 3%S C6 or ARC 3X3S C6 Foam Concentrates with C6 Formulation
  - UL Listed - Guide GFGV
  - FM Approved - Low Expansion Foam Systems

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NOTE : The Listings and Approvals for the Viking Low Flow Foam System are based on a complete system as indicated and described in this technical data page. Any alterations to the system configuration will void the listings and approvals as well as any Viking warranty.

3. TECHNICAL DATA

Specifications:
Refer to individual component technical data page.

Material Standards:
Refer to individual component technical data page.

Ordering Information:
Please contact your local Viking office or distributor.

4. INSTALLATION

A1. FM Approved Discharge Devices
Standard Spray Sprinklers (refer to water/foam sprinkler data page)

A2. Other Discharge Devices
Hose reels and hand lines

B. General Instructions and Warnings
1. Refer to the General Notes and Warnings on page 2a-d in the “Foam Design” section of the *Viking Website*.
2. Refer to specific technical data sheets, FM Global Property Loss Prevention Data Sheet 4-12, acceptable installation standards, applicable codes, and Authority Having Jurisdiction for additional installation, operation, and maintenance instructions.
3. The alarm check valve (C) must be installed using the variable pressure trim to minimize false operation of the Halar® coated concentrate control deluge valve (D).
4. Inspections - It is imperative that the system be inspected and tested on a regular basis. See Section 6 - 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.

5. The valve, trim, and assembly must be installed in an area not subject to freezing temperatures or physical damage.

C. Design & Installation

⚠ WARNING
Locate all portions of the foam/water system subject to freezing in a heated area.

The following guidance is given with reference to the general system schematics (Figures) detailed later in this system manual.
1. Refer to the Special Notes section on page 5 and the Warnings and General Notes on pages 2a-d in the Foam Design Section of our website.
2. Install the pilot operated pressure regulating control valve assembly and alarm check valve and trim (E&C) in accordance with the relevant Viking technical data page.
3. Install the ILBP device (B) in the system riser in accordance with the ILBP technical data page and Special Notes Section of this System Manual
4. Install foam solution test valve (25) and system isolation valve (26). These valves are used to conduct foam/water solution tests and are required.
5. Install hydraulically actuated Halar® coated Viking Deluge CCV (D) and associated trim as indicated in Figure 1,2 or 3 or refer to technical data page 61a-g. 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 bladder tank operation manual and the following key notes;
   a Recommended connections are shown in Figure 1,2 or 3.
   b Locate the tank as close as practical to the system riser. (See Special Note B on Page 5)
   c Allow enough room around the tank to perform maintenance on the bladder.

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d Allow access to the tank for filling from containers of foam concentrate
e All valves and devices should be located for easy access for operation and maintenance.
f "Install the water supply piping (16) from the riser to the bladder tank as shown in Figure 1
The bladder tank water supply piping (16) must be connected below the Model A-1 or B-2 Pilot Operated Pressure Control Valve Assembly (E)."
g Install the piping from the tank (A) to the concentrate controller (B) as straight as possible to limit pressure loss.
i Fill bladder tank (A) with foam concentrate in accordance with the bladder tank operation manual and leave isolated from the system.

D. Placing the system in service or removing the system from service

1. Placing the system into service:

a Refer to the Special Notes section on page 5 and the Warnings and General Notes on pages 2a-d in the Foam Design Section of our website.
b Verify the following valves are in the closed position: water supply control valve (8), PORV activation line ball valve (14), bladder tank water supply control valve (15), 1/2" CCV priming line ball valve (21), concentrate control shut-off valve (22), foam solution test valve (25), foam concentrate auxiliary drain valve (29) and alarm test shut-off valve on the alarm check valve (C).
c "Place the wet alarm check valve in service in accordance with the relevant Viking technical data page.
After pressurizing the complete system, bleed all air from priming chamber of pilot operated pressure control valve (E).
The discharge pressure may require adjustment to meet the 15PSI minimum differential requirement. See data pages included with the pilot pressure regulating valve for pressure adjustments and how to place into service."
d When the system piping is pressurized and has stabilized, prime the Halar® Coated Deluge CCV (D) by opening and securing the 1/2" CCV priming line ball valve (21) in the open position. When the pressure on the priming chamber water pressure gauge (27) equals the supply water pressure, the deluge valve will close.
e "The pilot operated pressure control valve (E) and wet alarm system (C) should now be in service. To place the bladder tank (A) in service refer to the bladder tank operation manual for the complete start-up procedure.

NOTICE
In accordance with the bladder tank operation manual, ensure that CCV (D) is closed, bladder tank is vented of air and shut-off valves (22) and (15) are opened slowly..

Place alarm test shut-off valve on alarm check valve (C) trim, in the alarm position.
When system pressure has stabilized, open PORV actuation ball valve (14)."
f Verify normal valve positions and secure in correct position (as detailed in Figure 1,2 or 3).
g Check for and repair any leaks in the foam/water system pipe network..

2. For system and riser piping service and maintenance:

a Refer to the Special Notes section on page 6 and the Warnings and General Notes on pages 2a-d in the Foam Design Section of our website.
b Close the water supply control valve (8).
c Close the bladder tank water supply control valve (15), concentrate control shut-off valve (22) and PORV activation line ball valve (14).
d Leave the system isolation valve (26) open.
e Refer to instructions for removing the pilot operated pressure control valve (E) and alarm check valve (C) from service in the relevant Viking technical data page.
f Open the main drain on alarm check valve (C) and sprinkler system auxiliary drain valves and remote inspector's test valve to vent system as required.
g Perform required service and maintenance on system devices or piping network.
h Refer to instructions for returning the pilot operated pressure control valve (E) and alarm check valve (C) to service in the relevant Viking technical data page.
i Verify Halar® Coated Deluge CCV (D) is closed by checking water pressure gauge (27) to insure that it is the same as or higher than the system pressure.
j "Open tank water supply valve (15) and concentrate control shut-off valve (22).
Place alarm test shut-off valve on alarm check valve (C) trim, in the alarm position.
When system pressure has stabilized, open PORV actuation ball valve (14)."
k Verify normal valve positions and secure in correct position (as detailed in Figure 1)..

