VIKING®

TECHNICAL DATA

MULTIPLE WET/FOAM SYSTEMS SUPPLIED BY A BLADDER TANK

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

With Multiple Wet/Foam Systems Supplied by a Bladder Tank, multiple wet foam risers can be supplied from a single foam concentrate source. Where a bladder tank is used as the foam concentrate storage container and foam concentrate source, a manifold foam concentrate supply from the bladder tank to the individual risers is a cost-effective method of installing many foam risers without duplicating the foam concentrate supply for each different riser. The foam concentrate bladder tank will be sized by the most demanding system. It is important to remember that the most demanding system will also require taking into account the fact that the duration requirement per system may differ as well.

Multiple wet foam risers are supplied by a single bladder tank by a piping manifold installed from the discharge head of the bladder tank to each individual riser. The foam manifold will be sized for the most severe volume requirement and metered pressure drop requirement. At each riser location, a supply outlet will be provided from the concentrate manifold supply. The supply outlet will have a concentrate shut-off valve, a Halar® coated concentrate control valve, concentrate piping, a concentrate swing check valve, and a concentrate controller (B) with integral metering orifice. The individual sprinkler riser will have a water supply control valve, Viking alarm check valve with variable pressure trim and retard chamber, sprinkler riser piping, concentrate controller (B), solution test valve, and system isolation valve.

A manifold supply from a bladder tank to multiple wet risers allows for individual proportioning at each riser, allowing for different sized risers. A manifold supply from a bladder tank to multiple wet risers also allows for individual system repair without completely losing foam protection for other areas.

2. LISTINGS AND APPROVALS

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

- Alarm Check Valve and Trim
  - UL Listed - Guide VPLX
  - FM - Waterflow Alarm Valves
- Concentrate Controller (Proportioner)
  - UL Listed - Guide GFGV
  - FM Approved - Low Expansion Foam Systems
- 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.
- Foam Concentrate
  - UL Listed - Guide GFGV
  - FM Approved - Low Expansion Foam Systems
- Bladder Tank
  - UL Listed - Guide GHXV
  - FM Approved - Low Expansion Foam Systems

3. TECHNICAL DATA

Specifications:

Refer to individual component technical data pages.

Material Standards:

Refer to individual component technical data pages.

Ordering Information

Refer to Tables 1 and 2.

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.

4. INSTALLATION

A. Discharge Devices

- Standard Spray Sprinklers
- Foam hose reels and nozzles
- Spray Nozzles (automatic type)

Listed discharge devices are tested with specific concentrates and may have different listed densities that what is listed in various NFPA standards. AR-AFFF foam concentrates are listed with specific discharge devices and the fuels they are to protect.

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B. General Instructions and Warnings

1. Refer to Warnings and General Notes on page 2a-d in the "Foam Design" section of the *Viking Foam Systems Engineering and Design Data* book.
2. Refer to specific technical data sheets, acceptable installation standards, applicable codes, and Authority Having Jurisdiction for additional installation, operation, and maintenance instructions.
3. Inspections – It is imperative that the system is inspected and tested on a regular basis. See Section 6 - Inspections, Tests ,and Maintenance.
4. **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 effected area.
5. The valve, trim, and assembly must be installed in an area not subject to freezing temperatures or physical damage.

