



## TECHNICAL DATA

## MODEL VNR WIDE RANGE PROPORTIONER

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](http://www.vikinggroupinc.com)

### 1. DESCRIPTION

The wide range proportioner accurately proportions foam concentrate into a water stream over a wide range of system flow rates. The device is configured to proportion foam concentrate at a 3% ratio. Wide range proportioners are an integral part of an approved foam system. In addition to the wide range proportioner, the main components of the approved foam system are: foam concentrate, a foam storage tank, a concentrate control valve, and foam discharge devices.

The system must be designed so that the wide range proportioner can accurately proportion foam over the range of flow rates expected during the system operation.

The wide range proportioner has the capability to accurately proportion foam concentrate into the water supply at low flow rates as required when only a small quantity of sprinklers have activated.

Please refer to specific system manual(s) for further information.

For further information, please contact the appropriate sales office in **Section 5**, or refer to the technical documentation.

The contents of this publication are subject to modifications without notice.

### 2. LISTINGS AND APPROVALS

#### FM Approved – Low Expansion Foam Systems (FM5130)



The wide range proportioner is FM Approved as part of a fire extinguishing system combining designated foam concentrates, bladder tanks and discharge devices. Approved system components can be found at [www.approvalguide.com](http://www.approvalguide.com)

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.



Image for illustration purposes only



**WARNING:** Cancer and Reproductive Harm-  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

### 3. TECHNICAL DATA

#### 3.1 Construction features

- Available in 6" (DN150) and 8" (DN200) sizes
- Wafer connection for installation between ANSI and PN16 flanges
- Brass construction
- Horizontal or vertical installation
- Direction of flow indicator on body
- For use with fresh or salt water
- Identification tag plate

#### 3.2 Standard Design Specifications

Table 3.2.1 - Standard design specifications

Table 3.2.1 - Standard design specifications	
Design pressure	250 psi / 17.2 bar (1.7 MPa)
Test pressure	500 psi / 34.4 bar (3.4 Mpa)
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) (as per FM 5130)
Minimum operating inlet pressure	30 psi / 2.1 bar (0.2 MPa)
Maximum operating inlet pressure	175 psi / 12.1 bar (1.2 MPa)
Proportioning range	See <b>Table 3.5.1</b>





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### 3.3 Components and Dimensions

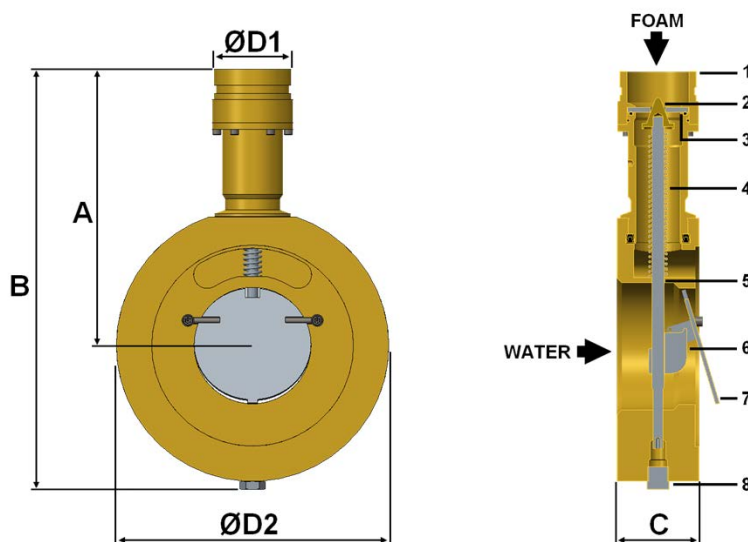


Figure 3.2.1: Components and Dimensions

Table 3.3.1 - Components

Item	Description	Item	Description	Item	Description
1	Grooved foam inlet	4	Spring	7	Clapper
2	Orifice restrictor	5	Rod	8	Plug
3	Orifice plate	6	Threaded collar	-	-

Table 3.3.2 – Weights and Dimensions

Nominal size (D2)	Approximate weight		Approximate dimensions							
			A		B		C		Foam inlet (D1)	
	lbs	kg	Inch	mm	Inch	mm	Inch	mm	Inch	mm
6" (150 mm) Wafer	47	21	9-1/4	236	13	353	2-3/4	70	2.5	76.1
6" (150 mm) Wafer	47	21	9-1/4	236	13	353	2-3/4	70	2.5	73.0
8" (200 mm) Wafer	71	32	10-7/8	277	16-1/2	419	3-1/4	82	2.5	76.1
8" (200 mm) Wafer	71	32	10-7/8	277	16-1/2	419	3-1/4	82	2.5	73.0