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3. For total system service and maintenance:

a Refer to the Special Notes section on page 5 and the Warnings and General Notes on pages 2a-d in the Foam Design Section of our website.

b Close the water supply control valve (8).

c Close the bladder tank water supply control valve (15), concentrate control shut-off valve (22) PORV actuation line ball valve (14) and 1/2" CCV priming line ball valve (21).

d Leave the system isolation valve (26) open.

e Refer to instructions for removing the pilot operated pressure control valve (E) and alarm check valve (C) from service in the relevant Viking technical data page.

f Open the main drain on alarm check valve (C) and sprinkler system auxiliary drain valves and remote inspector's test valve to vent system as required.

g Relieve pressure on CCV priming line (28) through the 3-way gauge valve (27).

h Perform required service and maintenance on system devices or piping network.

i Refer to instructions for removing the bladder tank (A) from service in the bladder tank operation manual.

j Perform required service and maintenance on bladder tank (A) in accordance with the bladder tank operation manual.

k To return the system into service, follow steps 2b through 2g in Section D above..

4. For bladder tank service and maintenance - while leaving deluge system in service:

a Refer to the Special Notes section on page 5 and the Warnings and General Notes on pages 2a-d in the Foam Design Section of our website.

b Close the bladder tank water supply control valve (15), concentrate control shut-off valve (22) and PORV actuation line ball 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 for the complete start-up procedure.

NOTICE
In accordance with the bladder tank operation manual, ensure that CCV (D) is closed, bladder tank is vented of air and shut-off valves (22) and (15) are opened slowly**..**

Place alarm test shut-off valve on alarm check valve (C) trim, in the alarm position.

When system pressure has stabilized, open PORV actuation ball valve (14)."

f 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 5 and the Warnings and General Notes on pages 2a-d in the Foam Design Section of our website.

b Close the water supply control valve (8).

c Close the bladder tank water supply control valve (15), concentrate control shut-off valve (22) and PORV activation line ball valve (14).

d Close the system isolation valve (26).

e Refer to instructions for removing the pilot operated pressure control valve (E) and alarm check valve (C) from service in the relevant Viking tech nical data page.

f Open the main drain on alarm check valve (C).

g Perform required service and maintenance on alarm check valve.

h Refer to instructions for returning the pilot operated pressure control valve (E) and alarm check valve (C) to service in the relevant Viking technical data page.

i Verify Halar® Coated Deluge CCV (D) is closed by checking water pressure gauge (27) to insure that it is the same as or higher than the system pressure.

j Open the system isolation valve (26).

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k "Open tank water supply valve (15) and concentrate control shut-off valve (22).
Place alarm test shut-off valve on alarm check valve (C) trim, in the alarm position.
When system pressure has stabilized, open PORV actuation ball valve (14)."

l 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 (24) should be checked to insure that it maintains a positive seal between the Halar® Coated Deluge CCV (D) and the wet 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 Halar® Coated Deluge CCV (D) and the swing check valve (24) by placing a container under the foam concentrate auxiliary drain valve (29) and opening the valve slowly.

c Drain excess foam concentrate into container. Should the leakage continue, check the priming pressure gauge (27) on the Halar® Coated Deluge CCV (D) to insure that the valve is primed and closed.

d If the foam concentrate auxiliary drain valve (29) continues to leak foam concentrate, then the Halar® Coated Deluge CCV (D) must be checked for proper operation and repaired if necessary. Follow the procedure in section 4.D.5 and refer to component data page for repair instructions.

e Should water continue to leak from the foam concentrate auxiliary drain valve (29), the foam concentrate swing check valve (24) clapper rubber and seat should be maintained. Follow the procedure in section 4.D.5 and refer to component data page for repair instructions.

E. Troubleshooting

1. For operating and maintenance instructions pertaining to Viking manufactured equipment, refer to the appropriate Viking Technical Data Sheet.
2. For operating and maintenance instructions pertaining to foam equipment manufactured for Viking, refer to the appropriate section of the Viking foam data book.
3. For operation and maintenance instructions for all other equipment, refer to appropriate equipment data.

5. OPERATION

Actuation of a sprinkler head allows system water to flow, causing the alarm check valve (C) clapper to open. The retard chamber (43) and alarm line (13) are pressurized, which causes the PORV (17) to operate. Pressure is relieved from priming chamber of Viking Halar® coated concentrate control deluge valve (D), allowing the valve to open. The bladder tank (A) is already pressurized by the water supply valve (15) and piping (16). 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 foam concentrate supply piping (23), Halar® coated concentrate control deluge valve (D), and to balancing valve (42) of ILBP assembly (B). The balancing valve (42) senses the inlet water pressure upstream of the concentrate controller (B) and adjusts the foam concentrate pressure to the same water pressure as the inlet to metering orifice of concentrate controller (B).

6. INSPECTION, TESTS, & MAINTENANCE

Refer to Wet Pipe Foam/Water System data page 1-9, Section 6, for inspection and maintenance instructions for the wet pipe foam/water system. Refer to data page 534a-f on the *Viking Website* book for inspection and maintenance of the Viking pilot operated pressure control valve.

7. AVAILABILITY

The Wet Pipe Low Flow Foam/Water System is available through a network of domestic and international distributors. See the Viking web site for closest distributor or contact Viking.

8. GUARANTEE

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

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SPECIAL NOTES

A. Provide a minimum of 5 pipe diameters of straight pipe on the inlet and outlet of the ratio controller (B) to minimize turbulence inside the ratio controller. Exception: The outlet for the tank water supply control valve (15) may be connected nearer to the inlet of the ratio controller and should not cause excessive turbulence. However, if the outlet to the foam solution test valve (25) is located closer than 5 pipe diameters, there may be turbulence at high flow rates.