C. Installation

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

1. Refer to the Special Notes section on page 11d and Warnings and General Notes on page 2a-d in the "Foam Design" section of the Viking foam data book.
2. Install the alarm valve and trim (A) in accordance with *Viking Engineering and Design Data* book.
3. Install the proportioning device, concentrate controller (B), in the riser at least 5 pipe diameters past the alarm valve. (The concentrate controller (B) must be installed 5 pipe diameters of straight piping past a valve or change of direction. The same 5 pipe diameters of straight pipe are required on the discharge side of the concentrate controller (B) as well to ensure proper proportioning)
4. Install foam solution test valve (7) and system isolation valve (8). These valves are required to facilitate annual foam proportioning tests. The system isolation valve (8) is in the normally open position when the system is in operation. The solution test valve (7) is in the normally closed position when the system is in operation. When the system is to be tested annually for proportioning, the system isolation valve (8) is closed to eliminate foam water solution from entering the system piping. The solution test valve (7) is opened to establish a flow rate in the riser. The solution test valve is normally sized the same size as the riser piping to accept the design flow of the system. The discharge of the solution test valve is normally piped to a test header with 2½" angle valves to aid in controlling the discharge of affluent.
5. Install the hydraulically actuated Halar® coated CCV valve (C) and associated trim as indicated on trim charts or technical data pages. A CCV priming connection is required upstream of the riser water supply control valve.
6. A concentrate shut-off valve (5) located upstream of the Halar® coated CCV valve (C) is required to isolate the Halar® coated concentrate control valve when setting up the system or when repairs are to be made to the wet foam system.
7. Install the Viking foam bladder tank and associated trim in accordance with Viking foam bladder tank installation instructions.
   a. Install the foam concentrate piping from the discharge head of the foam bladder tank to the individual sprinkler risers. The concentrate manifold supply line may be oversized from the concentrate controller (B) inlet piping to make up for friction loss from the bladder tank to the most remote sprinkler riser.
   b. Allow access to the foam bladder tank for filling from barrels of foam concentrate and bladder replacement. When a bladder is replaced in a foam bladder tank, a vertical tank will be laid on its side and tank flanges removed, while a horizontal bladder tank has all tank flanges removed for bladder removal.
   c. All valves and devices should be located for easy access for operation and maintenance.
8. Placing the System in Service:
   a. Verify that the water supply control valve (1) is closed, then place alarm valve (C) in service as follows (see instructions on the Viking technical data page). Open the system isolation valve (8) if closed. Close the solution test valve (7) if open.
   b. Prime the Halar® coated CCV valve (C) by opening the ½" ball valve located on the priming connection. The priming connection for the Halar® coated CCV valve (C) should be supplied upstream of the alarm check valve. Water will pass through the ½" priming valve, ½" Y strainer, ½" swing check valve, 1/8" restricted orifice, and PORV valve to the priming chamber of the Halar® coated CCV valve (C). Priming pressure will be present on the priming pressure gauge located as part of the CCV trim package. Bleed off any air pressure trapped in the priming line (3) to the Viking Halar® coated CCV (C) by opening the 3-way pressure gauge valve (6).
   c. Open the water supply control valve (1) to the alarm valve after the CCV valve (C) has been primed. The PORV isolation valve (4) should be in the closed position when filling the sprinkler system with water; closing this valve will ensure that the concentrate control valve is not opened due to water flowing through the system. The alarm shut-off valve may be closed during this time as well to eliminate activation of alarms or the water motor alarm.
   d. Place foam bladder tank in service. The concentrate shut-off valve (5) will be in the closed position until foam bladder tank is placed in service. After filling the bladder tank in accordance with the Viking Bladder tank installation manual, the bladder tank water supply control valve will be opened. The concentrate manifold drain valve (9) should be slightly opened to

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vent any air from the concentrate line. Once concentrate is discharged from the concentrate manifold drain valve, close the valve and allow concentrate manifold piping to pressurize. Foam concentrate pressure will be indicated on the foam concentrate pressure gauge (10) located upstream of the of the concentrate shut-off valve (5). Once pressure is indicated on the concentrate pressure gauge (10), slowly open the foam concentrate shut-off valve.

e. Once the foam concentrate shut-off valve (5) is opened, verify that foam concentrate is not passing by the Halar® coated CCV valve (C) by opening the ½" foam concentrate auxiliary drain valve (11). If foam concentrate appears, close the concentrate shut-off valve (5) immediately. If foam concentrate is passing by the Halar® coated CCV valve (C), the valve is not seating and is most likely fouled. Debris must be removed from the seat of the Halar® coated CCV valve (C).