### 3.4 Standard Materials

Table 3.4.1 - Standard materials

Body, neck, grooved inlet	Brass EN CB491K
Rod, clapper, threaded collar	Stainless steel
Orifice plate	UNS C95800
Spring	Stainless steel AISI-302 (DIN 17224)



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### 3.5 Ordering information

1. This wide range proportioner is for use with listed and approved foam concentrates at 3% proportioning rates.
2. The minimum and maximum flow demand of the fire protection system must be known to ensure correct selection of the wide range proportioner. The required minimum flow rate should be higher than the minimum flow rate shown in **Table 3.5.1**. The required higher flow rate should be lower than the maximum flow rate shown in **Table 3.5.1**. If more than one size is suitable, size selection can then be based on the size of the riser or supply pipework into which the wide range proportioner will be installed.
3. After selecting the size, check the appropriate graph in **Section 6.2** to ensure the required flows are possible at the available system pressure. If not, it may be necessary to increase to the next pipe size.

**Table 3.5.1 - Ordering information**

Connection		Foam type	Part number	Foam inlet orifice size <sup>3</sup>		FM approved			
Body wafer <sup>2</sup>	Foam inlet grooved					Minimum flow rate <sup>1</sup>		Maximum flow rate <sup>1</sup>	
				Inch	mm	GPM	l/min	GPM	l/min
6" (150mm)	2.5" (76.1mm)	Viking ARK, 3%	VNR066P	0.717	18.2	50	189	1895	7,173
		Viking USP, 3%	VNR066L	0.709	18.0	50	189	1420	5375
6" (150mm)	2.5" (73.0mm)	Viking ARK, 3%	VNR063P	0.717	18.2	50	189	1895	7,173
		Viking USP, 3%	VNR063L	0.709	18.0	50	189	1420	5375
8" (200mm)	2.5" (76.1mm)	Viking ARK, 3%	VNR086P	0.945	24.0	50	189	3003	11,368
		Viking USP, 3%	VNR086L	0.929	23.6	50	189	3010	11,394
8" (200mm)	2.5" (73.0mm)	Viking ARK, 3%	VNR083P	0.945	24.0	50	189	3003	11,368
		Viking USP, 3%	VNR083L	0.929	23.6	50	189	3010	11,394

**NOTES:**

<sup>1</sup> Please refer to graphs in **Section 6.2** for specific flow rate parameters.

<sup>2</sup> Can be installed between ANSI or PN16 flanges

<sup>3</sup> Foam inlet orifice is variable up to the point when the hinged clapper is fully open

### 4. SCOPE OF DELIVERY

- a) Ensure that all components are complete and in good condition.
- b) Check that the tamper proof seal on bottom plug is not damaged or removed. In case of either scenario, report immediately to supplier.
- c) The wide range proportioner is supplied boxed, with a fixed data plate and an integral sized orifice disc specific to its approved/ listed foam concentrate.
- d) Grooved couplings and flange kits are not included.

### 5. AVAILABILITY

Please contact your local Viking sales office for further information. 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