B. The combined total equivalent length of pipe (pipe length, plus equivalent lengths for fittings and valves) including both the water supply inlet piping (16) and the foam concentrate discharge piping (23), should not exceed 50 equivalent feet (15.2 meters). This will allow both pipes to be the same size as the foam liquid inlet to the ratio controller.

C. The CCV (D) and swing check valve (24) must be connected adjacent to the ratio controller using pipe nipples as short as possible.

D. The alarm check valve must be installed using the variable pressure trim and retard chamber (30) to minimize false operation of the CCV (D). The releasing PORV (17) for the CCV (D) is activated by the operation of the alarm valve.

E. The ball valve (14) must be left in the open position, except when conducting alarm or flow test. Failure to close ball valve (14) before running an alarm or flow test will result in the unwanted discharge of foam concentrate. Once the test is completed, the ball valve (14) must be returned to the open position, or the foam CCV (D) will not operate, and the foam concentrate will not flow to the ratio controller.

⚠ WARNING

Turning off the alarm test shut-off valve during a fire may cause the concentrate control valve to close, stopping the flow of foam concentrate. The installing contractor should post a sign stating the same at alarm shut-off valve and/or install a monitor switch on the alarm shut-off valve.

The suggested location for a water flow switch, should one be required, is between the outlet of the alarm check valve (C) and the inlet to the ratio controller.

F. Figures 1-3 are general schematics of the required piping arrangement. Refer to the appropriate technical data page for specific information regarding the valve, tank, and related trim and devices.

G. The technical information, statements, and recommendations contained in this manual are based on information and tests which, 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.

H. A strainer is not required in the foam concentrate discharge piping (23) of bladder tank systems per NFPA Standards.

I. The foam deluge CCV (D) does not require any trim except for a 1/2” priming line (28), 1/2” auxiliary drain valve (29), and gauge with 3-way valve (27). Plug all remaining valve trim outlets. Refer to the “Valves” section of this data book to find the correct trim kit part number for the corresponding size of foam concentrate control Halar® coated deluge valve (D) required.

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

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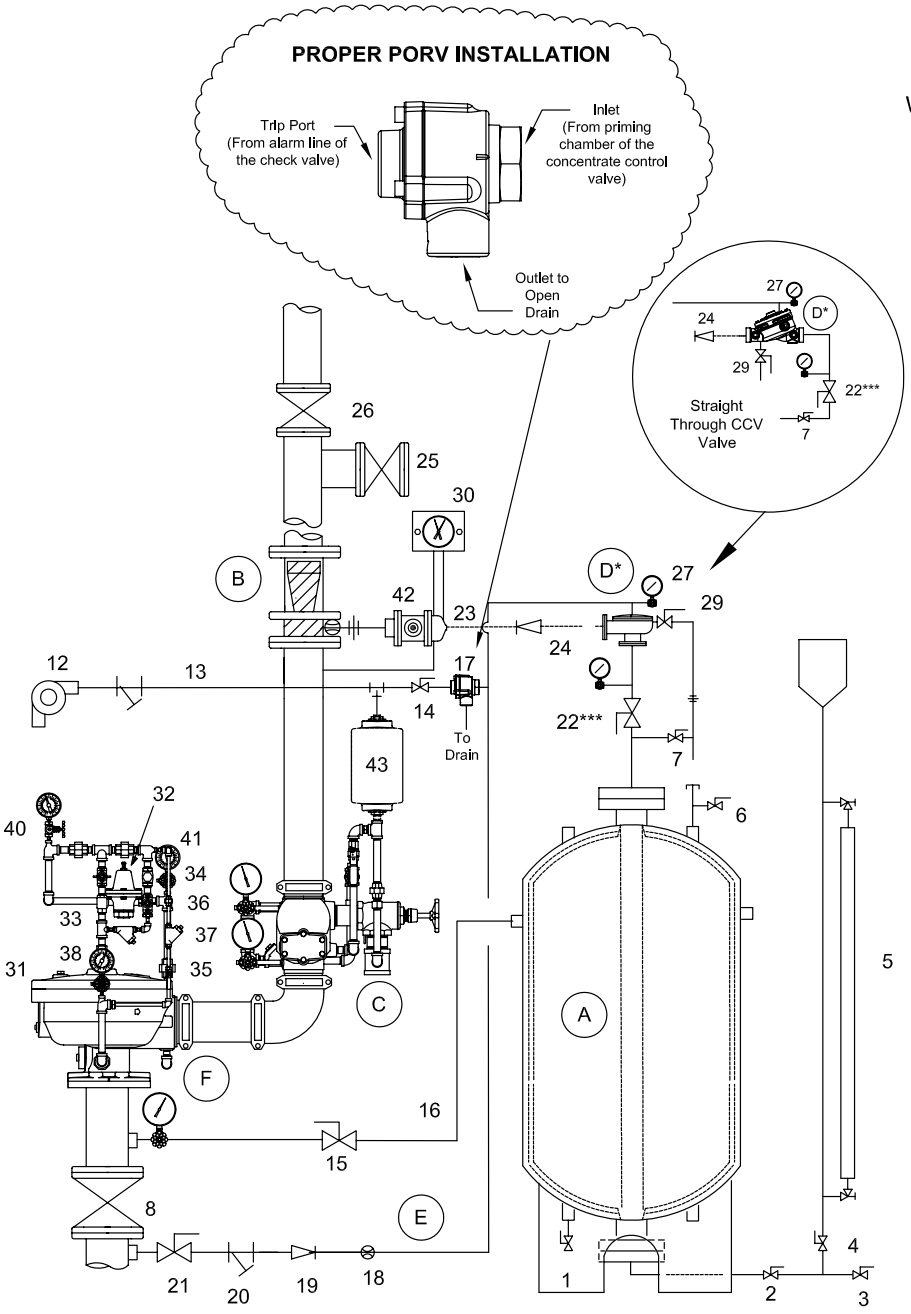