9. Removing the System from Service:
   a. Close the water supply control valve (1).
   b. Close the concentrate shut-off valve (5).
   c. Open the main drain valve on the alarm valve.
   d. Leave the system isolation valve (8) open.
   e. Refer to instructions for removing the alarm valve (A) from service in the *Viking Engineering and Design Data* book.
   f. Perform maintenance and service on the system and riser piping.
   g. If maintenance is required to be performed on concentrate piping, close the bladder tank water supply control valve (2) and open the shell vent valve on the bladder tank, this will relieve the pressure from the foam concentrate manifold piping. Open the concentrate manifold drain valve (9) to drain concentrate from manifold piping. It is important to remember to capture the foam concentrate drained from the concentrate piping. If disposal is required of the foam concentrate, check with local authorities for the acceptable method in which to do so.

NOTE: If repairs or modifications are required on the foam concentrate supply piping, the alarm valve and wet system may be kept in service for protection, while repairs to the foam system concentrate piping are performed.

5. OPERATION

Once a sprinkler head activates due to heat, the alarm valve opens exposing the ported seat, allowing water to enter the alarm trim piping. The PORV (12) located in the priming connection is pressurized on its sensing side, opening the priming line (of the CCV valve (C) to open drain. Once the CCV priming line is vented, the CCV valve (C) will open and foam concentrate will flow into the inlet of the concentrate controller (B). The foam concentrate is supplied by the foam bladder tank, which is under the same water pressure as the sprinkler riser. Once water starts flowing into the sprinkler riser(s), water is flowing into the bladder tank to displace the foam concentrate required at the concentrate controller (B). The water being supplied into the tank is equal to the foam concentrate being metered into the water stream at the concentrate controller (B).

Once water passes through the concentrate controller (B), foam concentrate is discharge into the concentrate controller (B) through an orifice listed and approved for the foam concentrate to be utilized. The foam and water mix and create a foam/water solution. Generally, the foam solution has a proportion of 1% or 3% of foam concentrate to water. A foam blanket is created once it has discharged through the discharge device(s). A foam blanket is produced through one of two actions; agitation as in what would happen when discharged through a standard sprinkler head, or aeration, as in what would happen when discharged through a foam chamber or foam maker. The foam blanket that is created by the discharge device is part of the listing or approval obtained with the foam concentrate testing.

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 that 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.

Inspections: It is imperative that the system is 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.

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7. AVAILABILITY

The Wet Pipe 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.

SPECIAL NOTES

A. Provide a minimum of 5 pipe diameters of straight pipe on the inlet and outlet of the concentrate controller (B) to minimize turbulence inside the concentrate controller. Exception, the outlet for the tank water supply control valve (2) may be connected nearer to the inlet of the concentrate controller and should not cause excessive turbulence. However, if the outlet to the foam solution test valve (7) 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 and the foam concentrate discharge piping, 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 concentrate controller. If the total equivalent length must exceed 50 feet (15.2 meters), then refer to the "Proportioning Equipment" section of this data book for the method of calculating these pipe sizes.

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

D. The alarm check valve must be installed using the variable pressure trim and retard chamber to minimize false operation of the CCV (C). The releasing PORV (12) for the CCV (C) is activated by the operation of the alarm valve.

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

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

G. 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.

H. 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. They represent 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.

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

J. The foam deluge CCV (C) does not require any trim except for a 1/2" priming line, 1/2" auxiliary drain valve, and and gauge with 3-way valve (11). 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 (C) required.