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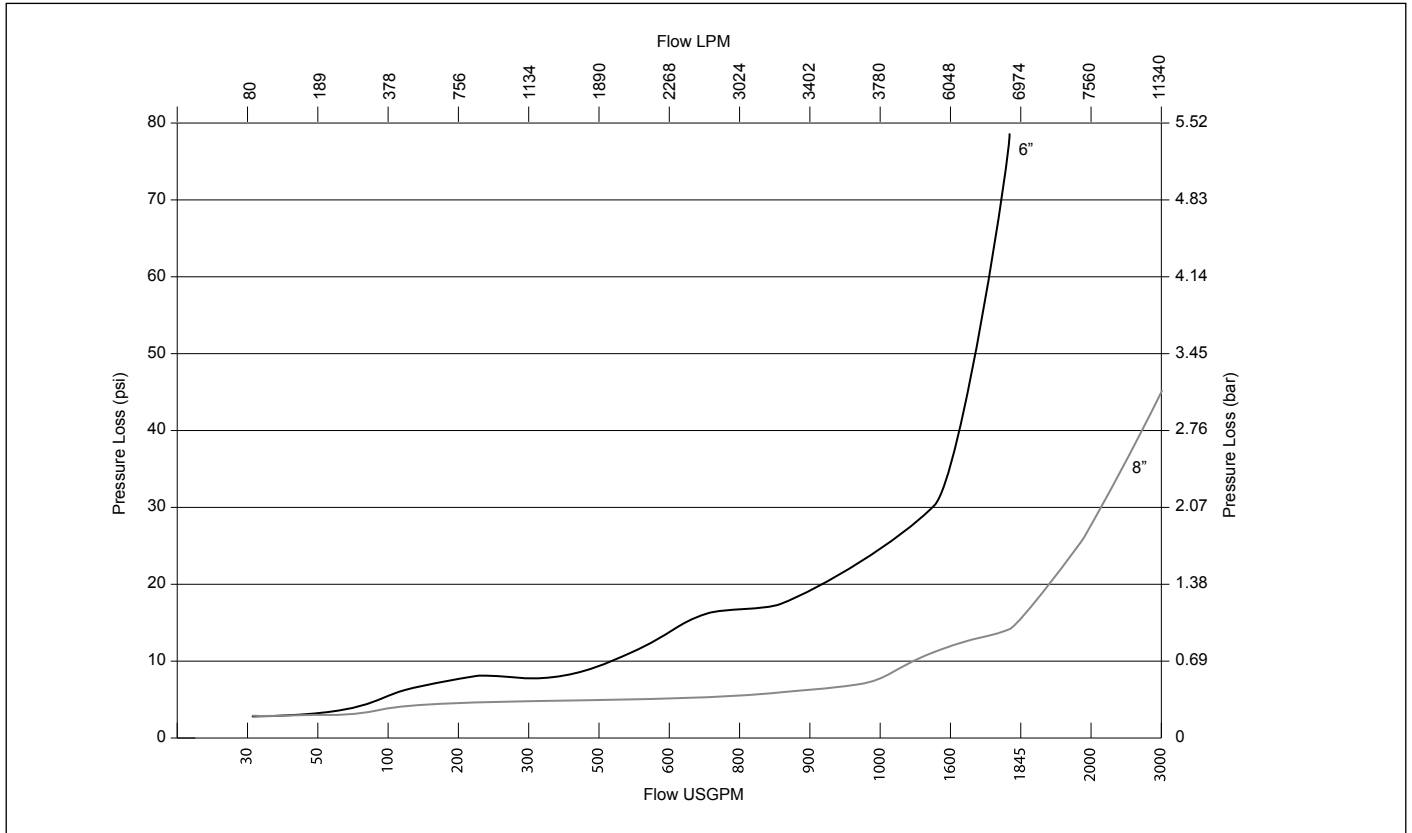
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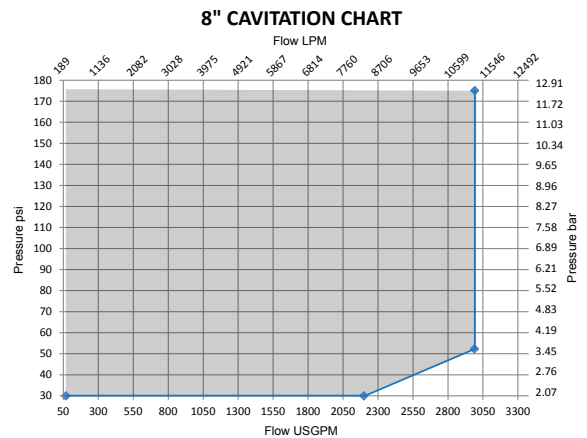
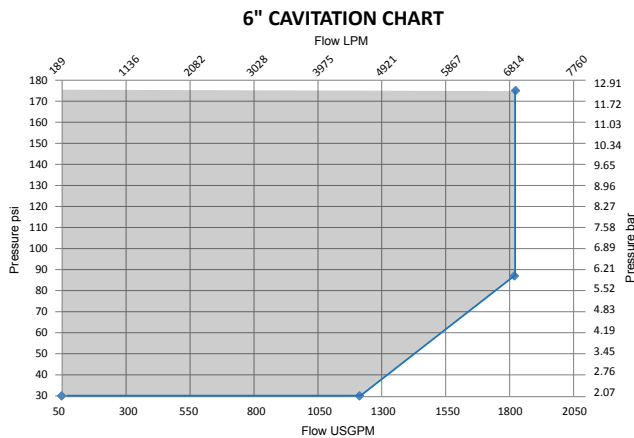
## 6. PERFORMANCE DATA

### 6.1 Friction loss vs foam solution flow



### 6.2 Inlet pressure vs foam solution flow

Wide range proportioner must be used within the shaded flow and pressure conditions.