WET PIPE LOW FLOW FOAM SYSTEM

Angle Style
Pilot Operated Pressure Control
Valve Assembly w/CCV Valve

A. Foam Concentrate Bladder Tank (includes Items 1-7)
1. Water Drain/Fill Valve - NORMALLY CLOSED
2. Fill Line Master Shut-off Valve - NORMALLY CLOSED
3. Concentrate Drain/Fill Valve - NORMALLY CLOSED
4. Fill Cup/Sight Gauge Shut-off Valve - NORMALLY CLOSED
5. Sight Gauge Assembly - The trim for this assembly varies with the type of foam concentrates to be used. Refer to Tank Manufacturer's O & M Manual for specific details.
6. Tank Water Vent Valve - NORMALLY CLOSED
7. Diaphragm Concentrate Vent Valve - NORMALLY CLOSED

B. Viking In-line Balanced Pressure Proportioner Assembly (ILBP) Including Ratio Controller with Metering Orifice (Includes Items 30 and 42)
30. Duplex Gauge
42. Spool Balancing Valve w/TFE lined stainless steel braided hose and fitting - ΔP foam vs. water, min. 15 PSIG ILBP Piping Stainless Steel or Brass (order separately)

C. Type of System - Alarm Check Valve with Variable Pressure Trim
43. Retard Chamber (Order separately)
44. Circuit Closer Vent Trim (order separately)

D. Concentrate Control Valve (CCV) - Hydraulically actuated Halar Coated Viking Deluge Valve (*Angle Style or Straight Through Style CCV valve available) CCV Trim (includes items 27 & 29)
27. CCV Priming Pressure Gauge
29. 1/2" foam concentrate auxiliary drain valve

E. Priming Line Connection (includes items 17-21)
17. P.O.R.V.
18. Restricted Orifice .125"
19. 1/2" Soft Seat Check Valve
20. 1/2" Strainer
21. 1/2" Ball Valve - NORMALLY OPEN

F. Factory assembled and tested Viking Model A or B Pilot Operated Pressure Control Assembly (includes items 31 through 41)
31. Viking Model H or J Flow Control Valve
32. Viking Model C-2 Pilot Pressure Regulating Valve
33. Viking Speed Control Assembly or Valve
34. Check Valve
35. Priming Valve
36. Restricted Orifice
37. Strainer
38. Water Supply Pressure Gauge
39. Drain Valve (Not shown)
40. Air Bleed Valve and Pressure Gauge
41. Downstream Pressure Gauge (Not Shown)

G. Accessory Trim - (Order each Item separately)
8. Water Supply Control Valve -NORMALLY OPEN
12. Water Motor Alarm and Strainer
13. Alarm Line Piping
14. 1/2" P.O.R.V. Water Supply Ball Valve - NORMALLY OPEN
15. Tank Water Supply Control Valve - NORMALLY OPEN
16. Water Supply Piping to Bladder Tank
22. Concentrate Control Shut-off Valve - NORMALLY OPEN ***
23. Foam Concentrate Discharge Piping
24. Foam Concentrate Swing Check Valve
25. Foam Solution Test Valve - NORMALLY CLOSED
26. System Isolation Valve - NORMALLY OPEN
28. 1/2" Priming Line

*** Full Port Bronze Body with 316 Stainless Steel Trim and Ball (2" and under). Cast Iron Body OS & Y with Bronze Trim and seats (over 2")

Figure 1

TECHNICAL DATA

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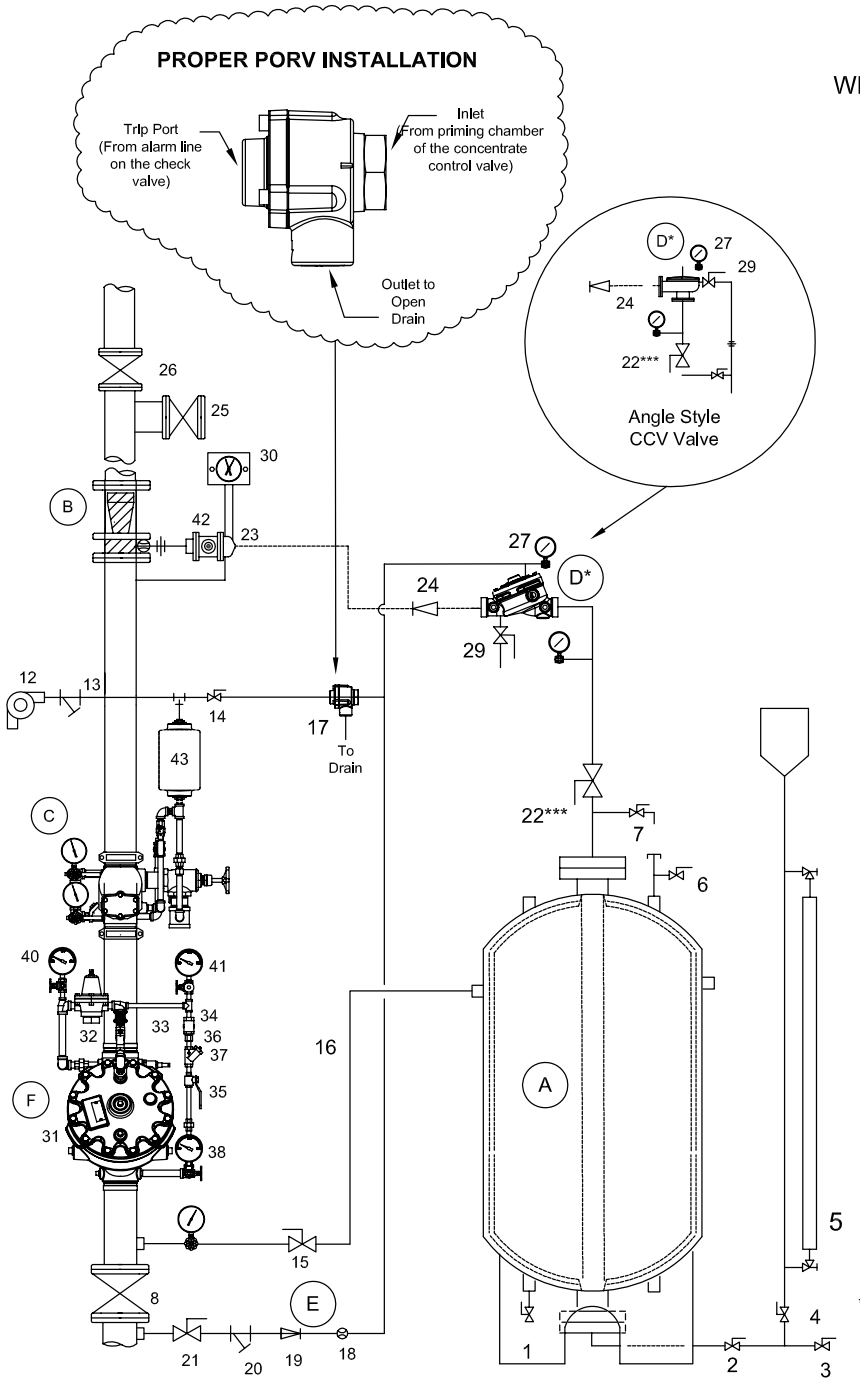