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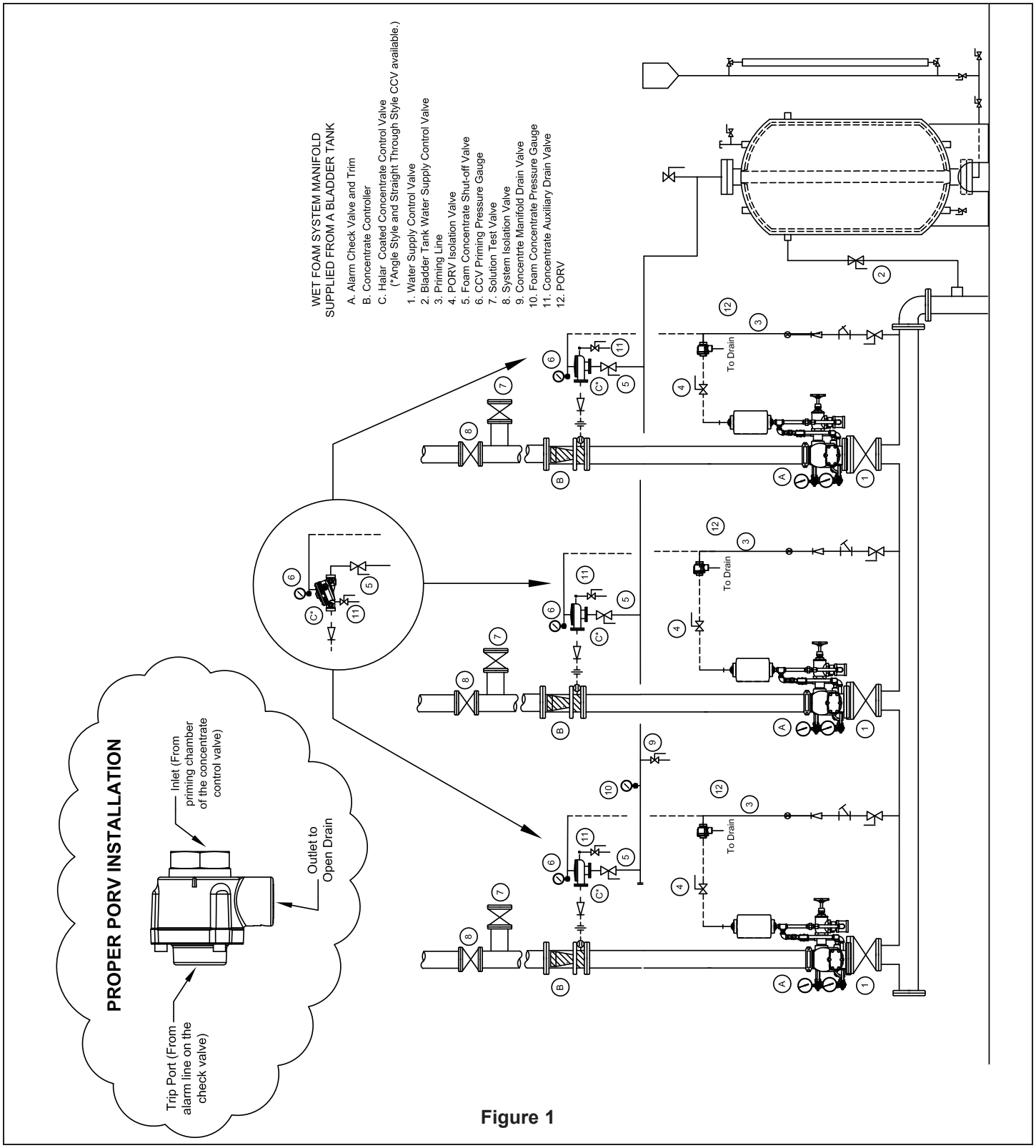

Figure 1

TECHNICAL DATA

MULTIPLE WET/FOAM SYSTEMS SUPPLIED BY A BLADDER TANK

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For complete Wet Pipe Low Flow Foam/Water System, select Alarm Valve and Trim, Retard Chamber and Circuit Closer Vent Trim, Pilot Operated Pressure Control Valve, Foam Concentrate Control Valve and Trim, Foam Concentrate and 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				
Angle Style				61a-f
Threaded NPT	Model & Pipe O.D.			
	Model E-4 48 mm	1½” / DN40	09890Q/B	
	Model E-2 60 mm	2” / DN50	08361Q/B	
Straight Through				
Threaded NPT	Pipe O.D.	Model F-2		
	NPT 65 mm	2½”	12402Q/B	
Groove/ Groove	Pipe O.D.	Model F-2		
	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 Angle Style Valve		Galvanized		61 a-f
		1½” / DN40	08098	
		2” / DN50	08099	
		Brass		
		1½” / DN40	09694	
		2” / DN50	09695	
Use with Straight Through Valves		Galvanized		
		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	