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### 7. INSTALLATION

#### **⚠ WARNING**

**Adjustment of the equipment poses the risk of fatal consequences.**

**The wide range proportioner must not be adjusted. A security tag is placed on the plug (#8) to prevent unauthorized adjustment.**

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. In addition, the Authority Having Jurisdiction (AHJ) may have additional installation requirements that must be followed.

Do not alter the piping without consulting a system design representative.

Before installing a wide range proportioner, check the system design drawing to ensure the device location does not create excessive head pressure or frictional losses.

#### **⚠ WARNING**

**When used with preaction and deluge systems, the wide range proportioner shall be installed on the supply side piping network, upstream of the deluge valve.**

- a) Check that the tamper proof seal on bottom plug is not damaged or removed. In case of either scenario, report immediately to supplier.
- b) The wide range proportioner must be installed with the arrow pointing in the direction of the water flow.
- c) The wide range proportioner can be installed in the vertical or horizontal position.
- d) If installed in the system riser, consideration should be given to drainage as the clapper (7) acts as a partial check valve which will result in slow drainage. Use of or installation of a drain valve downstream of the wide range proportioner is advisable for faster drainage.
- e) Straight piping equal to a minimum of five (5) pipe diameters should be installed upstream and five (5) downstream of the wide range proportioner to help ensure proportioning accuracy.
- f) A check valve must be placed on the foam concentrate line and a concentrate control valve is highly recommended.
- g) A removable section of pipe should be installed between the check valve and wide range proportioner foam inlet to allow the flushing of foam concentrate after system activation.
- h) The ideal location for the wide range proportioner is level with or below the top tank discharge point and within 3 ft. (1m) of the tank.
- i) 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.
- j) The pressure drop within the piping to the bladder tank water or foam concentrate piping can be minimized by:
  1. Limiting the number of tees and elbows used
  2. Using full port valves
  3. Increasing the pipe diameter
- k) Care should be taken to ensure that the bladder tank and foam concentrate line are vented of trapped air to assist proportioning performance.



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### 8. OPERATION

The wide range proportioner is a modified venturi device for use in bladder tank balanced pressure type proportioning systems. As water flows through the device, it creates an area of lower pressure, referred to as the metering pressure drop. As the water flow increases through the venturi, the metering pressure drop increases, allowing more foam concentrate to enter through the sized foam orifice. The foam orifice size is specific to the foam concentrate used. A decrease in the water flow reduces the metering pressure drop, thereby reducing the foam concentrate flow.

Because the foam concentrate flow changes in direct proportion to the water flow, the wide range proportioner can accurately proportion foam concentrate over a wide range of system flow rates.

The flow rate at which the metering pressure drop is just high enough to overcome the pressure losses through the bladder tank and its piping, is called the low flow rating. The water flow rate through the wide range proportioner must be at or above its low flow rating in order to properly proportion foam concentrate.

The wide proportioner is designed to accurately proportion foam at low flow rates when a small number of sprinklers are operating.

The proportioning is accomplished by means of a variable geometry concept where the foam concentrate inlet size varies as a function of the sprinkler system's water flow rate. When water passes through the main waterway as described above, the hinged clapper (7) changes the geometry of the orifice restriction (2) thereby increasing the cross sectional area of the foam inlet. The clapper (7) and the orifice restriction (2) progressively open further as the system flow rate increases. At larger water flow rates, the water clapper (7) and the orifice restriction (2) are fully open. (Refer to **Table 3.3.1**).

### 9. GUARANTEE

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

### 10. 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.



#### 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.*

### 11. DISPOSAL

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

### 12. ACCESSORIES AND SPARE PARTS

This device is not field repairable and there are no spare parts.

### 13. DECLARATION OF CONFORMITY

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