WET PIPE LOW FLOW FOAM SYSTEM

Vertical Straight Through
Pilot Operated Pressure Control
Valve Assembly w/CCV Valve

A. Foam Concentrate Bladder Tank (includes Items 1-7)
1. Water Drain/Fill Valve - NORMALLY CLOSED
2. Fill Line Master Shut-off Valve - NORMALLY CLOSED
3. Concentrate Drain/Fill Valve - NORMALLY CLOSED
4. Fill Cup/Sight Gauge Shut-off Valve - NORMALLY CLOSED
5. Sight Gauge Assembly - The trim for this assembly varies with the type of foam concentrates to be used. Refer to Tank Manufacturer's O & M Manual for specific details.
6. Tank Water Vent Valve - NORMALLY CLOSED
7. Diaphragm Concentrate Vent Valve - NORMALLY CLOSED

B. Viking In-line Balanced Pressure Proportioner Assembly (ILBP) including Ratio Controller with Metering Orifice (Includes Items 30 and 42)
30. Duplex Gauge
42. Spool Balancing Valve w/TFE lined stainless steel braided hose and fitting -ΔP foam vs. water, min. 15 PSIG ILBP Piping Stainless Steel or Brass (order separately)

C. Type of System - Alarm Check Valve with Variable Pressure Trim
43. Retard Chamber (Order separately)
44. Circuit Closer Vent Trim (order separately)

D. Concentrate Control Valve (CCV) - Hydraulically actuated Halar Coated Viking Deluge Valve (*Angle Style or Straight Through Style CCV valve available) CCV Trim (includes items 27 & 29)
27. CCV Priming Pressure Gauge
29. 1/2" foam concentrate auxiliary drain valve

E. Priming Line Connection (includes items 17-21)
17. P.O.R.V.
18. Restricted Orifice .125"
19. 1/2" Soft Seat Check Valve
20. 1/2" Strainer
21. 1/2" Ball Valve - NORMALLY OPEN

F. Factory assembled and tested Viking Model A or B Pilot Operated Pressure Control Assembly (includes items 31 through 41)
31. Viking Model H or J Flow Control Valve
32. Viking Model C-2 Pilot Pressure Regulating Valve
33. Viking Speed Control Assembly or Valve
34. Check Valve
35. Priming Valve
36. Restricted Orifice
37. Strainer
38. Water Supply Pressure Gauge
39. Drain Valve (Not shown)
40. Air Bleed Valve and Pressure Gauge
41. Downstream Pressure Gauge (Not Shown)

G. Accessory Trim - (Order each item separately)
8. Water Supply Control Valve -NORMALLY OPEN
12. Water Motor Alarm and Strainer
13. Alarm Line Piping
14. 1/2" P.O.R.V. Water Supply Ball Valve - NORMALLY OPEN
15. Tank Water Supply Control Valve - NORMALLY OPEN
16. Water Supply Piping to Bladder Tank
22. Concentrate Control Shut-off Valve - NORMALLY OPEN ***
23. Foam Concentrate Discharge Piping
24. Foam Concentrate Swing Check Valve
25. Foam Solution Test Valve - NORMALLY CLOSED
26. System Isolation Valve - NORMALLY OPEN
28. 1/2" Priming Line

*** Full Port Bronze Body with 316 Stainless Steel Trim and Ball (2" and under). Cast Iron Body OS & Y with Bronze Trim and seats (over 2")