DESCRIPTION	TANK SIZE	PART NUMBER	DATA PAGE
HORIZONTAL BLADDER TANK	50 - 4500 Gallon	CHBT2-xxxx *	240 a-h
VERTICAL BLADDER TANK	25 - 4500 Gallon	CVBT2-xxxx *	
* Where xxxx is the tank size			

Table 1

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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-1 PORV	½" / DN15	13598	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			

FOAM CONCENTRATES AND RATIO FLOW CONTROLLERS					
FOAM CONCENTRATE			RATIO FLOW CONTROLLER		
DESCRIPTION	PART NUMBER	DATA PAGE	SIZE	PART NUMBER	DATA PAGE
1% AFFF C103	F14969	100 a-b	2½" (65 mm) Threaded 1" NPT	F15001/A	170 a-d
			3" (80 mm) Wafer 1-1/4" NPT	F15007/A	
			4" (100 mm) Wafer 1½" NPT	F15013/A	
			6" (150 mm) Wafer 2" NPT	F15019/A	
			8" (200 mm) Wafer 2½" NPT	F15026/A	
3% AFFF C303	F14970	101 a-b	2½" (65 mm) Threaded 1" NPT	F15001/B	
			3" (80 mm) Wafer 1-1/4" NPT	F15007/B	
			4" (100 mm) Wafer 1½" NPT	F15013/B	
			6" (150 mm) Wafer 2" NPT	F15019/B	
			8" (200 mm) Wafer 2½" NPT	F15026/B	
3% AFFF MS C301 MS	F14971	102 a-b	2½" (65 mm) Threaded 1" NPT	F15001/C	
			3" (80 mm) Wafer 1-1/4" NPT	F15007/C	
			4" (100 mm) Wafer 2½" NPT	F15013/C	
			6" (150 mm) Wafer 2" NPT	F15019/C	
			8" (200 mm) Wafer 2½" NPT	F15026/C	
3% / 6% AR-AFFF @ 3% C363	F14973	103 a-b	2½" (65 mm) Threaded 1" NPT	F15001/D	
			3" (80 mm) Wafer 1-1/4" NPT	F15007/D	
			4" (100 mm) Wafer 1½" NPT	F15013/D	
			6" (150 mm) Wafer 2" NPT	F15022	
3% / 6% AR-AFFF @ 6% C363	F14973	103 a-b	2½" (65 mm) Threaded 1" NPT	F15001/E	
			3" (80 mm) Wafer 1-1/4" NPT	F15007/E	
			4" (100 mm) Wafer 1½" NPT	F15013/E	
			6" (150 mm) Wafer 2" NPT	F15019/D	
3% AR-AFFF CUG	F14972	104 a-b	2½" (65 mm) Threaded 1" NPT	F15001/J	
			3" (80 mm) Wafer 1-1/4" NPT	F15007/J	
			4" (100 mm) Wafer 1½" NPT	F15013/J	
			6" (150 mm) Wafer 2" NPT	F15019/J	
			8" (200 mm) Wafer 2½" NPT	F15026/J	
2% High Ex C2	F14974	105 a-b	2½" (65 mm) Threaded 1" NPT	F15001/H	
			3" (80 mm) Wafer 1-1/4" NPT	F15007/H	
			4" (100 mm) Wafer 1½" NPT	F15013/H	
			6" (150 mm) Wafer 2" NPT	F15019/H	

Table 2

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