Figure 2

TECHNICAL DATA

WET PIPE LOW FLOW FOAM/WATER SYSTEM

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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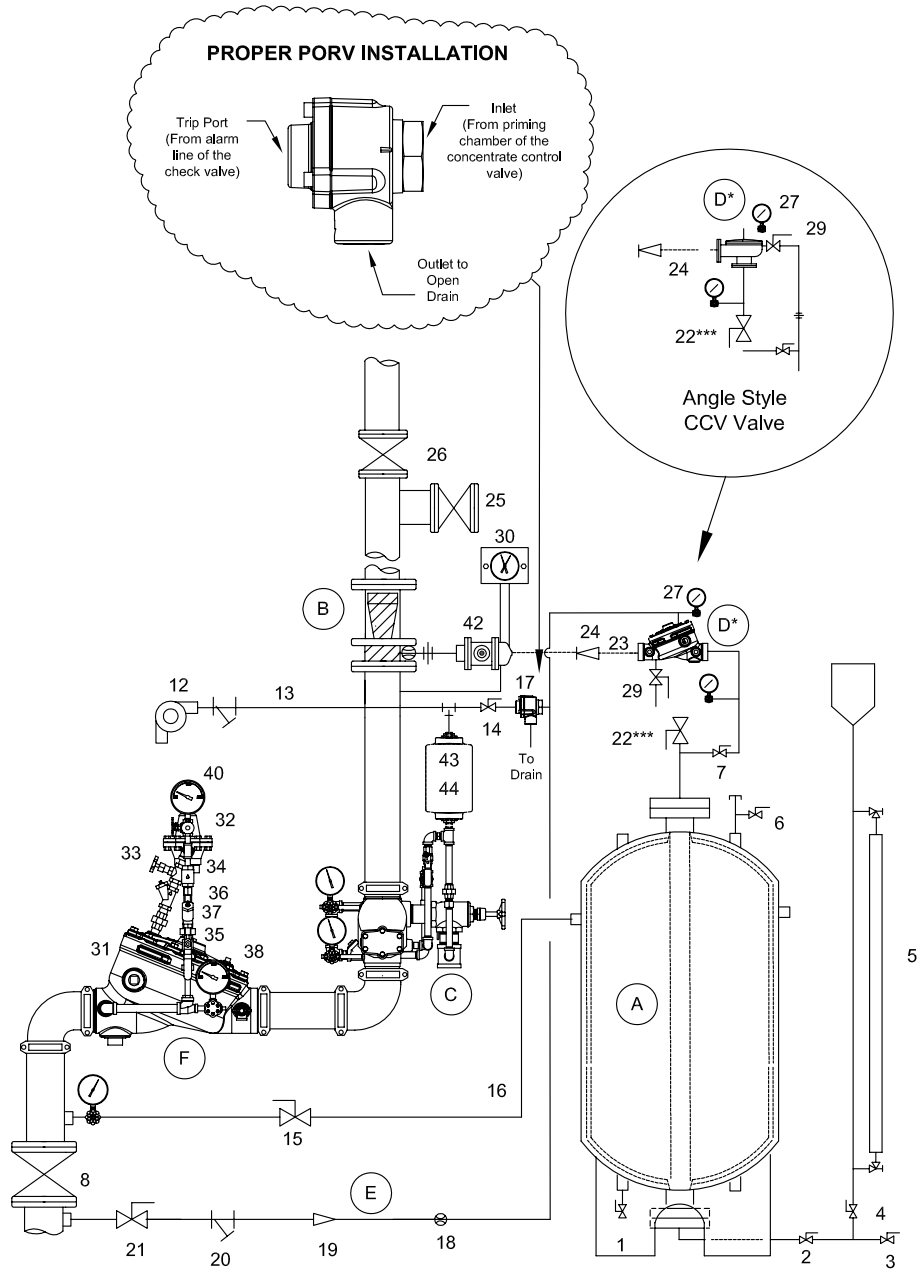

WET PIPE LOW FLOW FOAM SYSTEM

Horizontal Straight Through
Pilot Operated Pressure Control
Valve Assembly w/CCV Valve

A. Foam Concentrate Bladder Tank (Includes Items 1-7)
1. Water Drain/Fill Valve - NORMALLY CLOSED
2. Fill Line Master Shut-off Valve - NORMALLY CLOSED
3. Concentrate Drain/Fill Valve - NORMALLY CLOSED
4. Fill Cup/Sight Gauge Shut-off Valve - NORMALLY CLOSED
5. Sight Gauge Assembly - The trim for this assembly varies with the type of foam concentrates to be used. Refer to Tank Manufacturer's O & M Manual for specific details.
6. Tank Water Vent Valve - NORMALLY CLOSED
7. Diaphragm Concentrate Vent Valve - NORMALLY CLOSED

B. Viking In-line Balanced Pressure Proportioner Assembly (ILBP) including Ratio Controller with Metering Orifice (Includes Items 30 and 42)
30. Duplex Gauge
42. Spool Balancing Valve w/TFE lined stainless steel braided hose and fitting -△P foam vs. water, min. 15 PSIG ILBP Piping Stainless Steel or Brass (order separately)

C. Type of System - Alarm Check Valve with Variable Pressure Trim
43. Retard Chamber (Order separately)
44. Circuit Closer Vent Trim (order separately)

D. Concentrate Control Valve (CCV) - Hydraulically actuated Halar Coated Viking Deluge Valve (*Angle Style or Straight Through Style CCV valve available) CCV Trim (includes items 27 & 29)
27. CCV Priming Pressure Gauge
29. 1/2" foam concentrate auxiliary drain valve

E. Priming Line Connection (includes items 17-21)
17. P.O.R.V.
18. Restricted Orifice .125"
19. 1/2" Soft Seat Check Valve
20. 1/2" Strainer
21. 1/2" Ball Valve - NORMALLY OPEN

F. Factory assembled and tested Viking Model A or B Pilot Operated Pressure Control Assembly (includes items 31 through 41)
31. Viking Model H or J Flow Control Valve
32. Viking Model C-2 Pilot Pressure Regulating Valve
33. Viking Speed Control Assembly or Valve
34. Check Valve
35. Priming Valve
36. Restricted Orifice
37. Strainer
38. Water Supply Pressure Gauge
39. Drain Valve (Not shown)
40. Air Bleed Valve and Pressure Gauge
41. Downstream Pressure Gauge (Not Shown)

G. Accessory Trim - (Order each item separately)
8. Water Supply Control Valve -NORMALLY OPEN
12. Water Motor Alarm and Strainer
13. Alarm Line Piping
14. 1/2" P.O.R.V. Water Supply Ball Valve - NORMALLY OPEN
15. Tank Water Supply Control Valve - NORMALLY OPEN
16. Water Supply Piping to Bladder Tank
22. Concentrate Control Shut-off Valve - NORMALLY OPEN ***
23. Foam Concentrate Discharge Piping
24. Foam Concentrate Swing Check Valve
25. Foam Solution Test Valve - NORMALLY CLOSED
26. System Isolation Valve - NORMALLY OPEN
28. 1/2" Priming Line

*** Full Port Bronze Body with 316 Stainless Steel Trim and Ball (2" and under). Cast Iron Body OS & Y with Bronze Trim and seats (over 2")

Figure 3

TECHNICAL DATA

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For complete Preaction Foam/Water System Supplied by a Bladder Tank, select Deluge Valve and Trim, Release Trim, Foam Concentrate Control Valve and Trim, Easy Riser® Swing Check Valve and Trim, Foam Concentrate, Ratio Flow Controller, Bladder Tank, and Accessories.

DESCRIPTION		NOMINAL SIZE	PART NUMBER	DATA PAGE
ALARM CHECK VALVE				
Flange/ Flange	Flange Drilling	Model J-1		26 a-g
	ANSI	3”	08235	
	ANSI	4”	08238	
	ANSI	6”	08241	
	ANSI	8”	08244	
	PN10/16	DN80	09108	
	PN10/16	DN100	09109	
	PN10/16	DN150	09110	
	PN10	DN200	09111	
	PN16	DN200	12388	
Flange/ Groove	Flange Drilling / Pipe O.D.	Model J-1		26 a-g
	ANSI / 89 mm	3”	08236	
	ANSI / 114 mm	4”	08239	
	ANSI / 168 mm	6”	08242	
	ANSI / 219 mm	8”	08245	
	PN10/16 / 89 mm	DN80	09535	
	PN10/16 / 114 mm	DN100	09536	
	PN10/16 / 168 mm	DN150	09874	
	PN10 / 219 mm	DN200	09877	
	PN16 / 219 mm	DN200	12389	
Groove/ Groove	Pipe O.D.	Model J-1		26 a-g
	89 mm	3” / DN80	08237	
	114 mm	4” / DN100	08240	
	165 mm	DN150	09405	
	168 mm	6” / DN150	08243	
	219 mm	8” / DN200	08246	
MODEL J-1 ALARM VALVE TRIM BRASS				
Vertical		3” / DN80	11428	27 a-c
		4” / DN100	11429	
		6” / DN150	11430	
		8” / DN200	11431	
Horizontal		3” / DN80	11432	28 a-c
		4” / DN100	11433	
		6” / DN150	11434	
		8” / DN200	11435	

DESCRIPTION	NOMINAL SIZE	PART NUMBER	DATA PAGE
CIRCUIT CLOSER VENT BRASS TRIM		08220	38 a-b
MODEL C-1 RETARDING CHAMBER (not included in the trim)		05904B	

FOAM CONCENTRATE CONTROL VALVE HALAR® COATED				
	Straight Through			
Groove/ Groove	Pipe O.D.	Model F-2		61 a-f
	48 mm	1½” / DN40	12127Q/B	
	60 mm	2” / DN50	12058Q/B	
	73 mm	2½” / DN65	12404Q/B	
FOAM CONCENTRATE CONTROL VALVE TRIM				
Use with Straight Through Valves		**Galvanized**		61 a-f
		1½” / DN40	12848-1	
		2” / DN50	12848-1	
		2½” / DN65	12929-1	
		Brass		
		1½” / DN40	12848-2	
		2” / DN50	12848-2	
		2½” / DN65	12929-2	

Table 1

DESCRIPTION	PRESSURE RATING	TANK SIZE	DESIGN CODE	PART NUMBER	DATA PAGE
Vertical Bladder Tank	175psi (12bar)	25 to 4000 US Gallon	EN13445	VFTV****GF	xx
Horizontal Bladder Tank	175psi (12bar)	50 to 5250 US Gallon	EN13445	VFTH****GF	xx
Vertical Bladder Tank	232psi (16bar)	25 to 4000 US Gallon	EN13445	VFTV****GF-16	xx
Horizontal Bladder Tank	232psi (16bar)	50 to 5250 US Gallon	EN13445	VFTH****GF-16	xx
Vertical Bladder Tank	175psi (12bar)	25 to 4000 US Gallon	ASME Sec.VIII Div.1	VFTV****GAF	xx
Horizontal Bladder Tank	175psi (12bar)	50 to 5250 US Gallon	ASME Sec.VIII Div.1	VFTH****GAF	xx
Vertical Bladder Tank	232psi (16bar)	25 to 4000 US Gallon	ASME Sec.VIII Div.1	VFTV****GAF-16	xx
Horizontal Bladder Tank	232psi (16bar)	50 to 5250 US Gallon	ASME Sec.VIII Div.1	VFTH****GAF-16	xx
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)					

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DESCRIPTION	NOMINAL SIZE	PART NUMBER	DATA PAGE
FOAM CONCENTRATE SWING CHECK VALVE			
	1½" / DN40	99S-0150	-
	2" / DN50	99S-0200	-
	2½" / DN65	05497C	803 a-d
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			
OS & Y	2½" / DN65	8068A-0250	-
	3" / DN80	8068A-0300	
	4" / DN100	8068A-0400	
	6" / DN150	8068A-0600	
	8" / DN200	8068A-0800	
FOAM CONCENTRATE SHUT-OFF VALVE			
Ball Valve	1½" / DN40	T595Y66-0150	-
	2" / DN50	T595Y66-0200	
ACCESSORIES FOR FOAM/WATER SPRINKLER SYSTEMS			
MODEL D-3 PORV	½" / DN15	16970	287 a-b
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			

CONNECTION		FOAM TYPE	PART NUMBER		DATA PAGE
BODY GROOVED	FOAM INLET GROOVED		NAB (1)(3)	BRASS (2)	
3" (88.9mm)	1.5" (48.3mm)	AFFF 1% S C6	VLF089JAA	F20208A	xx
		AFFF 3% S C6	VLF089JAB	F20208B	xx
		ARC 3X3 S C6	VLF089JAJ	F20208J	xx
4" (114.3mm)	2" (60.3mm)	AFFF 1% S C6	VLF114JAA	F20207A	xx
		AFFF 3% S C6	VLF114JAB	F20207B	xx
		ARC 3X3 S C6	VLF114JAJ	F20207J	xx
6" (165.1mm)	2" (60.3mm)	AFFF 1% S C6	VLF165JAA	N/A	xx
		AFFF 3% S C6	VLF165JAB	N/A	xx
		ARC 3X3 S C6	VLF165JAJ	N/A	xx
6" (168.3mm)	2" (60.3mm)	AFFF 1% S C6	VLF168JAA	F20199A	xx
		AFFF 3% S C6	VLF168JAB	F20199B	xx
		ARC 3X3 S C6	VLF168JAJ	F20199J	xx
8" (219.1mm)	2.5" (76.1mm)	AFFF 1% S C6	VLF219JAA	N/A	xx
		AFFF 3% S C6	VLF2196JAB	N/A	xx
		ARC 3X3 S C6	VLF2196JAJ	N/A	xx
8" (219.1mm)	2.5" (73.0mm)	AFFF 1% S C6	VLF2193JAA	F20197A	xx
		AFFF 3% S C6	VLF2193JAB	F20197B	xx
		ARC 3X3 S C6	VLF2193JAJ	F20197J	xx

(1) Nickel Aluminium Bronze (NAB) - Standard Offering in Viking EMEA & APAC Territories. Brass available on request.

(2) Brass - Standard Offering in Viking Americas Territories. Nickel Aluminium Bronze available on request.

(3) NAB 219mm with 73mm foam inlet are non standard and could be subject to additional lead time and price.

Foam Type	Part Number		
	US Gallon		
	5	55	265
AFFF 1% S C6	F20335/5	F20335/55	F20335/265
AFFF 3% S C6	F20336/5	F20336/55	F20336/265
ARC 3X3 S C6	F20227/5	F20227/55	F20227/265
Foam Type	**Litres**		
	25	**200**	**1000**
AFFF 1% S C6	V-AFFF1S/25	V-AFFF1S/200	V-AFFF1S/1000
AFFF 3% S C6	V-AFFF3S/25	V-AFFF3S/200	V-AFFF3S/1000
ARC 3X3 S C6	V-ARC3X3S/25	V-ARC3X3S/200	V-ARC3X3S/1000

Table 2

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DESCRIPTION		NOMINAL SIZE	PART NUMBER	DATA PAGE
PILOT OPERATED PRESSURE CONTROL VALVES				
ANGLE STYLE VALVES (INCLUDES MODEL A-2 GALVANIZED TRIM. BRASS OR STAINLESS STEEL ALSO AVAILABLE)				
Threaded	Pipe O.D.			534 a-f
	60 mm	2" / DN50	10793	
Flange/ Flange	Flange Drilling			
	ANSI	3" / DN80	10801	
	ANSI	4" / DN100	10795	
	ANSI	6" / DN150	10807	
	PN10/16	DN80	10801FFPN1016	
	PN10/16	DN100	10795FFPN1016	
	PN10/16	DN150	10807FFPN1016	
Flange/ Groove	Flange Drilling / Pipe O.D.			
	ANSI / 89 mm	3" / DN80	10800	
	ANSI / 114 mm	4" / DN100	10794	
	ANSI / 168 mm	6" / DN150	10806	

DESCRIPTION		NOMINAL SIZE	PART NUMBER	DATA PAGE
PILOT OPERATED PRESSURE CONTROL VALVES				
STRAIGHT THROUGH VALVES (INCLUDES MODEL B-1 GALVANIZED TRIM. BRASS OR STAINLESS STEEL ALSO AVAILABLE)				
Horizontal Arrangement				
Threaded	Pipe O.D.			536 a-i
	48 mm	1½" / DN40	12774	
	60 mm	2" / DN50	12776	
	65 mm	2½" / DN65	12778	
Flange/ Flange	Flange Drilling			
	ANSI	3" / DN80	12782	
	ANSI	4" / DN100	12785	
	ANSI	6" / DN150	12788	
	ANSI	8" / DN200	12790	
Flange/ Groove	Flange Drilling / Pipe O.D.			
	ANSI / 89 mm	3" / DN80	12781	
	ANSI / 114 mm	4" / DN100	12784	
	ANSI / 168 mm	6" / DN150	12787	
Groove/ Groove	Pipe O.D.			
	48 mm	1½" / DN40	12775	
	60 mm	2 " / DN50	12777	
	73 mm	2½" / DN65	12779	
	89 mm	3" / DN80	12780	
	114 mm	4" / DN100	12783	
	168 mm	6" / DN150	12786	
	219 mm	8" / DN200	12789	
Vertical Arrangement				
Threaded	Pipe O.D.			536 a-i
	48 mm	1½" / DN40	12791	
	60 mm	2" / DN50	12793	
	65 mm	2½" / DN65	12795	
Flange/ Flange	Flange Drilling			
	ANSI	3" / DN80	12799	
	ANSI	4" / DN100	12802	
	ANSI	6" / DN150	12805	
	ANSI	8" / DN200	12807	
Flange/ Groove	Flange Drilling / Pipe O.D.			
	ANSI / 89 mm	3" / DN80	12798	
	ANSI / 114 mm	4" / DN100	12801	
	ANSI / 168 mm	6" / DN150	12804	
Groove/ Groove	Pipe O.D.			
	48 mm	1½" / DN40	12792	
	60 mm	2" / DN50	12794	
	73 mm	2½" / DN65	12796	
	89 mm	3" / DN80	12797	
	114 mm	4" / DN100	12800	
	168 mm	6" / DN150	12803	
	219 mm	8" / DN200	12806	

Table 3